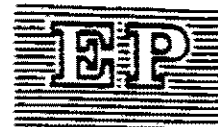




United Nations Environment Programme



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Executive Committee of the
Interim Multilateral Fund for the
Implementation of the Montreal Protocol

Seventh Meeting
Montreal, 23-26 June 1992

Addendum

PROJECT PROPOSALS: CHINA

PROJECT COVER SHEET

COUNTRY: China

PROJECT TITLE: ODS Phase Out Project

SECTOR COVERED: ALL

ODS CONSUMPTION IN SECTOR: 50,000 TPY ODS (1991)

CONSUMPTION WEIGHTED
WITH ODP VALUE: 22,000 TPY ODP

PROJECT DURATION: 3 years

PROJECT IMPACT: 16,200 TPY ODS

TOTAL PROJECT COST: \$17.5 million

PROPOSED OTF GRANT: \$14.9 million

IMPLEMENTING AGENCY: World Bank

NATIONAL COORDINATING
AGENCY: National Environmental Protection Agency

FINAL EXECUTIVE PROJECT SUMMARY

CHINA - OZONE DEPLETING SUBSTANCES (ODS) PHASE OUT PROJECT

Grantee: People's Republic of China

Cost: US\$17.5 million equivalent

Financing: US\$14.9 million (from the Ozone Trust Fund)
US\$ 2.6 million (from enterprises' resources)

Appraisal Date: August 1992

Tentative Grant Approval Date: October 1992

Proposed Peer Reviewers: Messrs. King (ENVPR), R. N. Anderson (EA2EH),
Shum (EA2IE), Arif (EMTEN),
Rhatigan (LALEI)

Technical Review Panel: Messrs./Meses. Davis (ASTEN) Newcombe (CODGE);
Outside Reviewer: Staven Andersen (USEPA)

Background

1. China ratified the Montreal Protocol (MP) in June 1991 and is eligible for Ozone Trust Fund (OTF) financing. The OTF has been created to provide financial support to qualifying developing countries for the work required to meet their MP obligations. The OTF is managed by the Montreal Protocol Executive Committee (MPEC), and is being implemented by IBRD, UNDP and UNEP. The main Chinese agencies involved in phasing out Ozone Depleting Substances (ODS) are the National Environmental Protection Agency (NEPA), as coordinating agency, and six technical ministries. UNDP is responsible for preparing China's ODS Country Program (CP). Preparation of the CP is underway and scheduled to be completed by end September 1992, funded from the OTF. The CP will include ODS phase out action plan and the development and implementation of strategy and policies to achieve total ODS phase out, with emphasis on short/medium term actions. A project preparation feasibility study (funded by UNDP and Finland) and completed in February 1992 identified about 40 potential subprojects totalling about US\$50 million.

2. China is the developing world's largest ODS consumer and producer. In 1991, consumption was about 30,000 tons of ODS (Annex 1) and production was about 30,000 tons ODS, largely comprising aerosols, halons (fire protection), refrigerants (refrigeration/air conditioning), blowing agents (foam products) and solvents (electronics and precision machines). The recent growth rate in ODS consumption has been about 11% per year. NEPA stated that the Government has agreed to a 5-year program to maintain ODS consumption in 1996 at the 1991 level, compared to unconstrained growth at 86,000 tons per year (tpy) ODS for 1996. Phase out of 36,000 tpy in five years represents a substantial commitment, larger

than any developing country has announced so far. Achieving this target will require the MP implementing agencies to undertake an innovative approach and rapid response to assist the Government in meeting this difficult goal. NEPA and the line ministries have initiated programs to start phase out, but efforts are severely hampered by lack of funds including foreign exchange, technology and access to information on current worldwide efforts. Present consumption and production is spread over six main subsectors, 6 line ministries and about 2,500 enterprises of different sizes and ownership in 8-10 provinces.

3. China's rapid industrial growth has been accompanied by the increased concern for the environment and substantial progress is being achieved in establishing a regulatory framework and taking corrective action to support environmental protection while pursuing sustainable industrial development. The Bank's lending program includes several industrial and environmental operations over the next three years.

4. The approach proposed herein is designed to respond to the urgent need for a fast start on China's short-term ODS phase-out commitment and to prepare a comprehensive, cost effective program of investments consistent with the MP. The first investment operation, consisting of about nine subprojects, is proposed for immediate execution.¹ Investment subprojects will typically be over US\$500,000, with well established technical and commercial viability, and will be handled through China Investment Bank (CIB) as financing agent. CIB will assist the Bank in appraising the proposed project and act as financial agent in handling subproject funds. These arrangements will be patterned closely on similar Bank --financed industrial environmental projects such as the Beijing Environmental Project. While some identified subprojects will require further preparation, most are ready for appraisal. The subprojects proposed for this first investment project are described in Annex 2 and the technical appendix.

5. In parallel, the Bank will prepare a second investment project, based primarily on subprojects listed in Annex 3. This second project will also use CIB for support in project appraisal. The draft CP will be available before appraisal of the second project and will be used to determine the total ODS phase-out costs for which China is eligible and any changes in the recommended treatment for incremental costs. (para 8).

Project Objectives

6. Project objectives are to: (a) support the Government's short-term actions to reduce ODS consumption; (b) establish a project implementation mechanism through local institutions; (c) implement cost effective, priority subprojects; and (d) develop effective coordination between NEPA, UNDP and the Bank, including integration of the overall ODS phase out program, policies, strategies and action plans being developed through the CP.

^{1/} A TA and demonstration program is being developed in parallel by UNDP. Demonstration subprojects will typically (a) be under US\$300,000; (b) need commercial and technical viability to be demonstrated; (c) represent technology development needs; and (d) do not warrant financial intermediation.

Project Description

7. The Project will support priority subprojects for use of non-ODS technology in aerosols, foam, solvents, halons and possibly refrigeration. All investment subprojects will be based on commercially proven technology already available outside China and include appropriate technology transfer arrangements. A TA component will also be included to provide direct support needed to ensure successful implementation of the subprojects included in the Project. The subprojects are fully described in the feasibility study. The investment subprojects are consistent with the expected goals of the CP and with China's environmental and development strategy.

Project Costs

8. Project cost estimates are shown below. Also shown are the incremental costs eligible for OTF grant financing according to the Bank's interpretation of MPEC guidelines (Annex 4). The methodology determining incremental cost is being developed in the draft report "Interim Multilateral Fund under the Montreal Protocol - Operational Procedures." The incremental costs are calculated as a fraction of total capital costs, adjusted for net operating costs and benefits. Incremental costs for China are defined herein as total capital costs minus the net present value of operating costs and benefits, discounted at 12% p.a. (compared to CIB's present lending rate of 9.2% p.a.).

Project Cost Estimates

US\$ million equivalent

Investment Component	Incremental Cost	<u>Project Costs</u>		
		Local	Foreign	Total
Halons, 2 subprojects	1.4	0.2	1.2	1.4
Aerosols, 2 subprojects	4.6	1.0	4.8	7.8
Solvents 2 subprojects	0.2	0.2	0.4	0.6
Foams, 2 subprojects	3.6	0.8	4.4	5.4
Other Subprojects ²	1.5	0.4	1.7	2.1
Subtotal Investment Component	<u>11.3</u>	<u>2.6</u>	<u>14.7</u>	<u>17.3</u>
Technical Assistance	0.2	-	0.2	0.2
Total Costs	<u>11.5</u>	<u>2.6</u>	<u>14.9</u>	<u>17.5</u>

N.B. The incremental cost calculations are very approximate and will be confirmed during preappraisal.

²/Other subprojects in refrigeration and/or other subsectors, will be prepared during preappraisal. The original refrigeration subproject selected involved use of HCFC12 and has been deferred on technical grounds.

Project Financing

9. Project financing is proposed as an OTF Grant to the Government to cover 100% of the direct foreign exchange requirements of the subprojects or the aggregate of incremental costs, whichever is greater; in this case, foreign exchange of US\$14.9 million. However, strictly speaking, the Government and the subprojects in this Project would be entitled to only a grant of US\$11.5 million, corresponding to the estimated incremental cost calculation. The OTF grant to the Government will be treated as part of the total incremental national ODS phase out costs as calculated and agreed in the CP now under preparation. In all subprojects in this first investment project, participating enterprises will receive funds partly as grants and partly as commercial loans from CIB with the grant portion equal to the subproject incremental cost calculation and the balance as a commercial loan from CIB. ODS users are not familiar with the technology and do not see any benefit from phasing out ODS. They need some financial incentive to start phase out projects quickly, including availability of all the incremental and foreign exchange costs required. Providing incremental costs to enterprises as a grant should lower the cost of capital to provide sufficient incentives to initiate action. Covering the entire foreign exchange cost will remove that constraint. The CP and the second investment project will include a more systematic and efficient policy and incentive package for subsequent projects. In this project, about 77% of the OTF resources (US\$11.5 million) are estimated as grants to enterprises and 23% (US\$3.4 million) as loans under standard CIB terms. The financing plan is summarized below:

Financing Plan (US\$ million equivalent)

OTF Grant	14.9
Enterprise Resources	3.6
TOTAL	17.5

Project Implementation

10. NEPA is responsible for the overall ODS phase-out program and will be the Project implementing agency. Each enterprise participating will prepare a detailed project preinvestment report (including the information listed in Annex 5), assisted by NEPA, the line ministry, and design institutes. The Bank will appraise each subproject, with support from CIB for financial appraisal and a technical institute selected by NEPA for technical appraisal. CIB and the technical institute will receive appropriate fees for appraisal services and for CIB as financing agent. Institutional arrangements, including the role of NEPA, MOF, CIB, the ministries and provincial agencies, and the enterprises, will be completed during appraisal. Analysis of each subproject will include technical and commercial viability, its cost effectiveness (unit abatement cost as defined

in Annex 5), ODS removed, project implementation arrangements and financial and economic viability.

Procurement and Disbursement

11. The Bank will supervise the Project, including approving each subproject prior to initial disbursement. NEPA and CIB will prepare quarterly supervision reports. Audit reports on the use of the OTF will be prepared according to standard OTF requirements. Procurement for individual subprojects will follow procedures consistent with the Bank's Trustee obligations under the MP and will be substantially the same as in the Beijing Environmental Project. These arrangements will be established during appraisal. Project funds are expected to be fully committed by the end of two years and fully disbursed by the end of three years. A disbursement schedule will be prepared during appraisal.

Environmental Considerations

12. NEPA will be responsible for preparing Environmental Impact Assessments (EA's) for all subprojects, particularly in regard to safety. EA's will be prepared according to local regulations and reviewed by the Bank during appraisal.

Project Sustainability and Risks

13. The full ODS phase-out program, consisting of TA Investment subprojects, and the CP and its action plan, is considered sustainable. Due to concerns about launching the first operation before the CP is completed, this first project is being limited to high priority actions with China's short-term phase-out program and require no immediate policy action.

14. Risks are considered reasonable. Subprojects are all based on technology commercially proven outside China, and substantial technical support is being provided both under the project and in UNDP's parallel TA program. Risks will be further minimized by cooperation between UNDP, the Bank and NEPA. Providing incremental costs as grants will ensure that enterprises will have a financial incentive to initiate action now.

Lessons from Previous Bank Experience

15. Projects utilizing OTF resources are being developed simultaneously in Mexico, Thailand, Egypt and other countries. A small pilot project has been approved in Mexico, and engineering projects have been approved in Thailand and the Philippines. Policies concerning the overall approach and methodology of the ODS phase out program in developing countries are being prepared under the direction of the Bank GEF/MP Coordinator. No OTF projects have been completed.

Project Benefits and Rationale for Use of Ozone Trust Fund

16. The Bank is one of the three Implementing Agencies (plus UNDP and UNEP) designated by the MP to implement ODS phase out operations. The Project, will help the Government begin implementation of an accelerated short-term ODS phase out program to reduce 1996 ODS consumption by about 42% of its unconstrained expected consumption (from 86,000 tons ODS to 50,000 tons). The Project itself will correspond to 16,200 tons/year of ODS reduction at full operation, or 45% of China's 1996 ODS phase out goal. UNDP financed TA support for training and institutional strengthening will support project activities.

Issues and Actions

17. Agreement will be sought with the Government on the following:
- (a) completion of the draft CP and its action plan by September 30, 1992, with a commitment to an early phase-out date and appropriate policies to achieve that target in a cost-effective way. (paras. 2 and 5).
 - (b) the definition of incremental costs (para. 8);
 - (c) the OTF grant to the Government to be equal to direct foreign exchange cost or incremental cost whichever is larger (para. 9);
 - (d) the OTF grant to the Government to be considered as a credit against China's overall ODS incremental phase-out costs, as determined in the Country Program (para. 9);
 - (e) enterprises to receive incremental costs, as defined by the Bank, as grants (para. 9); and
 - (f) a portion of OTF resources to be received by enterprises as commercial loans from CIB (para 9).

Project Review and Next Steps

17. The following steps are suggested for processing the Project:
- (a) The revised FEPS, with technical annex, to be submitted to the MP Executive Committee; and
 - (b) Subproject preparation and preappraisal to be completed in a mission to China during June 2 - June 15.
18. Project appraisal is scheduled for August 1992.

OZONE DEPLETING POTENTIALS (ODP)

<u>Substance</u>	<u>New ODP Assessment November 1991</u>	<u>ODP 1989 Assessment</u>	<u>Global Warming Potential (GWP)</u>
<u>CFCs</u>			
CFC-11	1.0	1.0	1.0
CFC-12	1.0	0.9-1.0	3.0
CFC-113	1.07	0.9-0.9	1.4
CFC-114	0.8	0.8-0.8	3.8
CFC-115	0.5	0.3-0.5	7.5
<u>HCFCs and HCCA</u>			
HCFC-22	0.055	0.04-0.06	0.3
HCFC-123	0.02	0.013-0.022	0.02
HCFC-124	0.022	0.016-0.024	0.1
HCFC-125	0	0	
HFC-134a	0	0	
HCFC-141b	0.11	0.07-0.11	0.1
HCFC-142b	0.055	0.05-0.05	0.4
HFC-152a	0		0.03
HCFC-225CA	0.025	-	
HCFC-225CB	0.033	-	
<u>Halons</u>			
H-1301	16	10.0	2.4
H-1211	4	3.0	
H-2402	7		
CH ₃ Br	0.6		
<u>Other ODS</u>			
Carbon Tetrachloride (CCl ₄)	1.04	1.0-1.2	0.35
1,1,1-trichloroethane (TCA) methyl chloride, CH ₃ CCl ₃	0.12	0.1-0.16	0.02

Sources: UNEP/OZI, Pro/WG.1/5/3: November 1991.

**1991 UNDP CHINA OZONE PROTECTION MISSION
LIST OF PROJECTS FOR APPLICATION TO MULTILATERAL FUND
Subprojects Selected for**

FIRST INVESTMENT PROJECT

<u>Name</u>	<u>Foreign Cost US\$</u>	<u>Annual ODS Reduction</u>	<u>Unit Abatement Cost \$/kg/yr</u>
Industry: Aerosol- Foams and Hair Sprays Shanghai and Tianjin CFC Conversion to LPG (2 main subprojects)	8,800,000	13,000 T CFC-12	
Industry: Foam - Polyurethane Insulation Adoption of 50% Reduced CFC Formulation (8 main subprojects)	3,800,000	2,200T CFC-11	
Industry: Foam - Polystyrene and Polyethylene Packaging Zhejiang CFC Conversion to Butane	800,000	400 T CFC-12	
Industry: Halon - 1211 Production Beijing Production of ABC Powder	470,000	500 T Halon 1211	
Industry: Halon-1211 Extinguisher Zhejiang Conversion to ABC and AFT Powder Type:	720,000	400 T Halon 1211	
Industry: Electronics Phase out use of solvents 2 subprojects	400,000	120 T TCA	
Other subprojects Refrigeration or other subsectors	1,750,000		
Total	14,700,000		

1991 UNDP CHINA OZONE PROTECTION MISSION
LIST OF PROJECTS FOR APPLICATION TO MULTILATERAL FUND

<u>Name</u>	<u>Cost US\$</u>	<u>Annual ODS Reduction</u>
Industry: Halon 1211-Fire Extinguishers Name: Tianjin Halon Alt System Development	470,000	
Industry: Halon-1211 Production Name: Foshan Emission Reduction	200,000	15 Halon 1211
Industry: Halon 1211 & 1301 Fixed Systems Name: Guangzhou Improved Detection to Reduce False Release	450,000	4 Halon 1211 & 1 AT Halon 1301
Industry: Halon - 1211 Fire Extinguisher Name: Guangzhou Production Emission Production	480,000	15 Halon 1211
Industry: Foam Polyurethane Insulation Name: TA Support for Adoption of 50% Reduced CFC Formulation	480,000	No direct reduction
Industry: Foam Polyurethane Pipe Insulation Name: Shanghai CFC Conversion to CO ₂	500,000	200 CFC-11
Industry: Electronics and Metal Cleaning - Picture Tube Name: Dandong Conversion to Aqueous Cleaning	450,000	80 CFC-113
Industry: Halon - 1211 Production Name: Foshan Emission Reduction	470,000	20 CFC-113
Industry: Electronics and Metal Cleaning Name: TA Support for China Design Institute Evaluation of non-ODS Options	200,000	No direct reduction
Industry: CFC-11/12 Production Type: TA Support for Guangdong (Guangdong) Import Substitute Samples	200,000	No direct reduction
Industry: Aerosol -Foams and Hair Sprays Name: Guangzhou CFC Conversion to LPG	100,000	No direct reduction

1991 UNDP CHINA OZONE PROTECTION MISSION
LIST OF PROJECTS FOR APPLICATION TO MULTILATERAL FUND

Name	Cost US\$	Annual ODS Reduction
Industry: Foam-Polyurethane Flexible Cushion Name: Tianjin CFC Elimination	200,000	18 T CFC-11
Industry: Halon-1211 Fire Extinguisher Name: Shanghai Improved Pressure Gages to Reduce Leakage	810,000	5 T Halon 1211
Industry: R & A/C Mobil Air Conditioning	1,941,000	350 T CFC-12
Industry: R & A/C Household Refrigerators Name: Conversion to 152a	900,000	185 T CFC-12
Industry: R & A/C Household Name: Shanghai CFC Conversion to 134a (Compressor and Refrigerator)	1,400,000	45T CFC-12
Industry: Refrigeration and Air Conditioning Name: Beijing and Area #2 Recycling Project Refrigerators Name: Conversion to 152a	750,000	To be determined
Industry: R/A/C Compressors Name: Luoyang Small Scale Ammonia Compressor Development	3,000,000	2,000T CFC-12 (potential)
Industry: CFC-12 Production Name: Shanghai CFC Conversion to HCFC-22	160,000	5,350 T CFC-12
Industry: R & A/C Recycling Name: Beijing (BHEAN) Development of Standards	800,000	To be determined
Industry: Halon Recycling Equipment Production Name: Tianjin Production of Recycling Equipment	2,390,000	100 T Halon 1211
Industry: CFC-11/12 Production Name: Shanghai CFC Conversion to HCFC-22	3,300,000	200 T CFC-12
Industry: CFC-11/12 Production Name: Shanghai 14lb/142 Process Development	450,000	88T CFC-11/12
Industry: CFC-11/12 Production Name: Zhejiang 123/124/125 Process Development	870,000	98T CFC-11/12

Industry: R/A/C Lubricant Production Name: Xian 134/Lubricants	315,000	No direct Reduction
Name: Beijing (BEIAP) Development of Standards		
Industry: R&A/C Recycling Equipment Production Name: Qingdao (Qindachao) Production of Recycling Equipment	800,000	To be determined
Industry: Halon-Recycling Equipment Production Name: Tianjin Production of Recycling Equipment	2,390,000	100 T Halon 1211
Industry: Halon-Fire Protection Name: Tianjin Halon Destruction Equipment Development	800,000	5,000-10,000 T Halon 1211/1301 (potential)
Industry: Halon-Fire Extinguishers Name: Shanghai: Halon Substitutes Testing	250,000	100 T Halon 1211 (potential)
Industry: Halon-Fire Protection Name: Tianjin Identification of Essential Uses	400,000	
Industry: R&A/C Compressors Name: Luoyang Small Scale Ammonia Compressor Development	3,000,000	2,000 T CFC-12 (potential)
Industry: CFC-11/12 Production Name: Shanghai and Zhejiang 152a/134a Process Development Project Type: Development/Pilot Demonstration	3,300,000	200 T CFC-12
Industry: CFC-11/12 Production Name: Shanghai 141B/142 Process Development	450,000	89T CFC-11/12
Industry: CFC-11/12 Production Name: Zhejiang 123/124/125 Process Development	870,000	88T CFC-11/12
Industry: R & A/C Lubricant Production Name: Xi'an 134/Lubricants Process Development	15,000	No direct reduction
Industry: Electronics and Metal Cleaning Name: Taiyuan and Tianjin Technical Support Centers	1,250,000	