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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Twenty-third Meeting
Montreal, 12-14 November 1997

PROJECT PROPOSALS: CHINA

This documents includes the comments and recommendations of the Fund Secretariat on the following project proposals:

Foam

- | | |
|---|------------|
| • Elimination of CFC-11 in the manufacture of rigid and spray polyurethane foams at Xinjiang Tianye Co. Ltd. | UNDP |
| • Elimination of the use of CFCs in the manufacture of sandwich polyurethane panels at Luoyang Refrigeration Machinery Factory | UNDP |
| • Elimination of the use of CFCs in the manufacture of sandwich polyurethane panels, pipes and spray foams at Baoding Oil Depot & Storage Engineering Company | UNDP |
| • Conversion of rigid and spray polyurethane foam manufacture from CFC-11 to HCFC-141b foam blowing agent at Yantai Moon Group Co. Ltd. | World Bank |
| • Conversion of rigid and spray polyurethane foam manufacture from CFC-11 to HCFC-141b foam blowing agent at Shanghai General Machinery Company (SGMC) | World Bank |
| • Conversion to CFC-free technology in the manufacture of flexible polyurethane foam (slabstock) at Dalian No. 1 | UNDP |

Refrigeration

• Revision of technical standards for non ODS products at Hefei General Machinery Research Institute (GMRI)	World Bank
• Licensing and Quality Control at Hefei General Machinery Research Institute	World Bank
• Conversion of test equipment at GMRI Hefei	World Bank
• Technology transfer and support to projects on phaseout of CFCs in Chinese industrial & commercial refrigeration industry at Hefei General Machinery Research Institute (HGMRI)	World Bank
• Elimination of CFCs 11 and 12 in the manufacture of domestic freezers at DeBao Refrigeration Equipment Co. Ltd.	UNDP
• Elimination of CFCs 11 and 12 in the manufacture of domestic freezers at Hongziang Group - Laizhou Freezer Plant	UNDP
• Elimination of CFCs 11 and 12 in the manufacture of domestic freezers at Jilin Jinuoer Electric Appliances Group Co.	UNDP
• Elimination of CFCs in the manufacture of domestic refrigerators at Wanbao Electrical Appliance Industries Co.	UNDP
• Phasing out ODS at the refrigerator plant of Bole Electric Appliances Group, China	UNIDO
• Phasing out ODS at the Changshu Refrigerating Equipment Works (Baixue), Changshu	UNIDO
• Phasing out ODS at the freezer plant of Xing Xing Electric Appliances Industrial Co., China	UNIDO
• Phasing out ODS at the refrigerator plant of Zhejiang Rongsheng Electric Co. Ltd., Xhejiang, Deqing County, China	UNIDO
• Conversion of refrigerator manufacture to HFC-134a refrigerant and cyclopentane foam blowing agent at Henan Xinfei Electric Co. Ltd.	World Bank
• Conversion of refrigerator manufacture to HFC-134a refrigerant and cyclopentane foam blowing agent at Shanghai Shangling Chang-An Refrigerator Co., Ltd (former Shanghai Yuandong Refrigerator Co. Ltd.)	World Bank
• Phasing out ODS at the Yuhuan Compressor Factory in Kanmen Town in Yuhuan County, South East China	UNIDO
• Conversion of CFC-12 compressor assembly line to HFC-134a Huada Zexel Automotive Air Conditioning Ltd.	World Bank
• Conversion of CFC-12 compressor assembly and machining line to HFC-134a at Mudanjiang Automotive Air Conditioning Factory (MDAFC)	World Bank
• Conversion of CFC-12 MACs condenser to HFC-134a at Hubei Jingsha Electric Group	World Bank

Solvent

• Elimination of ODS used in the production lines at Irico (Caihong) Colour Picture Tube Factory	UNDP
• Elimination of ODS (CFC-113) used in the production line at Fujian Putian Vikay Electronics Co. Ltd.	UNDP

PROJECT EVALUATION SHEET **CHINA**

SECTOR: FOAMS ODS use in sector (1991):

17,773 ODP tonnes

Sub-sector cost-effectiveness thresholds: Rigid
Flexible US \$6.23/kg

US \$7.83/kg

Project Titles:

- (a) Elimination of CFC-11 in the Manufacture of Rigid & Spray Polyurethane Foams at Xinjiang Tianye Co. Ltd.
- (b) LUOYANG REFRIGERATION MACHINERY FACTORY - Elimination of the use of CFC's in the manufacture of sandwich polyurethane panels
- (c) BAODING OIL DEPOT & STORAGE ENGINEERING COMPANY - Elimination of the use of CFC's in the manufacture of sandwich polyurethane panels, pipes and spray foams
- (d) Conversion of Rigid and Spray Polyurethane Foam Manufacture from CFC-11 to HCFC141b Foam Blowing Agent at Yantai Moon Group Co. Ltd.
- (e) Conversion of Rigid and Spray Polyurethane Foam Manufacture from CFC-11 to HCFC141b Foam Blowing Agent at Shanghai General Machinery Company (SGMC)

Project Data	Rigid					Flexible
	Xinjiang	Luoyang	Baoding	Yantai	SGMC	Dalian No. 1
ODS phase-out (ODP tonnes)	100	130	80	462.6	88.3	100
Proposed project duration (months)	18	24	24	24	24	12
Incremental capital cost (US \$)	187,000	302,500	242,000	330,000	231,000	632,500
- including contingency (%)	10	10	10	10	10	10
Incremental operational cost (US \$)	301,475	396,095	212,610	868,682	149,300	
Total project cost (US \$)	488,475	698,595	454,610	1,198,682	380,300	632,500
Local ownership (%)	100	100	100	100	100	100
Export component (%)						
Amount requested (US \$) {Original}	488,475	698,595	454,610	1,198,682	380,300	n/a*
{Revised}	300,620		400,960	1,132,682		
Cost effectiveness (US \$/kg)	4.89	5.37	5.68	2.59	4.31	4.90
National Coordinating Agency	National Environmental protection Agency					
Implementing Agency	UNDP		World Bank			UNDP
Technical review completed?						
Secretariat's Recommendations:						
Amount recommended (US \$)	300,620	698,595	400,960	1,132,682	380,300	
Project impact (ODP tonnes)	92.3	117.8	68	462.6	88.3	Not applicable
Cost effectiveness (US \$/kg)	3.26	5.93	5.90	2.45	4.31	
Implementing Agency support cost (US \$)	39,081	90,817	52,125	147,249	49,439	
Total cost to Multilateral Fund (US \$)	339,701	789,412	453,085	1,279,431	429,739	

* Request for change in technology.

PROJECT DESCRIPTION

Foam Sector Profile

Sector ODS consumption (1991) reported in country programme	17, 773 tonnes ODP
Most recent consumption data	Not available
ODS to be phased out in approved projects (as at July 1997)	6,760 tonnes ODP
ODS phased out (as at July 1997)	1,427 tonnes ODP
ODS to be phased out in current proposed projects	961 tonnes ODP
Latest (1995) CFC-11 consumption reported according to Art.7	30,436 tonnes ODP

Rigid Foam Projects

(a) Elimination of CFC-11 in the Manufacture of Rigid and Spray Polyurethane Foams at Xinjiang Tianye Co. Ltd.

1. Xinjiang Tianye Co. Ltd. will phaseout the use of CFC-11 in the manufacture of PVC resin and polyurethane pipes. The enterprise currently has three spray foam low pressure machines, one Glass-craft and two local units.
2. The manufacturing operations are to be converted to HCFC-141b as an interim step to a final full water-blown technology solution. The capital costs include one high pressure dispenser (US \$80,000), and one premix station. Trials, technology transfer and training amount to US \$25,000. Contingency costs of US \$17,000 are also included. Incremental operating costs of US \$301, 475 are expected based on the use of the following chemicals: 100,000 kg CFC-11; 70,000 kg HCFC-141b, 13,000 kg MDI.
3. Incremental operational cost of the project were calculated using the following prices: CFC-11: US \$1.30/kg; HCFC-141b: US \$3.00/kg; MDI: US \$2.54/kg.

(b) LUOYANG REFRIGERATION MACHINERY FACTORY - Elimination of the use of CFC's in the manufacture of sandwich polyurethane panels

1. The company Luoyang Refrigeration Machinery Factory will convert from the use of CFC-11 in the manufacture of polyurethane sandwich panels. Luoyang operates two low pressure dispensers, one Admiral V25-1H and one Wema V25-2H, with 60 kg/min and 2x60 kg/min capacities, respectively.
2. The production is to be converted to HCFC-141 as an interim step to a final solution. The capital cost of conversion involves the replacement of the two low pressure dispensers by two high pressure dispensers each of output 80 lit/min (US \$160,000), one premixing unit (US \$60,000), and a change on moulds for panels (US \$20,000). The capital cost associated with trials, technology transfer and training is US \$35,000, while the cost of contingency is US \$27,500. Incremental operating costs of US \$396,095 are expected

related to the use of HCFC-141b system which is today at a higher price level than the base CFC system.

(c) BAODING OIL DEPOT & STORAGE ENGINEERING COMPANY - Elimination of the use of CFC's in the manufacture of sandwich polyurethane panels, pipes and spray foams

1. Baoding Oil Depot & Storage Engineering Company will phaseout the use of CFC-11 in the manufacture of polyurethane sandwich panels, pipes and spray foams. The company currently has one high pressure Cannon H 200 with output 200 kg/min, and one spray machine TZC MG 703 with output 1.2 kg/min.
2. The manufacturing operations are to be converted to HCFC-141b as an interim solution. The capital costs of the equipment replacement and retrofit amounts to US \$185,000. Trials, technology transfer and training amount to US \$35,000. Capital costs also include contingency (US \$22,000). Incremental operating costs of US \$212,610 are expected related to the use of HCFC-141b system which is today at a higher price level than the base CFC system.

(d) Conversion of Rigid and Spray Polyurethane Foam Manufacture from CFC-11 to HCFC141b Foam Blowing Agent at Yantai Moon Group Co. Ltd.

1. Yantai Moon Group Co. Ltd. consists of four plants (workshops). The group will phase out the use of CFC-11 in the production of rigid, preformed pipe sections and spray polyurethane foam. The company has: three low pressure dispensers locally built (1985) and three high pressure Cannon dispensers, types: H200RF2, H100RF2 and H40, each purchased in 1985.
2. The chosen interim replacement is HCFC-141b, until full conversion to water blown or HFC-245fa systems. The capital costs include premix facilities (US \$180,000), and one mobile high pressure spray foam dispenser (US \$70,000). Trials, technology transfer and training amount to US \$50,000. Capital costs also include contingency (US \$30,000). Incremental operating costs of US \$868,681 are expected.

(e) Conversion of Rigid and Spray Polyurethane Foam Manufacture from CFC-11 to HCFC141b Foam Blowing Agent at Shanghai General Machinery Company (SGMC)

1. Shangai General Machinery Company will phaseout the use of CFC-11 in the production of sandwich panels, cold storage panels, freezers and refrigeration units. The company uses one low pressure foam dispenser locally made and two high pressure foam dispensers, Hennecke HK650 and HK2500, all purchased in 1987.

2. The chosen interim replacement is HCFC-141b, until full conversion to water blown and HFC-245fa systems. The capital costs include one premix facility (US \$60,000), one mobile high pressure spray foam dispenser (US \$25,000), and one stationary high pressure foam dispenser (US \$80,000). Trials, technology transfer and training amount to US \$45,000. Capital costs also include contingency (US \$21,000). Incremental operating costs of US \$149,300 are expected related to the added costs for individual key ingredients.

Justification for the Use of HCFCs

1. The above enterprises have chosen interim use of HCFC-141b as it can produce satisfactory foam at a reasonable cost and does not require significant new plant investment.

Equipment or Components to be Destroyed or Rendered Unusable

2. For all the above projects, the fate of the replaced equipment remains unknown.

Impact of Project on 1999 Freeze

3. In order to achieve the 1999 freeze at the average ODS consumption level of 1995 to 1997, China needs to phase out 8,000 ODP tonnes in 1997, 7,000 ODP tonnes in 1998, and 3,000 ODP tonnes in 1999. The projects will contribute towards that phaseout goal.

Flexible slabstock

(f) DALIAN No.1 Conversion to CFC-free Technology in the Manufacture of Flexible Polyurethane Foam (slabstock)

1. Dalian will phaseout the use of CFC-11 in the manufacture of flexible slabstock. The project was originally approved to use methylene chloride as the blowing agent at the 15th Meeting of the Executive Committee. It is being resubmitted for a change of technology to liquid carbon dioxide at no additional cost.
2. The purpose of this project is to phase out the CFC-11 usage through a combination of methylene chloride and liquid Carbon Dioxide (LCD) Technology. The capital costs include the LCD system with auxiliaries for the Maxfoam installation (US \$450,000). It is foreseen to use the Vertifoam installation for non ABA formulations only. A license fee of US \$70,000 is included, as well as an amount of US \$20,000 for local works for the LCD installation. Trials, technology transfer and training amount to US \$25,000. Contingency costs of US \$57,500 are also included. Incremental operating benefits of US \$89,400 represent the net present value of those costs over four years of operation, following the calculation method as proposed in a Fund-commissioned study that is currently under review.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Rigid Foam Projects

1. The projects were discussed between the Fund Secretariat and the respective implementing agencies and the costs agreed. For Xinjiang Tianye it was agreed to remove the 5% price increase of polyol amounting to US \$ 104,817 (2 years NPV) from the incremental operational cost calculation, while for Baoding it was agreed to provide retrofit cost of the premixer at US \$ 30,000 instead of a new premixer at US \$ 60,000. For Yantai Moon, two premixers at US \$ 120,000 instead of three at US \$ 180,000 were provided.

Flexible Slabstock

2. Dalian N.1 project was approved at the 15th meeting of the Executive Committee in November 1994 for use of methylene chloride with forced cooling system. The Implementing Agency reports that Dalian saw layout problems in the installation of the forced cooling system and requested in early 1996 that LCD system be considered for the conversion. It is also reported that the cost of the LCD system exceeds the approved grant, but Dalian will absorb any costs in excess of the approved grant.

RECOMMENDATION(S)

1. The Fund Secretariat recommends blanket approval of the rigid foam projects with the funding levels and associated support costs indicated in the table below:

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
(a) Elimination of CFC-11 in the Manufacture of Rigid and Spray Polyurethane Foams at Xinjiang Tianye Co. Ltd.	300,620	39,081	UNDP
(b) LUOYANG REFRIGERATION MACHINERY FACTORY - Elimination of the use of CFC's in the manufacture of sandwich polyurethane panels	698,695	90,817	UNDP
(c) BAODING OIL DEPOT & STORAGE ENGINEERING COMPANY - Elimination of the use of CFC's in the manufacture of sandwich polyurethane panels, pipes and spray foams	400,960	52,125	UNDP
(d) Conversion of Rigid and Spray Polyurethane Foam Manufacture from CFC-11 to HCFC141b Foam Blowing Agent at Yantai Moon Group Co. Ltd.	1,132,682	147,249	World Bank
(e) Conversion of Rigid and Spray Polyurethane Foam Manufacture from CFC-11 to HCFC141b Foam Blowing Agent at Sianghai General Machinery Company (SGMC)	380,300	49,439	World Bank
(f) DALIAN No.1 Conversion to CFC-free technology in the Manufacture of Flexible Polyurethane Foam (slabstock)	Not applicable	Not applicable	UNDP

2. It further recommends approval of the Dalian's request for change in technology from methylene chloride to LCD, noting that no change in the level of funding originally approved is requested.

PROJECT EVALUATION SHEET CHINA

SECTOR: REFRIGERATION ODS use in sector (1995): 12,200 ODP tonnes

Sub-sector cost-effectiveness thresholds: n/a

Project Titles:

- (a) Revision of technical standards for non-ODS products at Hefei General Machinery Research Institute (GMRI)
- (b) Hefei General Machinery Research Institute (GMRI) licensing and quality control
- (c) Conversion of test equipment at Hefei General Machinery Research Institute (GMRI)
- (d) Technology transfer and support to projects on phaseout of CFCs in Chinese Industrial & Commercial Refrigeration Industry

Project Data	Commercial Refrigeration			
	Technical Standards	Licensing & Quality Control	Test Equipment	Technology Transfer
ODS phase-out (ODP tonnes)	n/a	n/a	n/a	n/a
Proposed project duration (months)	48	48	48	36
Incremental capital cost (US \$)	219,000	555,400	165,460	280,800
- including contingency (%)	10	10	10	10
Incremental operational cost (US \$)		148,000		
Total project cost (US \$)	219,000	703,400	165,430	280,000
Local ownership (%)	100	100	100	100
Export component (%)	-	-	-	-
Amount requested (US \$) {Original}	130,000	555,400	129,460	90,000
{Revised}				
Cost effectiveness (US \$/kg)	n/a	n/a	n/a	n/a
National Coordinating Agency	National Environment Protection Agency (NEPA)			
Implementing Agency	World Bank			
Technical review completed?	Yes			

Secretariat's Recommendations:				
Amount recommended (US \$)		422,400		
Project impact (ODP tonnes)		-		
Cost effectiveness (US \$/kg)		-		
Implementing Agency support cost (US \$)		54,912		
Total cost to Multilateral Fund (US \$)		477,312		

PROJECT DESCRIPTION

- (a) Revision of technical standards for non-ODS products at Hefei General Machinery Research Institute (GMRI)**
- (b) Hefei General Machinery Research Institute (GMRI) licensing and quality control**
- (c) Conversion of test equipment at Hefei General Machinery Research Institute (GMRI)**
- (d) Technology transfer and support to projects on phaseout of CFCs in Chinese Industrial & Commercial Refrigeration Industry**

Background for all projects.

1. The Hefei General Machinery Research Institute (GMRI) is a state research institute. It specializes in research, testing and metrology in the general petrochemical and refrigeration fields.
2. The projects are to support Hefei GMRI in the development of standards, testing regimes, and licensing systems which the government of China wishes to implement, and to provide additional national technical support, for conversion of the manufacture of CFC-12 compressors to use HCFC-22 and ammonia in the commercial refrigeration sub-sector in China. Conversion of the sub-sector is being separately funded by the Multilateral Fund through a planned total of 24 industrial conversion projects, 16 of which have now been approved at a total cost of some US \$40 million.
3. It is advised in the project document that ODS consumption in the commercial refrigeration sub-sector is estimated at 12,200 MT (1995) with growth of 10% per year.
4. The project document states that commencement of effective phaseout measures in this sector will influence China's ability to meet the 1999 consumption freeze.

(a) Revision of Technical Standards for non ODS Products

1. The current licensing system for CFC-12 compressors will be changed to implement standards to guarantee the performance of the new replacement HCFC-22 compressors. The project is for development of performance and test standards for HCFC-22 compressor standards to be used in the new licensing system
2. The project costs of US \$130,000 are associated with manpower and travel, including (unspecified) international travel. There are no equipment costs and no incremental operating costs. The enterprise proposed to contribute an additional US \$89,000. The basis of the division of funding is not specified.

(b) Support Implementation of Licensing and Quality Control

1. The objective of this project is to set up a licensing and quality control system for HCFC-22 based commercial compressor production to replace the current licensing system for CFC-12. Under Chinese regulations, regular product testing is required to retain possession of a production license. This activity is currently carried out for CFC-12 compressors, and the Government of China wishes to continue the process for HCFC-22 compressors. The production licensing system will be the principle method of ensuring the control and elimination of CFC-12 compressor production from 2000 to 2002.
2. The project also requests the provision of centralized high precision calibration facilities to calibrate the gauges to be used by individual enterprises to calibrate their own production equipment. These facilities were deleted from individual compressor conversion projects on the basis that it was more cost effective to install them once only in a central facility.
3. The incremental capital cost of US \$555,400 consists of US \$384,000 for the optical calibration equipment, US \$133,000 for manpower and US \$38,400 for contingency costs (10%).
4. Incremental operating costs of US \$148,000 are included in the project document on the basis of four years of manpower costs for verification of compliance. These costs are not being sought from the Multilateral Fund.

(c) Conversion of Test Equipment at GMRI Hefei

1. The objective of this project is to modify the existing CFC-12 compressor test equipment for HCFC-22 compressors to support the standards and licensing projects described above. The project covers the replacement of pressure vessels with vessels designed to withstand the higher pressures of HCFC-22 compared to CFC-12. Project costs also cover manpower for modification of the software used to monitor and collect data from the test equipment.
2. It is stated that the replaced equipment will be sold or scrapped. A scrap value has been reported and subtracted from project costs.
3. Capital costs of US \$165,430 are comprised of equipment costs of US \$129,430 and manpower costs of US \$ 36,000. The enterprise proposes to meet the manpower costs. There are no incremental operating costs or savings.

(d) Technology transfer and support to projects on phaseout of CFCs

1. This project requests expenses for manpower and business travel in order to offer technical support to individual enterprises during design, technology selection and implementation of conversion projects for commercial refrigeration compressor manufacture. Support will be given to 24 projects that convert CFC-12 to HCFC-22 (21 projects), to ammonia-based equipment (2 projects), and HFC-134a based equipment (1 project).
2. Total project costs of US \$280,000 are comprised entirely of manpower and travel. The project proposal seeks funding from the Multilateral Fund of US \$90,000 on the basis of US \$5,000 to support each of 18 of the 24 conversion projects proposed for funding. The first six projects, now under implementation, will be supported by the Government of China.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The four projects constitute a US \$1.02 million request for additional technical assistance (including support costs) for conversion of the manufacture of commercial refrigeration compressors in China. 16 individual conversion projects for commercial refrigeration compressors have now been approved by the Executive Committee at a cost of some US \$40 million and a further eight are proposed.
2. The projects were foreshadowed in the strategy proposed by China for conversion of the manufacture of commercial refrigeration compressors. However in that document, five projects were foreshadowed at a total cost of US \$270,000
3. Project (b) has a component with a cost of US \$384,000 to which could be added a 10 percent contingency cost, for supply of two sets of optical measuring equipment. This component of the project is eligible and is supported by the Fund Secretariat as it was deleted from individual conversion projects in the review process, in favour of a centralized facility.
4. The Secretariat advised the World Bank that the eligibility of the remainder of the projects is questionable. This is because while the availability of national standards, testing facilities and licensing systems specifically for HCFC-22 compressors may be considered highly desirable by the Government of China, it may not be essential to the conversion process. The essential requirement is to convert the manufacturers, an activity which is now being funded by the Multilateral Fund.
5. The projects so far approved have included technology transfer fees to enable the enterprises to produce the new designs to the required standards. Considerable discussion took place concerning the need to provide funding for equipment that could meet the standards required in the new compressors designs by the suppliers of the technology, on the technology transfer fees themselves and on the contribution for technological upgrade involved. In this regard, the current proposals may not be fully consistent with the position that the funding of the 24 conversion projects is intended to represent the total costs to be sought for conversion of the refrigeration part of the commercial refrigeration sub-sector in China.
6. The World Bank advised that the licensing system will be a key factor in ensuring the CFC phaseout at enterprise level and to ensure that production of CFC-compressors are terminated in accordance with the sector strategy. The World Bank considers that both capital costs and manpower are eligible as incremental costs.

7. Additionally, revision of national standards and codes are essential for the conversion. Even if the technology transfer agreements provide each of the enterprises with necessary production drawings and specifications for production purposes, existing standards and codes have to be adjusted. The World Bank also advised that due to the change of refrigerant, the testing centre has to be modified so it can handle HCFC-22 also.

9. Finally, the World Bank advised that although each of the compressor conversion projects include financial support for foreign assistance and licensing agreements, it is important to ensure ongoing support from HEFEI to the enterprises during the implementation of the projects. The World Bank said it had been considered if such a support could be covered directly by the enterprises receiving financial support from the Multilateral Fund, but as all of the enterprises are financing part of the conversion (20% to 30%), they are not willing to pay the costs, despite the obvious need.

RECOMMENDATION

1. The Fund Secretariat recommends that the Executive Committee consider whether the project proposals are eligible for funding, with the exception of funding of the optical measuring equipment at a cost of US \$ 422,400 plus eligible support costs, which is recommended.

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
Hefei General Machinery Research Institute (GMRI) licensing and quality control	422,400	54,912	World Bank

PROJECT EVALUATION SHEET

CHINA

SECTOR: REFRIGERATION ODS use in sector (1993): 8,490 ODP tonnes

Sub-sector cost-effectiveness thresholds: Domestic 13.76 US \$/kg

- (a) Elimination of CFCs-11 and 12 in the manufacture of domestic freezers at DeBao Refrigeration Equipment Co. Ltd.
 (b) Elimination of CFCs-11 and 12 in the manufacture of domestic freezers at Honxiang Group - Laizhou Freezer Plant
 (c) Elimination of CFCs-11 and 12 in the manufacture of domestic freezers at Jilin Jinouer Electric Appliances Group Co.
 (d) Elimination of CFCs in the manufacture of domestic refrigerators at Wanbao Electric Appliance Industries Co.
 (e) Phasing out ODS at the refrigerator plant of Bole Electric Appliances Group
 (f) Phasing out ODS at the Changshu Refrigerating Equipment Works (BAIXUE)
 (g) Phasing out ODS at the freezer plant of Xing Xing Electric Appliances Industrial Co
 (h) Phasing out ODS at the refrigerator plant of Zhejiang Rongsheng Electric Co. Ltd.
 (i) Conversion of refrigerator manufacture to HFC-134a refrigerant and cyclopentane foam blowing agent at Henan Xinfei Electric Co. Ltd.
 (j) Conversion of refrigerator manufacture to HFC-134a refrigerant and cyclopentane foam blowing agent at Shanghai Shangling Chang -An Co. Ltd.
 (k) Phasing out ODS at the Yuhuan Compressor Factory in Kanmen

Project Data	Domestic										Compres.
	DeBao	Honxiang/ Laizhou	Jilin Jinouer	Wanbao	Bole	Baixue	Xing Xing	Zhejiang Rongsheng	Henan Xinfei	Shanghai Shangling	Yuhuan
ODS (CFC-11) phase out (ODP tonnes)	314.7	301.53	223.94	574.2	132	425.7	348	177.8	375	50	145.3
Proposed project duration (months)	24	24	24	24	24	24	24	24	24	30	24
Incremental capital cost (US\$)	785,030	1,083,335	2,314,400	4,688,530	1,395,735	3,099,108	3,348,070	841,940	2,429,600	1,434,900	2,026,945
- including contingency (%)					10	10	10	10	10	10	10
Incremental operational cost (US\$)	478,817	1,034,524	921,060	1,453,000	361,268	1,104,012	1,087,068	432,700	694,303	287,350	none
Total project cost (US\$)	1,263,847	2,117,859	2,235,460	6,141,530	1,757,003	4,203,120	4,435,138	1,643,887	3,315,543	1,720,000	
Local ownership (%)	100	100	100	100	100	100	100	100		100	
Export component (%)											
Amount requested (US\$) {Original}	1,656,576	2,117,859	3,235,460	6,141,530	2,149,909	4,952,007	5,138,380	1,643,887	3,315,543	1,720,000	2,026,945
Amount requested (US\$) {Revised}	1,263,847				1,757,003	4,203,120	4,435,138	1,274,640			1,465,155
Cost effectiveness (US\$/kg.)	3.49	4.76	9.39	6.96	13.31	9.87	12.74	7.17	8.91	13.76	n/a
National Coordinating Agency	National Environmental Protection Agency (NEPA)										
Implementing Agency	UNDP				UNIDO				World Bank		UNIDO
Technical review completed?	Yes										
Secretariat's Recommendations											
Amount recommended (US \$)	Pending	Pending	Pending	Pending	1,469,029	3,548,775	3,346,941	1,274,640	Pending	Pending	1,465,155
Project Impact (ODP tonnes)					132	425.7	348	177.8			145.3
Cost effectiveness (US \$/kg)					12.57	9.42	10.87	7.17			n/a
Implementing Agency support cost (US\$)					190,974	461,340	435,102	165,703			190,470
Total cost to Multilateral Fund					1,660,003	4,010,115	3,782,043	1,440,343			1,655,625

PROJECT DESCRIPTION

- (a) Elimination of CFCs-11 and 12 in the manufacture of domestic freezers at DeBao Refrigeration Equipment Co. Ltd.
- (b) Elimination of CFCs-11 and 12 in the manufacture of domestic freezers at Honxiang Group - Laizhou Freezer Plant
- (c) Elimination of CFCs-11 and 12 in the manufacture of domestic freezers at Jilin Jinouer Electric Appliances Group Co.
- (d) Elimination of CFCs in the manufacture of domestic refrigerators at Wanbao Electric Appliance Industries Co.
- (e) Phasing out ODS at the refrigerator plant of Bole Electric Appliances Group
- (f) Phasing out ODS at the Changshu Refrigerating Equipment Works (BAIXUE)
- (g) Phasing out ODS at the freezer plant of Xing Xing Electric Appliances Industrial Co
- (h) Phasing out ODS at the refrigerator plant of Zhejiang Rongsheng Electric Co. Ltd.
- (i) Conversion of refrigerator manufacture to HFC-134a refrigerant and cyclopentane foam blowing agent at Henan Xinfei Electric Co. Ltd.
- (j) Conversion of refrigerator manufacture to HFC-134a refrigerant and cyclopentane foam blowing agent at Shanghai Shangling Chang-An Co. Ltd.
- (k) Phasing out ODS at the Yuhuan Compressor Factory in Kanmen

Background for all projects.

1. ODS consumption in the affected sector is estimated at 8490 tons (1993) and was quoted to grow 16%. Annual production of domestic refrigerators reached 8.1 million units in 1993. The Executive Committee approved sixteen domestic refrigeration projects, phasing out 3956.1 ODP tonnes
2. In order to achieve the 1999 freeze at the average ODS consumption level of the three years 1995, 1996, 1997, China needs to phase out 8,000 ODP tons in 1997, 7,000 tons in 1998, and 3,000 tons in 1999.
3. 2,923 ODP tons will be phased as a result of implementation of the above mentioned ten domestic refrigeration projects. Approval of these projects by the MLF in 1997 should make a significant contribution to China's ODS elimination programme.
4. Incremental operation costs are calculated for the chemical and component costs for six months duration including incremental operating costs (ranging from US \$3-US \$5 per unit) for compressors.

(a) Elimination of CFC-11 and CFC-12 in the manufacture of domestic freezers at DeBao Refrigeration Equipment Co. Ltd.

1. DeBao Refrigeration Co. manufactures domestic freezers and refrigerators, with a production capacity of more than 300,000 units/year. 1996 production volume was 200,150 units. The implementation of this project will result in the phase-out of 314.7 ODP tonnes.
2. The foam production consist of three lines. The three lines are served from the same high pressure machine. DeBao will convert from CFC-11 to cyclopentane for its foaming system. This technology requires new/modified equipment and the installation of safety measures, gas detection and exhaust systems, underground storage tank, premixing stations and other modifications.
3. The refrigeration equipment consists of three charging units, 34 Chinese made vacuum pumps, and five leak detectors. This project selected HFC 134a to replace CFC-12 use. New refrigerator system designs, system evacuation, charging, and leak detection equipment are required.
4. No statement is made about the destruction of replaced equipment.

(b) Elimination of CFCs-11 and 12 in the manufacture of domestic freezers at Honxiang Group - Laizhou Freezer Plant

1. Laizhou Freezer Plant operates one single line for the production of six models of domestic freezers. Its current CFCs consumption is reported at 301.5 ODP tonnes for the production of 226,284 units in 1996.
2. The existing CFC technology originates from Zanussi, Italy, although it was acquired "second-hand" from a Chinese partner. The replacement refrigeration technology will be obtained from Tsinghua University Refrigeration Research Standards Department and from the Beijing Household Electrical Appliances Research Institute.
3. Laizhou plans to convert the refrigerant system from CFC-12 to HFC-134a and the foaming system from CFC-11 to cyclopentane.
4. The conversion requires installation of polyol/pentane premixing stations, pentane storage systems, modification of foaming lines, replacement of the refrigerant charging boards and leak detection systems; retrofit of the evacuation system, and vacuum pumps; provision of equipment and training needed for the safe handling and operation of the hydrocarbon based systems.
5. The proposal requests also the replacement of one Cannon high pressure machines of low capacity with a new high pressure machine of higher capacity and retrofitting of one locally made foaming machine.

6. The company will scrap or dismantle all ODS-based equipment.

(c) Elimination of CFCs-11 and 12 in the manufacture of domestic freezers at Jilin Jinouer Electric Appliances Group Co.

1. Jilin operates three separate and independent lines for the production of nine models of chest freezers and refrigerators. Its current CFCs consumption is reported at 223.9 ODP tonnes for the production of 221,988 units in 1996.
2. The existing CFC technology was obtained from Fujitsu General Co. of Japan which included refrigerator design and the supply of equipment. The company does not have marketing or product licensing agreements with Fujitsu..
3. The baseline equipment for refrigeration and foam parts consists of locally made and imported equipment.
4. Jilin plans to convert the refrigerant system from CFC-12 to HFC-134a. With assistance from Matsushita and Zanussi, the enterprise has already built and tested prototypes using HCF-134a refrigerant. The conversion requires replacement of all charging boards with automatic equipment suitable for HFC-134a refrigerant. Existing leak detectors will be replaced with new equipment. Vacuum pumps will be retrofitted to be compatible with the new refrigerant.
5. The foam system will be converted from CFC-11 to cyclopentane. Replacement of low pressure foaming machines with new high pressure equipment and retrofitting of high pressure machines are requested in the project proposal.
6. The conversion requires also installation of new cyclopentane storage facilities, new pre-mixing stations, modification of foaming lines, installation of safety equipment, technical assistance and training.

(d) Elimination of CFCs in the manufacture of domestic refrigerators at Wanbao Electric Appliance Industries Co.

1. Wanbao manufactures domestic refrigerators and freezers, with an average production capacity of more than 560,000 units/year. The average annual production for the three last years is 561,666. The production is divided into 4 production facilities, called factories. The foam production is being performed on 11 foaming lines. The implementation of this project will result in the phasing out of 574.2 ODP tonnes.
2. The company will convert from CFC-11 to cyclopentane for its foaming system. The existing foaming equipment will need to be replaced or retrofitted, the necessary safety measures installed including an underground storage tank, and other modifications.

3. This enterprise selected HFC-134a to replace CFC-12 use. Re-design and testing of the refrigerator systems, and changes to manufacturing procedures are required. New system evacuation, refrigerant charging, vacuum pumps, retrofitting of vacuum pumps, and leak detection equipment are required. The refrigeration line in factory # 1 has been converted to HFC-152a under a project approved for the World Bank.

(e) Phasing out ODS at the refrigerator plant of Bole Electric Appliances Group

1. UNIDO reported that Bole consumed in 1996 a total of 132 ODP tonnes (17.1 tonnes CFC-12 and 114.9 tonnes CFC-11) in the production of 145,061 refrigerators by the following two lines:
 - (a) Line 1 Factory 1: established in 1986 with CFC technology from Merloni, Italy with an annual capacity of 100,000 units per 8 hr shift.
 - (b) Line 2 Factory 2: established in 1994 with similar CFC technology to that of Line 1, however, some of the basic equipment is of local manufacture. The annual one shift capacity is 50,000 units.
2. In December 1996, Bole established a new non-CFC plant with modern imported technology, consisting of two lines with installed annual production capacity of 250,000 units. This plant is not included in the proposal.
3. Bole will convert the refrigeration system to isobutane and the foaming system to cyclopentane. The conversion will require procurement and/or modification of new machinery and equipment, redesign, prototyping and testing of refrigerators and freezers, and the provision of safety measures.
4. Bole is proposing to combine the operation of lines 1 and 2 in an expanded line 1 which will operate in two shifts to maintain the current CFC-based production, and is requesting the cost of this change.
5. The project includes a request for 6 months of incremental costs associated with chemicals, compressors and components.
6. UNIDO has stated that two 1986 foam machines, two premixers (one of 1994 vintage), two CFC-12 charging boards and 4 leak detectors will be dismantled and destroyed.
7. UNIDO stated: "The project will be finalised by end 1999 and thus, will contribute to the freeze target of the country by phasing out 132148 ODP tonnes in line with NEPA's ODS phase out programme".

(f) Phasing out ODS at the Changshu Refrigerating Equipment Works (BAIXUE)

1. BAIXUE produces compressors, freezers, refrigerators and security doors. 4 plants have an installed capacity of 500,000 refrigerators/freezer, 50,000 safety doors, and 600,000 compressors annually. Total ODP phase-out for this project is 425.7 tonnes (362.2 mt CFC 11 and 63.5 mt CFC 12).
2. BAIXUE will convert to isobutane as a refrigerant, and cyclopentane as a blowing agent for the polyurethane insulation foam for all of the lines in the four plants.
3. The production lines use vacuum pumps, CFC charging boards, and leak detectors. The foaming lines use foaming machines (high pressure dispenser, mixing heads and stations, carousel)
4. Conversion to isobutane as a refrigerant requires replacement of charging boards and leak detectors, new welding technology, redesign of the refrigeration system, and associated safety measures for the safe handling of hydrocarbons.
5. Conversion to cyclopentane requires retrofitting existing foam machines, redesign of, and new components for the polyol system, new mixing stations, gas detectors, fire protection systems, safety exhaust systems, other changes to reduce the risk of explosion, and training.
6. The Enterprise commits itself to destroy all equipment replaced by the Fund.
7. UNIDO stated: "The project will be finalized before the end of 1999 and thus will contribute to the freeze target of the country by phasing out 425.7 ODP tonnes in line with NEPA's ODS phase out programme".

(g) Phasing out ODS at the freezer plant of Xing Xing Electric Appliances Industrial Co

1. Xing Xing has two plants that produce domestic refrigerators, freezers and freezer components. The 1996 production was about 460,000 freezers. Total ODP phase-out for this project is 348 mt (288.7 mt CFC-11 and 59.4 mt CFC-12).
2. Xing Xing will convert to isobutane as a refrigerant, and cyclopentane as a blowing agent for the polyurethane insulation foam.
3. The South and North Factories both have three high pressure, single-headed foaming machines, purchased and manufactured in 1993/4.
4. Conversion to isobutane as a refrigerant requires replacement of existing charging boards and leak detectors, new welding technology, redesign of the cooling system, other technical requirements, and the associated safety measures.

5. Conversion to cyclopentane for foam blowing requires retrofitting of existing foam machines, redesign of and new components for the polyol system, new mixing stations, gas detectors, fire protection systems, safety exhaust systems, and other changes are required to reduce the risk of explosion, including training.
6. The equipment to be dismantled and destroyed include 2 locally made polyol mixers (1993 and 1994 vintage), 7 pieces of locally made CFC-12 charging boards (1987 and 1994 vintage), 1 Italian charging board, 4 pieces of CFC-12 leak detectors.
7. UNIDO stated: "The project will be finalised by end 1999 and thus, will contribute to the freeze target of the country by phasing out 348 ODP tonnes in line with NEPA's ODS phase out programme".

(h) Phasing out ODS at the refrigerator plant of Zhejiang Rongsheng Electric Co. Ltd.

1. Zhejiang Rongsheng started production of domestic refrigerators and freezers in 1994 from two production lines. The 1996 production was about 146,180 freezers. Total ODP phase-out for this project is 177.8 tonnes.
2. The technologies and some of the equipment are of Chinese origin. Zhejiang will convert to HFC-134a as a refrigerant, and cyclopentane as a blowing agent for the polyurethane insulation foam.
3. Production line is based on carousel conveyors and equipped with one high pressure, single-headed foaming machine, purchased and manufactured in 1993, and one low pressure foaming machine manufactured in 1989.
4. Conversion to HFC-134a as a refrigerant requires replacement of existing charging boards and leak detectors, retrofitting of vacuum pumps and redesign of the cooling system.
5. Conversion to cyclopentane for foam blowing requires retrofitting of one existing foaming machine and the replacement of another, redesign of, and new components, for the polyol system, a new mixing station, gas detectors, fire protection systems, safety exhaust systems, modification of carousel conveyors, and other changes are required to reduce the risk of explosion, including training.
6. No statement is made about the destruction of replaced equipment.
7. UNIDO stated: "The project will be finalised by end 1999 and thus, will contribute to the freeze target of the country by phasing out 177.8 ODP tonnes in line with NEPA's ODS phase out programme".

(i) Conversion of refrigerator manufacture to HFC-134a refrigerant and cyclopentane foam blowing agent at Henan Xinfei Electric Co. Ltd.

1. A project, submitted by the World Bank, was approved by the Executive Committee at its 10th Meeting (June 1993) for this enterprise to phase out of 50% of its CFC-11 consumption.
2. The approved project provided the following information on the status of the enterprise at the time of preparation of the approved project:
 - (i) 230,000 units were produced in 1992 and were expected to increase to 400,000 units in 1993
 - (ii) The project will complete implementation in 4 years and will phase out 103 mt of its CFC-11 consumption in the first year after conversion
 - (iii) US \$877,530 in incremental operating costs was approved for 4 years, to begin from 1994 to 1997 based on progressive increase in the number of units produced with reduced CFC-11 from 150,000 units in 1994 to 400,000 units in 1997.
 - (iv) The incremental capital cost was approved in the amount of US \$164,000.
3. The project being submitted by the enterprise at this meeting provides the following information:
 - (a) The 3 production lines proposed for conversion were established in 1985, 1989 and 1995, with a production capacity of 800,000 units.
 - (b) The CFC-11 consumption by the three lines was reduced by 50% as a result of the project approved in 1993 by the Executive Committee (this indicates that the third line which was established in 1995, after the project had been approved in 1993 was also converted to 50% reduced CFC-11)
 - (c) A new workshop with two lines was established in 1996 with a total capacity of 1.2 million units per year. Although the workshop employs state-of-the-art non-ODS technology, it produced 470,000 CFC refrigerators in 1996.
 - (d) The enterprise has 45% Singapore ownership.
4. The project proposal seeks to convert the three lines which were established in 1985, 1989 and 1995, and were partially converted to a 50% reduced CFC with Fund's assistance to non-ODS technology. The current CFCs consumption by the three lines is 375 tonnes.
5. Two of three lines will convert from 50% reduced CFC-11 foam formulation to cyclopentane, and from CFC-12 to the refrigerant HFC-134a. The third line has already

been converted to these technologies, and the cost of this conversion is being requested retroactively.

6. Xinfei presently has 8 high pressure foaming machines together with 19 cabinet jigs and 35 door jigs electrically heated. Conversion to cyclopentane involves provision of new pre-mixing facilities, retrofitting of high pressure machines, modifications of jigs and foaming lines, provision of a new cyclopentane storage, and gas detection systems, fire protection, safety exhaust systems. Other changes are also required to reduce the risk of explosion, including training and technology transfer.
 7. New/modified vacuum pumps, retrofitting of refrigerant charging machines, new HFC-134a leak detection equipment are required for conversion to HFC-134a technology.
 8. Incremental operation costs are calculated for the higher chemical costs for six months duration. IOC for compressors are not requested pending a review of compressor and end user production in 1995 in China in accordance with decision 22/26. Upon completion of this study, reimbursement in the form of additional grant will be requested.
 9. The enterprise states that equipment will be removed and demolished. The Environment Protection Bureau of Xinxiang city will monitor and verify the process. Photos will also be used for verification.
- (j) Conversion of refrigerator manufacture to HFC-134a refrigerant and cyclopentane foam blowing agent at Shanghai Shangling Chang-An Refrigerator Co., Ltd.**
1. The first production line for household refrigerators at Chang-An with an annual capacity of 100,000 units, was put into operation in January 1985. In 1986, an additional line, with a capacity of 200,000 units/year was added. The two lines will be replaced with one line in the course of conversion to non-ODP technology. The average production over the last three years was 80,466 units/year. The proposal states that annual ODS consumption was 92.6 ODP tonnes.
 2. The enterprise will convert from CFC-11 to cyclopentane for its foaming operations. This technology requires retrofitting of existing foam machines, modification of heating systems for foaming jigs, new mixing stations, gas detectors, fire protection systems, safety exhaust systems. Other changes are required to reduce the risk of explosion, including training.
 3. The enterprise selected HFC-134a to replace CFC-12 use. Re-design and testing of the refrigerator systems, and changes to manufacturing procedures are required. New system evacuation, refrigerant charging, vacuum pumps, retrofitting of vacuum pumps, and leak detection equipment are required.

4. No statement is made about the destruction of replaced equipment.

(k) Phasing out ODS at the Yuhuan Compressor Factory in Kanmen

1. Yuhuan produces domestic refrigeration compressors using 145.31 mt of CFC-113 for cleaning operations. Two sites each have a compressor production line. The proposal covers conversion of the second plant which was established in 1993; the first will be converted at the cost of the enterprise. The total production rate is just over 1 million units/year (1995).
2. Conversion to HFC-134a from CFC-12 technology and changing the cleaning agent in the second compressor plant will contribute to the direct elimination of 116 ODP tonnes of CFC-113.
3. Modifications that must be made to the compressors include: improvement of the valve construction to reduce losses, optimization of the suction system to increase flow, strengthening of motor parts to handle increased discharge pressure, and increased shell thickness to compensate for higher noise.
4. The technological and quality control processes must be modified because of the different chemical properties of HFC-134a. The conversion requires procurement of new machinery and equipment, modification of existing equipment, redesign, and testing of new compressors, training and servicing.
5. No incremental operating costs are claimed.
6. All replaced equipment will be sold for non-ozone depleting technologies, or dismantled and scrapped. Revenues from sales will be refunded by the Counterpart to the Fund. Written evidence of these actions should be provided to UNIDO to its satisfaction.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

(a) Elimination of CFCs-11 and 12 in the manufacture of domestic freezers at DeBao Refrigeration Equipment Co. Ltd.

1. Destination of part of DeBao production is not specified. Information on export of DeBao product was not included in the project document and will be submitted by UNDP. Costs of retrofitting the jigs installed in foaming lines are higher than costs included in projects approved in the past. The number of charging units and their costs is questionable. Incremental operating cost associated with compressors is requested. The Secretariat informed UNDP that this cost cannot be considered in the absence of the information required in Decision 22/26. The Secretariat and UNDP are still discussing the level of eligible incremental costs. The Sub-Committee on Project Review will be informed accordingly.

(b) Elimination of CFCs-11 and 12 in the manufacture of domestic freezers at Honxiang Group - Laizhou Freezer Plant

(c) Elimination of CFCs-11 and 12 in the manufacture of domestic freezers at Jilin Jinouer Electric Appliances Group Co.

1. The projects for Laizhou and Jilin were first submitted for consideration of the 22nd Meeting. The two projects were reviewed by the Secretariat. Most of the project components and their incremental costs were agreed between the Secretariat and UNDP. Several issues, however, were identified regarding replacement costs at international prices for baseline equipment of Chinese origin (foaming machines). The Sub-Committee on Project Review recommended that the two projects should not be approved for funding in view of number of issues still outstanding, and should be resubmitted at the later date once those issues had been resolved.

2. The Fund Secretariat had agreed with UNDP on the costs of the so-called "dry-part" conversion, and the principal issue remaining was to agree on the basis for calculating the incremental costs for the foam dispensing system.

3. The Fund Secretariat expected that discussion would continue on the basis of the projects submitted to the 22nd Meeting. This was not the case. UNDP submitted revised projects for consideration at the 23rd Meeting.

4. The revised projects accepted the position taken by the Secretariat in regard to calculation of incremental costs for foam machines, based on retrofits. However, other elements of the projects were extensively changed, in particular, removing certain rationalization of production facilities initially proposed. The rationalizations produced significant cost savings, which are no longer evident.

5. Therefore, the capital cost of conversion of foaming lines (less the incremental costs of foaming machines) has increased from US \$ 560,000 to US \$ 807,000 in Laizhou and from US \$ 958,400 to US \$ 1,277,160 in Jilin respectively. According to UNDP, the projects had to be reformulated with a different technical concept since both Laizhou and Jilin enterprises did not accept the rationalization proposal, even though the rationalization was included in the proposals submitted to the 22nd Meeting.

6. The rationalization took the form of replacement by one machine of adequate capacity with two booms and one premixer serving two foaming lines at Laizhou. Such an approach is more cost-effective solution and technically feasible to implement when two foaming lines are not too far apart. This approach was applied in several projects approved by the Executive Committee. In the information provided by UNDP for the projects as submitted to the 23rd Meeting, the two foaming lines are said to be 100 metres apart, therefore two foaming machines should be replaced and two new pre-mixers added. There is a significant inconsistency in the presentation of the information on the baseline of the enterprise, between the 22nd Meeting and 23rd Meeting submissions, in particular in regard to the distance between the foaming lines.

7. Two initial versions of projects for Laizhou and Jilin provided detailed breakdown of incremental cost items. The new proposals are much less transparent. Cost items are aggregated and requested at the upper limits of costs as established in the templates without justification.

8. Incremental operating cost associated with compressors is requested in the submitted project. The Secretariat informed UNDP that this cost cannot be considered in the absence of the information required in Decision 22/26.

9. The Secretariat and UNDP are still discussing the level of eligible capital and operating incremental costs. The Sub-Committee on Project Review will be informed accordingly.

- (e) **Phasing out ODS at the refrigerator plant of Bole Electric Appliances Group**
- (f) **Phasing out ODS at the Changshu Refrigerating Equipment Works (BAIXUE)**
- (g) **Phasing out ODS at the freezer plant of Xing Xing Electric Appliances Industrial Co**
- (h) **Phasing out ODS at the refrigerator plant of Zhejiang Rongsheng Electric Co. Ltd.**

1. The Secretariat discussed with UNIDO: consumption at the four enterprises and verification of number of units produced by each enterprise.

2. New information received at the Secretariat and confirmed by UNIDO led to reduction in the requested cost of the replacement of hydrocarbon based equipment of the refrigeration systems for three enterprises.

3. The Secretariat and UNIDO agreed that the cost of safety modification of cabinet and door foaming carousels and plugs should be reduced to reflect the baseline condition.

4. Since all four enterprises are requesting incremental operating costs associated with the new compressors, the Secretariat informed UNIDO that this cost cannot be considered in the absence of the information required in Decision 22/26. The incremental cost of compressors was not, therefore, used in the calculation of the incremental operating cost of the projects. Furthermore, the Secretariat and UNIDO agreed to use prices of chemicals applied to the projects submitted by China to the Twenty-second Meeting in the calculation of operating cost of the present submission.

(i) Conversion of refrigerator manufacture to HFC-134a refrigerant and cyclopentane foam blowing agent at Henan Xinfei Electric Co. Ltd.

1. Since the enterprise was funded in 1993 on the basis of the then existing baseline and production level of up to 400,000 units per year, the request for funding to include the enterprise expansion in the use of CFCs after 1993 may not be eligible. The submitted project may need to be considered as a continuation of the project approved for the enterprise in 1993, subject to the views of the Executive Committee on expansion of capacity in enterprises which have received Multilateral Fund funding. Otherwise, the project approved in 1993 could be judged to have increased, rather than decreased, the enterprise's CFC consumption.

2. The World Bank is requesting information from the enterprise regarding the dates of acquisition by Singapore of 45% share. Singapore was not operating under Article 5 but was subsequently reclassified as an Article 5 country. Singapore ownership share was discounted in the calculation of a Multilateral Fund grant to Danshui Huaya Plastics project in China, in 1994. The Executive Committee decided *inter alia* that "projects involving transnationals owned by enterprises in countries that had been classified as Article 5 countries should be considered on a case-by-case basis, taking into account paragraph (e) of decision VI/5 of the Sixth Meeting of the Parties". South Korean enterprises' shares in the ownership of an approved Indonesian project were discounted in the calculation of incremental costs after South Korea had been reclassified as an Article 5 country.

3. According to the project implementation schedule conversion of Line 2 and Line 3 has already been completed, with full non-ODP operation planned to start in May and August 1997 respectively.

4. The Secretariat and World Bank are still discussing the eligibility and incrementality of capital costs items.

(j) Conversion of refrigerator manufacture to HFC-134a refrigerant and cyclopentane foam blowing agent at Shanghai Shangling Chang-An Refrigerator Co., Ltd.

1. The proposal does not provide the rationale for the enterprise's annual CFC consumption at 92.5 MT used in calculation of the grant amount. The World Bank has requested confirmation on the CFC consumption. The Secretariat and the World Bank are still discussing the eligible level of funding. The Sub-Committee will be informed accordingly.

(k) Phasing out ODS at the Yuhuan Compressor Factory in Kanmen

1. The Secretariat has discussed with UNIDO eligibility and the level of funding of modification of tools, fixtures and gauges, cleaning machine, modification at core inlay machine and vacuum dehydration equipment. The budget was adjusted to reflect incremental costs approved in other similar conversion projects.

RECOMMENDATION

1. The Fund Secretariat recommends blanket approval of the project with associated support costs at the funding level indicated in the table below:

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
(a) Elimination of CFCs-11 and 12 in the manufacture of domestic freezers at DeBao Refrigeration Equipment Co. Ltd.	Pending		UNDP
(b) Elimination of CFCs-11 and 12 in the manufacture of domestic freezers at Honxiang Group - Laizhou Freezer Plant	Pending		UNDP
(c) Elimination of CFCs-11 and 12 in the manufacture of domestic freezers at Jilin Jinouer Electric Appliances Group Co.	Pending		UNDP
(d) Elimination of CFCs in the manufacture of domestic refrigerators at Wanbao Electric Appliance Industries Co.	Pending		UNDP
(e) Phasing out ODS at the refrigerator plant of Bole Electric Appliances Group	1,469,029	190,974	UNIDO
(f) Phasing out ODS at the Changshu Refrigerating Equipment Works (BAIXUE)	3,548,775	461,340	UNIDO
(g) Phasing out ODS at the freezer plant of Xing Xing Electric Appliances Industrial Co.	3,346,941	435,102	UNIDO
(h) Phasing out ODS at the refrigerator plant of Zhejiang Rongsheng Electric Co. Ltd.	1,274,640	165,703	UNIDO
(i) Conversion of refrigerator manufacture to HFC-134a refrigerant and cyclopentane foam blowing agent at Henan Xinfei Electric Co. Ltd.	Pending		World Bank
(j) Conversion of refrigerator manufacture to HFC-134a refrigerant and cyclopentane foam blowing agent at Shanghai Shangling Chang -An Co. Ltd.	Pending		World Bank
(k) Phasing out ODS at the Yuhuan Compressor Factory in Kanmen	1,465,155	190,470	UNIDO

PROJECT EVALUATION SHEET **CHINA**

SECTOR: REFRIGERATION ODS use in sector (1995): 1,462 ODP tonnes

Sub-sector cost-effectiveness thresholds: MAC compressor/heat exchanger N/A

Project Titles:

- (a) Conversion of CFC-12 Compressor Assembly line to HFC-134a at Huada Zexel Automotive Air Conditioning Ltd.
- (b) Conversion of CFC-12 Compressor Assembly and Machining line to HFC-134a at Mudanjiang Automotive Air Conditioning Factory (MDAFC).
- (c) Conversion of CFC-12 MACs Condenser to HFC-134a at Hubei Jingsha Electric Group

Project Data	Compressor		Condenser
	Huada Zexel	Mudanjiang	Hubei Jingsha
ODS phase-out (ODP tonnes)	21.8	76.01	41
Proposed project duration (months)	24	24	24
Incremental capital cost (US \$)	687,746	802,407	1,042,053
- including contingency (%)	10	10	10
Incremental operational cost (US \$)	133,178	94,913	30,997
Total project cost (US \$)	820,904	897,320	1,073,050
Local ownership (%)	55	100	100
Export component (%)			
Amount requested (US \$) {Original}	451,497	897,320	1,073,050
{Revised}			
Cost effectiveness (US \$/kg)	20.71	110.04	26.17
National Coordinating Agency	National Environmental Protection Agency (NEPA)		
Implementing Agency	World Bank		
Technical review completed?	Yes	Yes	Yes

Secretariat's Recommendations:			
Amount recommended (US \$)	Pending	Pending	Pending
Project impact (ODP tonnes)			
Cost effectiveness (US \$/kg)			
Implementing Agency support cost (US \$)			
Total cost to Multilateral Fund (US \$)			

PROJECT DESCRIPTION

- (a) Conversion of CFC-12 Compressor Assembly line to HFC-134a at Huada Zexel Automotive Air Conditioning Ltd.
- (b) Conversion of CFC-12 Compressor Assembly and Machining line to HFC-134a at Mudanjiang Automotive Air Conditioning Factory (MDAFC).
- (c) Conversion of CFC-12 MACs Condenser to HFC-134a at Hubei Jingsha Electric Group

1. The project proposals are for converting two MAC compressor manufacturing plants and one MAC manufacturing plant from CFC-12 to HFC-134a refrigerant.

Sector Background

2. Production of MAC units started in the late 1980's. Currently, there are 38 separate manufacturers of MAC components, including four compressor manufacturers. Several new component producers entered the market in 1995 and 1996. In 1996, approximately 460,000 MAC units were produced with locally manufactured components (399,100 units at major car manufacturers).

3. The supply of MACs to vehicle builders in the form of a complete unit is very unusual in China. Statistics provided by the Ministry of Machinery Industry show that only 5.5 per cent of MAC units are supplied in this way. In the vast majority of cases, auto makers source individual MAC components directly from several manufacturers rather than purchasing complete systems from separate suppliers; in some cases, they even source components from abroad.

4. From 1991 to 1996, the average annual growth rate in the production of MACs was 26 per cent while vehicle production grew at a rate of 13 per cent. Since these growth rates are expected to continue, an early conversion to non-CFC refrigerant would minimize CFC consumption over the transition period. Despite the optimistic growth rates predicted for MACs, some over-capacity in MAC production exists in China. This will be addressed during the transition phase and can be expected to end by 2001.

5. The total cost of converting the MAC production subsector in China is estimated at US\$ 42.48 million. Fourteen out of the 38 factories producing MACs components are expected to seek Multilateral Fund funding for the value of US\$ 15.15 million. The remaining factories will convert with their own resources, or will either merge their production facilities with other companies or shut down.

Project proposals

6. The projects submitted for the consideration of the Executive Committee at its 23rd Meeting, constitute the second phase of a three-stage conversion of MAC production. The Executive Committee at its 17th Meeting approved four investment projects in the MAC sector (two MAC compressors and two MAC plants), and allocated US \$6.58 million for their implementation. Once the projects under consideration (second phase) become operational, 70 per cent of the total production requirement will have been eliminated. Complete elimination of CFCs in MAC production will be achieved by 2001.

7. The Mudanjiang Automotive Air Conditioning Factory started production of CFC-12 compressors in 1994. The annual production capacity of the plant is 100,000 units; however, only 6,760 compressors were produced in 1996. Based on documentary evidence of contracts, production for 1997 is estimated at 56,650 units. The project proposes procurement of new jigs and fixtures for machining of new parts, an oil charging machine and modifications to the piston swaging and life test machine (US \$434,000), acquisition of HFC-134a compressor technology (US \$296,400), and training, installation and commissioning (US \$26,000).

8. Huada Zexel Automotive Air Conditioning manufactures GM type MAC compressors via a license agreement with Zexel, Ltd., of Japan. The original agreement was signed in November 1992 for the rights to produce CFC-12 compressors, and full scale production started in 1995. The annual production capacity of the plant is 100,000 units; however, only 21,800 compressors were produced in 1996. To date, manufacturing has been based only on the assembly of components imported from the Japanese licensor. The project proposes to modify existing assembly line to handle HFC-134a refrigerant (US \$277,000), technology transfer fees (US \$320,000), and training, installation and commissioning (US \$57,292).

9. Hubei Jingsha manufactures fin and tube heat exchangers used for MAC condensers and evaporators. The production facility is also used to produce heat exchangers for split and through the wall air-conditioners. The baseline equipment consists of a tube bending and cutting machine, a fin stamping machine, a tube expander and leak test equipment. The enterprise has developed its own aluminium coil design. The project proposes to convert the existing copper tube and fin to a similar aluminium tube and fin design at a capital cost of US \$802,674, procurement of two HFC-134a charging units (US \$113,971), and training, installation and commissioning (US \$30,676).

10. Incremental operating costs associated with the production of MAC compressors and heat exchangers are being requested. The present value of redundant equipment has not been estimated for any enterprise.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Secretariat reviewed the projects in the context of: (a) Executive Committee policies and guidelines; (b) China's country programme; (c) MAC sector strategy on ODS phase out in China (1995); (d) MAC conversion projects so far approved by the Executive Committee, in particular those approved for China in July 1995; and (e) the OORG MAC Subsector Meeting's Report (January 1995).

Eligibility issue

2. The Secretariat questioned the eligibility of the projects in view of Decision 17/6. The supply of MACs to vehicle builders in the form of a complete set is very unusual in China (only 5 per cent of MAC units are supplied in this way). In the vast majority of cases, vehicle builders source components directly from component producers. This situation is not consistent with Decision 17/6 by which project proposals in the MAC subsector should emanate from the manufacturers of MAC units themselves, not the manufacturers of component parts.

3. The World Bank provided the following explanation on this issue:

- (a) "At its 17th Meeting, the Executive Committee decided that projects should emanate from the MAC unit producers and not from component producers (Decision 17/6). The decision was taken based on the understanding that that would be the normal situation.
- (b) It should be noted that MACS are not rebuilt nor pre-assembled, but consist of a number of components. When a MAC system is installed when the vehicle is built, installation becomes less expensive and provide other benefits as well. Furthermore, the vehicle manufacturer has the option of buying either complete MAC kits or individual components from component producers. In both cases, the vehicle manufacturer provides the specification for the MAC systems and components and assembles, commissions and warranties the system.
- (c) As MACS become standardized products, it is almost universally true that the system is purchased as components and treated much as any other components in a vehicle assembly operation. Each step in this evolution is dictated by economics. The prime criterion is to pursue the most efficient way to produce the most reliable product.

- (d) In the USA, MAC systems are normally bought as complete units (but not assembled). The MAC system manufacturers might produce all components, source components from component suppliers or outsource production of components.
- (e) In China a decision has been made (and incorporated into the country program) to consolidate the component manufacturing operations. This also provides unique opportunity for not having to upgrade several component manufacturers, and to upgrade only a limited number of enterprises”.

4. Based on Decision 17/6, the Secretariat also questioned the eligibility of the Huada Zexel compressor project, since the plant has been assembling only components imported from the Japanese licensor and does not manufacture component itself at this stage. The World Bank stated that “funding is only requested for equipment related to the change over from CFC-12 to HFC-134a. No modification to existing production equipment (or new equipment) is requested. It is our understanding that technology transfer fees are related to the HFC-134a compressors, and not production in general”.

5. On a clarification requested by the Secretariat as to the actual date that the two compressor manufacturing plants started production, the World Bank verified that production in the two plants started before July 1995.

Technical issues and level of funding

6. Notwithstanding the above policy issues which the Executive Committee might wish to address, the Secretariat and the World Bank discussed additional technical issues and the cost of some equipment items.

7. For the Mudanjiang compressor project, the Secretariat discussed with the Bank the eligibility of some items associated with modifications to the compressor life and performance test equipment since they are not refrigerant specific; the high cost of the oil charging machine (US \$180,000) as compared to similar equipment requested elsewhere (US \$93,200); and the difference in costs associated with modifications to the piston swaging machine as indicated in different sections of the proposal.

8. For the two compressor projects, the World Bank was also requested to provide copies of the technology transfer agreements, to explain the differences in the level of funding requested for the technology transfer fees considering that both plants have the same production capacity; and the basis for calculating contingency costs.

9. The MAC heat exchanger project includes a request for refrigerant charging equipment. The Secretariat informed the Bank that since refrigerant charging is performed at the automobile manufacturing plant, the cost of this equipment should not be covered by the Fund. The Secretariat indicated that the request for a new return elbow and crossover bender (US \$124,892)

was ineligible taking into account that the same heat exchanger design would be used when changing to HFC-134a refrigerant. The Secretariat also sought clarification on whether the new heat exchanger equipment for MAC units would also be used for split and through-the-wall air conditioners manufactured at the plant.

10. The Secretariat is still discussing some outstanding issues with the World Bank regarding the level of funding for capital equipment. Results of these discussions will be provided to the Sub-Committee on Project Review.

11. For the first time, incremental operating costs associated with the production of MAC compressors and heat exchangers are being requested (US \$94,913 for Mudanjiang, US \$133,178 for Huada Zexel and US \$31,076 for Hubei). The OORG MAC Subsector Meeting's Report concluded that incremental operating costs associated with the production of MAC compressors and heat exchangers are not eligible, and have never been claimed in any project submitted to the consideration by the Executive Committee.

RECOMMENDATION

1. The Executive Committee may wish to consider the eligibility of the projects for funding in the light of Decision 17/6.

2. If the Executive Committee decides that the projects are eligible, it might wish to consider if the request for incremental operating costs for the three enterprises are eligible.

3. The Executive Committee is requested to decide on the eligibility of funding of incremental operating costs for MAC manufacture, bearing in mind its decision 22/26 on compressors.

PROJECT EVALUATION SHEET **CHINA**

SECTOR: SOLVENT ODS use in sector (1995): 4072 ODP tonnes

Sub-sector cost-effectiveness thresholds: CFC-113 19.73 US \$/kg
TCA 38.50 US \$/kg

Project Titles:

- (a) Elimination of ODS (CFC-113) used in the production line at Fujian Putian Vikay Electronics Co. Ltd.
- (b) Elimination of ODS used in the production line at IRICO (Caihong) Colour Picture Tube Factory

Project Data	CFC-113, TCA	
	Fujian Putian	IRICO (Caihong)
ODS phase-out (ODP tonnes)	56	166.6
Proposed project duration (months)	24	4 years
Incremental capital cost (US \$)	602,000	5,164,500
- including contingency (%)	10	10
Incremental operational cost (US \$)	283,398	(1,812,000)
Total project cost (US \$)	885,400	3,352,500
Local ownership (%)	100	100
Export component (%)	-	-
Amount requested (US \$) {Original}	725,100	3,372,679
{Revised}	885,400	2,853,200
Cost effectiveness (US \$/kg)	15.8	17.1
National Coordinating Agency	NEPA	
Implementing Agency	UNDP	
Technical review completed?	Yes	

Secretariat's Recommendations:		
Amount recommended (US \$)	-	2,853,200
Project impact (ODP tonnes)	-	166.6
Cost effectiveness (US \$/kg)	-	17.1
Implementing Agency support cost (US \$)	-	370,916
Total cost to Multilateral Fund (US \$)	-	3,224,116

PROJECT DESCRIPTION

Background

1. Each project proposal contains an overview of the solvent sector. The 1993 sectoral consumption is reported as 4,527 ODP tonnes with a suggested growth rate of over 14 percent per annum. There are reported to be 3,200 middle and small-sized enterprises currently using ODS-based cleaning processes. 21 projects have been approved for the solvent sector in China with a combined phase-out of 453 ODP tonnes.
 2. The proposals indicate that in order to meet the 1999 freeze China needs to phase out 8,000 ODP tonnes in 1997, 7,000 ODP tonnes in 1998 and 3,000 ODP tonnes in 1999. It is stated that the ODS phase-out in each proposal will contribute to meeting this target.
- (a) Elimination of ODS (CFC-113) used in the production line at Fujian Putian Vikay Electronics Co. Ltd.**
1. This project will phase out 56 ODP tonnes of CFC-113. The solvent is used to clean liquid crystal displays (LCD used in electronic calculators, games etc. The enterprise has four vapour cleaning machines in the baseline which use CFC-113 as a solvent. A smaller quantity of purified CFC-113 is also used for vacuum deposition of the liquid crystal mixture in the manufacture of the LCD, prior to the cleaning process. This has to be phased out at the same time because the same equipment is used to reclaim the cleaning solvent and purify the process solvent.
 2. Three of the cleaning machines are to be replaced with low-loss machines designed for the 'co-solvent' process. The fourth less critical machine will be replaced by one semi-aqueous batch cleaner. The process solvent will be replaced by introducing a new non-solvent deposition process. Retrofitting of the existing machines was examined but would have been more costly since the new machines can achieve significant reductions in the quantities of solvent used and the replacements, initially HCFC-225, and finally, HFE-7100 have a high cost (US \$36/kg). Replacement of the process solvent was also considered, without introduction of new equipment. However, again, operating costs for the 900 kg of solvent used annually almost equal the cost of the new process equipment.
 3. The proposal provides an explanation of the reason for initial use of HCFC-225, a transitional substance, as it most closely resembles the properties of CFC-113 now used.
 4. The enterprise is 70 percent locally owned. The remaining 30 percent is owned by a Singapore based company. No discount has been applied for foreign ownership because Singapore has been reclassified as an Article-5 country. 95 percent of the product is sold to Article-5 countries in south-east Asia.

5. Capital costs of US \$602,000 are comprised of US 350,000 for four replacement cleaning machines and one drying machine, US \$95,700 for a replacement vacuum deposition system and costs for shipping, insurance, acceptance checking, site preparation, training, technology transfer and startup, with a contingency allowance of 10 percent.
6. Operating costs of US \$283,398 arise principally from the very high cost of the replacement solvent (US \$36/kg), even though the volume is reduced by a factor of 10 compared to current CFC-113 consumption.
7. The overall cost effectiveness of the project is US \$15.8/kg compared to the threshold of US \$19.73/kg for the sub-sector.

(b) Elimination of ODS used in the production line at IRICO (Caihong) Colour Picture Tube Factory

1. This is a very large project. It will phase out the use of 130.4 ODP tonnes of CFC-113 (163 metric tonnes) and 36.2 ODP tonnes of TCA (362 metric tonnes), used annually in various cleaning operations associated with the manufacture of colour picture tubes at IRICO, a 100% locally owned enterprise. IRICO currently produces some 7.5 million picture tubes per year. The enterprise has five factories in its plant which cover a total area of 300,000 square metres.
2. Replacement of the two ODS cleaning agents used in the production processes involving 16 cleaning machines will be accomplished by replacing 14 machines with an aqueous cleaning process and two machines with a mineral spirits process. The phaseout will be implemented over four years in several phases related to the production processes and the factories in which they are located, in order to cause minimum disruption to the ongoing high volume production. Project inputs will include a combination of replacement of the existing 16 cleaners, improved ventilation, site preparation and plant modifications, technology transfer and trials.
3. The enterprise installed two trichloroethylene (TCE) cleaning systems in the 1980s, but converted the systems back to TCA in 1989 and January 1995 because of difficulties with stringent local regulations regarding the use of TCE. The conversion has therefore been proposed principally on the basis of aqueous cleaning technology. For two cleaning lines, aqueous technology requires a change in product design and an alternative cleaning process such as plasma technology, which is compatible with current product design, may be adopted. This will be more costly than aqueous technology, but the additional cost will be absorbed by the enterprise if this technology is chosen.
4. Incremental capital costs of US \$5,164,500 are made up of US \$3,350,000 for 14 new cleaning machines, US \$585,000 for 13 de-ionised water plants, US \$310,000 for building modification and site preparation, with the balance for: retrofit costs; ventilation and

vapour recovery systems; shipping and insurance, and; technology transfer, training, trial runs and start-up. A 10 percent contingency has been added.

5. Incremental operating savings over four years of US \$1,812,000 will be realised from the decreased costs of solvent, partially offset by increases in energy and labour costs associated with the use of aqueous systems and the de-ionized water plants.
6. The enterprise proposes to provide counterpart funding of US \$499,300 and is seeking a grant of the balance of project costs of US \$2,853,200. The cost effectiveness of the project is US \$17.1/kg. The weighted threshold for the project is US \$23.78.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. Decision 22/30 approved UNDP's work programme inter alia "on the understanding that UNDP would pre-screen all project proposals in China's solvent's sector to ensure that they concerned cost-effective projects for the phase-out of CFCs." In relation to this requirement, UNDP has pointed out that the IRICO solvents project is the largest in China with 525.4 metric tonnes to be eliminated (362.4 metric tonnes of TCA and 163 metric tonnes of CFC-113), and that the cost effectiveness is US \$17.1/kg, some 28 percent below the weighted threshold for the project which is US \$23.78/kg and 13 percent below the CFC-113 threshold of US \$19.73/kg. Putian Vikay is the second-largest stand-alone CFC-113 user currently identified. Its cost effectiveness of US \$15.8/kg is much below the threshold of US \$19.73/kg.

2. UNDP advised that it considers that both projects fully meet the criteria under Decision 22/30.

(a) Elimination of ODS (CFC-113) used in the production line at Fujian Putian Vikay Electronics Co. Ltd.

1. The Fund Secretariat discussed the configuration of the plant with the implementing agency to confirm that four cleaning machines were eligible for funding.

2. It was also established that the consumption of solvent in the manufacture of the LCD, prior to cleaning, is only some 0.9 tonnes per year. However there is a need on technical grounds to phase this use out at the same time that the solvent cleaning is phased out. The cost of the new processing equipment to achieve this phase-out of 0.9 tonnes, sourced from Japan, is indicated as US \$110,000. There is no significant technological upgrade involved. The phase-out could be achieved without new equipment using HCFC-225 solvent, but incremental operating costs for the 0.9 metric tonnes of HCFC-225 would be US \$95,700. The eligible cost for the new machine was therefore capped at this figure.

3. The Fund Secretariat also discussed with the implementing agency the eligibility for funding of the 30 percent share owned by a Singapore-based company, in the light of Singapore's recent reclassification to Article-5 status, and Decision 20/75 which provides that projects involving transnationals owned by enterprises in countries that had been reclassified as Article-5 countries should be considered on a case-by-case basis, taking into account paragraph (e) of decision VI/5 of the Parties. UNDP took the view that the enterprise is not a transnational and therefore the decision does not apply.

(b) Elimination of ODS used in the production line at IRICO (Caihong) Colour Picture Tube Factory

1. The Fund Secretariat reviewed with the implementing agency the technology selection, retrofit options, major equipment costs, building modification and site preparation costs and chemical prices for incremental operating costs and savings.

2. Initially, the project was costed on the basis of conversion to TCE for four of the sixteen of the cleaning systems. However it was proposed in the original project document that aqueous systems would, in fact, be installed since the enterprise had not been able to implement TCE cleaning systems effectively because of stringent local regulatory provisions concerning operator safety. The project was reformulated on the basis of what was actually proposed to be implemented, and costs were maintained at the same level through counterpart funding.

3. The implementing agency advised that the high level of building modification and site preparation costs arises from the very large size of the factories and the cleaning systems themselves, some of which are up to 8 metres in length and located in the centre of the buildings. Additionally, since many of the operations take place under very clean conditions, the entire factory atmosphere has to be returned to particulate-free conditions after conversion. This presents a significant logistics problem as well as raising local works expense to a high level.

4. Solvent prices were adjusted to reflect those used in projects at the 22nd meeting, as previously agreed between the implementing agencies and the Secretariat for projects coming to the 23rd meeting, pending the implementation of a methodology for assessing chemicals prices.

5. The project document suggests that the annual phase-out of 167 ODP tonnes will contribute towards the 1999 freeze. However, as the project has a four year implementation period, it seems this will not be the case.

RECOMMENDATIONS**(a) Elimination of ODS (CFC-113) used in the production line at Fujian Putian Vikay Electronics Co. Ltd.**

1. The Fund Secretariat considers that individual cost items in the project are eligible, to a total of US \$1,000,502, together with the associated support costs. The Secretariat seeks guidance as to whether the grant should be discounted for the 30 percent Singapore ownership.

(b) Elimination of ODS used in the production line at IRICO (Caihong) Colour Picture Tube Factory

2. The Fund Secretariat recommends that the eligibility and costs of the project be accepted, with the associated support costs, at the level of funding indicated below. The Executive Committee might wish to consider the priority to be accorded to the project since it will not be completed until after the freeze date.

Project Title		Project Cost US \$	Support Cost US \$	Implementing Agency
(b)	Elimination of ODS used in the production line at IRICO (Caihong) Colour Picture Tube Factory	2,853,200	370,916	UNDP