

National report on the Vienna Convention and Montreal Protocol implementation in Cambodia

Introduction

Cambodia is a Party to the Montreal Protocol having acceded to the Vienna Convention and the Montreal Protocol in June 2001. Cambodia is a developing country and has been classified as an Article 5(1) country.

This ODS Phase-out Management Plan including Country Program, Terminal Phase out Management Plan and HCFC Management Plan have been prepared and Implemented by Cambodia National Ozone Unit of the Ministry of Environment on behalf of the Royal Government of Cambodia. It is a consensus approved by the National Steering Committee and by the Senior Minister, Minister of Environment on behalf of the Royal Government of Cambodia. The plans; especially, HCFC Phase-out Management Plan explains the policies and programs that the Royal Government of Cambodia has both adopted and intends to adopt to ensure Cambodia's compliance with the Montreal Protocol on ODS phase-out schedule. Many of these activities presume that financial and technical assistance for Cambodia's efforts will be provided from the Multilateral Fund.

Recently Cambodia's Hydro-Chlorofluorocarbon Phase-out Management Plan (HPMP) of Ozone Depleting Substances was prepared and submitted for consideration at the 61st Meeting of the Executive Committee of the Multilateral Fund and was approved at the same meeting in November 2010. Cambodia's consumption of HCFCs in 2008 was 165 metric tonnes. Thus, Cambodia was faced with a challenge to freeze this consumption by 2013 and phase-down this consumption by new control schedule of Montreal Protocol 10% by 2015 and 35% by 2020 and 67.5% by 2025, and finally the 100% reduction from the base line by 2030 for Annex-C Group-I substances (HCFCs).

Use of CFC and HCFC in sectors

Cambodia uses CFC and HCFCs only in the installation and servicing of refrigeration and air conditioning equipment.

Based on data survey for end-users in 2008, Cambodia used about 164 MT of HCFC-22 and 1.2 MT of HCFC-123. The HCFCs were used in sub-sectors such as air conditioning, chiller, commercial refrigeration and transportation refrigeration. There are also HFC-blended refrigerants (R-404A, R-407C, and R410A) being used. The survey in 2009 did not find any use of HCFC in foam-blowing, fire-fighting, or solvent applications.

Based on data of importation in 2009; there are about 10 companies were registered (included old and new companies) and applied for imported permission from NOU/MoE; and there also the importation of HFCs refrigerant, Air Conditioning equipment contained HCFC-22 Air Conditioning equipment contained HFC-410a as blend refrigerant and others RAC equipment were imported by those companies into Cambodia by the year of 2009 and the estimation trend for the few year ahead as show in the table below:

Forecast number of air conditioner installations and its servicing needs

	2009	2010	2011	2012	2013	2014	2015
Number of new AC import (1,000 units)	42.4	46.7	51.1	55.4	59.8	64.1	68.5
Number of second-hand AC (1,000 units)	5.0	5.3	5.5	5.8	6.1	6.4	6.7
Number of scrapped AC (1,000 units)	15.5	16.2	17.0	17.9	18.8	19.7	20.7
Total installations (1,000 units)	405.3	440.2	478.9	521.4	567.5	617.3	670.8
Total installed capacity (MT)	405.3	440.2	478.9	521.4	567.5	617.3	670.8

Servicing needs (MT)	154.0	167.3	182.0	198.1	216.7	234.6	254.9
Servicing needs (ODP)	8.5	9.2	10.0	10.9	11.9	14.0	15.2

There are ten companies that have previously registered with Ministry of Environment as importers of ozone depleting substances in Cambodia plus four new importers that registered in 2009 (i.e. a total of 14 importers). All except one are in Phnom Penh. The source of imported HCFCs in 2009 was mainly from China, India, and Singapore. There was some amount that was supplied through cross-border trade with Thailand and Vietnam.

Table below shows the Article 7 data for HCFCs that Cambodia had reported to the Ozone Secretariat during 2003-9.

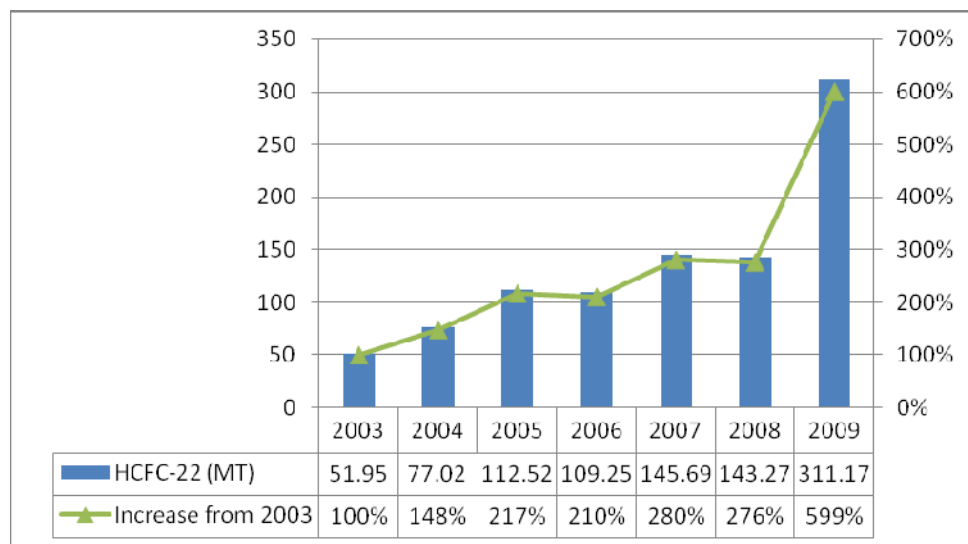
Cambodia HCFC Article 7 Data from 2003-9 (ODP Tons)

	2003	2004	2005	2006	2007	2008	2009
Annex C-I	2.8	4.2	6.2	6.0	8.0	7.9	17.1

Error! Reference source not found. 1 shows the import of HCFC-22 from 2003-9 as compiled by the Cambodian NOU. Besides HCFC-22, there is no record of other HCFCs being imported into Cambodia though the survey indicated that 1.2 MT of HCFC-123 had been used in 2008. The import of HCFC-22 has steadily increased in line with the country economic development. HCFC-22 import in 2008 was at 143.27 MT which is almost three times the 2003 import.

Cambodia NOU has also reported 2009 Article 7 consumption data which amounted to 311.17 MT of HCFC-22. This is a dramatic increase of more than twice the 2008 import. The reasons for such high import in 2009 appear to be market penetration and possible stockpiling by new importers.

Figure 1



Production

Cambodia does not produce any ODS and all ODS must be imported. The total amount of ODS imported to Cambodia is used only to meet its local demand. There is no known branch/subsidiary of foreign fluorochemical manufacturers in the country.

For the HCFC consumption, there is no known manufacturing of HCFC-dependent RAC equipment such as air conditioners in Cambodia. All RAC equipment is imported into Cambodia.

Exports

Export of ODS including HCFCs is controlled under the Sub-Decree. There is no record of export of HCFCs from Cambodia to other countries.

Levels of HCFCs in blends and as feedstock, as applicable;

There is no HCFC used as feedstock in Cambodia nor is there any record of import of HCFC in blends. The data survey did not find any use of HCFC blends by the servicing workshops. The NOU also has not issued any import license for HCFC blends.

HCFC use and consumption

Cambodia uses HCFCs only in the installation and servicing of refrigeration and air conditioning equipment. The 2009 survey did not find any use of HCFC in foam-blowing, fire-fighting, or solvent applications.

Levels of HCFC consumption

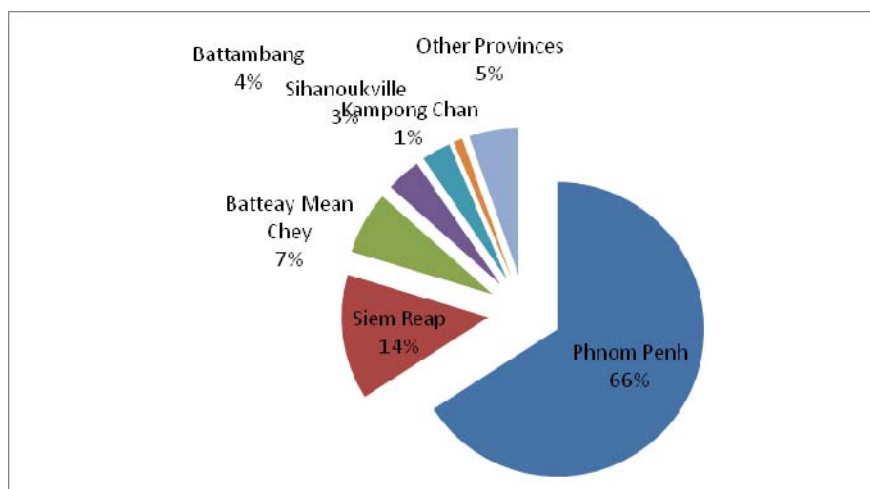
Based on the end-user data survey, Cambodia used about 164 MT of HCFC-22 and 1.2 MT of HCFC-123 in 2008. There are also HFC-blended refrigerants (R-404A, R-407C, and R410A) being used. The survey revealed that HCFCs were used in the following sub-sectors: air conditioning, chiller, commercial refrigeration and transportation refrigeration as shown in Table below:

Estimated HCFC use in different sub-sectors (MT)

Sub-sectors	HCFC-22	HCFC-123	Total	Share
Air conditioning	143.0		143.0	87%
Chiller	15.0	1.2	16.2	10%
Commercial refrigeration	4.0		4.0	2%
Transportation refrigeration	2.0		2.0	1%
Total	164.0	1.2	165.2	100%

As shown in Figure 2 **Error! Reference source not found.** most of HCFC are used in Phnom Penh (66%), followed by Siem Reap (14%) and Batteay Mean Chey (7%). These 3 provinces are the major cities where most hotels, casinos, restaurants, apartments, office buildings, and other establishments are located. The remaining consumption (13%) is used in other provinces.

Figure 2 Distribution of HCFC use by provinces



Information on Ozone issues to the public

The National Ozone Unit under the Institutional Strengthening Program being assisted by UNEP. The NOU has raised awareness on ozone related issues, published awareness materials for distributing to the public, relevant institutions and stakeholders. In addition, the National Ozone Unit conducted the Inter-ministerial Meeting, awareness workshops for the participants from relevant institutions and stakeholders attended these workshops.

Market study on the cost of Refrigerants

There some study and survey on the cost of the refrigerants in the market in Cambodia that study are focusing on ODS and alternative refrigerant (non-ODS) and looking ahead for the implementation of the HPMP in Cambodia. The cost of the refrigerant are enclose here bellow:

Prices of refrigerants in Cambodia in 2010

USD 120 for HFC-134a /cylinder of 13.6 kg,

USD 90-160 for R-410a /cylinder of 11.3 kg,

USD 85-135 for R-404 /cylinder of 10.9 kg,

USD 85-135 for R-407 /cylinder of 11.3 kg,

USD 35-42 for HCFC-22 /cylinder of 13.6 kg,

Prices of refrigerants in Cambodia in February 2011

USD 130 for HFC-134a /cylinder of 13.6 kg,

USD 80-140 for R-410a /cylinder of 11.3 kg,

USD 80-130 for R-404 /cylinder of 10.9 kg,

USD 75-135 for R-407 /cylinder of 11.3 kg,

USD 35-43 for HCFC-22 /cylinder of 13.6 kg,

Future plan

Since Cambodia is the one of the developing countries; therefore, Cambodia are very keen to participate in the research program in the other countries as well as to set up the instrument to monitor the ozone level that can effect to human health, crop, etc,. In this regard, Cambodia would like to take any project that related to ground ozone Monitoring in Cambodia.

Need and recommendation

- There is the need to install the equipment to monitor the ground ozone monitoring in place
- Training on the scientific and technical training and more international collaboration

- Need the financial support for exchange visit among the countries in the region at the monitoring station to improve the knowledge and experiences

Finally, we would like to express our sincere thanks to WMO/UNEP give me the opportunity for me to participate in the meeting and the national report on the implementation of the Montreal Protocol related issues in Cambodia and we hope that we will get more other support on this activities in the near future.

References

- *HCFC Phase Out Management Plan for Cambodia*
- *Terminal Phase out Management Plan for Cambodia*
- *Country Program for Montreal Protocol Implementation*