

# Annual Project Report

Sector Plan for HCFC Phase-out in the Industrial and Commercial Refrigeration and Air Conditioning (ICR) Sector in China (Stage-I)

2012.12.30

## Basic Project Information

Project Title: Sector Plan for HCFC Phase-out in the Industrial and Commercial Refrigeration and Air Conditioning (ICR) Sector in China (Stage-I)	
UNDP Award ID	00063099
UNDP Project ID	00080423
Project Duration	2011 - 2016
Reporting Period	2012.1 – 2012.12
Total Approved Project Budget	US\$ 61,000,000
Participating UN agencies	UNDP
Implementing Partners/ National collaborating agencies	Ministry of Environmental Protection (MEP)/Foreign Economic Cooperation Office (FECO)
International collaborating agencies	
Cost-sharing third parties	
UNDP Contact officer	Cao Qiaohong
Project website	

## Executive Summary

The implementation of the sector plan follows the PBP scheme outlined in the Memoranda of Understanding between UNDP and FECO. The work on the sector plan in 2012 is mostly about establishing the principles for implementation and selecting implementation partners. All milestones for the 2011 tranche are met, but actual conversion will begin in 2013.

FECO and CRAA cooperated closely to implement the sector plan. In early 2012, 17 enterprises submitted their letter of intention to participate in the conversion projects. After further reviewing of their proposals, FECO and CRAA signed contracts with 4 of the enterprises, amounting to about 3,000 MT of HCFC-22 phase-out.

Major risks identified are: R32 flammability and related liability issues, uncertainty on the enterprises choice of refrigerant, and time limit. FECO and CRAA have adopted measures to address these issues.

## 1. Background

### Development Context

The XIXth Meeting of the Parties to the Montreal Protocol in September 2007, through its Decision XIX/6, adopted an accelerated phase-out schedule for HCFCs. The first control is the freeze on production and consumption of HCFCs from 01 January 2013, at the Baseline Level (average of 2009 and 2010 consumption levels). The other control steps are reduction of 10% by 2015, reduction of 35% by 2020, reduction of 67.5% by 2025, reduction of 100% by 2030, allowance of 2.5% of baseline (annual equivalent) for period 2030-2040 and complete phase out by 2040. China is a party to the Montreal Protocol and must comply with the above targets.

To fulfil the country's compliance and to achieve the HCFC phase-out targets for stage-I, i.e. freezing the HCFC consumption at the average level of 2009-2010 from January 2013 and reduction of 10% of the baseline consumption from January 2015, in cooperation with UNDP, the ICR HPMP of China was prepared and submitted for the consideration of the 62nd Meeting of the Executive Committee after due review and endorsement by the Government. The Executive Committee approved the ICR HPMP of China in 64th meeting for Stage-I in July 2011 at a funding level of US \$ 61,000,000. The agreement between Government of China and the Executive Committee of the Multilateral Fund (Document UNEP/OzL.Pro/ExCom/6739, Annex-X) for the reduction in consumption of Hydrochlorofluorocarbons (Annex-C Group-I substances) in China was updated at the 67th Meeting of the Executive Committee of the Multilateral Fund. The agreement between the ExCom and Government of China indicated the ICR HPMP of China aims to phase out 224.5 ODP tons in 2013 and 240.3 ODP tons in 2015.

The breakdown of the annual HCFC consumption and phase-out control targets, approved funding and disbursement schedule, reproduced from the agreement is as below:

Table 1 Consumption Control Targets for HCFC in ICR Sector (tons ODP)

	2011	2012	2013	2014	2015	Total
--	------	------	------	------	------	-------

Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tonnes)	n/a	n/a	19,269.0	19,269.0	17,342.1	n/a
Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)	n/a	n/a	18,865.4	18,865.4	16,978.9	n/a
Maximum allowable consumption of Annex C, Group I substances in the ICR sector (ODP tonnes)	n/a	n/a	2402.8	2402.8	2162.5	n/a
Total Phase-out (ODP tonnes)	n/a	n/a	224.5	n/a	240.3	464.8

Table 2 Annual Funding Installments for ICR Sector (US\$)

	2011	2012	2013	2014	2015	Total
Sector Lead IA (UNDP) agreed funding (US \$)	25,380,000	6,900,000	8,495,000	11,075,000	9,150,000	61,000,000
Total	27,283,500	7,383,000	9,089,650	11,850,250	9,790,500	65,396,900

Under the Sector Plan, funding tranche for 2011 in the total amount of \$25,380,000 has been approved and released by the Executive Committee at its 64th Meeting.

## Project Objectives and Strategy

The ICR sector in China proposes to return its HCFC consumption to the baseline level (average of 2009 and 2010) by 2013 and reduce a further 10% to meet the 2015 target. The ICR sector will need to phase-out a total about 8,450 metric tonnes of HCFC consumption for meeting the 2015 target, of which 167 metric tonnes are expected to be phased out by non-A5 owned enterprises through their own resources. Thus, the net eligible HCFC consumption in the ICR Sector is 8,283 metric tonnes. Of this, about 312 metric tonnes will be phased out by the two previously approved demonstration projects (Yantai Moon and Tsinghua Tongfang). The remaining eligible HCFC consumption of 7,971 metric tonnes will be addressed in this Sector Plan, through technology conversions in about 55 enterprises, which will be carefully selected based on their financial soundness and sustainability, technical and managerial capacity, reputation and criticality for sustainable reductions. In order to ensure that the phase-out actions are carried out on time and remain sustainable, targeted policy and regulatory actions, management and coordination, technical assistance and awareness programmes will also need to be introduced.

## 2. Key Results

FECO and CRAA cooperated closely to implement the sector plan. In early 2012, 17 enterprises submitted their letter of intention to participate in the conversion projects. After further

reviewing of their proposals, FECO and CRAA signed contracts with 4 of the enterprises, amounting to about 3,000 MT of HCFC-22 phase-out.

## **Project Outcomes**

In 2012, the conversion projects under the sector plan were carried out. In total, 20 enterprises expressed their willingness to participate in the conversion. FECO recruited an accounting firm to conduct the verification of consumptions and the production line to be converted. After the verification, FECO organized experts to review conversion proposals, and signed contracts with 4 enterprises whose proposals have been approved. FECO has also prepared the project implementation manual for internal use and a plan for technical assistance activities under the sector plan.

### **Outcome 1: Investment projects**

After the Launching Meeting in 19 December 2011, the PMO and CRAA take every opportunity to mobilize the enterprise to develop their conversion plan and submit the letter of intent. Until May, there were totally 17 letters of intent submitted to PMO. With the assistance of CRAA, PMO preliminarily reviewed the letter of intent. Generally, all 17 enterprises were established before 21 September 2007 cut-off date. Some key information was found missing and requested to be supplemented. Some substitute routines were suggested to be adjusted according to the actual situation of the enterprises. All the letter of intent was further reviewed and discussed in the expert committee meeting held in May.

Daxin Certified Public Accounts was selected through bidding to be responsible for the verification of 17 enterprises' consumption and production line to be converted. As it was customarily done before, such verification was conducted before the contract was signed between FECO and the enterprises. This will also be a necessary procedure in projects henceforth. Verification result will be one of the key factors for calculation and finalization of the incremental cost of each enterprise. From June to August, two verification teams were respectively composed by the 2 CPAs, 1 technical expert, 1 staff of CRAA and 1 officer of PMO verified 17 enterprises.

Once the consumption and equipment information is obtained through the verification, FECO requested detailed conversion project proposals from the enterprises as a basis to determine the project schedules and costs. The proposals were reviewed by a panel of experts in the ICR sector. Based on the result of the review, proposals by 4 enterprises, namely Gree, TICA, Dun'an and Zhejiang Commercial Machinery Factory, were approved with revisions. FECO coordinated the revision work by the enterprises, and signed the contracts with the enterprises on December 12<sup>th</sup> of 2012, meeting the target of signing contracts amounting to 3,000 tons in 2012.

### **Outcome 2: Technical assistance**

In May, FECO called on a meeting of experts to discuss the technical assistance requirements for the sector plan. The experts suggest that the funding for TA activities should be used to fund

researches on the applicability of alternative substances. A series of standards that needs to be revised or drafted were also proposed by the experts.

Based on the discussion on the meeting, a detailed TA plan for the period of 2012-2015 was composed. The plan outlined the TA activities needed, the schedules, and the budgets for each activity in each year. The TA component in the bi-annual work plan will be determined according to this plan.

### **Outcome 3: Project Management and monitoring**

FECO has submitted quarterly progress reports by UNDP's requests. The activities carried out in each quarter and the financial situations have been reported. FECO has also submitted a progress report to the UNDP prior to the 68<sup>th</sup> ExCom meeting for the ExCom to evaluate the progress since the approval of the sector plan.

### **Activities and Outputs**

#### **Activity 1 Completion of project implementation plan**

Verification indicates that over 6,000 MT consumed in 20 production lines covering unitary air-conditioner, multi-connected air-conditioner, heat pump water heaters, small-sized water chiller, Industrial & commercial water chiller and Freezer and cold storage equipment were verified by the accountant.

Based on the above information, the proportion of conversions selecting R32 and R410A technologies, and a projection of future conversions, FECO was able to compile a table of cost-effectiveness thresholds for different types of enterprises and substituting technologies. This is a key part of the project implementation plan. The plan also include aspects such as the principles to select enterprises, the methods for verification of performance, etc.

### **Development Effectiveness**

The enterprises worked closely with FECO and China Refrigeration and Air-conditioning Industrial Association (CRAA) on the conversion and technology assistance activities. In events organized by FECO or CRAA, representatives from enterprises are invited and welcomed. The input from enterprises in all forms was taken into consideration in the process of designing projects and making plans.

The enterprises also constantly report their progress to FECO, and notify FECO when there are potential issues that may hinder the progress.

### **Cross-cutting issues**

The sector plan must be implemented with the cooperation of multiple enterprises with different status and positions in the industry, whose needs and benefits must be balanced. This is done by carefully designing the cost-effectiveness threshold for different types of enterprises.

By signing the phase-out contract with enterprises, the industry committed to reduce about 3.5 million of GHG emission per year.

### **3. Project Management and Oversight**

The implementation of the sector plan follows the PBP scheme outlined in the Memorandum of Understanding between UNDP and FECO. The performance milestones were agreed in the project document. FECO reports its progress to UNDP in the form of quarterly progress report.

#### **Implementation Status**

The work on the sector plan in 2012 is mostly about establishing the principles for implementation and selecting implementation partners. All milestones for the 2011 tranche are met, but actual conversion will begin in 2013.

#### **Monitoring and Evaluation**

FECO has assigned staff to track the progress of conversion preparation by each enterprise. A timetable for the conversion preparation was given to the enterprises to clarify what needs to be done and the deadlines. The staff constantly exchanges information with the enterprises. FECO has also notified UNDP about its progress on expert consultation and meetings, and submitted materials indicating achieving performance milestones.

#### **Human Resource Management**

One of the project officers working on this project at FECO has been on maternal leave until September. With adequate documentation, her colleagues were able to carry on the implementation.

Since November, the PMO has undergone significant position changes. Previously separate PMOs for room air-conditioner and ICR sectors have been combined. Project officers are switching roles, but implementation of the sector plans are still carried out according to schedules.

#### **Risk Management**

Major risks identified are: R32 flammability and related liability issues, uncertainty on the enterprises choice of refrigerant, and time limit.

China's National Standard GB9237, which determines whether an industrial and commercial air-conditioner can be put on the market in China, is a verbatim translation of ISO 5149. In 2012, the new draft of ISO 5149 failed to pass the vote, thus R32 and other A2L refrigerants are not allowed to be used on the Chinese market. By mid-2014, if the standards are not in place, the converted R32 production lines may have legal hurdles to overcome. The PMO plans to hold the disbursement of IOC funds if this happens, and to continue payment once the standards allow R32 products to be sold. During proposal review, the PMO and CRAA also asked some enterprises to submit explanations on their safety considerations and designs before their project can be approved, to reduce the legal risks of R32 products.

The first batch of enterprises who submitted the letters of intension show unexpected enthusiasm towards R32 technology. This raises the concern that the original cost-effective estimate may lead to insufficient funds at a later period. The PMO expect most of the subsequent proposals to use R410A, as the remaining enterprises in the sector are smaller in scale and less technically competent. The PMO will also strengthen proposal review, to control costs of projects, and avoid insensible use of R32 technology.

To achieve the freeze target, the time for the first batch of conversion projects is very limited. The PMO will strengthen performance monitoring and ask Tongfang and Yantai Binglun to share their experiences from the demo projects, to help the enterprises avoid management problems. CRAA will be more involved in the conversion, helping the enterprises to identify and solve technical problems.

### **Communication and Advocacy**

The project has been made well known through constant publicity efforts in the past year. In various occasions, CRAA promoted the project goals and approaches to the industry, and mobilized the enterprises. The PMO organized training sessions to network with the industry and facilitate project development.

## 4. Financial Management

	Source of Fund	Budget	Expenditure
Expenditure Vs. Approved project budget by source of funding	UNDP	US\$61,000,000	US\$25,380,000*/1,220,635.2**
	Government Cost Sharing		
	Third Party Cost-sharing		
	Other (please specify)		
	<b>Total</b>	US\$61,000,000	US\$25,380,000*/1,220,635.2**

Note: \* refers to the cumulative expenditure from UNDP to FECO/MEP; \*\* refers to the cumulative expenditure by FECO/MEP until the reporting year.

Output	Activities	Source of Funding	Budget Description	Annual Budget (USD)	Annual Expenditure (USD)	Note
Output 1	1.1 Sign contract with enterprises	MLF	Subcontracts with beneficiary enterprises etc	13,970,000		
Output 2	2.1 3-4 Training workshops on project implementation and policies with assistance of consultants; awareness campaigns	MLF	Training workshops, travel, consultants, subcontract etc	40,000	15068.19	
		MLF	Subcontract, local consultants, travel etc.	200,000		
	2.2 Tracking the international trend of alternatives, conducting sectorwide researches on properties of refrigerants, optimization of products, etc.	MLF	Subcontract, local consultants, travel etc.	130,000		



	<b>2.3 Data Collection and analysis, establishment and operation of information system</b>	MLF	Subcontract, local consultants, meetings/workshops etc	250,000	18,980	
	<b>2.4 Standard revision, consultation and formulation, organize 3 workshops</b>	MLF	Subcontracts, local consultants etc.	50,000		
	<b>2.5 Policy consultation, research and design</b>	MLF	Subcontract with CRAA for project implementation coordination and management etc.	380,700		
	<b>2.6 Facilitating implementation by industry</b>	MLF	Subcontracts, local consultants etc.	120,000	145,260	
	<b>2.7 Monitoring and verification missions/meetings/reports on project implementation; finalize the detail implementation plan</b>	MLF	Training workshops, travel, consultants, subcontract etc	40,000		
<b>Output 3</b>	<b>3.1 Project Coordination and management</b>	MLF	Subcontracts, local consultants, travel etc.	1,649,700	1,041,327.01	
				<b>Total</b>	16,790,400	1,220,635.2

Note: the annual expenditure from UNDP to FECO/MEP is USD 9,380,000 in the reporting year.

## 5. Management recommendations

FECO and UNDP should enhance the monitoring of progresses and disbursement, and work out how monitoring activities from both agencies can create a synergy. FECO and UNDP should organize review meetings and ensure that the enterprises attend at least once in a year.

A monitoring and evaluation plan shall be included in the annual work plan. And the planned monitoring activities like the quarterly report, review meetings, field visit and annual review meeting etc shall be done in quality and in time.

The daily communication between FECO and UNDP shall be enhanced. Any key activities/events, milestone achievement of project shall inform UNDP in advance for its early information or endorsement.

The management task at the PMO is heavy, as the integrated approach requires the staff to work with multiple projects across three sectors at the same time. The PMO should respond to the situation by giving the staff more training on understanding all relevant sectors, enterprises, technologies and implementation agencies.

## 6. Conclusion

The PMO has laid groundwork for the implementation of the sector plan in 2012. The internal implementation manual served as the framework for designing conversion projects. In addition to the implementation plan, the TA plan will provide another important part of the next few years' work approach.

The greatest uncertainties are the technological reliability of the new products from the converted line and the timetable for the standards relevant to products using A2L refrigerants. Although these issues depends on external vendors and institutions and is outside the scope of the project, FECO and the enterprise have considered actions to reduce the risk, including conducting more rigorous testing, and accelerate the formulation of laws and standards.

Successful implementation of the conversion projects will depend on the close cooperation of UNDP, FECO, CRAA and the ICR sector.

## 7. Annexes

I. Summary of enterprises verified