



**United Nations  
Environment  
Programme**

Distr.  
LIMITED

UNEP/OzL.Pro/ExCom/40/47  
14 June 2003

ORIGINAL: ENGLISH



---

EXECUTIVE COMMITTEE OF  
THE MULTILATERAL FUND FOR THE  
IMPLEMENTATION OF THE MONTREAL PROTOCOL  
Fortieth Meeting  
Montreal, 16 -18 July 2003

**COUNTRY PROGRAMME UPDATE: DPR KOREA**

This document consists of:

- Country Programme Evaluation Sheet (prepared by the Fund Secretariat)
- Comments and Recommendations of the Fund Secretariat
- Transmittal Letter from the Government of DPR Korea
- Country Programme Cover Sheet
- Country Programme (Executive Summary)

## COUNTRY PROGRAMME EVALUATION SHEET

1. The Fund Secretariat's evaluation of the country programme update consists of the following sections:

- Section 1: Production and consumption of ODSs and national ODS phase-out plan
- Section 2: Comments of the Fund Secretariat
- Section 3: Recommendation
- Section 4: List of projects approved for DPR Korea  
Country Programme Cover Sheet and Executive Summary (prepared by UNEP and UNIDO)

### **Section 1: Production and consumption of ODSs and national ODS phase-out plan**

#### Background

2. In 1997, when the Executive Committee approved the DPR Korea country programme, the totals for production and consumption of ODSs in DPR Korea were estimated at 2,267 ODP tonnes and 2,325 ODP tonnes, respectively. Since the approval of the original country programme, DPR Korea has received over US \$9.5 million (including agency support cost), to phase out 1,134 ODP tonnes of controlled substances in the consumption sector. In addition the Government of DPR Korea had agreed with the Executive Committee to phase out the total production of ODSs, namely CFC by 2003 and CTC by 2005. As of December 2002, 570 ODP tonnes were already phased out in the foam and solvent sectors. DPR Korea has met the 1999 freeze level for CFCs production and consumption.

3. In 2002, the total production of ODSs in DPR Korea was 2,326 ODP tonnes which was at the same level as the ODS consumption (i.e., 2,326 ODP tonnes). Of the total amount of ODSs produced and consumed, 2,027 ODP tonnes were CTC used as a solvent, process agent and fumigant.

4. From 1995 onwards, the economic situation in DPR Korea changed. Natural calamities that struck the country between 1995 and 1998 together with a decrease in trade with Russia and other Eastern countries had an adverse impact on the economic development in the country. Due to these circumstances, the Government gave priority to the metallurgy and machinery industry to support agricultural production which required the use of solvents. Therefore, since 1996, production and consumption of CTC increased in the country; however, production and consumption of CFCs decreased substantially.

5. In 1995, the Government of DPR Korea decided to dismantle the MB production facility with an installed capacity of 120 ODP tonnes. Since then, CTC has been used as a fumigant for grain storage and soil. The production and import of halons ceased in 1996.

6. The 1995-2002 ODS production and consumption levels in DPR Korea are shown in Tables 1 and 2, while the sectoral distribution of ODS consumption is shown in Table 3:

**Table 1: Production of ODSs (ODP tonnes)**

ODS	Capacity	1995	1996	1997	1998	1999	2000	2001	2002
CFC-11	250	185	60	50	45	40	23	54	64
CFC-12	1,000	500	150	125	40	50	42	208	235
CFC-113	400	80	32	28	28	16	12	29	-
CTC	2,530	1,166	2,004	2,082	2,224	2,184	1,753	2,078	2,027
MCF	100	10	10	10	10	9	5	7	-
MB	120	120	-	-	-	-	-	-	-
<b>Total</b>	4,400	2,061	2,256	2,295	2,347	2,299	1,836	2,376	2,326
CTC(feedstock)		1,052	363	297	138	143	102	397	442

**Table 2: Consumption of ODSs (ODP tonnes)**

ODS	1995	1996	1997	1998	1999	2000	2001	2002
CFC-11	194.2	70.0	70.0	45.0	40.0	23.0	56.0	64.0
CFC-12	446.6	165.0	135.0	40.0	50.0	42.2	237.0	235.0
CFC-113	80.0	32.0	28.0	28.0	16.0	12.0	28.8	-
CFC-115	1.5	-	-	-	-	-	-	-
Halon-1211	-	-	-	-	-	-	-	-
Halon-1301	10.0	-	-	-	-	-	-	-
CTC	1,166.0	2,004.2	2,082.3	2,224.2	2,183.5	1,753.4	2,077.9	2,027.3
MCF	10.0	10.0	10.0	9.0	9.0	5.1	7.0	-
MB	72.0	-	-	-	-	-	-	-
<b>Total</b>	1,980.3	2,281.2	2,325.3	2,346.2	2,298.5	1,835.7	2,406.7	2,326.3

**Table 3. Sectoral distribution of ODSs (ODP tonnes)**

Sector	ODS	1995	1996	1997	1998	1999	2000	2001	2002
Refrigeration manufacturing	CFC-11	-	31.0	-	-	-	12.0	31.0	37.0
	CFC-12	0.2	20.0	-	-	-	8.2	21.0	19.0
	CFC-115	1.5	-	-	-	-	-	-	-
Refrigeration servicing	CFC-11	50.2	19.0	40.0	25.0	25.0	11.0	25.1	27.0
	CFC-12	446.3	145.0	135.0	40.0	50.0	34.0	216.0	216.0
Fire fighting	Halon-1211	-	-	-	-	-	-	-	-
	Halon-1301	10.0	-	-	-	-	-	-	-
Foam	CFC-11	144.0	20.0	30.0	20.0	15.0	-	-	-
Aerosol	CFC-12	-	-	-	-	-	-	-	-
Solvent	CFC-113	64.0	25.6	22.4	22.4	12.8	9.6	23.0	-
	MCF	10.0	10.0	10.0	9.0	9.0	5.1	7.0	-
	CTC	374.0	874.5	896.5	860.2	902.0	738.1	987.8	917.4
Fumigation	MB	72.0	-	-	-	-	-	-	-
	CTC	-	357.5	412.5	564.3	484.0	204.6	336.6	335.5
Process agent	CTC	792.0	772.2	773.3	799.7	797.5	810.7	753.5	774.4
<b>Total</b>		1,964.3	2,274.8	2,319.7	2,340.6	2,295.3	1,833.3	2,401.0	2,326.3

ODS production facilities

7. In 2001, an independent techno-economic audit of ODS production facilities in DPR Korea, supported by the Multilateral Fund, was conducted. On the basis of the results provided by the audit, the Government and the Executive Committee agreed (36<sup>th</sup> Meeting) on the terms for the closure and dismantling of the ODS production facilities.

8. The report submitted by the independent consultant who audited the production facilities in the country indicated that “sales of products are currently weak, and thus the plant’s operating rates are low. The production of CFC-11, CFC-12, and CFC-113 decreased substantially after 1995-1996 as a result of the economic slowdown in the DPRK, fuelled by the collapse of the economies of Eastern Europe. Low CFC demand directly affects the production of the major raw materials—carbon tetrachloride (CTC) and anhydrous hydrogen fluoride (HF) gas. CTC constitutes one of the major raw material costs of CFC production. The 2.8 Vinalon Factory, the only CTC producer in the DPRK, produces CTC only to meet domestic demand. HF gas also constitutes a substantial raw material cost in CFC production. The Myonggan Chemical Plant, the only HF producer in the DPRK, produces HF only to meet domestic demand”.

Refrigeration sector

9. DPR Korea manufactures CFC-based domestic and commercial refrigeration equipment and compressors at one enterprise (October 5<sup>th</sup> Automation Complex) with a production capacity of 100,000 units/year.

10. The refrigeration servicing sub-sector consists of small workshops servicing 2.906 million domestic and commercial refrigerators, cold storage, MAC and centrifugal chillers; large installations have in-house servicing facilities. The total number of service technicians is 550. The distribution of CFCs in the refrigeration sector is shown in the following table.

**Table 4. Distribution of CFCs in the refrigeration sector (ODP tonnes)\***

Sub-sector	ODS	Application	1995	1996	1997	2000	2001	2002
Domestic	CFC-11	Manufacturing	-	31.0	-	12.0	31.0	37.0
	CFC-12	Manufacturing	-	16.5	-	5.4	18.8	17.0
		Servicing	133.3	110.0	112.0	24.0	136.2	145.6
Commercial	CFC-12	Manufacturing	0.2	3.5	-	2.6	2.2	2.0
		Servicing	42.4	-	10.0	5.5	30.9	22.7
Industrial	CFC-11	Manufacturing	-	-	-	-	-	-
		Servicing	50.2	19.0	40.0	11.0	25.0	27.0
	CFC-12	Servicing	-	-	-	4.5	5.3	4.5
MAC	CFC-12	Servicing	270.4	15.0	11.0	-	43.6	43.2
<b>Totals</b>	CFC-11		50.2	50.0	40.0	23.0	56.0	64.0
	CFC-12		446.3	145.0	133.0	42.0	237.0	235.0
	CFCs		496.5	195.0	173.0	65.0	293.0	299.0

\* No data was reported for 1998-1999

11. The Government of DPR Korea has submitted for the consideration of the Executive Committee at its 40<sup>th</sup> Meeting, a project proposal for the conversion of the refrigeration manufacturing enterprise to non-CFC technologies and a refrigerant management plan (UNEP/OzL.Pro/ExCom/40/38).

Uses of CTC as a solvent, process agent and fumigant

12. There are 13 major enterprises using ODS solvents (CFC-113, CTC and TCA) to clean metal components in machinery, electronics, printing and textile industries. There are also six enterprises manufacturing chemicals and pharmaceutical active ingredients using 774 ODP tonnes of CTC as a process agent (i.e., chlorinated and sulfochlorinated polyethylenes, chlorinated rubber including paints, asbestos products, PVC and tar, ascorbic acid, ciprofloxacin, norfloxacin, and sodium dichlorisocyanurate).

13. As of December 2002, the Executive Committee approved 9 projects that will lead to the phase out of 985 ODP tonnes. The Government of DPR Korea submitted to the consideration of the Executive Committee at its 40<sup>th</sup> Meeting, a project proposal for the phase-out of CTC in the cleaning solvent sub-sector (UNEP/OzL.Pro/ExCom/40/38).

National ODS phase-out plan

14. The Government of DPR Korea has decided to completely phase out the remaining consumption of ODSs through a national phase out plan, which will be implemented through annual performance-based action programmes between 2004 and 2010. The objectives of the action plan are the phase out of CFCs in the refrigeration manufacturing sub-sector by 2006 and in the servicing sector by 2010, and the complete phase out of CTC by 2005.

15. The phase out plan will be based on existing laws and regulations in place together with additional regulations, including:

- (a) Ban on the manufacture, installation, and/or import/export of CFC-based refrigeration equipment as of 1 January 2005;
- (b) Conversion of CFC-based refrigeration equipments to non-CFCs as of 1 July 2006 (provided that the Executive Committee approves for funding the phase out investment project submitted to the 40<sup>th</sup> Meeting);
- (c) Ban on the manufacture and/or import/export of CFC-based compressors as of 2004;
- (d) Ban on imports of CFCs, halons, TCA, CTC, and MB and exports of CFC-11, CFC-12 and CTC from 1 January 2007;
- (e) Reduction on import duties for CFC and/or HCFC recycling units; and

- (f) Compulsory licensing/certification of refrigeration servicing workshops and technicians to service CFC-based refrigeration equipment, to be enforced once the training of refrigeration technicians is completed, and recovery and recycling units are deployed.

Proposed action plan

16. The proposed actions to be implemented on a yearly basis are shown in the table below.

**Table 5. Proposed action plan**

<b>Year</b>	<b>Target</b>	<b>Action</b>
2003	Import of CFC-113, MCF, halon is banned; installation of CFC based MAC on new vehicles is banned; customs officer training programme is prepared; implementation of RMP and refrigeration manufacturing project are commenced; improved data collection and reporting	Establish, enforce and monitor production and import (quota and license) of all ODSs, drafting new laws and regulations; start to set up the recovery and recycling network; develop annual programme of country programme implementation
2004	Recovery and recycling equipment deployed; training for trainers and customs officer are carried out; ODS consumption reduced as planned; new laws and regulations promulgated	Train the trainers and customs officers, soliciting opinions on new laws and regulations; monitor and evaluate implementation of conversion project and RMP; education campaign for new laws and ODS phase out
2005	50% CFC reduction achieved; refrigeration and CTC conversion projects completed; new laws and regulations are enforced	Implementing annual programme; monitor and evaluate recovery and recycling; step up enforcement of new laws and regulations
2006	CTC use is stopped; CFC use is only limited to the servicing sector and further reduced. PCRs of conversion projects are submitted; CTC and TCA import for cleaning is banned	Monitor and evaluate recovery and recycling; step up enforcement of new laws and regulations
2007	85% reduction of all ODS is achieved; imports of CFCs, MCF, CTC, halons and MB and exports of CFC-11, CFC-12 and CTC are banned as of 1 January 2007	Monitor and evaluate recovery and recycling; step up enforcement of new laws and regulations
2008	RMP reviewed and updated	Review and update RMP; monitor and evaluate recovery and recycling; step up enforcement of new laws and regulations
2009 - 2010	ODSs except for refrigeration servicing equipment are phase out; import of all ODS (except recycled CFC) are banned	Monitor and evaluate recovery and recycling; enforce new laws and regulations; awareness programme for ODS phase out

Estimated cost

17. The cost for the implementation of the national phase out plan for DPR Korea has been estimated at US \$18,306,405, with the following breakdown:

**Table 6. Estimated cost of the national phase out plan (US \$)**

<b>I. Refrigeration sector</b>		
1	Refrigeration manufacturing (56 ODP tonnes)	799,411
2	Compressor	750,000
3	Refrigeration management plan	1,296,994
<b>II. CTC</b>		
1	Solvent	4,500,000
2	Process agent	6,500,000
3	Fumigation	3,500,000
<b>III. Halon</b>		
1	Halon management plan	300,000
<b>IV. Technical assistance</b>		
1	Preparation of investment project for refrigerator and compressor (UNIDO)	50,000
2	Preparation of CTC phase out plans (fumigation, solvent and process agent)	60,000
3	Preparation of halon management plan (UNEP)	50,000
4	Institutional strengthening for 2003-2010 (UNEP)	500,000
<b>Total cost</b>		<b>US\$18,306,405</b>

## Section 2: Comments of the Fund Secretariat

18. At its 36<sup>th</sup> Meeting, the Executive Committee approved for UNIDO US \$30,000 for the preparation of the DPR Korea country programme update. However, the country programme update was not presented in conformity with the format approved by the Executive Committee at its 35<sup>th</sup> Meeting (Decision 35/58).

### ODS data survey

19. The Secretariat noted significant discrepancies between the data reported in the country programme update and the data reported by DPR Korea in accordance with Article 7 of the Montreal Protocol for the period 1995-2000 as well as the data reported to the Fund Secretariat (progress report on the implementation of the country programme) sometimes by as much as 100 per cent difference.

20. As reported in the country programme update, between 1995 and 2000, CFC consumption in the country (CFC-11 and CFC-12) decreased from 640 tonnes to 65 tonnes and subsequently increased to more than 290 tonnes in 2001 as shown in Table 7 below. The Secretariat sought a clarification from UNEP and UNIDO on the increase in CFC consumption taking into consideration the natural calamities that occurred in the country between 1995 and 1998 and the decrease in trade with eastern block countries.

**Table 7. Increase in the consumption of CFCs in the refrigeration sector**

ODS	Application	2000	2001	%change
CFC-11	Manufacturing	12	31	258%
CFC-12	Manufacturing	8	21	256%
CFC-11	Servicing	11	25	228%
CFC-12	Servicing	34	216	635%
Total		65	293	451%

21. In this regard, UNEP indicated that the figures reported in the country programme update are based on a recent survey conducted in the country. The trade relations with China remained at the same level or may even have increased due to the diminishing trade with Eastern European countries. It is also to be noted that the 2002 consumption figures are still below the 1995 level while there has not been any assistance provided to DPR Korea.

22. The Secretariat also indicated that data in the country programme update was also at variance with the data reported by the independent audit into the supply and demand of ODS in DPR Korea for the period 1995-2000, introducing ODS consumption sectors such as formulation solvent and process agent which had hitherto not been reported by the country. The significance of the data discrepancy is that the country's baseline consumption for CTC has been changed from 1,285.2 ODP tonnes to 2,121.1 ODP tonnes although the Parties have not been informed of this significant change (according to Decision XIII/15, changes to the reported baselines data by a Party should be presented by the Party concerned before the Implementation Committee for presentation to the Meeting of the Parties for approval). Therefore, it appears that the data presented in the country programme update presents a departure from the recognized basis for determining the compliance of DPR Korea with the Montreal Protocol's obligations relating to CTC. The Secretariat also noted that the current baseline consumption of CTC for DPR Korea contains an amount of 102.3 ODP tonnes which was erroneously reported in 2000 to the Ozone Secretariat as consumption.

23. Regarding the issue of CTC consumption, UNIDO stated that "as far as the solvent sector is concerned there was not a proper understanding in the country of process agent applications. All CTC quantities except used for solvent cleaning was considered as feedstock". UNIDO also stated that "there does not seem to have been a clear understanding on the part of DPRK on the meaning of feedstock for ODS production (i.e., CFCs) and feedstock and/or process agent for non-ODS production, which has clearly not been adequately considered prior to the 2003 CP update"

#### Refrigeration servicing sector

24. The Secretariat, UNEP and UNIDO discussed technical issues related to the refrigeration sector, including the large number of domestic refrigerators (about 2.5 million) and ice cream machines (287,400 units) taking into consideration the current economic difficulties in the country and its level of economic development, the number of domestic refrigerators serviced every year; and the number of CFC-based MAC units. UNEP and UNIDO reported that the number of domestic refrigerator serviced in 2002 was about 520,000 units, and the estimated



population of vehicles fitted with a MAC unit was about 100,000 units (in the past 10 years, a considerable percentage of vehicles were imported from Russia, other Eastern European countries and China).

25. The Secretariat pointed out that since 1996, there has been no consumption of halons in DPR Korea (neither production nor imports and no stockpile). Furthermore, uses of halon for fire prevention are extremely limited and the use of CO<sub>2</sub>, nitrogen and water for fire fighting is prevalent in the country. Therefore, the development of a halon management plan proposed by the Government at an estimated cost of US \$300,000, was not justifiable. UNEP and UNIDO reported that no halon study has been conducted in the country. The Government is currently assessing the installed capacity for halons to determine whether or not it could receive assistance for the establishment of a halon bank.

#### National action plan to phase out CFCs

26. The Government of DPR Korea has decided to phase out its ODS consumption through several national sector phase out plans (covering the various ODS used in the country). For the phase out of CFCs, the Government is proposing a phase out plan for one domestic refrigeration manufacturing company and a compressor manufacturer; a RMP for the phase out of 85 per cent of CFC consumption in the servicing sector; and a subsequent proposal for the remaining 15 per cent in CFC consumption. However, consistent with relevant Executive Committee decisions, the Secretariat suggested to present a single national CFC phase out plan covering the entire consumption of CFCs used for manufacturing equipment (56 ODP tonnes) and servicing refrigeration equipment (243 ODP tonnes), with the following considerations:

- (a) The plan should cover the total CFC consumption and incorporate an agreement between DPR Korea and the Executive Committee;
- (b) The maximum level of CFC eligible for funding (under Decision 35/57) for DPR Korea is 291.7 ODP tonnes (i.e., about 7 ODP tonnes below the 2002 CFC consumption);
- (c) The maximum level of CFC to be phased out during the 2003-2005 triennium is 225.5 ODP tonnes (according to the compliance oriented model); with the remaining consumption to be phased out after 2005; and
- (d) Technical assistance and capacity building should be a component of the CFC phase out plan (and any other ODS phase out to be developed), rather than a stand-alone activity as it is currently being proposed.

27. The Secretariat was informed that during the preparation of country programme update and the RMP, UNEP and UNIDO discussed the above issue with the Government. In this regard, the Government indicated that “due to internal reasons, which relate to inter-ministerial difficulties, the separate submission for the servicing and the manufacturing projects would be the only acceptable solution. In view of this fact and the very low cost effectiveness being currently used for the national phase out plans, we believe that it is better to keep these two projects separate”. Furthermore, including the project proposals for the conversion of the

refrigeration manufacturing plant and the compressor plant within a CFC phase out plan, with a cost-effectiveness of US \$5 to US \$6 per kg (similar to the cost-effectiveness of already approved CFC phase out plans), would not be feasible.

#### Substitute production

28. The country programme update reported that in order to meet domestic demand for ODS alternatives, the Government of DPR Korea is proposing the production of several non-ODS alternatives. In the refrigeration sector, it is proposed to replace the use of CFC-11 and CFC-12 with isobutane and propane. However, the new refrigeration equipment being imported into the country is based on HFC-134a refrigerant and the proposal for the refrigeration manufacturing sector submitted to the 40<sup>th</sup> Meeting proposes the replacement of CFC-12 with HFC-134a (and not isobutane).

29. The Secretariat also pointed out that the Research Centre for Environment Protection has developed a new refrigerant ('Moran') produced from propylene as a CFC-12 replacement in domestic refrigerators. Notwithstanding that: (i) more than 85 per cent of the total CFC-based refrigeration equipment in the country are domestic refrigerators, (ii) more than 67 per cent of CFC-12 used in the servicing sub-sector is for servicing this equipment, (iii) the CFC-11 and CFC-12 producing facility will be dismantled in 2003, and (iv) CFCs imports are nil (zero in 2002 and 30 ODP tonnes of CFC-12 in 2001), the action plan does not address the technical, safety and cost related issues associated with the use of hydrocarbon as a refrigerant. UNEP and UNIDO responded that the information related to the new refrigerant was provided by the Government to reflect its effort in searching for new alternatives to CFCs refrigerants. However, the new refrigerant ("Moran") has not yet been proven to be a commercially viable alternative, and therefore, the Government has selected HFC-134a as the refrigerant in the manufacturing sub-sector.

#### CTC consumption sector

30. The 2002 CTC consumption in the country was 2,027 ODP tonnes. By the end of 2004, more than 1,720 ODP tonnes must be phased out to achieve compliance with the 2005 CTC phase out target. A plan for the phase out of CTC in the cleaning solvent sub-sector was submitted for the consideration of the Executive Committee at its 40<sup>th</sup> Meeting; however, additional CTC phase out action plans are being proposed for submission in 2004. The Secretariat indicated that DPR Korea may not be in compliance in 2005 regarding CTC consumption taking into consideration the large amount of CTC used in the country in many applications (solvent, process agent, soil fumigation and fumigation of commodities), and the average timeframe for implementation of projects (between 3 and 7 years or more).

31. In the fumigation sub-sector, it has been proposed to replace CTC with a combination of various alternatives chemicals and/or techniques. The Secretariat noted, however, that some of the alternatives to CTC proposed are not cost-effective, their long-term sustainability is in doubt, or require major capital investment. For example, cold, irradiation, micro waves, and anaerobic treatments are not considered cost effective alternatives for grain storage and flour mills at this time due to their high implementation costs and unproven consistency in performance. While phosphine and phosphine with CO<sub>2</sub> are viable alternatives for grain storage, the exact nature of

the pest involved and the storage conditions have a major impact on their effectiveness and long term sustainability. The ethyl formate and methyl formate treatments have not been demonstrated to be reliable or effective in commercial scale operations and also present potential environmental and health risks. Chloropyriphos is not a good alternative for soil fumigation; it has been associated with pollution, poses health risks and is not consistent in controlling soil borne pest.

32. Regarding the above issues, UNEP and UNIDO indicated that the remaining action plans for CTC phase-out from fumigant and process agent applications will be submitted to the 41<sup>st</sup> Meeting of the Executive Committee. For most of the enterprises using CTC, alternatives have already been developed and partially tested. In a few more complex process agent applications, enterprises are making some provisions for stockpiling for uses of CTC after 2005, to cover the market demands if the conversion is not completed on time. Therefore, if all proposed phase out plans are approved in 2003, it would be feasible to achieve the 85 per cent reduction in CTC consumption on schedule.

33. In the grain storage application (135 ODP tonnes), an ad-hoc alternative to CTC is feasible. For grain and storage fumigation, phosphine (alone or in combination with CO<sub>2</sub>) is a suitable alternative. For soil fumigation, chloropyriphos (as the alternative technology), has to be re-evaluated due to the environmental and health risks.

### **Section 3: Recommendation**

34. The Executive Committee may wish to:
- (a) Note the proposed DPR Korea country programme update submitted by UNEP; and
  - (b) Request UNEP and UNIDO to address the issues raised by the Fund Secretariat regarding CTC data discrepancies, revise the country programme update document accordingly and resubmit it, using the format approved in Decision 35/58, to a future meeting of the Executive Committee.

#### Section 4. List of projects approved for DPR Korea

Project Title	Agency	Sec.	ODP to be phased out (cons)	ODP phased out (cons)	ODP to be phased out (prod)	ODP phased out (prod)	\$Approv	\$Disb
Phasing out CFC-11 at Hamhung Foam Factory, Hamgyong South Province	UNIDO	FOA	35.0	35.0			100,376	100,376
Phasing out CFC-11 at Pyongyang Foam Plant	UNIDO	FOA	83.0	83.0			101,424	101,424
Phasing out CFC-11 at Chongjin Foam Factory, Hamgyong North Province	UNIDO	FOA	32.0	32.0			103,434	103,434
Preparation of a demonstration project in the methyl bromide sector	UNIDO	FUM	-	-			23,013	23,013
Non-investment project: promotion and information transfer of alternatives to the use of methyl bromide in the preparation of seedbeds for the cultivation of rice and maize	UNIDO	FUM	-	-			27,304	27,304
Closure of ODS production plant	UNIDO	PRO	-	-	500.0	500.0	1,344,350	1,344,350
Development of a refrigerant management plan	UNEP	REF	-	-	-	-	60,000	0
Conversion of metal cleaning processes from ODS solvents to vapour degreasing at Unsan Tools Factory (UTF)	UNIDO	SOL	110.0	110.0			311,921	311,921
Conversion of metal cleaning processes from ODS solvent to vapour at Pyongyang September 18 Bearings Factory	UNIDO	SOL	121.0	121.0			1,076,889	1,076,889
Conversion of remaining metal cleaning processes from ODS solvents to vapour degreasing at Unsan Tools Factory (UTF)	UNIDO	SOL	168.0	168.0			490,157	487,186
Conversion of metal cleaning processes from CTC solvent to TCE vapour degreasing at Ceramic Tools Factory (CTF)	UNIDO	SOL	19.8	19.8			206,657	206,657
Preparation for four projects in the solvent (CTC) sector	UNIDO	SOL	-	-			70,000	69,802
Conversion of cleaning installations from carbon tetrachloride to aqueous cleaning techniques at the Gumsong Tractor Factory (GST)	UNIDO	SOL	198.0	-			1,932,207	12,468
Conversion of cleaning processes from CTC to aqueous and solvent cleaning techniques at Huichon February 26 Factory (HUI)	UNIDO	SOL	209.0	-			1,945,477	0
Conversion of methyl chloroform and CTC to non-ODS solvent cleaning in the plating workshop of the Taedong-gang Television Factory (PTV), Taedong-gang District, Pyongyang City	UNIDO	SOL	59.8	-			597,886	0
Conversion of Cleaning Processes from CTC to perchloroethylene cleaning at the galvanising workshop of the Pyongyang Illuminating Fixtures Factory (PIF)	UNIDO	SOL	29.7	-			230,172	0
Conversion of cleaning processes from CTC (formerly methyl chloroform) to perchloroethylene cleaning at the Plating Workshop (PLT) of the refrigeration factory of the 5 October Automation Complex, Pyongchon District, Pyongyang City	UNIDO	SOL	69.3	-			508,068	0
Country programme preparation	UNEP	SEV	-	-	-	-	40,000	40,000

Project Title	Agency	Sec.	ODP to be phased out (cons)	ODP phased out (cons)	ODP to be phased out (prod)	ODP phased out (prod)	\$Approv	\$Disb
Establishment of a National Ozone Cell	UNEP	SEV	-	-	-	-	142,560	126,456
Project formulation of investment projects in all sectors	UNIDO	SEV	-	-	-	-	68,172	68,172
Renewal of institutional strengthening	UNEP	SEV	-	-	-	-	95,040	0
Preparation of country programme update	UNEP	SEV	-	-	-	-	30,000	0
<b>Total</b>			1,134.6	568.8	500.0	500.0	9,505,107	4,099,452



# COUNTRY PROGRAMME COVER SHEET

Country: Democratic People's Republic of Korea      Date Received: May 2003

Lead National Agency: National Coordinating Committee for Environment

Period covered by Country Programme: 2002-2010

## 1. Phase Out Schedule

Substances	Current consumption (tonnes x ODP) in 2002	Planned total consumption till phase-out (tonnes x ODP)	Planned year phase-out
CFC-11	64 x 1.0 = 64	192 ODP tons	2009
CFC-12	235 x 1.0 = 235	768 ODP tons	2009
CFC-113	0	0	Already phased out in
Halon 1211	0	0	2001
Halon 1301	1843 x 1.1 = 2027.3	0	2007
CTC	0	4,119 ODP tons	2007
MTC			2006
<b>Total:</b>	<b>2,326 ODP tons</b>	<b>5,079.5 ODP tons</b>	<b>2009</b>

## 2. Government Action Plan

Year(s)	Description of action	Sector (if any)	Intended effect	Estimated costs
2003-2005	Refrigerant Management Plan	Refrigeration service	Phase out 243 tons of CFC-12	1,177,394
2003-2005	Sector plan for production conversion of refrigerator and compressor	Refrigeration Production	Phase out 56 tons of CFCs directly (plus 21 tons of indirect phase out)	1,365,011
2003-2010	Halon Management Plan	Halon	Sustain halon phase out	300,000
2003-2005	CTC phase out in solvent sub-sector	Solvent	332.3 ODP tons of CTC	4,500,000
2003-2005	CTC phase out in process agent sub-sector	Process agent	774.4 ODP tons of CTC	6,500,000
2003-2005	Implementation of the ODS production closure project	ODS production	500 ODP tons	1,344,350
2003-2010	CTC phase out in fumigation sector	Fumigation	335.5 ODP tons of CTC	3,500,000
2003-2005	Prepare and promulgate legislation and standard for ODS phase out	All sectors	Control use of ODS for all sectors; Control import and export of ODS and equipment that consumes ODS; License and monitor refrigeration service system, Establish National CFCs Recovery and Recycling Network;	Cost is included in above sector plans

### 3. Project Summary

Year (s)	Type of project	Project description	Project cost	Incremental cost	Participating Implementing Agencies (if any)	Tons x ODP Phased Out
2003-2005	Training, workshops and capital	Refrigerant Management Plan	1,177,394	1,177,394	UNEP, UNIDO	243 ODP MT
2003-2005	Capital	Sector plan for production conversion of refrigerator and compressor	1,365,011	1,365,011	UNIDO	56 ODP MT directly, 21 MT indirectly
2003-2010	Training, workshops	Halon Management Plan	30,000	300,000	UNEP	0
2003-2005	Capital	CTC phase out in solvent sub-sector	4,500,000	4,500,000	UNIDO	332.3 ODP MT
2003-2005	Capital	CTC phase out in process agent sub-sector	6,500,000	6,500,000	UNIDO	774.4 ODP MT
2003-2005	Capital	CTC phase out in fumigation sector	3,500,000	3,500,000	UNIDO	335.5 ODP MT
2003	Pre investment	Preparation of sector plan for refrigerator and compressor	50,000	50,000	UNIDO	N.A.
2003	Pre investment	Preparation of National CTC Phase out Plans (fumigation, solvent and process agent)	60,000	60,000	UNIDO	N.A.
2004	Pre investment	Preparation of Halon Management Plan	50,000	50,000	UNEP	N.A.
2003-2010	Training information transfer	Institutional Strengthening	500,000	500,000	NCCE/UNEP	N.A.

Project types include: pre-investment, training, workshops, information transfer, and capital.

### 4. Costs

Cost of Activities and Projects in Country Programme update (US \$)	18,002,405	
Estimated cost of complete phase out (US \$)	18,002,405	
Estimated cost effectiveness (US \$)	10.34	per tonne x ODP



## Executive Summary

The Country Program Update (CPU) for DPR Korea provides an overview of activities implemented under the Montreal Protocol on Substances That Deplete the Ozone Layer (MP) in DPR Korea. This overview also includes an assessment of the assistance provided by the Multilateral Fund for the Implementation of the Montreal Protocol (MLF) for supporting DPR Korea's effort in meeting its obligations under the MP as given in the initial Country Program. It also includes an analysis of remaining ODS phase out that is required in the country and presents a strategy, an action plan and cost estimates to complete the phase out of remaining ODS.

DPR Korea is committed to complete ODS phase out in accordance with the control measures under the MP. DPR Korea ratified the Montreal Protocol (MP) on 24 January 1995, and is eligible to receive grants from the MLF. DPR Korea received financial assistance from the MLF for the development of a Country Programme (CP) in 1995. The CP was completed with the assistance of UNEP in December 1996 and approved by the Executive Committee (ExCom) of the MLF at its 21<sup>st</sup> meeting in February 1997.

DPR Korea, with an economic policy of industrial self-sufficiency, is a consumer and a producer of ODS. In 1995, the production and consumption of controlled substances in the country was 895 ODP tons (excluding CTC), and 814 ODP tons (excluding CTC) respectively. ODS demand and supply has been severely impacted by the natural disasters of 1996-1997 that led to lower production and consumption in the subsequent years. The economic recovery after 1997 saw an increase in the production and consumption of ODS in the country. However, the country was able to meet its 1999 freeze commitment as specified in the Montreal Protocol.

ODS consumption in 2002 was 2,326 ODP tons. This included 299 ODP tons of CFC-11/12 and 2027 ODP tons of CTC (1843 ODS tons). As of 2002, DPR Korea has stopped producing and consuming CFC-113, halon-1211, halon-1301, Methyl Chloroform and Methyl Bromide. The remaining ODS use of CFC-11/12 is in the production of domestic and commercial refrigerators and in the refrigeration servicing sector. CTC is used in solvents cleaning, as process agent and in fumigation. In the CPU, the only household refrigerator production facility is proposed for conversion to ODS substitute, 134a as refrigerant.

The National Ozone Unit (NOU) of DPR Korea, set up within the National Coordinating Committee for Environment (NCCE), has played a key role in developing and implementing the ODS phase out program. When the program was initiated in 1996, with the assistance of UNIDO and UNEP, NCCE was actively involved in implementing and monitoring the ODS phase out projects and were able to develop its management capacities.

The original CP set quantitative intermediate targets for ODS phase out in Table 3.1. Assessing progress against the MP control measures, DPR Korea has been able to meet the first MP control measure of 1999 freeze level for Annex A Group 1 substances. CFC consumption in 1999 was 106 ODP tons against the planned target of 287.27 ODP tones in 1999 in the original CP. This is 24 % of the freeze level (441.67 ODP tones) for CFC consumption. CFC production in 1999 was 106 ODP tons against the base line of 403.3 ODP tons. This is 26 % of the freeze level for CFC production. However, it may be mentioned that this drastic reduction in consumption and production was primarily due to the economic downslide witnessed by the country during 1995-1999.

UNEP and UNIDO carried out reviewing and updating of ODS data in February 2000, analyzing the consumption trends in the post 1999 period and the data for 2002, it is presumed that DPR Korea may be able to achieve the 2005 and 2007 reduction targets if relevant phase out activities proposed in the CPU are implemented.

In the 36<sup>th</sup> meeting of the Executive Committee (March 2002) DPR Korea's CFC production sector phase out plan for shutdown and dismantling its ODS production facilities was approved. ODS production phase out will be completed as per the Agreement between DPR Korea and ExCom. CFC-113 and MCF production facilities have already been dismantled showing the proactive actions of the country to phase out the ODS use in the country. The CFC-11/12 and CTC production facilities will be dismantled in 2003 and 2005, respectively. CTC production for solvent, process agent and fumigant will be dismantled in 2005. Future demand for critical/essential uses of Halons is proposed to be met through the halon management plan.

The CPU has been prepared based on a review of the current assessment of the implementation of the original CP and the Amendment to the original CP, and a critical assessment of the required policy, strategy and action plan to complete the phase out of remaining ODS in the country. Approved activities will continue to be implemented as designed. These include ongoing Institutional Strengthening project, solvent sector projects, and ODS production closure project.

In addition, DPR Korea has decided to address the remaining consumption of ODS through the following national phase out plans:

- National CTC Phase out plan proposed to be submitted in 2004.
- Refrigerant Management Plan (RMP) including the refrigeration manufacturing sector plan being submitted in 2003.

Halon Management Plan will be developed separately to meet essential uses. These plans will be coordinated and implemented by the NCCE as NCCE will assume the lead role in managing the ODS phase out plan. The country has requested UNIDO and UNEP to assist it in implementing the investment and non-investment components of the above-mentioned plans. NCCE will also be in charge of technical support and technical assistance program for addressing the residual consumption in a large number of workshops through a combination of awareness-raising, training and financial support. Future servicing needs of all remaining ODS containing equipment is proposed to be met through recovered and recycled ODS under the project activities of National CFCs Recovery and Recycling Network proposed by RMP or imported which will be controlled by Import/export Monitoring and Control measures under the activities of Legislative provisions and regulations of RMP and Customs Training Component of RMP from 2006 to 2010. The proposed Action Plan is presented in Chapter III.

The overall targets for phase out in all sectors will be:

<b>Sector</b>	<b>By when</b>
ODS production	2005
Process agent CTC uses	2005
Remaining solvent CTC uses	2005
CTC uses in fumigation	2005
CFC service requirements	2010
Halon requirements	2010
Conversion of compressor factory	2005
Conversion of domestic refrigerator factory	2005

The estimated incremental cost of remaining eligible consumption of 1741 ODP tons is approximately US\$18,306,405. The costs effectiveness, therefore, is US\$10.52/kg ODP.

This CP Update is result of assistance received from UNEP and UNIDO. An innovative approach of South-South cooperation was utilized to get hands-on expertise of SEPA China. This also resulted into wider consultation with the stakeholders within the country.

-----





조선민주주의인민공화국 환경민족조정위원회

DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA  
National Coordinating Committee for Environment

P.O.Box 44 Pyongyang, Tel. 850-2-18111(381 8370), Fax 850-2-381 4660

May 8, 2003

Dear Dr. Omar El-Arini,

**Subject: the Country Programme Update and the Refrigerant Management Plan for DPR Korea**

We have the honour to herewith submit to you the Country Programme Update for the Phase out of the Ozone depleting substances in our country.

Together with the Country Programme we submit a project proposal for the Refrigerant Management Plan which has been developed along with the present Country Programme.

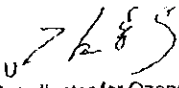
The National Coordinating Committee for Environment, DPR Korea would like to take this opportunity to emphasize the appreciation of the Government of DPR Korea for the financial assistance extended to it through the Multilateral Fund, which enabled the preparation of the present Country Programme Update and the Refrigerant Management Plan respectively.

We are pleased to ensure that the Government of DPR Korea is highly committed to the implementation of its strategy for the phase out of ozone depleting substances as stipulated in this programme.

We hope that the Country Programme Update and the Refrigerant Management Plan will get approved in the 40<sup>th</sup> Meeting of Executive Committee of the Multilateral Fund in July 2003.

Thank you for your cooperation and support.

Yours truly,

  
Kim Yong U  
National Coordinator for Ozone

Dr. Omar El-Arini  
Chief Officer  
Secretariat of MLF

Cc: Mr. Surendra Shrestha  
Director  
UNEP ROAR/RRC AP

Ms. Yalcindag  
Director  
Montreal Protocol Branch  
UNIDO