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**REVIEW OF THE IMPLEMENTATION OF  
CHINA'S COUNTRY PROGRAMME FOR ODS PHASEOUT**

**(Submitted by the Government of the People's Republic of China)**

REVIEW OF THE IMPLEMENTATION OF  
CHINA'S COUNTRY PROGRAMME FOR ODS PHASEOUT

STATE ENVIRONMENTAL PROTECTION ADMINISTRATION  
THE PEOPLE'S REPUBLIC OF CHINA

MARCH 1999

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# REVIEW OF THE IMPLEMENTATION OF CHINA'S COUNTRY PROGRAMME FOR ODS PHASEOUT

## A. Objective

1. The purpose of this review is to assess progress in the implementation of China's ODS phaseout program up to 1997 to enable the Country Programme (CP) Update to: a) reformulate the phaseout strategy and action plan to more effectively meet realistic Ozone Depleting Substances (ODS) phaseout targets consistent with Montreal Protocol (MP) limits; b) assess and adjust policy actions and strategies to support effective phaseout; c) develop a more flexible approach to phaseout management and action plan; and d) benefit from lessons learned in the early years of CP implementation.

## B. Background

2. **Development of Country Programme.** China's State Council approved the China Country Programme (CP) for the Phaseout of Ozone Depleting Substances under the Montreal Protocol in January 1993. In March 1993, it was approved by the 9<sup>th</sup> Meeting of the Executive Committee (ExCom) of the Multilateral Fund (MLF). Since then, China has prepared an addendum to the CP -- Complement of Tobacco Sector. In 1995, all sectors related to ODS production and consumption prepared phaseout strategies at sector level, based on the results of the early years of CP implementation.

3. The action plan in the Country Programme was formulated based on the Chinese Government (hereinafter the Government) phaseout strategy and policy framework. The action plan was divided into three stages: short-term (1992 - 1996); medium term (1997 - 2000); and long-term (2000 - 2010). Table 6 summarizes implementation of the action plans. Generally speaking, the action plan reflects systematically and comprehensively Government strategies and policies regarding ozone layer protection. Most of the proposed actions have started implementation and achievements have been made.

4. In 1998, the CP itself was updated. The CP Update takes into account the many changes that have taken place, in regard to technology changes, better understanding and accuracy of costs and funding available from MLF, and the significant changes in MLF eligibility for funding and phaseout deadlines. The CP Update also takes into account improved institutional capability within China. Shifting to national implementation with strong emphasis on policy actions and sector approaches/umbrella projects rather than relying on individual projects will lead to further improvements in implementation and cost efficiency, as well as better monitoring and enforcement mechanisms.

### **C. Country Programme Management**

5. **Management Structure.** The Government established a Leading Group for Ozone Layer Protection of China (hereinafter Leading Group) in 1992 and the Leading Group continues to provide overall management of CP implementation. The responsibility of the Leading Group is to provide guidance to and coordinate the ODS phaseout activities in China. Currently, the members of the Leading Group consist of 18 Ministries and Commissions, including, National Environmental Protection Agency (NEPA, now the State Environmental Protection Administration, SEPA)<sup>1</sup>, Ministry of Foreign Affairs, State Planning Commission (now State Development Planning Commission), State Science and Technology Commission (now Ministry of Science and Technology), State Economic and Trade Commission, Ministry of Finance, Ministry of Public Security, Ministry of Machinery (now State Machine-Building Industry Bureau), Ministry of Electronics Industry (now Ministry of Information Industry), Ministry of Chemical Industry (now State Petrochemical Industry Bureau), Ministry of Domestic Trade (now State Internal Trade Bureau), Ministry of Agriculture, General Administration of Customs, China's Association for Light Industry (now State Light Industry Bureau), State Tobacco Monopoly Bureau, State Administration for Medicine Supervision and Management, China Aviation Industry Company, China Space Industry (now China Space Science and Technology Company). After 1998, the management role of most of the restructured Ministries, Commissions and Administrations will be reduced and appropriate changes in CP management will be introduced. The role of SEPA has correspondingly increased along with an increase in responsibility at the local and enterprise level. Under the original CP, these agencies carried a significant responsibility for development and implementation of the CP.

<sup>1</sup> In March 1998, China began restructuring government agencies. Some Ministries and Agencies names were changed then.

6. As the responsible domestic agency assigned by State Council, SEPA has established a Project Management Office (PMO) to strengthen the leadership for ozone layer protection. PMO acts as a Secretariat of the Leading Group, and is also responsible for daily operation of implementation of the CP. PMO is responsible for organizing activities related to design and formulation of policies and regulatory system for ozone layer protection, data collection for ODS production and consumption, preparation and application of MLF projects, monitoring and supervision of project implementation, check and acceptance; and organizing training, education and information exchange activities.

7. The member ministries/agencies and related sectors also established their own leading groups at sector level according to their responsibilities to coordinate and provide guidance for program development and implementation within the respective sector. The sector level leading groups will continue to function after 1998 under the respective restructured agencies.

8. **Supervision of CP Implementation.** The CP management and institutional framework established in China uses the existing administrative and management functions of related agencies. Using the existing systems make it easier to incorporate phaseout of ODS production and consumption into the daily monitoring, management and operation of related agencies. Such an institutional arrangement promotes and ensures the development of ozone layer protection activities in China.

9. To strengthen monitoring and supervision for ODS phaseout activities at enterprise level, the Government emphasizes the role played by local Environmental Protection Bureaus (EPBs). In 1995, the Circular for Issues Related to Environmental Impact Assessment for MLF Projects was issued by NEPA. In February 1997, to control newly added production capacities for ODS production and consumption, and to implement related policies effectively, NEPA issued Circular on Enhancing the Monitoring and Supervision Function for Ozone Layer Protection by local EPBs. NEPA further required local EPBs to enhance monitoring and supervision of MLF projects, and to be responsible for enforcing and implementing related policies. Local governments at various levels have been actively involved, to help enterprises complete conversion projects, to ensure that counterpart funding is available, to monitor implementation and operation of MLF projects, and to plan and control ODS production and consumption at local level. For example, Shanghai EPB, Municipal Science and Technology Commission, Municipal

Economic Commission have studied the strategy for ozone layer protection since 1992. In recent years, these organizations worked together and completed the investigation for ODS production and consumption in Shanghai. A cooperation network has been established between enterprises and related agencies, and it has launched investigations on ODS recycling from mobile air conditioners, ODS production and consumption for solvent sector.

10. China supervises ODS phaseout activities by monitoring production, consumption, import and export of ODS, through the following:

1) ***Developing standardized data registration and reporting system.*** China has established and will further improve the data registration and reporting system for ODS phaseout projects, utilization of MLF funds, production, consumption, import and export of ODS/products, to monitor the whole process of ODS phaseout actions. Since 1993, China has been reporting required data and information to Secretariat of Montreal Protocol and MLF.

2) ***Establishing ODS substitutes/products quality control.*** China has set up quality monitoring system for domestic refrigerators and halon sector. China has revised or formulated products standards, quality standards, safe production standards, and products control center for some ODS substitutes/products. To ensure phaseout activities proceed smoothly, China has enhanced technical management for substitution, by establishing supporting institutions to assist in developing sector strategies, helping enterprises select technologies, and implementing conversions in chemical industry, industrial and commercial refrigeration, solvent, and domestic refrigeration sectors.

3) ***Establishing and improving management information system.*** China has established and operates a management information system for implementing MLF projects. Now SEPA is expanding the management information system under the sector plans. Improving the management information system will enable SEPA to monitor and control the ODS phaseout process, monitor implementation of phaseout plans, and assess results of MLF projects, enforcement and effectiveness of related policies.

4) ***Developing guidelines for implementation of MLF projects.*** In 1994, PMO formulated the Guidelines for Implementation of MLF Projects, which became effective in 1995 on a trial basis. The guidelines are aimed at standardizing the management on submission and

implementation of MLF projects, improving the quality and implementation efficiency of submitted projects, ensuring that projects being implemented follow the proposed plans and achieving the phaseout targets set.

11. **Policy Framework.** The policy framework for the action plan set out in the CP has played an important role in guiding the design of policies for ODS phaseout. China has designed, issued and implemented over 20 policy documents during 1991-1997 (see Table 18 of CP Update). Meanwhile, China is also considering new policies according to changes of social, economic and institutional context which affect the design and implementation of policies (see Table 19 of CP Update). Some of these policy actions are summarized below:

1) ***Reflecting requirement for ODS phaseout in sector development plans.*** ODS production and consumption sectors take consideration of requirement of ozone layer protection and ODS phaseout when designing and implementing sector development plans. The objective is to control production and consumption of ODS combined with implementation of MLF projects, and to encourage development, production and application of substitutes and substitute technologies.

2) ***Linking ODS phaseout into the environmental regulatory system.*** By using the existing environmental regulatory system, China links ODS phaseout activities into the daily operation of environmental management by government policies. For example, to strengthen the ODS phaseout management by using existing pollution emission registration and environmental impact assessment. ODS phaseout has been reflected in some important government documents since the Fourth National Environmental Protection Conference (1996). For example, Decisions Regarding Some Environmental Protection Issues by the State Council (1996), 9<sup>th</sup> Five-year National Environmental Protection Plan and Long-term Objective to 2010, Trans-century Green Project Plan of China, and other documents.

3) ***Controlling ODS production and consumption by policy actions.*** The Government has issued several policies aimed at controlling new capacity for ODS production and consumption. For example, the production quota permit system implemented in Halon sector, tradable production quota system for Halon sector, and policies regarding management for new, expansion and modernization in ODS production and consumption projects. On November 11, 1997, NEPA, State Planning Commission, State Economic and Trade Commission, State Industrial and



Commercial Administration jointly issued Circular on Bans for New Construction of Production Facilities of ODS Production and Consumption. This policy indicates that China will strictly control and ban new, expansion and modernization production facilities construction for ODS/product production and consumption, by environmental impact assessment, and other approval procedures of government agencies.

4) ***Controlling ODS production and consumption.*** The Government has recognized that changes in demand will impose a huge impact on producers' behavior. Therefore, the Government has designed and implemented policies aimed at guiding consumption to achieve the objective which is to control production and consumption, such as, Definition and Bans on the New Installation of Halon Extinguishers at Non Essential uses areas and Environmental Labeling for Substitute Products.

5) ***Promoting substitute production through product quality codes and management.*** Since ODS phaseout and substitute processes involve many issues related to product quality and safety, it is necessary to establish and improve the quality management and monitoring system for ODS substitutes/products. The Government has started to design quality standards and safe production standards, as well as related codes for some products, such as the quality standards for ABC dry powder and codes for building design and revision for Halon sector, regulations for promoting the application of Halon substitutes.

6) ***Controlling production behavior of enterprises by government policies.*** According to the requirements of the CP and of sector strategies concerned, Government Agencies inform the enterprises and guide their behaviors by policies and guidelines, such as, Circular for Bans on Using CFCs for New Cars of China's Car Industry, Circular on Bans for New Installation of Halon Extinguishers. To achieve the planned target set by CP for bans of using ODS in Aerosol Sector, nine ministries and commissions of the Government (NEPA, China's Association for Light Industry, State Planning Commission, State Economic and Trade Commission, Ministry of Public Security, Ministry of Chemical Industry, Ministry of Agriculture, State Industrial and Commercial Commission, State Technology Supervision Administration) jointly issued Publicly Note for Bans of Using CFCs at Aerosol Sector in June 5, 1997, informing that China would ban the use of CFC as propellants for aerosol products (except for medicinal uses) from December 31, 1997.

7) ***Strengthening the monitoring and management system.*** The monitoring and management responsibilities of concerned agencies have been clearly defined in the policies. These responsibilities will improve enforcement of policies, such as Circular on Enhancing the Monitoring and Supervision Function for Ozone Layer Protection by local EPBs, stipulations regarding ODS data reporting, environmental impact assessment and implementation guidance of MLF projects.

12. **Role of Sector Strategy and Sector Approach.** Based on the development of ODS phaseout in China, the Government designed Sector Strategy for Phaseout of ODS (Sector Strategy) in eight related sectors in June 1995. The Sector Strategy further projected ODS production and consumption trends on the basis of more accurate assessment of ODS production and consumption data. The Sector Strategy analyzed the possible phaseout approaches based on the specific conditions of each sector, and estimated the incremental cost for phaseout, put forward policy measures, and further clarified the phaseout strategy for sectors concerned.

13. To ensure that the phaseout objective is met, to speed up implementation of phaseout projects, to let MLF fully play its strategic role and to improve fund utilization efficiency, the Government prepared and submitted the Sector Plan for Halon Phaseout in China (sector approach). The features of this sector approach are: a) It can achieve cost effective objectives of phaseout activities through indicators controlling and monitoring production and consumption of halon and substitutes at the national level; b) It will ensure phaseout targets are met by strengthening policy formulation and implementation; and c) It will establish improved monitoring and supervision system to ensure that the objectives of plans and policies are met. This Sector Plan was submitted to the 20<sup>th</sup> ExCom Meeting and was approved by the 23<sup>rd</sup> ExCom Meeting. Now China is working on the design of sector approach plans for solvent, tobacco, and chemical production sectors. Other sectors could be considered later.

14. **Link Between CP Policy, Strategy and Action Plan.** The importance of policy action and sector strategy as flexible, long range planning tools to achieve phaseout have been recognized. It is also recognized that the action plan for phaseout should concentrate on short term actions to meet realistic targets, with flexibility to adjust and update as needed. The action plan should be responsive to situations that emerge in each sector, the impact of overall economic growth, in technology and funding availability and the growing role that the sector

approach/umbrella approach is expected to play in the near future. With this strategic view in mind, it has been decided that the CP Update would focus on policy actions and overall strategies and management needed to implement ODS phaseout. The separate and flexible Action Plan, based on the CP policies and strategy, will focus on:

- short term action (3 - 4 year period); and
- medium and long term action (up to 2010).

15. The Action Plan would periodically be updated to reflect changes in funding availability, and requirements, technology availability, available data on production/consumption, progress actually being made and any corrective actions needed, and results from sector approach/umbrella approach. It is anticipated that Action Plan Update would not require an update of the CP itself, unless a fundamental shift in policy is required.

16. **Education, Publicity, and Training.** Education and publicity are important instruments to encourage public participation, especially since the occurrence and impacts of ozone depletion are difficult to understand for the public. However, the consumption behavior and public opinions can have large impact on ODS phaseout. To raise the awareness on ozone layer protection, China conducted extensive activities of education in the form of books, journal and newspapers, broadcast, TV programs, movies, workshops, training, posters, street education activities. Those activities greatly popularized the knowledge of ozone layer protection (See Table 6). Technical assistance and training activities continue to be emphasized, particularly in developing and expanding the monitoring system for new technology and in implementation at project level.

## **D. Evaluation of Progress in ODS Phaseout**

17. **ODS Phaseout Results.** By the end of 1996, significant progress had been made in ODS phaseout. With support of MLF, by industry restructuring, policy implementation, and voluntary involvement of enterprises, the Government has controlled ODS production and consumption growth, and has started the phaseout of ODS. By the end of 1996, China overall had phased out about 23,000 tons of ODS (ODP value). By August 1998, China had submitted and received approval by MLF for 249 projects, with grants of US\$ 254 million, which will phaseout ODS of about 63,000 tons of ODP (see Table 1). By the end of 1997, 23 MLF projects had been checked

and accepted as completed, with ODS phaseout amount of about 23,898 tons of ODP. However, these accomplishments fell short of the ambitious short-term target set out in the CP as discussed below.

Table 1 Project and Incremental Cost Approved By MLF and by Sectors  
(As of August of 1998)

Sector	Number of Project		Fund Received (US\$ 1,000)		Phaseout amount ODP tons proposed
	Total	Of which, investment project	Total	Of which, investment project	
Industrial and commercial refrigeration	24	18	40,931	39,717	3,599
Halon*	16	3	66,913	65,433*	22,178
Chemical industry	5	0	985	0	0
Domestic refrigerators	49	36	75,515	68,498	8,970
Methyl Bromide	3	0	675	0	0
Foam	79	71	38,476	36,941	9,112
Aerosol	5	3	7,053	6,978	17,891
MAC	4	4	6,583	6,583	795
Solvent	23	19	8,547	7,767	710
Tobacco	2	0	250	0	0
Recycling	3	0	603	0	
Others	36	0	7,942	0	
<b>Total</b>	<b>249</b>	<b>154</b>	<b>254,473</b>	<b>231,917</b>	<b>63,255</b>

Note: \*include entire Sector Plan of Halon Phaseout which was approved in November 1997.

18. The CP estimated demand for ODS under without control scenario, based on economic development conditions and growth rate of ODS consumption of each sector in the 1980's, as well as the 8<sup>th</sup> 5-year and 9<sup>th</sup> 5-year plan. The CP set ozone layer protection as a priority to be considered when designing and implementing the ODS phaseout plan. Thus, the CP set a quicker phaseout plan than that required by the MP.

19. The CP used 1991 as the base year for ODS production and consumption, and proposed that consumption in 1996 would be slightly lower than the 1991 baseline, as shown in Table 2 below. Table 3 below shows detailed data on production, consumption, import and export of ODS and ODP during 1991-1997.

Table 2 CP Implementation Performance (ODS Consumption)

	CP Target (1,000 tons)		Actual (1,000 tons)	
	Total ODP	ODP without Halon	Total ODP	ODP without Halon
<b>1991</b>			55.7	42.5
<b>1996</b>	52.6	42.5	81.4	51.9

Note: corrected for Halon at 10.0 ODP

Table 3 Controlled ODS Production and Consumption in China (Tons)\*

	Production (ODS)	Import (ODS)	Export (ODS)	Consumption (ODS)	Production (ODP)	Consumption (ODP)
<b>1991</b>	30,980	17,443	0	48,423	38,920	55,880
<b>1992</b>	24,650	32,378	134	56,894	31,760	64,350
<b>1993</b>	27,009	38,659	295	65,373	34,996	71,848
<b>1994</b>	46,417	23,722	1,042	68,827	60,404	81,414
<b>1995**</b>	55,914	34,541	3,815	86,640	85,749	105,069
<b>1996**</b>	57,832	9,261	2,921	64,172	84,484	81,049
<b>1997**</b>	65,133	8,428	3,457	70,104	95,761	87,618

Note: \* During 1995-1996, the total ODP consumption decreased, in which, CFC-12 dropped about 13,600 tons. CFC-11 and CFC-113 was the major contributor to the increase of the total consumption during 1996-1997, because continuing increase particularly of foam and solvent sector.

\*\* Data for 1995-1997 is based on the new survey and investigation.

20. Overall, the CP target for 1996 was not achieved. 1996 ODP consumption was about 81,000 tons ODP compared to the target of 52,600 tons ODP, or 54% over target. However, if halon is deleted from the consumption, then the results are about 51,900 tons ODP achieved compared to the target of 42,500 tons ODP, or 22% over target. The high impact of halon is due to its high ODP coefficient, its unusually high growth rate as explained below and the inability to reach early agreement with ExCom on an effective halon phaseout action plan. (The Halon Sector Plan has since corrected this problem.)

21. **Problems in Implementing CP.** The shortfall in achieving the 1996 target was due primarily to the following:

1) *Economic growth was considerably greater than anticipated in the CP.* During the early 1990's, China's economy had a high growth rate. As income levels rose, demand on certain ODS using products grew quickly and further improved the development of certain industries (see Table 4). For example, demands for safety of fire control increased dramatically, which

resulted in the huge demand market for fire fighting equipment and facilities. Sales of domestic refrigerators grew at 13.3% per year during 1991-1996. All of these factors imposed great pressure on ODS production and consumption in China. In addition, the lack of substitute development and production, resulted in technical and economic difficulties that slowed ODS phaseout and added to increased ODS production. This high growth rate, resulted in higher demand growth for the ODS consuming sectors, well beyond the forecast in the CP, and was the principal reason for not reaching target levels.

Table 4 Economic Development and Production of Major Products in China

		1990	1995	1996	Annual growth rate 1991-1996 %
<b>GDP (billion Yuan)</b>		1,855*	5,848*	6,778*	11.6**
<b>Total industrial output (billion Yuan)</b>		2,393*	9,189*	9,949*	21.2**
<b>Consumption level of per capita (Yuan)</b>		803*	2,311*	2,677*	22.2**
<b>Production of Major Products (10,000 sets)</b>	<b>Domestic Refrigerators</b>	463	919	980	13.3
	<b>Domestic Air Conditioners</b>	24	682	646	73.1
	<b>Cars</b>	51	145	154	20.2

Note: \* By current price; \*\* By constant price

Sources: China Statistic Year Book, 1991-1997.

2) **High growth in service sector.** Consumption in service sector also grew rapidly, largely for the same reasons listed above. There was little information available on the service sector when preparing the CP and the CP did not focus on service requirement. In retrospect, service sector ODS can not be phased out until an effective action plan is in place to eliminate ODS in new equipment, particularly in industrial and commercial refrigeration, MAC and household refrigeration. Service sector requirements will be addressed in the action plans of the concerned sectors.

3) **Development of guidelines within ExCom, Implementing Agencies and local agencies took longer than anticipated.** Guidelines and administrative procedures were developed and changed on a continuing basis, particularly during 1992-1995. Each Implementing Agency had to adjust MLF guidelines to fit within its own management framework and SEPA, in turn, had to adjust the various guidelines/procedures to fit local conditions. This adjustment process took its toll, particularly in the early stages of CP implementation in China. At present, procedures and

guidelines are well established and no longer represent a major obstacle to implementation.

4) *Flow and level of funds from MLF did not meet China expectations.* MLF grants did not meet the demand of China's ODS phaseout. Implicit in the CP, the precondition for China to phaseout ODS of 50,450 tons was for MLF to provide financial support of about US\$ 428 million by the end of 1996. However, only US\$ 126 million, 28 % of funds needed, was approved for China (see Table 5). The approval process itself also is time consuming. In some cases, projects are deferred for 1-2 meetings, adding to total implementation time. The low level of financial assistance from MLF not only impacted on the phaseout process, but also affected the willingness of enterprises to participate the ODS phaseout process. Amount and flow of funds continue to be an issue.

Table 5 MLF Funds Approved and Incremental Cost Estimated in China

As of end of 1996 (US\$1,000)

Sector	Fund Needed*	Fund Approved	
		Amount	Percentage of Needed
Chemical industry	91,970	635	0.7%
Foam	118,150	27,420	23.2%
Industry and commercial refrigeration In which MAC**	92,380	26,410 6,583	2.7%
Domestic refrigerator	25,260	41,138	162.9%
Halon	53,260	4,913	9.2%
Aerosol	8,400	6,505	77.4%
Solvent	25,950	5,106	19.7%
Recycling and reuse	13,180	603	4.6%
Others		6,334	
Tobacco	18,791	50	0.3%
Sub-total	447,341	125,699	28.1%
Methyl Bromide***		87	

Note: \* The incremental cost estimated by original CP.

\*\* In original CP, MAC was included in the industrial and commercial refrigeration sector.

\*\*\* Methyl Bromide was not included in original CP

5) *Project by project approach not as effective as anticipated.* Implementation period of MLF projects is typically too long, with negative impact on implementation of phaseout projects as well as achievement of phaseout targets. For example, the first group of projects for industrial

and commercial refrigeration sector was approved in December of 1994, however, the grant agreement was not signed until 1996. Under the project by project approach, the time period for project preparation and approval, time for procurement and implementation and supervision is cumulative for each project and requires micro management at all levels of individual project details. All of these factors add considerable time to execution and ODS phaseout results. The sector approach/umbrella approach is being designed to remove most of these constraints.

6) ***Domestic implementation capacity is in a process of improving.*** When the original CP was created, it was early in the implementation process for MLF and many of China's institutions were optimistic in their forecasted accomplishments and capabilities. As all developed along their own "learning curve", some were able to accomplish more than others. Some, including SEPA (then NEPA) were initially impacted significantly by personnel turnover while trying to simultaneously increase staff and train them. Overall, while consumption was reduced, the support from strong policies/regulations was delayed, somewhat hindering progress. Many of the organizations have since taken actions to improve capabilities and based on their improved knowledge, have also tempered their optimism. The new result is believed to be a more realistic plan and a better integration of policy support.

22. There are two significant issues that continue to affect CP implementation:

1) ***Existence of technology transfer obstacles.*** According to the MP, developed countries should transfer technologies at favorable terms, and MLF should provide financial assistance to developing country for technology transfer related to the ODS phaseout activities. Although MLF has set up principles regarding technology transfer, and emphasized importance of technology transfer, an efficient, workable technology transfer mechanism has not been established. In practice, enterprises in developed countries do not want to transfer technology at a price either the developing countries can accept, or a price the MLF can provide. Such obstacles result in a delay in affected projects. For example, The projects of Industrial and Commercial refrigeration, (five out of six projects in first group) were impacted by difficulties in technology transfer. Meanwhile, due to technology transfer obstacles, enterprises had to seek lower level technologies. Therefore, the quality of substitution technology was affected, and it impacted on the healthy development of conversion process.

2) ***Lag in ODS production sector phaseout and production substitutes.*** ODS phaseout in



production sector, and substitute development and production lagged behind seriously. Thus, demand for substitutes could not be met, due to technical and economic reasons, and for lacking the necessary assistance from MLF (as of October 1998, guidelines for production closure and substitute production have not been issued). This results in the demand of ODS substitutes heavily dependent on imports, which impacts on the healthy development of industries concerned. It will also be one of the major obstacles in ODS consumption phaseout in the future.

## **E. LESSONS LEARNED FROM CP IMPLEMENTATION**

23. The following lessons emerged from reviewing implementation of the original CP and have been taken into account in the CP Update:

24. **Joint Efforts of MLF, Implementing Agencies and Local Agencies Essential.** The essential conditions for China fulfilling its obligations under the MP and implementing the CP are sufficient support from MLF and effective technology transfer. The Chinese experience shows that support from MLF is a key element for achieving ODS phaseout. Meanwhile, the Implementing Agencies provide important assistance to China's ODS phaseout. The policies, monitoring and supervision mechanisms designed and enforced by the Government are the guarantee for ODS phaseout process continuing smoothly. How to establish and further improve effective cooperation relationships are important for achieving China's ODS phaseout targets. Therefore, all the organizations concerned need to continue working together closely to ensure successful completion of future ODS phaseout activities. On that basis, the Government proposed to speed up policy formulation, establishment of monitoring and management system, to ensure phaseout plan targets are met.

25. Implementing Agencies concerned should further simplify implementation procedures, shorten time for project implementation and accelerate disbursement rates.

26. **Effective Monitoring and Supervision Mechanism.** China has established a monitoring system based on the existing administrative framework and management responsibilities of government agencies concerned. The system links ODS production and consumption phaseout into the daily monitoring and management activities of the sectors concerned. It also enables

local EPBs to monitor and manage the phaseout activities at various levels. At the same time, the Government has given attention to self-capacity building while implementing the CP. The capacities of domestic entities (for example, central government agencies, PMO, agencies at sector level, local government and domestic consultants) for design, preparation and implementation management for ODS phaseout projects have been improved and are playing a more and more important role. The domestic institutions now have the capacity to complete project preparation and implementation. The improvement of management and enforcement, and implementation capacity of domestic entities has strengthened the quality of project implementation and enforcement. This capability ensures that ODS phaseout is suitable to China's situation and further encourages the ODS phaseout process.

27. **Effective Policies and Strategies.** The Government made great efforts in policy design and enforcement, and has achieved good results. China's practice shows that domestic policies, regulatory framework must be established and enforced. The ODS phaseout targets and strategies can be achieved only by using policies, incentives, and enforcement to influence the behavior of enterprises and consumers.

28. **Education, Training and Communication.** Education, publicity and training are important instruments to encourage the public participation and involvement of enterprises. The Government made great efforts, by various types of education, training and other activities, the awareness for ozone layer protection of decision makers, managers, enterprises and public was improved significantly. In addition, such activities have provided related sectors and enterprises large amount of information regarding technologies and market situation. At the same time, it is realized that a well established communication program is needed involving the ministries concerned, local EPBs, implementing agencies, producers and consumers, to ensure that target groups are reached and the combinations of various actions will be employed effectively.

29. **Project Implementation Through Multiple Approaches.** Since the approval of the CP, project application and implementation approaches as well as the related fund operation mechanism have been changed. For example, from individual project application, to the combination of individual and umbrella projects; then to the co-existence of individual, umbrella and sector plan approach, cost effectiveness has been improved. However, it is helpful to choose the right combination of phaseout alternatives based on the characteristics of sectors concerned

especially since the number of enterprises are very large and the types of enterprises are complicated. Since 1995, to accelerate the implementation of phaseout process and improve the effectiveness of the projects, China has started to design and implement sector plan for halon sector and production sector. Now, China is developing sector plans for solvent sector and tobacco sector.

30. **Link between Production and Consumption Sectors.** The implementation of CP shows that, to ensure the ODS phaseout process being implemented smoothly, phaseout strategy and measures must take related factors into consideration. Only by taking full concern of those factors, will the phaseout targets be achieved. First, the phaseout process of production should be considered together with the phaseout process of consumption. Second, the phaseout process of production and consumption should be considered together with the development and production construction of ODS substitutes. Third, the phaseout process of production and consumption should be considered together with the development, introduction, and application of substitutes technology. Fourth, the phaseout of production and consumption should be considered together with the development of regulatory system and policies.

31. **Priority for SMEs.** Compared with the large sized enterprises, SMEs face more financial and technology problems for implementing ODS phaseout strategy than larger enterprises. Such problems have not attracted much attention within MLF in the last years. If the ODS phaseout in SMEs can not be solved properly, it is very likely that the ODS phased out by large enterprises will transfer to SMEs, and therefore offset the effects that have been achieved. Therefore, it is necessary to develop project application, implementation approaches as well as the suitable technologies, which are suitable to the technical and economic characteristics of the SMEs.

Table 6 Completion of Government Actions Proposed in CP

	<b>Actions adopted</b>	<b>Effects proposed and achieved</b>
<b>Sector ODS Phaseout Strategy</b>	<ul style="list-style-type: none"> <li>• CP is under implementation and some adjustments made. In 1994, complement of CP for tobacco sector finished. Since then, 8 sector strategies for ODS phaseout were completed, including, aerosol, chemical production, foam, halon, domestic refrigerator, industrial and commercial refrigeration, mobile air conditioner, solvent. An international workshop on the sector strategies held in June of 1995. The sector strategies were introduced at 17<sup>th</sup> ExCom Meeting. Sector Plan for Halon Phaseout was approved by ExCom in November 1997.</li> <li>• 249 projects for ODS phaseout had been approved and funded by MLF.</li> <li>• Established and improved institutional arrangement for ozone layer protection at national and ministry level.</li> <li>• co-ordinating working group for CFCs phaseout at China's aerosol sector was established</li> <li>• Adjusted and reorganized PMO, strengthened the policy study and formulation.</li> <li>• China's Leading Group for Ozone Layer Protection held over 30 meetings, discussed issues for ODS phaseout.</li> </ul>	<ul style="list-style-type: none"> <li>• all sectors implementing sector strategies and ODS phaseout activities</li> <li>• by the end 1996, China phased out 23,000 tons ODP</li> <li>• some enterprises have voluntarily closed, converted, or phased out some ODS consumption</li> <li>• MLF provide Halon sector 62 million USD which can phaseout halon 21,378 tons (ODP)</li> <li>• by August 1998, 254 million USD was granted by MLF, can phaseout ODS 63,255 tons (ODP).</li> <li>• Institutions for management and monitoring ensures phaseout going smoothly, and formulates and enforces phaseout plans and policies.</li> <li>• Provide basis for ban on CFC uses in aerosol</li> </ul>
<b>Policy</b>	<ul style="list-style-type: none"> <li>• policy study expert group was established. This group collected and analyzed policies regarding ozone layer protection in China and abroad, conducted studies for specific policies based on the policy framework in CP</li> <li>• China's Association of Light Industry, Ministry of Chemical Industry, Ministry of Agriculture, General Company of Packaging in China, and other agencies concerned jointly working to study and formulate policies, which provided basis for bans on CFCs uses in aerosol sector since the end of 1997.</li> <li>• National Environmental Protection Agency jointly working with Ministry of Public Security, Ministry of Chemical Industry for issuing the production quota for halon agent and the management for this system.</li> </ul>	<ul style="list-style-type: none"> <li>• Analyzed policy framework proposed by CP, put forward policy recommendations, some implemented</li> <li>• Provided basis for bans on CFCs at aerosol sector</li> <li>• halon production permit and quota system has been formulated and implemented, which provides policy basis for implementing sector plan effectively</li> </ul>

<b>Bans</b>	<ul style="list-style-type: none"> <li>• In April 1991, Ministry of Light Industry jointly with NEPA issued “Circular for Controlling Development of Aerosol Products Consuming CFCs, requiring new and expansion production enterprises to adopt CFC substitute technology”.</li> <li>• In July 1992, Ministry of Machinery (China's General Company for Mobile Industry) issued “Circular for Stop Using CFC-12 Air Conditioners for New Cars by End of 2000”</li> <li>• In July 1997, Ministry of Machinery issued “Bans on Consumption of CFCs for New Produced Cars of China's Mobile Industry”</li> <li>• In December 1993, Ministry of Chemical Industry and NEPA jointly issued “Circular on Management for CFCs and Their Substitutes Production Construction”, requiring to stop new constructions for CFCs production.</li> <li>• In November 1994, Ministry of Public Security and NEPA jointly issued “Bans on New Installation of Halon Extinguishers at Non-essential Uses Area”</li> <li>• In August 1995, Shanghai EPB and Shanghai Transportation Agency issued “Regulations on Recycling of CFCs from Mobile Air Conditioners by Vehicle Servicing Enterprises in Shanghai”.</li> <li>• In July 5, 1996, Ministry of Public Security issued “Policies for Promoting Halon Substitutes”.</li> <li>• In June 5 of 1997, nine ministries and commissions jointly issued “Bans for Using CFCs at Aerosol Sector”</li> <li>• In November 1997, four ministries and commissions jointly issued “Bans for New Installation of Facilities for Production and Consumption of ODSs”, requiring local EPBs to monitor by Environmental impact assessment.</li> </ul>	<ul style="list-style-type: none"> <li>• CFC consumption increase rate has been decreased</li> <li>• four types of car started to use HFC-134a MAC since 1995. Production amount accounts for 27% of total in China. There are 4 manufacturers for MAC parts are implementing innovation projects for HFC-134a, which is proposed to be completed in 1998, and all converted by 2001.</li> <li>• new types of cars developed since August of 1997 banned to use CFC as refrigerant</li> <li>• controlled new CFCs production facilities</li> <li>• most producers of halon agent and extinguishers readjusted production plans and reduced production.</li> <li>• major servicing enterprises for MAC have installed CFC recycling and recovery facilities in Shanghai, Beijing and Tianjin.</li> <li>• since end of 1997, producer of aerosol were not allowed to use CFCs (exclude medical uses)</li> <li>• controlled new ODS production and consumption.</li> </ul>
<b>Investment policy</b>	<ul style="list-style-type: none"> <li>• Ministry of Machinery required to stop investing on new and expansion project for producing and consuming CFCs products in 1992</li> <li>• Sectors concerned clearly stated that the investment for ODS products was not encouraged. And promoted to invest on substitutes production in their 9<sup>th</sup> five year plan (1996-2000)</li> </ul>	<ul style="list-style-type: none"> <li>• controlled effectively the CFC consumption in industrial and commercial refrigeration sector</li> <li>• promote conversion and technology substitution, control development of ODS products, encourage development and production of substitutes.</li> </ul>
<b>Production permit</b>	<ul style="list-style-type: none"> <li>• production permit system had been introduced to Halon agents and halon extinguishers since 1991. The production quota system was implemented since December of 1997</li> <li>• Ministry of Chemical Industry issued the implementation issues for CFCs production permit</li> </ul>	<ul style="list-style-type: none"> <li>• by implementing halon permit and quota system can ensure reduction of halon production and consumption</li> <li>• by implementing CFC production permit will effectively control CFC production</li> </ul>

<b>Codes and Standards</b>	<ul style="list-style-type: none"> <li>• refrigerator with CFC free or less CFC quality monitoring centre has established</li> <li>• CFC Substitute quality Control Centre has been established, and has established ODS Substitute Products Engineering Technology Center. Aerosol Quality Monitoring Centre being established</li> <li>• Construction Design Code for Fire Fighting of Tall Civil Buildings and other codes have been revised and were implemented. The quality standard for ABC dry powder has been formulated.</li> <li>• Design standard for refrigeration storage using CFCs is been revised.</li> <li>• Technical supporting institutes have been defined for I&amp;C, MAC, foam, aerosol, and halon sectors.</li> <li>• aerosol product standards are being formulated, including management for safe production.</li> </ul>	<ul style="list-style-type: none"> <li>• to help enterprises/factories to choose suitable substitution technologies. To ensure quality of substitute/products. To provide technical support for implementing environmental labelling system, therefore to speed up ODS phaseout process</li> <li>• bans installations of halon extinguishers at non-essential uses areas</li> <li>• promote CFC phaseout</li> </ul>
<b>Education and training</b>	<ul style="list-style-type: none"> <li>• In 1995, all sectors held workshops for new substitutes technology, policies, sector strategies</li> <li>• China Ozone Action has published over 30 volumes since March 1995.</li> <li>• The book of "Responsibility for Ozone Layer Protection" was published (3 volumes)</li> <li>• Editing and Translating "Save the Ozone Layer" training handbook and video tape provided by UNEP</li> <li>• translated the reports of TEAP</li> <li>• In 1995, workshop for International Ozone Day was held, with participants of over 100 from China and abroad. Local EPBs launched education activities by broadcast, TV, newspaper, journal, posters in September 1995. TV program was made and shown at national television stations. About 40 newspapers reported news about ozone layer.</li> <li>• First National Conference for Ozone Layer Protection was held from Sep 16-17, 1996, with over 400 international and domestic participants . This conference summarized 10 years experience of ozone layer protection in China, and put for ward objectives for 9<sup>th</sup> five year plan.</li> <li>• In Sept 1997, a nation wide Xinfei Cup Competition for Ozone Layer Protection was held, with 50000 participants. In the same day, China-Japan Workshop on Ozone Layer Protection was held.</li> <li>• Huge educational and training activities were conducted by all sectors</li> </ul>	<ul style="list-style-type: none"> <li>• promote awareness of decision makers, enterprises and public</li> <li>• enterprises got good understanding about substitute /technologies and their development, and have started to think about issues related to conversion</li> </ul>
<b>Environmental labelling</b>	<ul style="list-style-type: none"> <li>• environmental labeling system has been implemented for refrigerator and aerosol products</li> </ul>	<ul style="list-style-type: none"> <li>• 48 products from 24 enterprises were approved to use environmental label</li> </ul>

<p style="text-align: center;"><b>Conversion</b></p>	<ul style="list-style-type: none"> <li>• all sectors have determined ODS phaseout projects, some of them got financial assistance from MLF</li> <li>• NEPA and sector management agencies trace the new development of substitute technologies via investigation and participating workshops</li> <li>• chemical production sector has started the experiment projects for HCFC—123, HFC—134a, 227 and other substitutes, while HCFC—141B can have commercial production</li> <li>• the mixed (blend) substitutes can be directly filling is being developed.</li> </ul>	<ul style="list-style-type: none"> <li>• 249 projects were approved, and 63,255 tones of ODS (ODP value) can be phased out</li> <li>• most of sectors has determined the substitution technologies</li> </ul>
<p style="text-align: center;"><b>Recycling and recovery</b></p>	<ul style="list-style-type: none"> <li>• recycling and recovery projects for halon and CFCs has been conducted</li> </ul>	<ul style="list-style-type: none"> <li>• reduce emission of CFC and halon, and reduce demand for ODS production</li> </ul>
<p style="text-align: center;"><b>Monitoring and enforcement</b></p>	<ul style="list-style-type: none"> <li>• monitoring institutions and responsibilities defined for ministries/commissions under Leading Group</li> <li>• Guidelines for Implementing ODS Phaseout projects have been issued and implemented</li> <li>• 23 MLF projects have been approved as completed</li> <li>• Capacity of PMO for monitoring implementation of projects has been strengthened by training, standardizing management procedures</li> <li>• Local EPBs have been required to monitor implementation of policies and projects.</li> <li>• data registration, reporting and checking system were established and are being improved</li> <li>• management information system is been established</li> </ul>	<ul style="list-style-type: none"> <li>• defined responsibilities of central and local governments</li> <li>• monitoring system for ODS phaseout projects established</li> <li>• payment rate of international implementing agencies has been increased</li> <li>• by management measures to monitor and manage the aerosol production enterprises</li> </ul>