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Ministry of Waters, Forests and Environmental Protection, Romania

UNIDO

Danish Environmental Protection Agency

Country Programme for the Phaseout of Ozone Depleting Substances in Romania

Final Report

June 1995

COWIconsult
Consulting Engineers and Planners AS

ICPIAF S.A.

Ministry of Waters, Forests and Environmental Protection, Romania

UNIDO

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Country Programme for the Phaseout of Ozone Depleting Substances in Romania

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Abbreviations and Acronyms

CEE	Central and Eastern Europe
CFC	ChloroFluoroCarbons
CIS	Commonwealth of Independent States
CMEA	Council for Mutual Economic Assistance
CTC	Carbon TetraChloride
DME	DiMethylEther
EBRD	European Bank for Reconstruction and Development
EC	European Community
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environment Facility
HCFC	HydroChloroFluoroCarbon
HFC	HydroFluoroCarbon
HP	High Pressure (foam blowing)
LPG	Liquified Petroleum Gas
MCF	MethylChloroForm
MF	Multilateral Fund
MT	Metric Tonnes
MWFEP	Ministry of Waters, Forests and Environmental Protection
NGO	Non-Government Organization
ODP	Ozone Depleting Potential
ODS	Ozone Depleting Substances
POF	Private Ownership Funds
PU	PolyUrethane
R&D	Research and Development
SA	Societate Anonima (Joint Stock Company)
SC	Societate Commerciale (Commercial Company)
SOF	State Ownership Fund
SRL	Societate cu Raspundere Limitata (Limited Liability Company)
TAG	Technical Advisory Group
TAGCO	TAG Coordination Office
UM	Uzina Mecanica (Mechanical Works)
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
USD	US Dollar
UV	UltraViolet

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Executive Summary

Background

On 22 March 1985 the Vienna Convention for the Protection of the Ozone Layer (Vienna Convention) was adopted by concerned countries gathered to take measures to protect the Earth's Stratosphere. The Montreal Protocol on Substances that Deplete the Ozone Layer (ODS) was signed by 24 countries in 1987 and as of 1 January 1995 it is ratified by 146 countries. When the Montreal Protocol came into effect on 1 January 1989, it required that all parties to the Protocol freeze production and consumption of chlorofluorocarbons (CFC) at 1986 levels by 1 July 1989, and by 1998 a 50% reduction was demanded. As the scientific evidence of ozone depletion increased, the phaseout requirements were tightened in London (1990) and further in Copenhagen (1992) and new substances were included in the Protocol. The main ODS are CFC (used as refrigerants, foam blowing agents, aerosol propellants, and solvents), halon (used in fire fighting equipment), carbon tetrachloride and methyl chloroform (both used as solvents).

Of the 146 countries which have ratified, 65 have been categorized as operating under Article 5, paragraph 1 of the Montreal Protocol, ie they obtain a ten-year delay in the required ODS phaseout schedule to meet basic domestic needs. **Romania belongs to this group.** In addition, 34 countries have been temporarily categorized as operating under Article 5, paragraph 1 of the Montreal Protocol, ie the categorization is temporary pending receipt of complete data.

Romania and the ODS Country Programme

Romania ratified the Vienna Convention, the Montreal Protocol and the London Amendments in January 1993. It has as described above been categorized as an Article 5 country. Although Romania has not yet ratified the Copenhagen Amendments, it is aiming to do so before 1 January 1996, thereby emphasising the Government's strong commitment to take the necessary measures to protect the stratospheric ozone layer.

The ODS Country Programme for Romania has been prepared under guidance of the Ministry of Waters, Forest and Environmental Protection of Romania (MWFEP), which is the lead agency in ODS phaseout in Romania. The principles of the ODS phaseout strategy provided in the Country Programme was strongly endorsed by MWFEP on 22 May 1995 in a letter to UNIDO. In addition, Government Decision No 243 concerning the establishment, organisation and functioning of the National Committee for the Protection of the Ozone Layer (CNPSO) was approved 17 April 1995.

The ODS Country Programme for Romania has two objectives. Firstly, the provision of an overview of the current situation in Romania with respect to ODS production and consumption, ODS industry structure and significant actions already taken by the Romanian Government as well as responses to the Montreal Protocol by

ODS producing and consuming enterprises. Secondly, an outline of the ODS phaseout strategy, including the Action Plan endorsed by the Romanian Government.

The following two sections summarise the current situation regarding Romanian ODS production and consumption, respectively, while the latter two sections outline the Romanian Government's ODS phase-out strategy and identified key ODS phaseout projects at enterprise level.

ODS Production in Romania

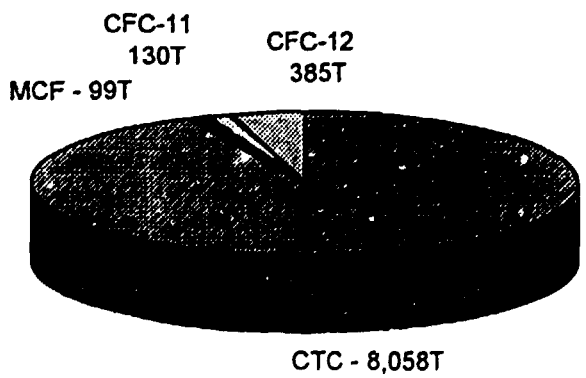
CFCs have only been produced in Romania from 1989 and since then production has fallen steeply. Chart E1 shows that almost 95% of ODS produced in Romania in 1993 consisted of CTC. Around 80% of the CTC was, however, exported, and of the remaining part for the domestic market, most of it was used as a chemical intermediate input and thus constitute non-regulated consumption. The actual production levels in 1993 were: 8,058 tonnes of CTC, 99 tonnes of MCF, 130 tonnes of CFC-11 and 385 tonnes of CFC-12.

There are only two ODS producers in Romania: BICAPA S.A., Tarnaveni, and S.C. OLTCHIM S.A., Ramnicu Valcea. The former produces the CFCs while the latter is engaged in CTC and MCF production. The two most plausible ODS phaseout options are: *a conversion to alternative production* and *a closing down of production lines*.

BICAPA considers a conversion to HFC-134a or HCFC-22. It is, however, unlikely that sufficient demand for the former exists, while the latter as a transitory substance is only a short-term solution. OLTCHIM contemplates an introduction of other chlorine-based solvents, but likely future restrictions in their use make this strategy uncertain. Increased production of PVC to absorb the chlorine is also considered as an option. A closing down of production lines will result in economic losses due to the connected nature of the chemical production process. Upstream as well as downstream problems exist. For OLTCHIM the caustic soda production will become loss-making, for example. Both BICAPA and OLTCHIM are large employers in their respective local economies, thus redundancies will have wider economic and social consequences.

At the fifteenth meeting of the Executive Committee of the Multilateral Fund, December 1994, a draft terms of reference for an expert group on the production of substitutes for ODS was presented (UNEP/OzL.Pro/ExCom-/15/45). The functions of this expert group will be: advise on operational policies and guidelines on various technical and economic issues associated with the production of substitutes for ODS; draft the terms of reference for an audit of the ODS producing industries in each of the ODS producing Article 5 countries; and advise on any other issues in the production sector as may be requested by the Executive Committee.

Chart E1: ODS Production in Romania, 1993



ODS Consumption in Romania

The ODS consumption occurs in the five industrial sectors: refrigeration, foams, aerosols, solvents and fire extinguishants. Chart E2 shows the 1993 shares of total tonnes (ODP-weighted) ODS consumption. The actual (ODP-weighted) consumption levels in 1993 for the sectors were: 926.7 tonnes in aerosols, 266.7 tonnes in foams, 176.7 tonnes in refrigeration, 156.8 tonnes for solvents and 31.4 tonnes in the fire extinguishant sector.

Aerosol, almost solely FARMEC in Cluj, is clearly the most important sector followed by foams. Within the foams sector, more than 70% of the CFC used is for the blowing of rigid foam for refrigeration insulation. METAPLAST in Buzau accounts for most of the remaining CFC use for rigid foam, mainly for the production of sandwich panels, while SPUMOTIM in Timisoara and CHIMICA in Orastie are the dominant producers of flexible foams based on CFC-blowing.

The 11% ODS use for refrigeration covers the CFC used as refrigerant. This was in 1993 almost evenly shared between domestic refrigeration (ARCTIC in Gaesti and U.M. SADU in Gorj), commercial refrigeration (TEHNOFRIG in Cluj and FRIGOCOM in Bucharest), and servicing of refrigeration (a few large state-owned companies including the refrigerator producers, the COMSERVICE network and the transport refrigeration company, TRANSFRIGOTREN in Bucharest, around 50 private authorised servicing shops and numerous servicing shops without authorization). In addition, a small amount of CFC is used for industrial refrigeration (TEHNOFRIG).

The solvents sector accounted for 10% of the ODS consumption in 1993, comprising several hundred companies most with a fairly small consumption. The sector is only covered scarcely in this report. This is mainly due to the variety of small companies using solvents and the diversity of applications. The main single application is for metal degreasing, and this sector is in Romania dominated by producers of ball bearings. The small use of halons for fire fighting is primarily by TAROM in Bucharest and NAVROM in Constanta.

Chart E2: ODS Consumption in Romania, 1993 (1,558 ODP-weighted tonnes)

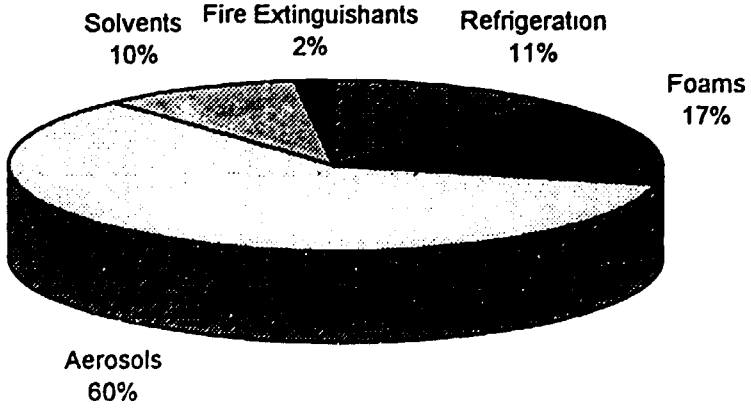
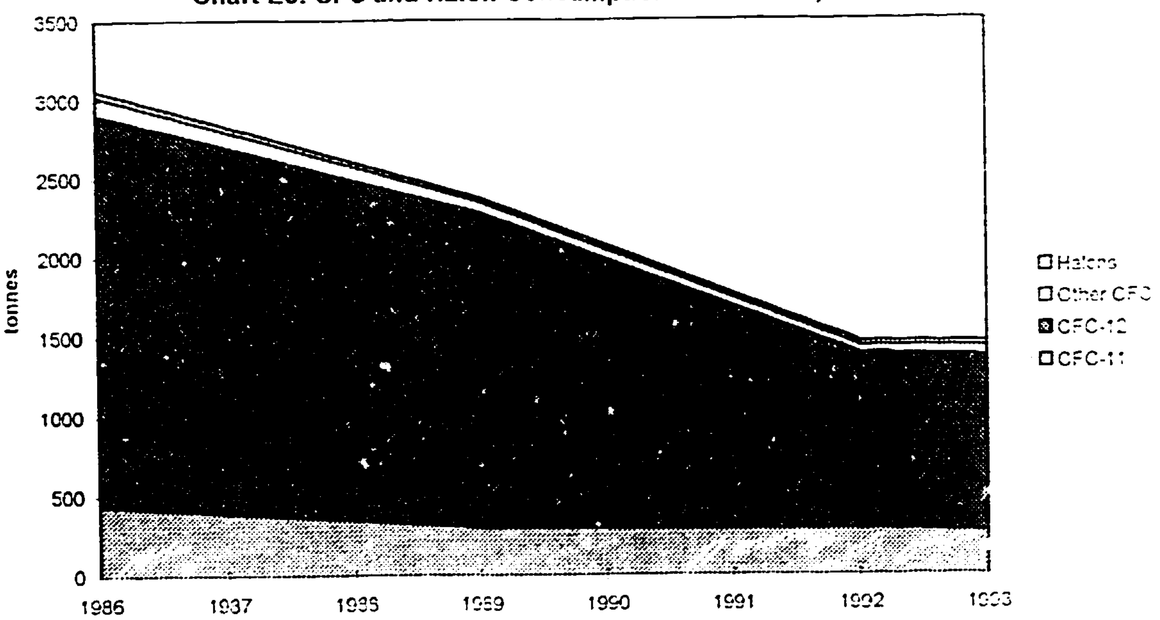


Chart E3 shows that CFC consumption has halved between 1986 and 1993. The main decline has been for CFC-12 which is primarily due to the cutbacks in aerosol production, but also because less CFC being used as refrigerant. The fairly constant foam production has meant that the use of CFC-11 has only declined little since 1986.

The options for phasing out the remaining ODS use in the different sectors varies. In aerosols the most suitable and cost-effective conversion is to propane-butane as propellant. This option is seeked by FARMEC. For rigid foam-blowing conversions to either HCFC-141b or cyclopentane are feasible options, while the latter should be preferred. As refrigerant the most seeked substitute for CFC-12 is HFC-134a. Various non-ODS options exist for the solvents sector, while CO_2 is the most likely substitute for halons in the fire extinguishant sector.

Chart E3: CFC and Halon Consumption in Romania, 1986-93



The Romanian Government's ODS Phaseout Strategy

The Romanian Government's point of view is that the key challenges of ODS phaseout in Romania are only partly of a technical nature. There are several non-technical factors which must be addressed and in many cases need more consideration than the technical issues. Technical substitution options exist or are under development in Romania though the technology in a few cases is not up-to-date compared with Western standards. Probably the scarcity of capital and the deficiencies in the institutional set-up are the two most important challenges to completion of the necessary R&D and to successful implementation of the ODS phaseout strategy. In addition, MWFEP will implement a regulatory regime for ODS production, consumption and trade, making use of administrative and economic instruments.

The Romanian Government has charged MWFEP, which is the lead agency on issues related to the Montreal Protocol, to ensure an institutional strengthening of the ODS phaseout activities in close co-operation with the Ministry of Industries which is responsible for the contacts to the individual enterprises on ODS phaseout related matters. This includes an inter-ministerial committee called the *National Committee for the Protection of the Ozone Layer* (CNPSO), having the role of promoting the measures and the actions necessary for the appli

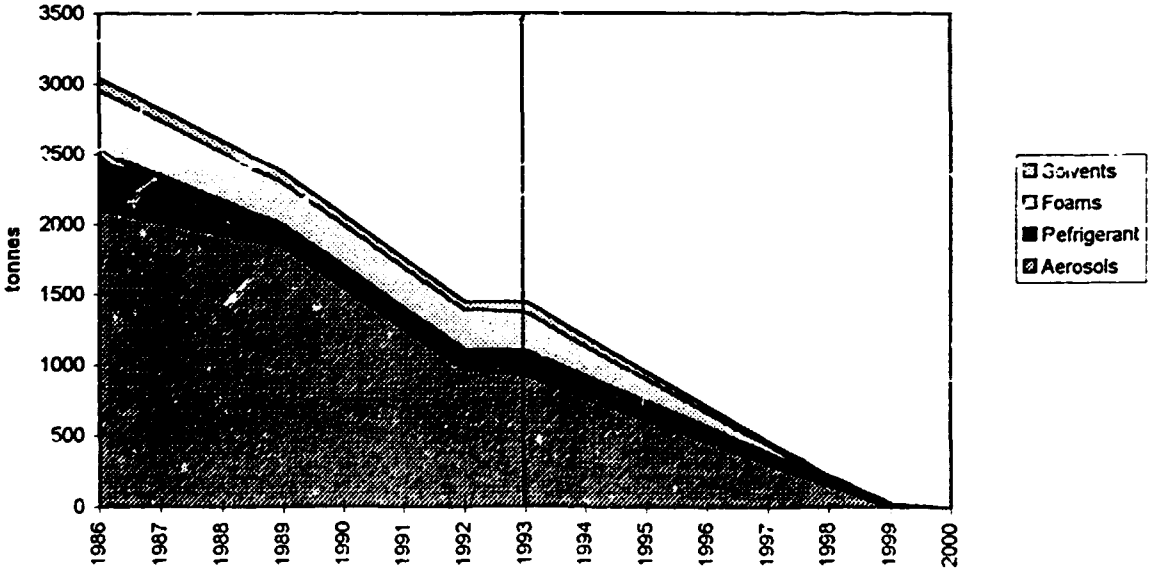
cation of the Montreal Protocol in Romania. Furthermore, two permanent bodies will be established under CNPSO: the *Ozone Secretariat* (STO) which will act as a national focal point, and the *Groups of Technical Experts* in which technical, economic and legal experts prepares proposals on ODS related matters.

The Romanian Government seeks financial assistance from the Multilateral Fund for such an institutional strengthening project as well as for conversion projects at enterprise level to non-ODS using applications. These projects are being developed by the enterprises themselves with assistance from consultants from UNIDO, ICPIAF and COWIconsult (see the following section for a list of the key projects ready for submission).

The instruments which the Romanian Government will implement to support ODS phaseout include *administrative instruments* such as improvements of customs subclassifications and ODS import licenses, introduction of ODS production licenses, bans on reexport of ODS, sector-specific bans on ODS consumption and bans on import of selected ODS based goods corresponding to the domestic sector-specific bans. It also covers *economic instruments* such as non-compliance measures and economic support for ODS phaseout activities, and *additional measures* such as monitoring arrangements, voluntary agreements with ODS import organisations and ODS producing and consuming enterprises, introduction of an accreditation system (certificates) for refrigeration servicing technicians, awareness campaign and a revision of industry norms and standards, including safety standards.

The Romanian Government's ODS Phaseout Strategy is expected to lead to a CFC consumption phaseout profile shown in Chart E4. Similar profiles are expected for halons, CTC and MCF.

Chart E4: CFC Consumption by Sector in Romania, 1986-93, and Planned Phaseout Schedule



Identified Key Projects

A preliminary list of 14 projects has been identified. This list covers seven projects in the refrigeration sector (ARCTIC, U.M. SADU, FRIGOCOM, TEHNOFRIG, COMSERVICE, ICPIAF and TRANSFRIGOTREN) three in the foam sector (METAPLAST, SPUMOTIM and CHIMICA), one in aerosols (FARMEC) and one in the solvents sector (RULMENTUL, Barlad). In addition to these, are the institutional strengthening project (MWPEF) and an information dissemination project (TERRA NOSTRA). These projects cover (almost) all the ODS used in aerosols, foams and new installations in refrigeration. The servicing of refrigeration is only partly covered, while solvents applications are very scarcely covered. There are no project for the fire extinguishant sector.

The five projects ready for submission to the Multilateral Fund at of mid-June are:

1. FARMEC S A., Cluj, aerosols, conversion from CFC-12 to butane-propane as propellant. The project will phase out an annual consumption of 700 tonnes CFC as a cost-effectiveness of 0.52 USD/kg.

2. ARCTIC S.A., Gaesti, domestic refrigeration, conversion from CFC-12 to HFC-134a as refrigerant and CFC-11 to cyclopentane as foam-blowing agent. The project will phase out annual consumption of more than 200 tonnes of CFCs at a cost-effectiveness of 8.48 USD/kg.

3. SPUMOTIM S.A., Timisoara, flexible foam, conversion from CFC-11 to CO_2 foam-blowing. The project will phase out an annual consumption of around 30 tonnes of CFC.

4. S.C. TRANSFRIGOTREN INTERNATIONAL S.A., Oras-Buftea (Bucharest), transport refrigeration, conversion from CFC-12 to HFC-134a as refrigerant. The project will phase out an annual consumption of 10.4 tonnes of CFCs at a cost-effectiveness of 23.36 USD/kg.

5. The Institutional Strengthening project.

1 Introduction

1.1 The Montreal Protocol

On 22 March 1985 the Vienna Convention for the Protection of the Ozone Layer (Vienna Convention) was adopted by concerned countries gathered to take measures to protect the Earth's Stratosphere. The Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol) was signed by 24 countries in 1987 and as of 1 January 1995 it is ratified by 146 countries (see Map 1).

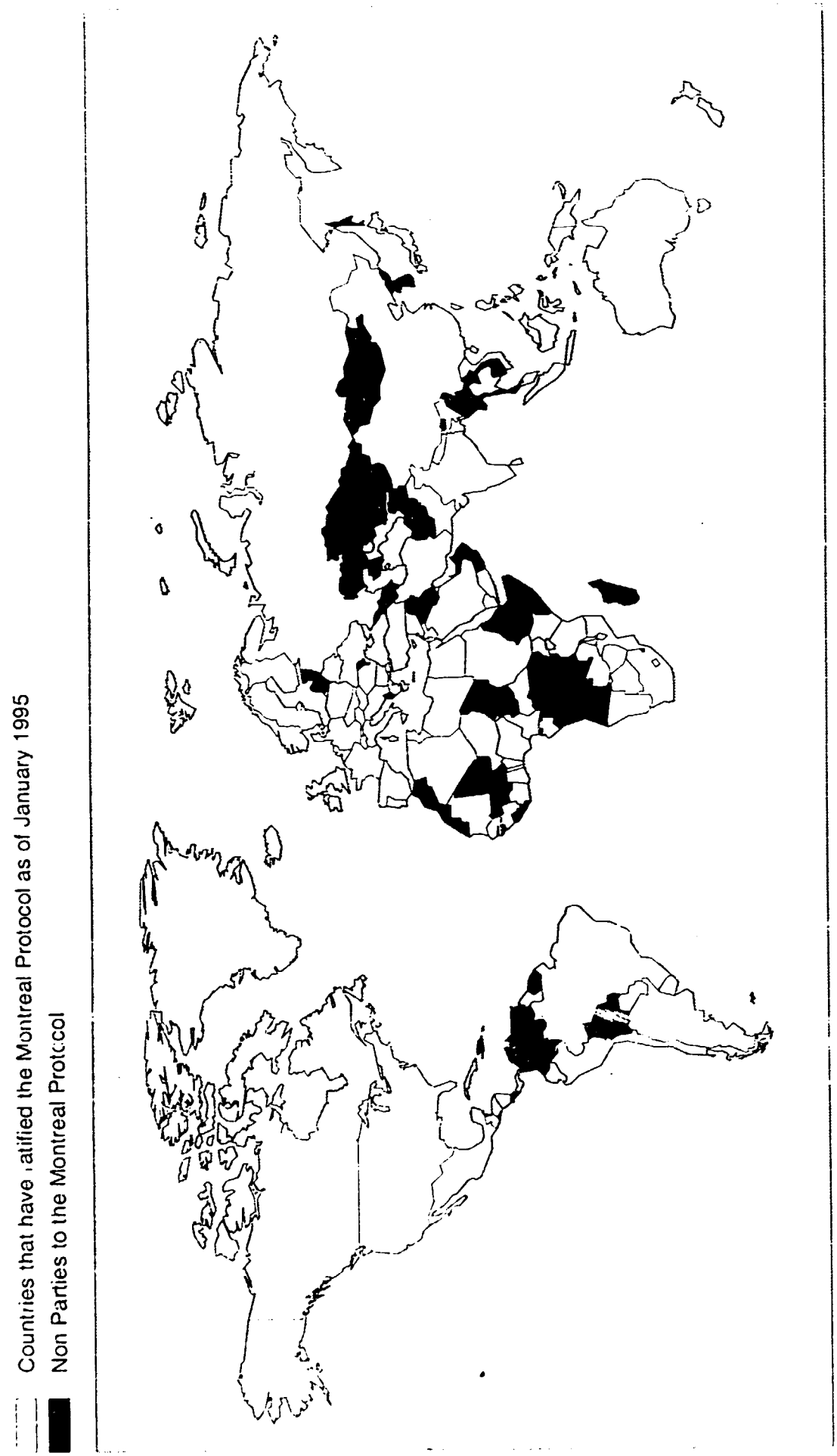
When the Montreal Protocol came into effect on 1 January 1989, it required that all parties to the Protocol freeze production and consumption of chlorofluorocarbons (CFC) at 1986 levels by 1 July 1989, and by 1998 a 50% reduction was demanded. However, Article 2, paragraph 6 of the Protocol allows for the addition of ODS production to the 1986 base year production if new production facilities were contracted for before 16 September 1987, and completed before 31 December 1990. Thus, the base year may be different from 1986.

As the scientific evidence of ozone depletion increased and the potential impacts on humans and the earth's ecosystems were further defined, the phaseout requirements were tightened in London (1990) and further in Copenhagen (1992) and new substances were included in the Protocol. According to the latest adjustments, a complete phaseout of the major ozone depleting substances (ODS) must be achieved already by January 1996 (January 1994 in the case of halon, see Chart 1.1). The major ODS are CFC (used as refrigerants, foam blowing agents, aerosol propellants, and solvents), halon (used in fire fighting equipment), carbon tetrachloride and methyl chloroform (both used as solvents). A description of the main contents of the Montreal Protocol and its Amendments is provided in Appendix III.

As of 1 January 1995 the London Amendment is ratified by 100 countries. The Copenhagen Amendment entered into force on 14 June 1994 after having been ratified by 20 Parties to the Montreal Protocol, and as of 1 January 1995 it is ratified by 37 countries.

Of the 146 countries which have ratified, 65 have been categorized as operating under Article 5, paragraph 1 of the Montreal Protocol, ie they obtain a ten-year delay in the required ODS phaseout schedule to meet basic domestic needs. In addition, 34 countries have been temporarily categorized as operating under Article 5, paragraph 1 of the Montreal Protocol, ie the categorization is temporary pending receipt of complete data.

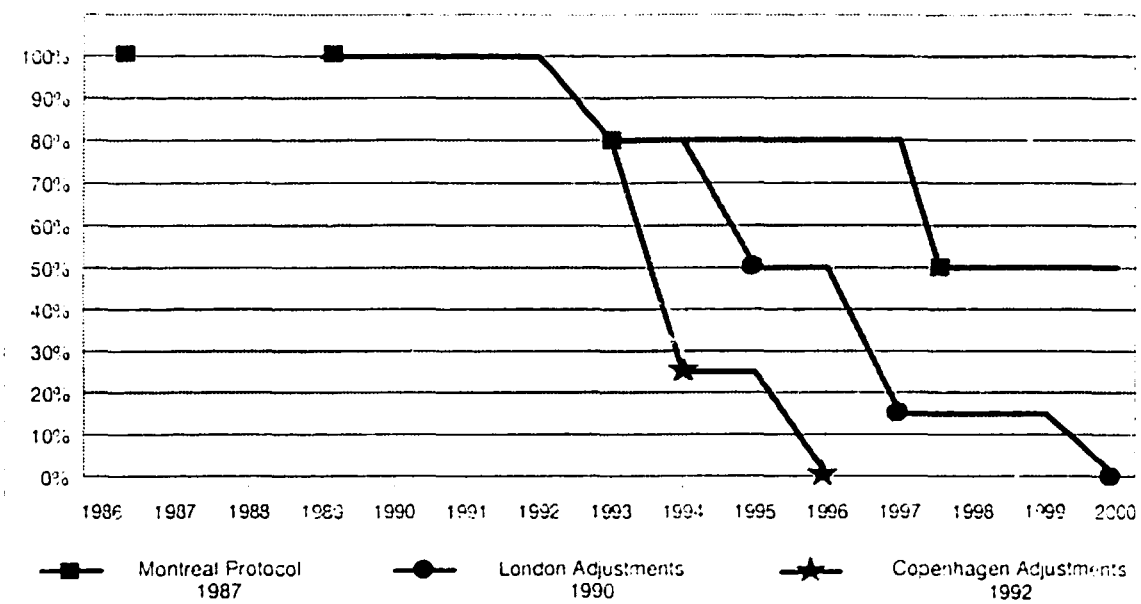
According to the Montreal Protocol (Article 5, para 1) a ten-year grace period in compliance with control measures is allowed developing country Parties whose annual calculated level of consumption of the controlled substances listed in Annex A is less than 0.3 kg per capita. These countries were hereafter referred to as Article 5 countries.



Map 1: Status of Ratification of the Montreal Protocol, January 1995

According to the London Amendments any Party operating under Article 5, para 1 shall exceed neither an annual calculated level of consumption of the controlled substances in Annex A of 0.3 kilograms per capita nor an annual calculated level of consumption of the controlled substances in Annex B of 0.2 kilograms per capita. That is, Article 5 countries, allowed a ten-year grace period in compliance with control measures, committed themselves to the additional requirement that the annual calculated level of consumption of additional CFCs, MCF and CTC combined does not exceed 0.2 kg per capita. Although, Article 5 has been further revised since then, this requirement still holds true.

Chart 1.1: Maximum Allowable CFC Consumption Relative to the 1986 Base Consumption under the Montreal Protocol (1987), London Adjustments (1990), and Copenhagen Adjustments (1992)



Note: Romania has a ten-year grace period for ODS use to meet basic domestic needs ie to 2006.

1.2 Romania and the Montreal Protocol

Romania ratified the Vienna Convention, the Montreal Protocol and the London Amendments in January 1993. It has been categorized as an Article 5 country. Although Romania has not yet ratified the Copenhagen Amendments, it is aiming to do so before 1 January 1996, thereby emphasising the Government's strong commitment to take the necessary measures to protect the stratospheric ozone layer.

The ODS Country Programme for Romania has been prepared under guidance of the Ministry of Waters, Forest and Environmental Protection of Romania (MWFEP), which is the lead agency in ODS phaseout in Romania. The principles of the ODS phaseout strategy provided in the Country Programme was strongly endorsed by Mr Ioan Jelev, Secretary of State, on 22 May 1995 in a fax to Mr Si Ahmed of UNIDO. In addition, Government Decision No 243 concerning the establishment, organisation and functioning of the National Committee for the Protection of the Ozone Layer (CNPSO) was approved 17 April 1995.

The country study for Romania (Chapter 2 of this Country Programme) provides an overview of the current situation, ODS replacement projects at enterprise level and available administrative and economic instruments supporting an ODS phaseout strategy for Romania. It may therefore be used as a comprehensive manual for Government officials when implementing the Action Plan.

1.3 Purpose of Country Programme

The ODS Country Programme for Romania has two objectives. Firstly, the provision of an overview of the current situation in Romania with respect to ODS production and consumption, ODS industry structure and significant actions already taken by the Romanian Government as well as responses to the Montreal Protocol by ODS producing and consuming enterprises. Secondly, an outline of the ODS phaseout strategy, including the Action Plan endorsed by the Romanian Government.

The Country Programme is a reflection of the commitment of the Romanian Government to comply with the obligations as a Party to the Montreal Protocol. It records and presents the information and analysis from which the Action Plan has been developed, it provides the framework within which financial assistance from the Multilateral Fund is requested, especially for implementation of ODS replacement projects at enterprise level, and it provides the basis for monitoring the extent to which the Action Plan is being followed and its effectiveness in reducing the ODS production and consumption in accordance with the ODS phaseout strategy chosen.

1.4 Assistance Received

The Country Programme and the investment projects contained herein have been prepared jointly by COWIconsult, UNIDO and ICPIAF[1] of Romania in close cooperation with the MWFEP and the Ministries of Industries and Commerce and the ODS producing and consuming enterprises in Romania. The technical assistance offered to Romania for Country Programme preparation and investment project identification and preparation has been provided by the Danish Environmental Protection Agency (USD 165,000) and the Multilateral Fund of the Montreal Protocol (USD 54,000). In addition to this technical assistance, the Romanian Government has through internal means provided a substantial input to the Country Programme preparation in terms of staff time and communication and transport costs (roughly estimated at USD 30,000).

The Romanian Government appreciates truly the technical assistance received.

Several Government departments and agencies in Romania have facilitated the development of the ODS Country Programme for Romania, foremost MWFEP in which State Secretary Mr Ioan Jelev has managed the technical assistance received from abroad. Government officials from MWFEP and the Ministry of Industries have had regular meetings with the consultants, participated in enterprise visits and reviewed working papers.

[1] The consultants involved from COWIconsult and ICPIAF were: Claus Hvashøj Jørgensen (Project Manager), Jesper Karup Pedersen (COWIconsult Team Leader), Eugen Lemnian (ICPIAF Team Leader), Sabin Bobos, Tim Jeppesen, Sorin Macovescu, Peter G. Madsen, Anthony Smith, Nicolae Olteanu and Mihaela Veres. The ODS replacement projects in the refrigeration and foam sectors were developed by the following UNIDO staff: Tamas Grof, Siegfried Nowotny and Risto Ojala. Last, but not least Mr S.M. Si Ahmed, Coordinator, Montreal Protocol Operations in UNIDO, has acted as supervisor throughout the preparation of the Country Programme and the preliminary documentation for ODS replacement projects.

1.5 Organisation of the Country Programme

Section 2 of the Country Programme comprises a presentation of recent developments in ODS production and consumption as well as a crude forecast of consumption to 2010 if no attempt is made to comply with the Montreal Protocol. Section 2 also covers a description of the present Romanian institutional and policy framework regarding ODS issues and a discussion of Government and industry responses to the Montreal Protocol.

Section 3 then presents the Romanian Government's ODS phaseout strategy. This covers Government actions regarding administrative and economic instruments, for example, and a short description of the institutional strengthening needed. The identified projects at enterprise level are summarised, while more extensive descriptions will be provided in a separate document.

2 Current Situation

2.1 Current and Forecast Consumption of ODS

Prior to this Country Programme the amount of detailed data on ODS production and consumption in Romania was limited. The data originated from:

- reports by the Romanian Ministry of Water, Forestry and Environmental Protection to the Secretariat for the Ozone Layer in Nairobi;
- a national inventory of the ODS under construction by ICIM (research group funded by the Romanian Government's *Research Programme regarding the Changes in the Ozone Layer and the Protection of its Quality*; see Section 3.2.1).

The former data source suffers from the fact that data are available by substance only and not by user sector. Furthermore, the data are reported for a few years only. The latter data source is still at an initial stage and thus not sufficient for a comprehensive picture of the current situation. This Country Programme will therefore also constitute an input to this inventory.

The strategy adopted here has been to initiate an own data collection as the primary source; and then use the above existing sources as complements when applicable. This procedure contained several elements:

- an industrial seminar was held 22 November 1994 at the Ministry of Industries, Bucharest, where ODS producers and users were informed about the Montreal Protocol (see Appendices VI and VII);
- following the seminar eight enterprises were visited. In February 1995, during the Main Technical Mission, further seven enterprise visits were made. At both these missions, data were collected;
- through questionnaires survey and telephone follow-up, ICPIAF has gathered data from enterprises and other organisations which were not visited as well as possible additional data from those visited;
- all the information collected by ICPIAF was entered into sector-specific reviews produced by COWI-consult;
- while the survey data only covers the main ODS producers and users, an estimate of the size of the remaining ODS use was carried out to reach a figure for total ODS consumption in Romania.

The data presented in the following section must therefore be seen as best estimates rather than actual data. While both the refrigeration, foam and aerosol sectors are adequately covered, the data for the solvents, in particular the share of non-regulated CTC and MCF, and fire extinguishants sectors are rough estimates.

All data are presented with one decimal-point in Section 2.1.1. This is a matter of convenience rather than the preciseness of the figures. These uncertainties are also carried over into the projections of ODS production and use in the future (Section 2.1.2).

2.1.1 Current Consumption

This section shows through six tables the current production and consumption of ODS as well as the situation in recent years. Detailed descriptions of the different sectors are found in Section 2.2, hence the comments to the tables here are kept concise.

Table 2.1 shows that CFCs have only been produced in Romania from 1989 and has fallen since. The CTC and MCF productions are also in decline, a trend which is expected to continue.

Table 2.1: Production of ODS in Romania 1986-93 (Tonnes)

Substance	1986	1989	1992	1993
CFC-11	-	214.0	158.0	130.0
CFC-12	-	1,176.0	645.0	385.0
CFC-113	-	-	-	-
CFC-114	-	-	-	-
All CFCs	-	1,390.0	803.0	515.0
Halon-1211	-	-	-	-
Halon-1301	-	-	-	-
Halon-2402	-	-	-	-
All halons	-	-	-	-
Carbon tetrachloride, CTC	18,711.0	13,367.0	9,600.0	8,058.0
Methyl chloroform, MCF	274.0	240.0	120.0	99.0
HCFC-22	-	-	-	-
Methyl bromide, MBR	-	-	-	4.4

Sources: ICPIAF survey and enterprise visits.
MBR: Department of Chemical Industries, Ministry of Industries.

Trade in ODS is very important. Table 2.2 reveals that almost two-thirds of CFC used in 1993 was imports. In contrast more than 80% of the CTC produced went to export markets, and of the CTC sold on the domestic market, most was as an intermediate product and thus not subject to regulation.

Of the consumption, CFC-12 is by far the most important, predominantly due to the large refrigeration and aerosol sectors.

Table 2.2: ODS Balances 1993 in Romania, by Substance (Tonnes)

Tonnes / Substance	Production	Imports[1]	Exports	Non-regulated ODS consumption[2]	Regulated ODS consumption[3]	Ozone depleting potential	Consumption in ODP tonnes
Annex A Group I							
CFC-11	130.0	138.7	1.5	-	267.2	1.0	267.2
CFC-12	385.0	717.5	-	-	1,102.5	1.0	1,102.5
CFC-113	-	76.0	-	-	76.0	0.8	60.8
CFC-114	-	0.5	-	-	0.5	1.0	0.5
All CFCs	515.0	932.7	1.5	-	1,446.2	-	1,431.0
Annex A Group II							
Halon-1211	-	1.2	-	-	1.2	3.0	3.6
Halon-1301	-	2.6	-	-	2.6	10.0	26.0
Halon-2402	-	0.3	-	-	0.3	6.0	1.8
All Halons	-	4.1	-	-	4.1	-	31.4
Annex B Group II							
Carbon tetrachloride, CTC	8,058.0	48.0	6,361.0	1,678.6	66.4	1.1	73.0
Annex B Group III							
Methyl chloroform, MCF	99.0	454.0	-	328.0	225.0	0.1	22.5
Annex C, Group I							
HCFC-22	-	7.6	-	-	7.6	0.05	0.4
Annex E, Group I							
Methyl bromide, MBR	4.4	-	-	4.4	-	0.7	0.0
Total							1,558.3

Sources: ICPIAF survey and enterprise visits.
MBR: Department of Chemical Industries, Ministry of Industries.

Notes:
1. Apart from CTC and MCF, imports are calculated as residual.
2. For CTC, MCF and MBR non-regulated ODS is calculated as residual.
3. For CTC and MCF the shares of regulated ODS are estimated by ICPIAF using the data collected for the solvents sector.

The development in ODS consumption by substance (Table 2.3) signifies that the use of CFCs, HCFC-22 and CTC has fallen since 1986. The use of halons has been fairly constant while MCFs have grown in importance.

Table 2.3: Consumption of Regulated ODS in Romania 1986-93, by Substance (Tonnes)

Substance	1986	1989	1992	1993
CFC-11	436.5	300.0	286.3	267.2
CFC-12	2,470.0	1,981.5	1,106.8	1,102.5
CFC-113	82.5	75.0	55.0	76.0
CFC-114	52.0	10.0	2.0	0.5
All CFCs	3,041.0	2,366.4	1,450.2	1,446.2
Halon-1211	1.0	1.1	1.0	1.2
Halon-1301	3.0	1.8	2.1	2.6
Halon-2402	0.8	0.5	0.5	0.3
All halons	4.8	3.4	3.6	4.1
Carbon tetrachloride, CTC	535.0	270.0	51.6	66.4
Methyl chloroform, MCF	82.2	78.0	124.8	225.0
HCFC-22[1]	200.0	10.8	8.7	7.6

Sources: 1986: The figures for CFCs and halons are based on import data 1984-85 from ICE DANUBIANA (now CHIMEXIM) and 1989 data.
1989-93: ICPIAF survey and enterprise visits.

Note: 1. Ministry of Industries letters 76246/30.07.93 and 100351/20.02.1995 claim the data to be 517 tonnes in 1989 and 53.9 tonnes in 1993. It is not indicated which sector uses the HCFC-22.

Table 2.4: CFC Consumption in Romania 1986-93, by Sector (Tonnes)

Year / End-uses	1986	1989	1992	1993
Refrigerants	422.0	151.8	136.0	176.3
Aerosols[1]	2,100.0	1,839.7	972.8	926.7
Solvents	83.0	75.5	55.5	76.5
Foams	436.0	299.5	285.8	266.7
Fire Extinguishants	-	-	-	-
Total	3,041.0	2,366.4	1,450.2	1,446.2

Sources: 1986: The figures for CFCs and halons are based on import data 1984-85 from ICE DANUBIANA (now CHIMEXIM) and 1989 data.
1989-93: ICPIAF survey and enterprise visits.

Note: 1. The 1989 and 1992 figures include estimates for NORVEA's (became COLGATE-PALMOLIVE in 1992) use as they were not covered by the survey. The consumption has been assumed to follow FARMEC's trend.

Table 2.4 shows that the aerosol sector is by far the largest CFC user with around two-thirds of the total consumption in 1993; and within this sector FARMEC in Cluj accounted for more than 95% of the consumption. The uses of CFCs as refrigerant and for foams are closely correlated because most foam produced in Romania is for the refrigeration sector.

Tables 2.5 and 2.6 finally present the ODS consumption at a detailed level, ie by substance and by sector. The single largest figure is here the CFC-12 for personal care aerosols, followed by CFC-11 used for rigid foams in the refrigeration sector and CFC-12 as refrigerants.

Table 2.5: ODS Consumption in Romania 1989-93, by Substance and Sector: REFRIGERATION and FOAM (Tonnes)

Sector	Substance	Application	Consumption (tonnes)		
			1989	1992	1993
Refrigeration					
Domestic	CFC-12	Refrigerators and freezers	101.3	103.5	60.2
	HCFC-22		2.5	1.9	1.6
Commercial	CFC-12	Refrigerators and freezers	-	2.2	55.0
Industrial	CFC-12	New installations	12.6	13.6	5.0
	HCFC-22		3.8	4.8	2.8
Transport	CFC-12	New installations	9.0	-	-
Servicing	CFC-12	Domestic	10.5	10.7	11.1
	CFC-12	Commercial	8.0	4.8	6.0
	CFC-12	Industrial	10.0	4.0	3.0
	HCFC-22	Industrial	4.0	1.5	2.0
	CFC-12	Transport	13.0	10.8	10.8
	CFC-12	*not specified*[1]	28.6	29.1	30.2
	HCFC-22	*not specified*	0.5	0.5	1.2
Total	CFC-12	Refrigeration	151.8	136.0	176.3
	HCFC-22		10.8	8.7	7.6
Foams	CFC-11	Flexible foam[2]	78.9	59.2	51.4
	CFC-11	Rigid foam for refrigeration	194.8	203.4	192.3
	CFC-11	Rigid foam	25.8	23.2	23.0
Total	CFC-11	Foams	299.5	285.8	266.7

Sources: ICPIAP survey and enterprise visits.

Notes: 1. The 1989 and 1992 figures are estimates based on the 1993 figure and the trend for servicing domestic refrigeration.

2. In the figures for 1989 and 1992, CHIMICA's, Orastie, contribution is estimated using the trend for SPUMOTIM, Timesoara.

Table 2.6: ODS Consumption in Romania 1989-93, by Substance and Sector: AEROSOLS, SOLVENTS, FIRE EXTINGUISHANTS, and Total ODS (Tonnes)

Sector	Substance	Application	Consumption (tonnes)		
			1989	1992	1993
Aerosols	CFC-12[1]	Personal care	1,367.2	698.3	675.0
	CFC-114	Personal care	10.0	2.0	0.5
	CFC-12	Household products	347.5	177.5	171.3
	CFC-12	Industrial products	115.0	95.0	80.0
Total	CFC-12	Aerosols	1,829.7	970.8	926.2
	CFC-114		10.0	2.0	0.5
Solvents	CFC-11[2]	Dry cleaning	0.5	0.5	0.5
	CFC-113	Electronics	3.0	1.0	1.0
	CFC-113	Metal degreasing	72.0	54.0	75.0
	MCF	Metal degreasing	30.0	76.0	143.0
	MCF	Other solvent applications	48.0	48.8	82.0
	CTC	Other solvent applications	270.0	51.6	66.4
Total	CFC-11	Solvents	0.5	0.5	0.5
	CFC-113		75.0	55.0	76.0
	MCF		78.0	124.8	225.0
	CTC		270.0	51.6	66.4
Fire exting.	Halon-1211	Portable equipment	1.1	1.0	1.2
	Halon-1301	Portable equipment	1.7	2.0	2.5
	Halon-2402	Portable equipment	0.5	0.5	0.3
	Halon-1301	Small scale systems	0.1	0.1	0.1
Total	Halon-1211	Fire extinguishants	1.1	1.0	1.2
	Halon-1301		1.8	2.1	2.6
	Halon-2402		0.5	0.5	0.3
Total ODS	CFC-11		300.0	286.3	267.2
	CFC-12		1981.5	1106.8	1102.5
	CFC-113		75.0	55.0	76.0
	CFC-114		10.0	2.0	0.5
	HCFC-22[3]		10.8	8.7	7.6
	MCF		78.0	124.8	225.0
	CTC		270.0	51.6	66.4
	Halon-1211		1.1	1.0	1.2
	Halon-1301		1.8	2.1	2.6
	Halon-2402		0.5	0.5	0.3
Total	All		2,728.6	1,638.9	1,749.3

Sources: ICPIAF survey and enterprise visits.

Notes:
1. The 1989 and 1992 figures include estimates for NORVEA's (became COLGATE-PALMOLIVE in 1992) use as they were not covered by the survey. The consumption has been assumed to follow FARMEC's trend.
2. The figures for 1989 and 1992 are assumed equal to the 1993 figure.
3. Ministry of Industries letters 76246/30.07.93 and 100351/20.02.1995 claim the data to be 517 tonnes in 1989 and 53.9 tonnes in 1993. It is not indicated which sector uses the HCFC-22.

2.1.2 Forecast Consumption

The Multilateral Fund's Country Programme Guidelines request forecasts of the use of each substance by user sector, assuming that *no attempt* is made to comply with the Montreal Protocol, and that ODS continue to be abundantly available from existing sources, at current prices. The purpose of this section is primarily to discuss the barriers faced in forecasting ODS consumption for Romania. A crude forecast to 2010 will, however, be provided.

Firstly, the assumption that ODS in the forecast are available in unconstrained quantities is very implausible whether compliance with the MP is pursued or not. Romanian ODS users have already been facing CFC delivery problems from external sources, and the quality of BICAPA's CFC is by several users considered to be too low. In addition, ODS prices are expected to increase with the decline in production levels throughout the World.

Secondly, the decline in the demand for ODS in recent years (see Section 2.1.1) is partly due to the economic recession in Romania in general. As described in Appendix VIII, this decline appears to have come to a halt and positive growth rates are expected in the future; the magnitude depending on the Government's reform programme, especially the speed of privatisation, and the growth in export markets. Forecasts based on extrapolations of data for the recent years will therefore not be suitable.

A crude forecast is shown in Chart 2.1 where the demand for ODS is assumed to followed economic growth of 0% in 1994 and to average 3% pa in 1995-2010. There is no distinguishing between sector and thus substances. The forecast is only an illustration of how the picture would be if the ODS use followed economic growth in general.

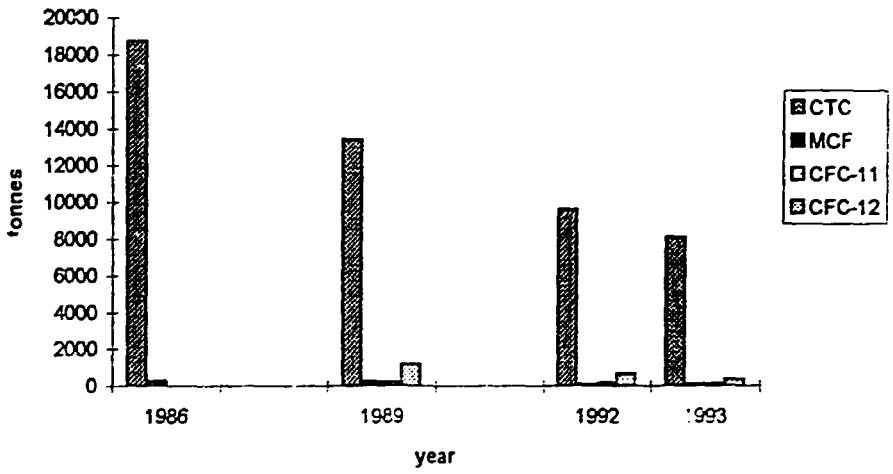
Chart 2.1: ODS Consumption Forecast for Romania to 2010

2.2 Industries Structure

2.2.1 ODS Producer Industries

CFCs have only been produced in Romania from 1989 and the production has fallen steeply since (see Chart 2.2). In 1994 the production was at a halt for ten months due to a lack of customers. Production re-started in November 1994 only. This production decline has meant increased imports. Chart 2.2 also shows that almost 95% of ODS produced in Romania in 1993 consisted of CTC. Table 2.2 in Section 2.1, however, clarifies that around 80% of the CTC was exported, and of the remaining part for the domestic market, most of it was used as an intermediate input and thus as non-regulated consumption.

Chart 2.2: ODS Production in Romania, 1986-93



There are two main ODS producers in Romania (see Map 2):

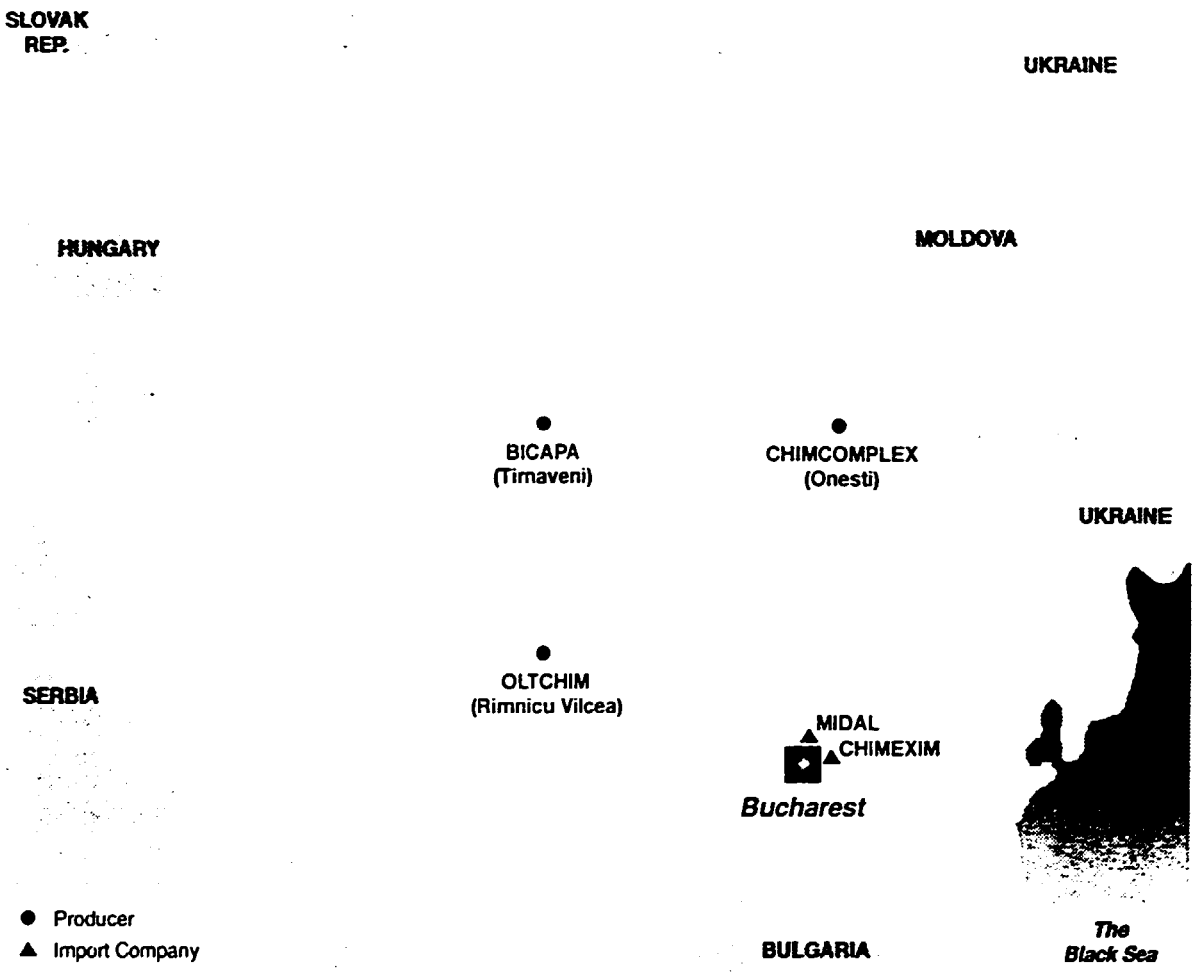
- BICAPA S.A., Tarnaveni (Box 1)
- S.C. OLTCHIM S.A., Ramnicu Valcea (Box 2)

The former produces the CFCs while the latter is engaged in CTC and MCF production. In addition to these, CHIMCOMPLEX in Onesti has a small CTC production (around 18 tonnes in 1993).

Most of OLTCHIM's CTC production is exported, primarily to Greece. Of the CTC sold on the domestic market, BICAPA procured 63% (used as an intermediate substance), while the remaining part went to the solvents sector. All MCFs produced in 1993 went to the domestic sector.

Romanian CFC-users regard imported produce superior to the domestic CFC, because of the lower water content, for example. It is therefore unlikely that BICAPA will regain its market share and a change towards exports seems implausible.

Map 2: Romanian ODS Producers and Importers



According to the Copenhagen Adjustments to the Montreal Protocol the production of CFC, CTC and MCF need not be phased out before 2006 because of Romania's status as an Article 5 country. However from 1996, exports to non-Article 5 countries will be banned and exports of products using ODS will also not be allowed. ODS production is therefore set to decline further in line with the falling demand.

The most plausible ODS substitute options include (see Appendix X for a more detailed description):

- converting to alternative production
- closing down of production lines; and

BICAPA considers a conversion to HFC-134a or HCFC-22. It is, however, unlikely that a shortage in demand for the former exists, while the latter as a transitory substance is only a short-term solution. OLTCHIM contemplates an introduction of other chlorine-based solvents, but likely future restrictions in their use make this strategy uncertain. Increased production of PVC to absorb the chlorine is also considered as an option.

In so far as OLTCHIM's exports to non-Article 5 countries, especially Greece, exceed 70% of the production, an ODS replacement project prepared for/by OLTCHIM is not eligible for funding following the guidelines endorsed by the Executive Committee at its Fifteenth Meeting.

A closing down of production lines will result in significant economic losses due to the connected nature of the chemical production process. Upstream as well as downstream problems exist. For OLTCHIM the caustic soda production will become loss-making, for example. Both BICAPA and OLTCHIM are large employers in their respective local economies, thus redundancies will have wider economic and social consequences.

At the fifteenth meeting of the Executive Committee of the Multilateral Fund, December 1994, a draft terms of reference for an expert group on the production of substitutes for ODS was presented (UNEP/OzL.Pro/ExCom-/15/45). This functions of this expert group will be: advise on operational policies and guidelines on various technical and economic issues associated with the production of substitutes for ODS; draft the terms of reference for an audit of the ODS producing industries in each of the ODS producing Article 5 countries; and advise on any other issues in the production sector as may be requested by the Executive Committee.

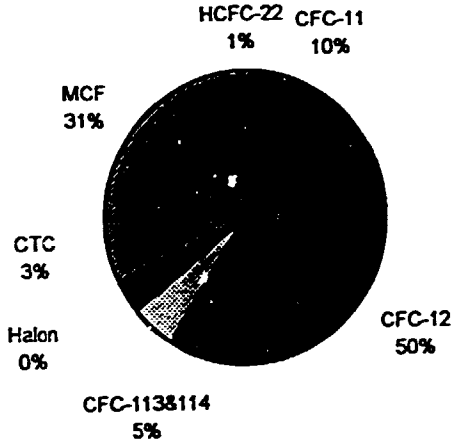
BOX 1: BICAPA S.A., Turnavei	
Company profile	Founded in 1916, but the CFC and HF production lines did not come into operation before 1989. BICAPA has 3,000 employees of which around 400 are directly and indirectly dependent on the CFC and HF production. Turnover in 1993 was 14.8 bn Lei, of which CFC and HF accounted for around 0.9 bn Lei. The profit margin was in 1993 around 4%. It is a state-owned enterprise (70% SOF, 30% POF), but is on the list of enterprises targeted for privatisation.
Product range	The sole Romanian producer of most of its products, including CFC. Its main products are: 1) chrome salts, 2) barium salts, 3) fluorine products, including CFC-11, CFC-12 and HF, 4) inorganic salts, 5) sulphur antifungal and insecticide products, 6) ceramic products, and 7) miscellaneous chemical products.
ODS production	Around 80% of the ODS production is CFC-12 and 20% is CFC-11. Since 1989 the production has declined drastically from 1,176 tonnes of CFC-12 in 1989 (214 tonnes of CFC-11) to 385 tonnes in 1993 (130 tonnes of CFC-11). The production capacity is 3,900 tonnes of CFC-12 and 850 tonnes of CFC-11.
Market	BICAPA has no exports of CFCs, and one domestic customer, FARMEC in Cluj, accounts for more than 50% of its sales; none of the remaining customers account for more than 10% of sales.
Equipment	The CFC production line was installed in 1987-89; all equipment Romanian made. The company has also drying equipment, but this has not yet been installed. There are some leakage problems which will be solved by the installation of French-made valves.
Supply	The Chlorflouride is imported from China and the CTC is purchased from OLTCHIM. BICAPA produces HF itself.
ODS phaseout	BICAPA wishes to convert to HFC-134a or HCFC-22.

BOX 2: S.C. OLTCHIM S.A., Ramnicu Valcea	
Company profile	Founded in 1968; production of CTC and MCF commenced in 1974. Out of 6000 employees, around 1350 are dependent upon the CTC and MCF production. In 1993 the turnover amounted to 250 m USD. OLTCHIM is state-owned (70% SOF, 30% POF), but it expects that 30% of the shares will be sold in 1995 to private investors.
Product range	Main products: 1) organic chlorinated products (including CTC and MCF), 2) macromolecular products (including PVC), 3) chlorosodics, 4) organic synthesis products, 5) amines, and 6) pesticides.
ODS production	Capacity of 40,000 tonnes chlorinated solvents, of which around 50% is for CTC. In 1993 the CTC production amounted to 8,040 tonnes. MCF is produced on a discontinuous line, which in 1993 delivered 99 tonnes.
Market	OLTCHIM is the only producer of CTC in Romania. Around 80% of the CTC is exported, mainly to Greece and USA, while on the domestic market the produce is mainly for BICAPA (63%) and the solvents sector.
Equipment	The CTC line was installed in 1974 (French supplier), but the pipes and heat exchangers were revamped in 1989-1992.
ODS phaseout	OLTCHIM intends to base future production on chlorine. Two strategies have been developed: 1) introduction of other chlorine-based solvents; 2) an increase in the present PVC suspension capacity.

2.2.2 ODS Importers

Chart 2.3 illustrates the composition of ODS imports in 1993, where CFC-12 comprises the largest share, followed by MCF and CFC-11. Around two-thirds of the CFC used in 1993 was imported (see Table 2.2), all halons and HCFC-22 are imported and so is the main part of MCFs. CTC on the other hand is mainly domestically produced.

Chart 2.3: ODS Import in Romania, 1993



Imports arrive partly through import companies, which since 1989 have become numerous[2]. and partly as direct imports by the ODS-using industries.

Two of the main import companies, which each imported around 100 tonnes of CFC in 1994, are (see Map 2):

- CHIMEXIM S.A., Bucharest (Box 3)
- MIDAL, Bucharest (Box 4)

Any importer of ODS in Romania must have a *Certificate of Ability.* This certificate ensures that the importer has personnel capable of handling chemical substances and that is has the necessary storing facilities. Any company, but not individuals, can apply for the certificate. Customers, however do not need a certificate to buy ODS from the importers. The importers must report monthly to the Central Statistical Office.

[2] The visited import companies did not consider themselves able to make a satisfactory guess.

BOX 3: CHIMEXIM S.A., Bucharest	
Company profile	Founded in 1950. In 1994, CHIMEXIM employed 150, a decrease of 50 compared with 1989. It became a private company through an employee-buyout in November 1994. Profit in 1993: 1.7 bn Lei.
Product range	Import and export of a wide range chemical products, of which CFC has a diminutive share (less than 1%).
Market	The main customers of CFCs include SADU in Gorj, FARMEC in Cluj, and until last year MIDAL, Bucharest bought its CFC through CHIMEXIM.
ODS import	CHIMEXIM imported 100 tonnes of CFCs in 1994 (Romanian import of CFCs as a whole was 933 tonnes in 1993), mainly CFC-12. In 1995 there has so far (February 1995) been no requests from customers.
Supply	Mainly from Italy, but also from Greece and Ukraine.
ODS phaseout	CHIMEXIM expects the ODS phase-out to have little effect for the company because of CFCs relatively small part of the total turnover.

BOX 4: MIDAL, Bucharest	
Company profile	Founded in 1991 as a privately-owned company. MIDAL employees 35 of which 12 are refrigeration servicing technicians. MIDAL comprises three sections: 1) Foreign trade, 2) Internal trade, 3) Refrigeration provisions.
Product range	The import of CFCs is an important part (40%) of MIDAL's business. Of importance is also the import of refrigeration equipment, condensing units, charging stations, leak detectors, tools and compressors. The company also specialises in servicing and retrofitting of refrigerators.
Market	All Romania.
ODS import	MIDAL imports around 100 tonnes of CFCs per year, mainly CFC-12, but the company has also a stock of 10 tonnes HFC-134a.
Supply	MIDAL has exclusive rights in Romania to DUPONT products, but buys from other companies as well.
ODS phaseout	The company is planning a seminar on ODS alternatives in Bucharest, autumn 1995. It expects to benefit from the ODS phase-out due to increased sales of alternative refrigerants and the need for retrofitting.

According to Government Decision No 340, 20 June 1992, some commodities require an import licence. These are commodities which are dangerous to the health and the environment. ODS is *not* included in this Decision at present, but the Ministry of Commerce intends to extend the Decision to include ODS or promote a new decision in 1995. A licence is issued by the Ministry of Commerce, but must in some cases be approved by, for example, the Ministry of Industry or the Ministry of health depending on the nature of the commodity in question. The Ministry of Commerce is obliged to respond within 5 days to an application. According the Ministry of Commerce Order No 10, the period of a licence is, since January 1995, four months. For some licences there are quotas, so that there exist competitions such as "first-come - first-get" or according to the quantity imported in the previous period.

The import tariff on chemicals averages 15% with 20% applicable for ODS. On top of this VAT of 18% applies.

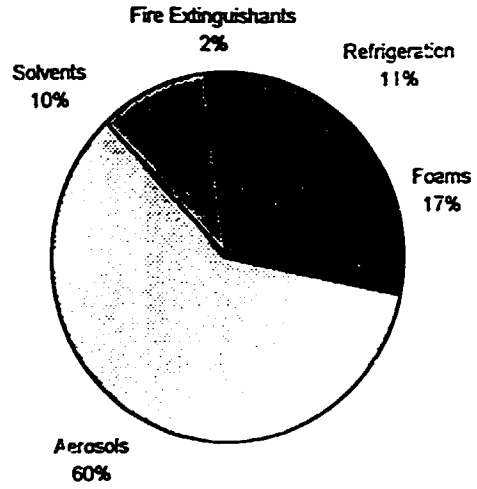
The Romanian importers and custom officials claim that an effective customs declaration system is in place. The procedure is that the importer declares the content of shipment when reaching the border. The customs officer compares the declaration with the bill and performs occasional checks.

In the past imports are were registered at a 6-digit level compared with a 8-level (EU compatible) generally. This means that imports of ODS which were possible at the 8-digit were included with other chemicals at the 6-digit-level, and therefore no data were immediately available. Since April 1993, however, customs declarations have been registered at the 8-digit level.

2.2.3 ODS Consumer Industries

The ODS consumption occurs in the five industrial sectors: refrigeration, foams, aerosols, solvents and fire extinguishants. Chart 2.4 shows the 1993 shares of total tonnes (ODP-weighted) ODS consumption. Aerosols (FARMEC in Cluj) is clearly the most important sector followed by foams.

Chart 2.4: ODS Consumption in Romania, 1993 (ODP-weighted)



2.2.3.1 Refrigeration

Three types of refrigeration equipment are produced in Romania (see Map 3):

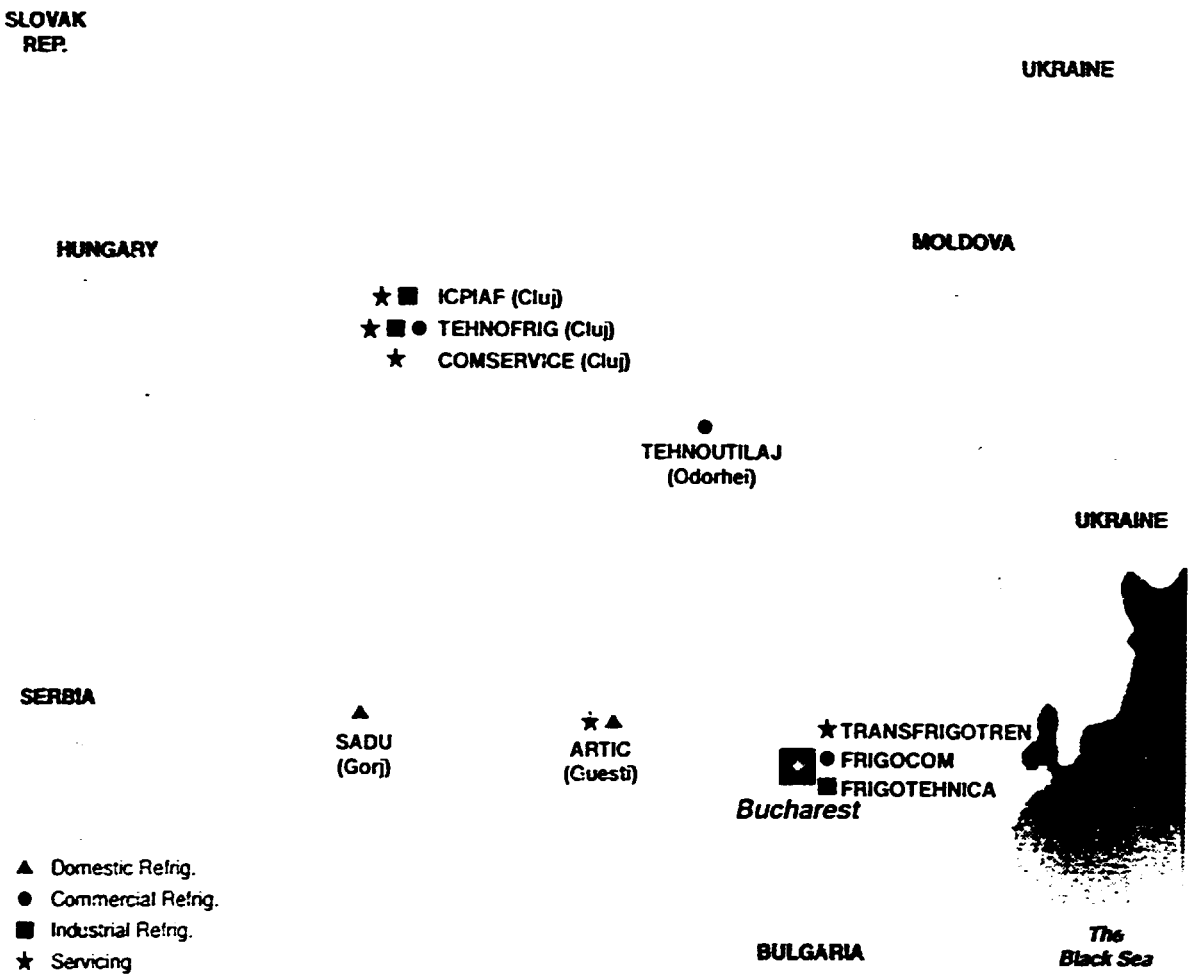
- domestic refrigeration
- commercial refrigeration
- industrial refrigeration

In addition to these, the sector:

- servicing of refrigeration

which covers the above three types of equipment as well as the servicing of rail transport refrigeration is described in the following.

Map 3: Romanian Refrigeration Enterprises



Note: COMSERVICE has many shop; on the map is only the shop in Cluj, which was visited in the Main Technical Mission, indicated.

Chart 2.5 shows the development in the CFC-12 consumption 1989-93 for the four refrigeration sectors. Apart from industrial refrigeration, the amounts were fairly even in 1993. This is, however, unlike recent years as the commercial refrigeration production has only just commenced as an attempt to offset the falling demand for domestic and industrial refrigeration.

Around a third of the production in domestic refrigeration was exported to western Europe in 1993, mainly to the UK, France and Greece. There are no exports of commercial and industrial refrigeration.

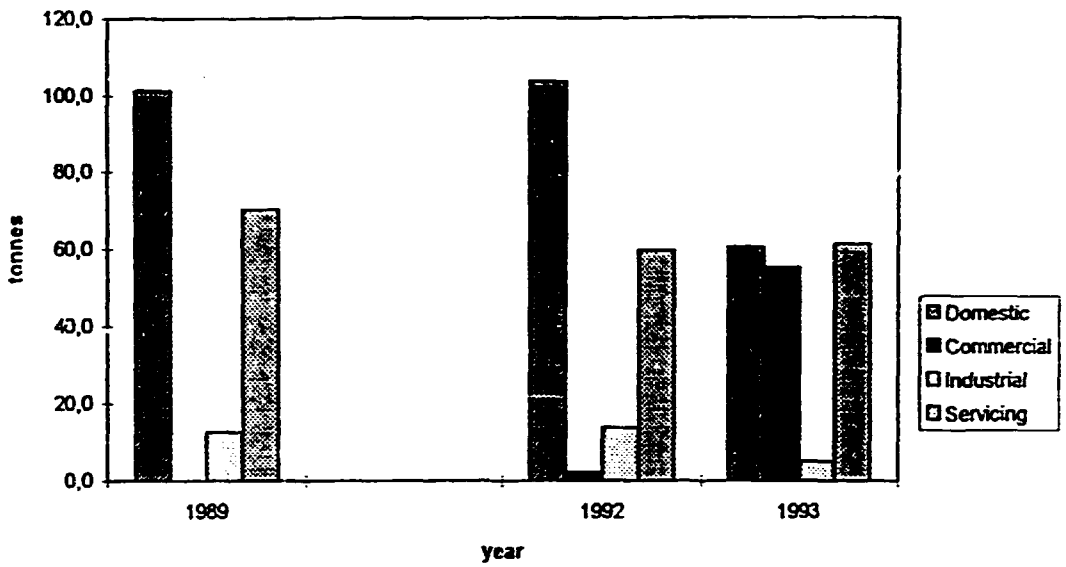
There is no formal sector organization for refrigeration producers in Romania, but the companies are in a continuous dialogue with the Ministry of Industry, department of machine building. This department acts as an advisor to the individual enterprises without organising cooperation between the companies. Cooperation is organised directly by the companies themselves.

The General Association of Refrigeration Technicians (AGFR), affiliated to the International Refrigeration Institute (IIR), is a professional organisation covering technicians from technical universities, research institutes,

producers and users of refrigeration plants. AGFR organises the professional contact between technicians only, hence not between companies.

Designs of refrigeration plants and equipment are mainly performed by: ICPIAF, Cluj (refrigeration equipment for enterprises belonging to the Engineering Construction Ministry); ISPCAIA, Bucharest (refrigeration plants for enterprises in the food industry); ICPROCHIM, Bucharest (for enterprises belonging to the Ministry of Chemical Industries).

Chart 2.5: CFC-12 Use in Refrigeration, 1989-93



Domestic Refrigeration

There are around 7.6 m domestic refrigeration units (70% refrigerators and 30% freezers) in Romania, a country with around 23 m inhabitants. Each unit contains 90-120 g CFC-12 as refrigerant (0.1 m units are, however, of the absorbtion type with a water/ammonia solution). The ordinary lifetime of a domestic refrigerator is around 10 years, but several repairs typically extend the lifetime to 20 years. This long lifetime is due to the present strain on personal incomes.

Before 1989, around 500,000 domestic refrigerators were imported from the former Soviet Union (ZIL and MINSK). Since 1989, some 500,000 units have been imported from ELECTROLUX, BOSCH, PHILIPS and ZANUSSI. High prices for foreign refrigerators limit the amount of imports notably.

There are two manufacturers of domestic refrigerators in Romania:

- ARCTIC S.A., Gaesti (Box 5)
- U.M. SADU, Gorj (Box 6)

ARCTIC and SADU have the agreement that SADU buys compressors from ARCTIC who in turn buys thermostats and plastic spare parts produced at SADU.

BOX 5: ARCTIC S.A., Gaesti	
Company profile	ARCTIC was founded in 1968, and produced on a Thompson-Houston licence until 1975. Its products are of own design and are manufactured by its workforce of around 4300 (including servicing personnel). The ownership structure is 70% SOF and 30% POF.
Product range	Domestic refrigerators, larders, two-door refrigerators, upright freezers, chest freezers, fridge-freezers, compressors and spare parts.
Market	ARCTIC produces mainly for the domestic market. In 1993, 112,000 units (30% of the production) were exported to France, Greece, and the UK. The export is, however, decreasing due to a large growth in the domestic demand.
Equipment/ production	ARCTIC has 32 production lines in operation of which more than half are 25 years old. Most of the foaming lines are 5-10 years old, but the line for chest freezers is from 1994. The production capacity is around 400,000 units.
ODS consumption	As refrigerant for new units, ARCTIC used in 1993 52.5 tonnes of CFC-12. In addition to this 9.6 tonnes of CFC-12 were used in servicing (see also Box 9) and 150 tonnes of CFC-11 were consumed in foam production.
Supply	Suppliers include BASF and ICI.
ODS phaseout	ARCTIC has as of 1st November 1994 converted from CFC-12 to HFC-134a, and from CFC-11 to HCFC-141b. It wishes to go further and use cyclopentane.

BOX 6: U.M. SADU, Gorj	
Company profile	SADU is part of the RATMIL corporation in Bucharest, a military industrial complex. SADU is located in Gorj, around 330 km west of Bucharest. SADU has 5,200 employees of which 800 are engaged in the production of domestic refrigerators. The ownership structure is 70% SOF and 30% POF.
Product range	Domestic compressor refrigerators, domestic absorbtion type refrigerators, thermostats and detonators.
Market	The domestic market only.
Equipment/ production	SADU has a production capacity of 160,000 compressor refrigerators and 40,000 absorbtion type refrigerators. Production in 1993 was 61,000 and 35,000 units respectively. Additionally, SADU produced around 400,000 thermostats in 1993.
ODS consumption	In 1993, SADU used 9 tonnes of CFC-12 of which 3.2 tonnes were used in the production of thermostats. For foam production 30 tonnes of CFC-11 were consumed.
Supply	SADU acquired 14 tonnes of CFC-11 and all its CFC-12 from BICAPA in 1993. The remaining 16 tonnes of CFC-11 was imported from Greece.
ODS phaseout	SADU wishes to convert from CFC-12 to HFC-134a and CFC-11 to HCFC-141b.

Commercial Refrigeration

Commercial refrigeration covers cold chambers, display cases, sales cabinets and freezers. It is estimated that the stock in Romania amounts to 175.000 units, each unit containing around 2 kg CFC-12. Most of these are domestically produced but there exists also a small import of ZANUZZI and ELECTROLUX appliances.

The CFC-12 containing Romanian commercial refrigerators are primarily produced by:

- S.C. TEHNOFRIG S.A., Cluj (Box 7)
- S.C. FRIGOCOM S.A., Bucharest (Box 8)

TEHNOUTILAJ, Odorhei, is also a noteworthy producer of commercial refrigerators.

BOX 7: S.C. TEHNOFRIG S.A., Cluj	
Company profile	Founded in 1949 to manufacture industrial refrigeration equipment and machinery for the food industries. It has since 1992 also been engaged in commercial refrigeration. It has 1,800 employees of which 350 are employed in refrigeration. The turnover in 1993 reached 7.5 bn Lei with 30% derived from refrigeration.
Product range	For the food industry: plants for bottling, breweries, dairies. For refrigeration: compressors, marine refrigeration units, cooling boxes, freezers, and display cabinets.
Market	TEHNOFRIG has almost a 100% domestic market share regarding commercial refrigeration. The market has, however, deteriorated since 1990 and TEHNOFRIG started its production of commercial refrigeration. In commercial refrigeration there are around 20 competitors (15 foreign and 5 Romanian; 2 of these very small). It has no exports.
Equipment/ Production	In 1993, TEHNOFRIG produced 5,000 units of commercial refrigerators and about 200 industrial refrigeration units.
ODS consumption	It consumed 3.4 tonnes of CFC-12 and 2.5 tonnes of HCFC-22 as refrigerants and 1.4 tonnes of CFC-11 for foaming in 1994.
Supply	The CFCs are imported from Greece through MIDAL in Bucharest (see Box 4).
ODS phaseout	TEHNOFRIG intends to convert from CFC-12 to HFC-134a and from CFC-11 to HCFC-141b as soon as possible.

BOX 8: S.C. FRIGOCOM S.A., Bucharest	
Company profile	Founded in 1950. The number of employees has decreased from 900 in 1989 to 550 in 1993, of which around 200 were engaged in refrigeration. The turnover in 1994 amounted to 800 bn Lei, with a profit of 800 m Lei. Around 75% of the profit stems from refrigeration. The ownership structure is 70% SOF and 30% POF.
Product range	Display cases, condensing units, soft-ice machines, isothermal cases, cold-chambers, freezers and hermetic compressors (started in 1994). The company produces also commercial furniture and kitchens.
Market	All units are sold on the domestic market. Before 1989 it cooperated with TEHNOFRIG and ARCTIC, but these are now competitors. FRIGOCOM is at present (February 1995) in severe need for new contracts.
Equipment/ production	The production capacity on the refrigeration lines is 20,000 units per year, but the production in 1993 only amounted to 6,000 units. The company has its own foam production line with two HENEKE high-pressure injection machines.
ODS consumption	FRIGOCOM used 50 tonnes of CFC-12 and 9 tonnes of CFC-11 in 1993
Supply	The CFC is imported from Greece and Russia through CHIMEXIM (see Box 3). The iso-cyanid is bought in Italy and the Netherlands. Regarding servicing, before 1989 FRIGOCOM had a contract with IRUC, the state-owned servicing company, but now the company has a service contract with COM-SERVICE (see Box 10).
ODS phaseout	The company intends to convert to HCFC-22 as refrigerant and HCFC-141b as the foam-blowing agent.

Industrial Refrigeration

The main producer of industrial refrigeration equipment in Romania is:

- S.C. TEHNOFRIG S.A., Cluj (Box 7)

ICPIAF, Cluj, (see Box 12) is mainly a design institute (all TEHNOFRIG's equipment has been designed by ICPIAF), but is has also some special refrigeration equipment production of its own: weather-testing chambers, freeze-drying plants, cryogenics plants, and CO_2 plants.

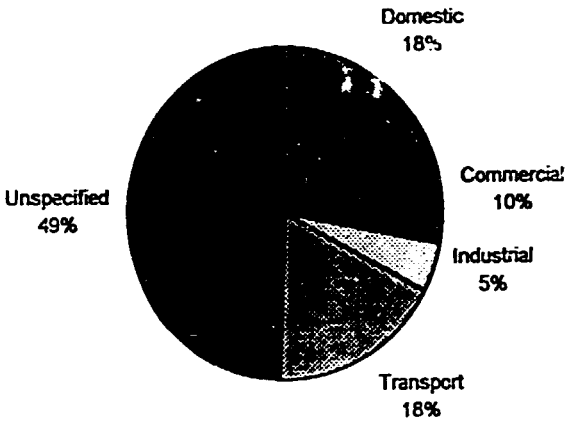
FRIGOTEHNICA, Bucharest, produces also components for industrial refrigeration: condensers, air-cooling units; all based on ammonia.

There is at present no production of transport refrigeration in Romania. Before 1989 there existed only one refrigerated transport company, which since has been separated into one for rail transport, TRANSFRIGO-TREN (see Box 13) and several for road transport. The refrigeration units in the trains were all imported mainly from the former East Germany.

Servicing of Refrigeration

The servicing sector comprises a few relative large state-owned companies, around 50 private authorized servicing shops and numerous servicing shops without authorization. Chart 2.6 shows the 1993 shares of CFC-12 by application. The large category *unspecified* is expected to relate mainly to domestic refrigeration, and so this is the largest user.

Chart 2.6: CFC-12 Use for Servicing of Refrigeration, 1993



Legal requirements exist for operating a servicing point; they comprise:

- a technical certificate from the Ministry of Health and the police
- an authorization from the Ministry for the Protection of Working and Social Conditions

Due to a lack of knowledge about the number of unauthorized refrigeration service shops, it is difficult to estimate the amount of service jobs performed by uneducated technicians. The *educational background* of the authorized service technicians is on of the three following:

- superior studies at a technical university
- medium studies at an industry high-school
- refrigeration course at an industry high-school

The bulk of Romania's refrigeration systems are CFC-12 based and the three *ODS phaseout options* exist:

- Keep servicing the refrigeration equipment with CFCs until scrapping. This is likely to be the cheapest solution but it would mean continued use of CFCs for 10-15 years which is unacceptable.
- Retrofit with HFC-134a. This is time consuming and quite expensive as HFC-134a is not compatible with the mineral oil and five successive changes of the expensive Polyol Ester oil are required.
- Use a HCFC-22 based drop-in blend until the equipment is scrapped.

- *Servicing of domestic refrigeration*

Servicing of the around 7.5 m domestic refrigerators is done by the two producer ARCTIC (see Box 9) and SADU (see Box 10), and a large number of small shops, but also some by the commercial refrigeration servicer, COMSERVICE (see Box 11).

BOX 9: ARCTIC S.A., (Servicing Shops)	
Company profile	ARCTIC has 86 servicing shops spread all over Romania. Of these, 37 are owned by ARCTIC, whereas the remaining 49 work on a contract with ARCTIC. Only 2% of the servicing jobs concern appliances from other manufacturers. In total, 300 people are engaged in the servicing.
Servicing procedure	ARCTIC offers a warranty period of one year. In 1993, 18.9% of its appliances were serviced during the warranty period. The lifetime of its appliances is normally 10 years. However, due to the ongoing economic recession refrigerators are replaced rather overdue.
Equipment/ production	In 1993, 74,282 appliances (68% refrigerators and 32% freezers) were serviced by ARCTIC, of which 54,929 (74%) appliances were serviced in the warranty period. Approximately 90% of the servicing jobs include refrigerant top-up or recharge. ARCTIC has 5 filling stations, established in 1978, 1985, 1990, 1992 and 1993, respectively. The equipment used for recharging includes P.S.N. 201, manufactured in Poland, and ROBINAIR, manufactured in Switzerland. The bulk of the service jobs are carried out at the servicing points (85%).
ODS consumption	ARCTIC used 9.6 tonnes CFC-12 for servicing in 1993, which amounts to around 130 g per servicing job.
ODS phaseout	ARCTIC service-men need training to handle non-CFC refrigerants. Investments are needed for recovery/recycling equipment.

BOX 10: U.M. SADU, (Servicing Shops)	
Company profile	SADU has 40 servicing shops spread all over Romania typically with only one refrigeration technician employed.
Servicing procedure	The bulk of the servicing jobs are carried out at the servicing points and within the warranty-period of one year.
Equipment/ production	The equipment used for recharging during servicing is similar to ARCTIC's ie P.S.N. 201 from Poland, usually 5 years old.
ODS consumption	The CFC-12 consumption of SADU's shops was in 1993 around 1.5 tonnes.
ODS phaseout	SADU service-men need training to handle non-CFC refrigerants. Investments are needed for recovery/recycling equipment.

Since 1989, a vast number of small private servicing shops have been established. These small shops, typically with one employee, are serious competitors to ARCTIC and SADU. Usually they have no authorization, and many of their technicians have not received any education or training in servicing. Their price of a service is on

average 15% lower than that of ARCTIC and SADU, and they mostly service *on location*, that is in the homes. There appears to exist an informal network between the technicians from the unauthorized shops, and they seem often to get a large proportion of their CFC-12 from ARCTIC's and SADU's servicing shops. In Cluj, the second largest city in Romania with 300.000 inhabitants, there are 10 small servicing shops with authorization and around 30 without an authorization. The total number of these small servicing shops in Romania is unknown.

- *Servicing of commercial refrigeration*

Before 1989, IRUC was the sole servicing company for commercial refrigeration, having shops in most counties. It was then divided into around 50 small service shops organized under the network COMSERVICE of which five shops are named COMSERVICE (see Box 11 for the Cluj-based shop). The remaining part of the COM-SERVICE network consists of smaller authorized private shops. The situation regarding unauthorized servicing shops is similar to the one for domestic refrigeration. A large, but unknown, number of unauthorized servicing shops has been established since 1989. These shops have typically 2-3 employees, but some are larger. In Timisoara, for example, there is claimed to be an unauthorized commercial refrigeration servicing shop with 8 employees.

BOX 11: COMSERVICE S.A., Cluj	
Company profile	Founded in 1965. It has 70 employees of which 45 are employed in servicing of refrigerators. Owned 70% by SOF and 30% by POF.
Servicing procedure	Servicing of commercial refrigeration units; in the company as well as *on location.*
Equipment/ production	There are around 3,000 commercial refrigeration installations in Cluj, of which the 2,000 are serviced by COMSERVICE. It covers also the seven neighbouring municipalities. Its equipment, which includes leak detectors, is of high quality compared with the private servicing shops.
ODS consumption	COMSERVICE used 1.2 tonnes of CFC-12 in 1993.
Supply	The CFC is bought from MIDAL, Bucharest (see Box 4).
ODS phaseout	COMSERVICE technicians need to learn to deal with non-ODS commercial refrigerators. Investments are needed regarding recovery/recycling equipment. It has already invested in leak detectors for HFC-134a.

- *Servicing of industrial refrigeration*

The servicing of the around 70,000 industrial refrigeration units is performed by TEHNOFRIG (see Box 7) and ICPIAF, Cluj (see Box 12). TEHNOFRIG has a servicing department with ten employees, which collaborates, on a contract basis, with technicians in all of Transylvania. It is estimated that 5-6 similar companies exist in Romania.

BOX 12: ICPIAF S.A., Cluj	
Company profile	Founded in 1974. It employees 427 people of which 70 are employed in refrigeration. It has one servicing shop employing 4 technicians. Owned 70% by SOF and 30% by POF.
Servicing procedure	ICPIAF services imported refrigeration units as well as the units it has assisted installing. Around 25 installations were serviced in 1993. It has also some special refrigeration equipment production of its own: weather-testing chambers, freeze-drying plants, cryogenics plants, and CO_2 plants.
Equipment/ production	ICPIAF produces per year around 50 units cryogenics plants, 80 heat exchangers, 10 CO_2 plants and 60 other refrigeration plants.
ODS consumption	ICPIAF used 0.5 tonnes of CFC-12 in 1993 for servicing (around 1 tonnes of CFC-12 was used in new installations).
Supply	The CFC is bought from Greece through MIDAL in Bucharest.
ODS phaseout	ICPIAF proposes a project to carry out training for refrigeration technicians regarding recovery and recycling, and conversion to non-ODS servicing.

Some companies with industrial refrigeration units also perform the servicing themselves. This is done partly by their own employees and partly by external, often unauthorized, private servicing shops. It is not possible to estimate the size of this activity.

- *Servicing of transport refrigeration*

In 1989, the sole Romanian transport refrigeration company, ETI, was split into one rail transport refrigeration company, TRANSFRIGOTREN (Box 13) and numerous county-based road transport refrigeration companies. In 1989, ETI possessed 400 refrigerated trucks.

BOX 13: TRANSFRIGOTREN, Bucharest	
Company profile	Founded in 1990 as the rail transport refrigeration section of ETI. The turnover in 1993 amounted to 1.3 bn Lei in 1993, and it employs 160 people (around 1/3 refrigeration engineers, 1/3 electricians, 1/3 mechanical engineers, and 20 administrative staff). Owned 70% by SOF, 30% by POF.
Product range	Rail transport refrigeration transport services, mainly internationally but also for domestic transport. On average 15 trains per months are occupied, each with 8 wagons each (see below).
Market	Through the participation in the INTERFRIGO network, based in Basel, Switzerland, the market is European-wide (both east and west). Around 60% of the transport is abroad and 40% domestic.
Equipment/ production	TRANSFRIGOTREN possesses 30 trains consisting of 8 wagons (+ 1 technical wagon partly for electricity generation and partly as accommodation for the travelling technicians). Each wagon has two compressors with a cooling capacity of 4,500 Kcal/hour (5,850 Kcal/hour warming capacity). The equipment dates back to 1978-82 and is bought in Dresden, Germany. It transports 4,000-4,500 tonnes per month.
ODS consumption	The ODS stock in the compressors amounts to 10.6 tonnes CFC-12 and 10.8 tonnes per year are used for servicing. The large amount is due to leakages, which is considered normal in rail transport refrigeration because of the vibrations during the transport.
Supply	In 1994, around 50% of the CFC-12 was acquired from Ukraine. The remaining 50% was bought from BICAPA.
ODS phaseout	TRANSFRIGOTREN intends to phaseout ODS as soon as possible. The present proposal is a conversion to HFC-134a.

2.2.3.2 Foams

In Table 2.5 (Section 2.1) data for three categories of foams are shown:

- rigid foam for refrigeration
- rigid foam (other)
- flexible foam

Their shares of CFC-11 use in 1993 are illustrated in Chart 2.7. Rigid foam for refrigeration is clearly the most important use, but the companies belonging to this category have previously been described: ARCTIC (Box 5), SADU (Box 6), TEHNOFRIG (Box 7) and FRIGOCOM (Box 8). In the following there will thus only be focused on the two latter categories (the companies are shown on Map 4).

Before 1989, the Ministry of Commerce and the Ministry of Industry coordinated the activities of the foam producers. After 1989, the companies became competitors, but in 1994, only a few foam producers remain in existence.

Map 4: Romanian Foam Producers

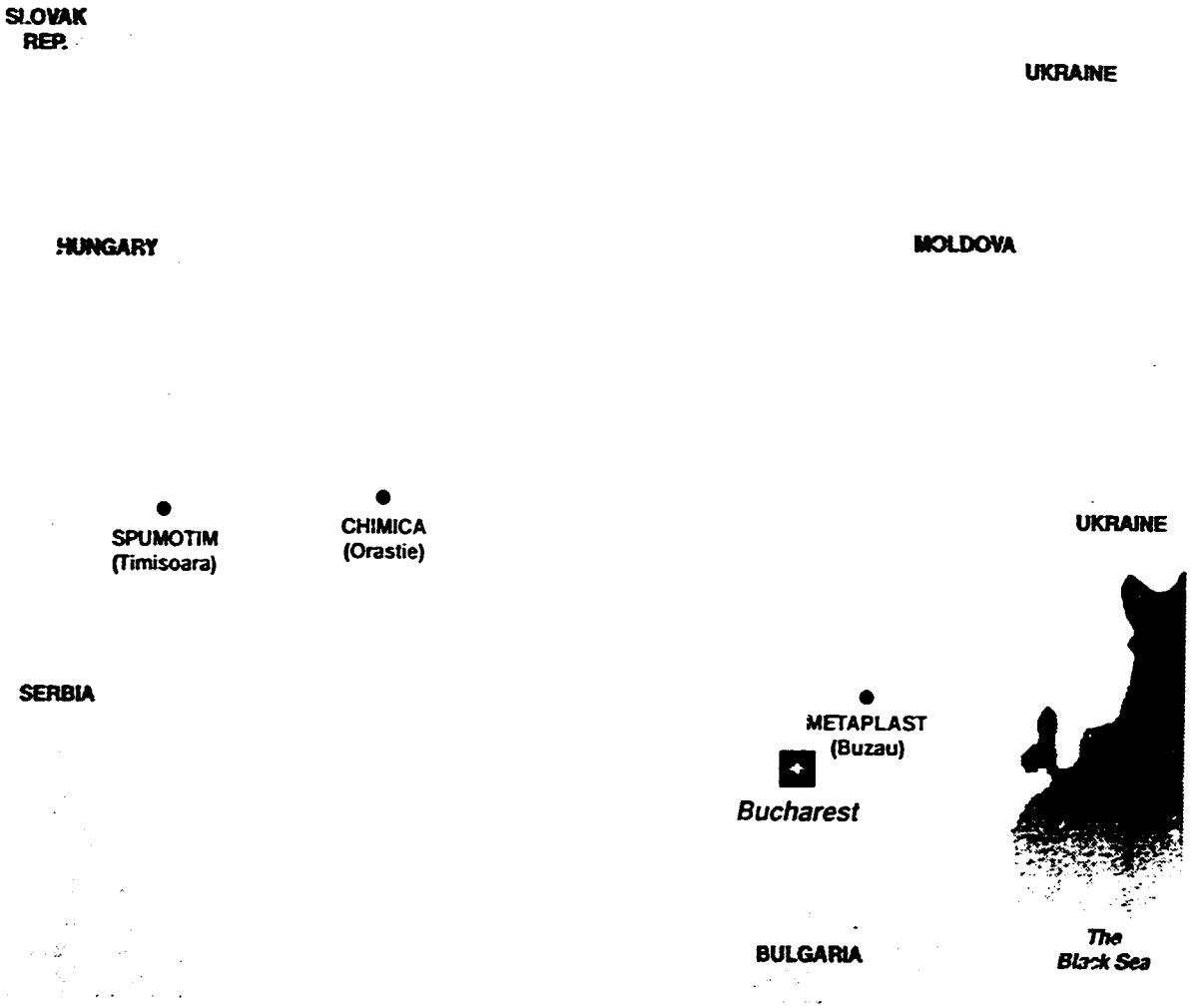
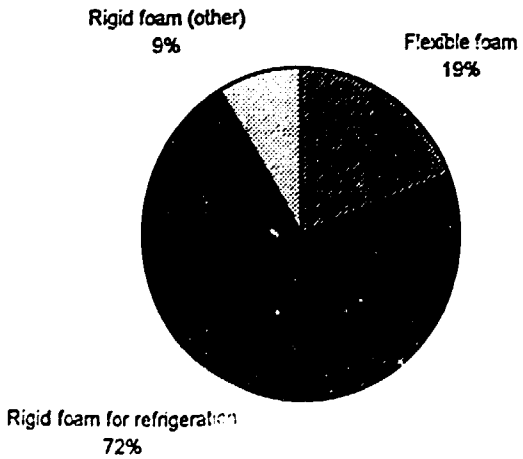


Chart 2.7: CFC-11 Use for Foams



Rigid Foam (Other)

The main enterprise engaged in this production is:

- METAPLAST S.A., Buzau (Box 14)

A small production was also provided by CHIMICA (see Box 16) in 1994.

BOX 14: METAPLAST S.A., Buzau	
Company profile	Founded in 1973. It has 700 employees of which 16 work directly on the continuous rigid foam production line.
Product range	Materials for construction: plastic pipes and tubes, profiles for walls, doors, windows, ROMPAN panels for roofs and walls, metallic profiles for various uses, products of rigid foam: sandwich panels (started in 1980) and flexible foam: furniture and camping equipment (discontinuous line commenced in 1994).
Market	All rigid foam products are sold on the domestic market, while all the products of flexible foam are exported to Germany
Equipment/ production	The machinery for the sandwich panel production was acquired in 1979 from BROLA, Italy. It as a capacity of 300,000 m^2 sandwich panels in one shift (only one shift per day). The capacity utilisation was around 50% 1994.
ODS consumption	For rigid foam, 21.5 tonnes of CFC-11 was consumed in 1993 and just 0.4 tonnes for the flexible foam. The company uses only pre-mixed polyols.
Supply	METAPLAST's suppliers include BEYER, BASF and ICI.
ODS phaseout	In 1995 the CFC-11 will be replaced by HCFC-141b.

Flexible Foam

Two main companies are engaged in this production:

- SPUMOTIM S.A., Timisoara (Box 15)
- CHIMICA S.A., Orastie (Box 16)

The production of CHIMICA is in principle named semi-rigid foam.

METAPLAST (see Box 14) has also a small production of flexible foam, comprising of cushions for furniture and camping equipment.

MIZIL, Prahova, is a small furniture producer, who before 1989 bought its foam from SPUMOTIM. It produces now its own flexible foam, but consumes less than one tonnes of CFC-11 per year.

BOX 15: SPUMOTIM S.A., Timisoara	
Company profile	In 1994, 638 people were employed at SPUMOTIM, 31 directly on the foam production line, while almost 500 people are dependent on the foam production (in the camping equipment section etc). The turnover was 12.55 bn Lei in 1994 (7.929 bn Lei in 1993). The foam production's share was 40-45%. Owned 70% by SOF and 30% by POF.
Product range	Apart from the foam for furniture and camping equipment, SPUMOTIM produces goods such as flexible moulding and shoe soles. Around 10 years ago the export of the shoe soles to the USSR was is primary business.
Market	Of the foam produced, 27% goes to export markets, much of it through a dealer in Sweden. IKEA is an important customer. It experiences increased competition from GEINER in Austria who has bought a factory in Hungary and who, together with RECTICEL, Belgium, has created the joint-venture: EURO-FOAM.
Equipment/ production	The company has equipment which produces the foam using Polyol, TDI and CFC-11. The capacity was in 1993 around 12,000 tonnes while the production only amounted to 2,525 tonnes.
ODS consumption	The consumption of CFC-11 has decreased from 45 tonnes in 1989 to 29.4 tonnes in 1993.
Supply	All CFCs are bought from BICAPA
ODS phaseout	SPUMOTIM wants to convert to 100% CO_2 foam-blowing.

BOX 16: CHIMICA S.A., Onesti	
Company profile	Founded in 1965. It employs 2,000 of which 77 are directly engaged in the foam production. The turnover in 1993 amounted to 80 bn Lei; around 15% arose in the foam production.
Product range	Plastic products accounts for 65% of the production and foams the remaining part. The plastic products include: flowers, camping furniture, household products, barrels, bathroom products etc. The foam production (semi-rigid) comprises: spare parts for cars and busses: seats, panels, door handles etc. In December 1994 the company started a production of insulating pipelines with rigid foam, but it has not yet succeeded to sell the produce.
Market	All produce is sold on the domestic market.
Equipment/ production	The foam is produced using five HENEKE high pressure machines and one from TRUSINIA (former GDR). The HENEKE machines are 4-5 years old but are in a bad condition due a lack of maintenance.
ODS consumption	In 1993, 18.6 tonnes of CFC-11 were consumed. In 1994, the consumption is estimated to have fallen to 12 tonnes, of which a small part was for rigid foams.
Supply	SPUMOTIM bought in 1993, 70% of its CFC from BICAPA and the rest from Greece through CHIM-EXIM, Bucharest.
ODS phaseout	The company wants to convert to foam-blowing based on HCFC-141b. The possibility for CO_2 will also be considered.

2.2.3.3 Aerosols

Romania has one dominant aerosol producers:

- F. .RMEC S.A., Cluj (Box 17)

Some aeresols are produced by COLGATE-PALMOLIVE (formerly NORVEA), Brasov, and BIOFARM, Bucharest (see Map 5)

Most of the CFC used is for personal care products, followed by household products, while around 10% is used for industrial purposes such as the production of silicon (see Table 2.6 in Section 2.1).

Until 1989, the entire range of cosmetics and pharmaceutical products was from domestic sources. From the beginning of 1990, however, foreign products entered the market in Romania. Consequently, the production and the sale of home products diminished, and so did the CFC use (see Chart 2.8).

Map 5: Romanian Aerosol Producers

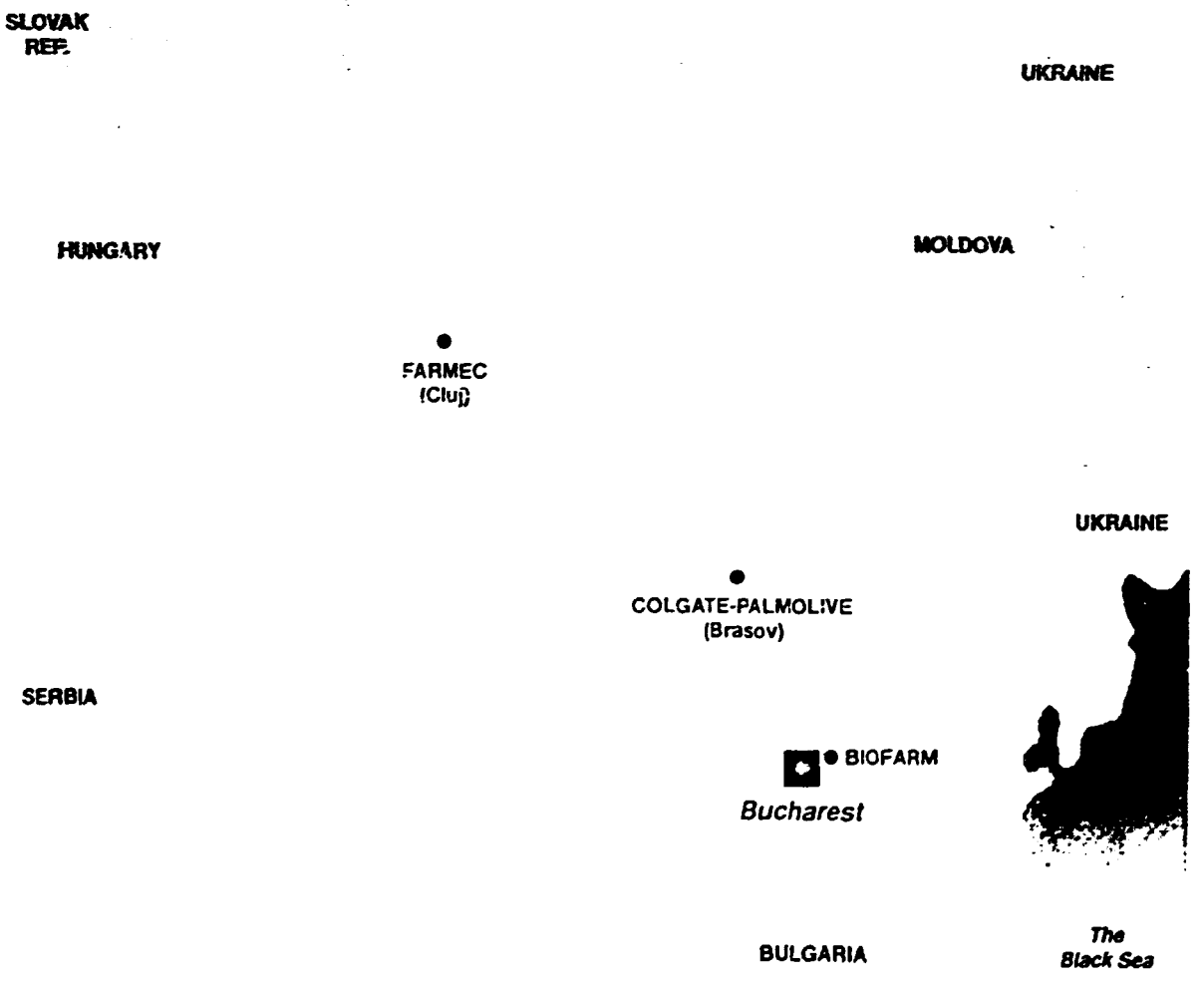
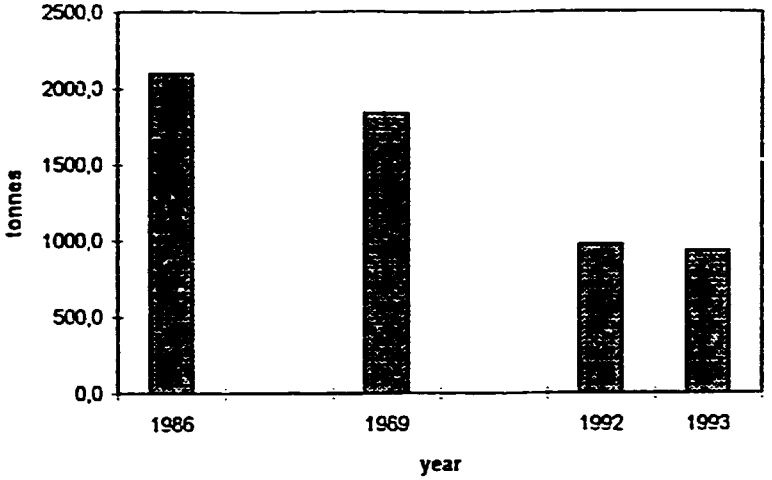


Chart 2.8: CFCs Used for Aerosols



BOX 17: FARMEC S.A., Cluj	
Company profile	Founded in 1949, but the aerosol production did not begin until 1968. In 1994, 1,100 were employed at FARMEC, of which around 275 were engaged in the aerosol production. In 1993, the turnover was 17-20 bn Lei; profit margin was 15%. Around 60% of the turnover came from the aerosol production. Owned 70% by SOF, 30% by POF. FARMEC aspires to be privatised.
Product range	The main products are: 1) for personal care: creams and hand lotions, deodorants, perfumes and shaving foams; 2) household products: insecticides, detergents. FARMEC produces it own aluminium cans and plastic jars.
Market	FARMEC is the main producer of sprays in Romania. It accounts for around 97% of the aerosol production. COLGATE-PALMOLIVE (formerly NORVEA) accounts for the remaining 3%. At present, FARMEC has no export (before 1990 it produced some goods for Schwarzkopf). FARMEC has a market share of around 40 % in Romania, the rest is imported. FARMEC experiences an increasing competition from abroad.
Equipment; production	For aerosols, the production capacity is above 15 m cans per year (= 1992 production). In 1993 and 1994 the production fell to 10 m and 8 m cans, respectively. Of these, around 2 m cans per year contained compressed air. The aerosols are produced on PAMASOL and AER-ATOM lines; all are around 20 years old.
ODS consumption	The consumption of CFC-12 dropped from 1,390 tonnes in 1989 to 700 tonnes in 1994. The consumption of CFC-114 dropped in the same period from 10 tonnes to 1 tonnes. Delivery problems were experienced in 1994 but these appears to have vanished.
Supply	Today, FARMEC receives most of its ODS supplies from Ukraine through CHIMEXIM (see Box 3). It receives only a little from BICAPA because of the price (higher) and the quality (lower).
ODS phaseout	FARMEC intends to convert its production lines from CFC-12 to butane-propane, but wishes to retain its compressed air production line.

Personal Care Products

While FARMEC produced 7-8 m cans for personal care in 1993, the contribution of COLGATE-PALMOLIVE amounted to around 1 m cans. The product range include creams and hand lotions, deodorants, perfumes and shaving foams.

BIOFARM produced in 1993 around 21,000 aerosols for pharmaceutical use, using 1.2 tonnes CFC-12. The enterprise employs 10 people in the aerosol sector. Its products were sold solely on the domestic market.

Household Products

FARMEC is the only Romanian producer of household aerosols, which include insecticides and detergents.

Industrial Products

The aerosol production for industrial application is limited in Romania with an consumption of 80 tonnes CFC-12 in 1993, mainly for silicon.

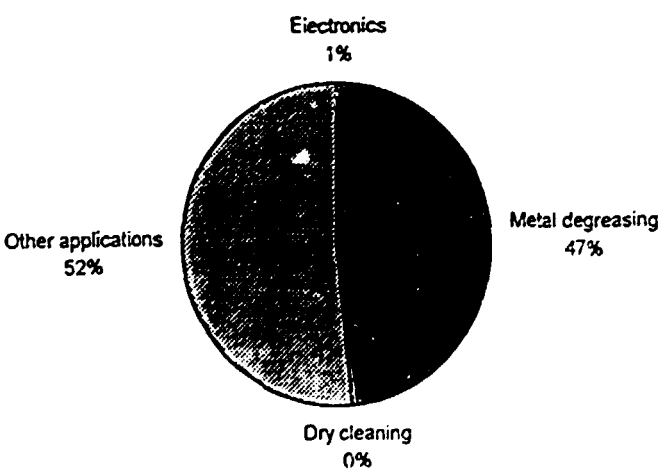
2.2.3.4 Solvents

The solvents sector in Romania comprises the following applications (see Chart 2.9):

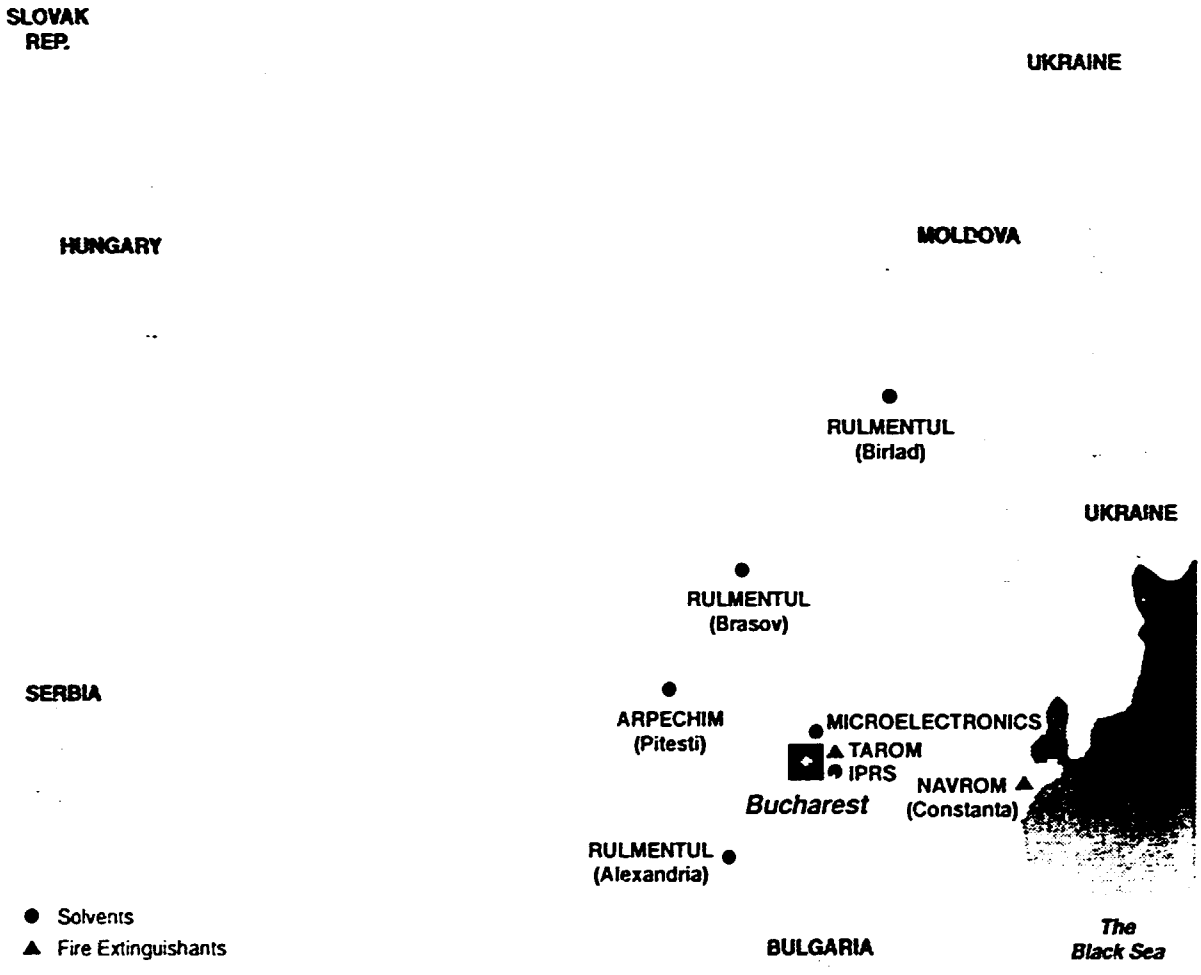
- Metal degreasing
- Dry cleaning
- Electronics

OLTCHIM (see Box 2) and CHIMCOMPLEX, Onesti, manufacture around 97% of the CTC and 18% of the MCF used in these sectors; the remainder is imported.

Chart 2.9: ODS Used as Solvent, 1993 (ODP-weighted)



Map 6: Romanian Solvents and Fire Extinguishant Users



Metal Degreasing

The metal degreasing sector in Romania is dominated by producers of ball bearings. After 1989 the cooperation between the companies stopped and they are now competitors in the Romanian market.

The main companies using solvents in the metal degreasing process are (see Map 6):

- S.C. RULMENTUL, Barlad (see Box 18)
- S.C. RULMENTUL, Alexandria
- S.C. RULMENTUL, Brasov
- S.C. ARPECHIM, Pitesti

BOX 18: S.C. RULMENTUL[1], Barlad	
Company profile	Founded in 1980 but restructured in 1990. In 1993, it employed 5000 of which 950 were engaged in the solvent-using production. The turnover in 1993 amounted to 86 bn Lei; with a profit margin of 9%. The ownership structure is 70% SOF and 30% POF.
Product range	Design and production of ball bearings.
Market	More than 80% of the production is exported. In the domestic market it has three large competitors.
Equipment/ production	The capacity of the ODS consuming production was 23 m pieces in 1993, while the production reached 20 m pieces.
ODS consumption	RULMENTUL consumed 50 tonnes of CFC-113 and 3 tonnes of MCF in 1993.
Supply	OLTCHIM supplies the MCF, while the CFC-113 is imports.
ODS phaseout	Conversion from 113 to alcohol-based metal degreasing.

Note 1. Rulmentul means *ball bearing* in Romanian.

Ot the other large enterprises, S.C. RULMENTUL in Alexandria has 800 employees and manufactures annually about 24 m bearings of which 22 m are exported. The main solvent used is MCF. S.C. RULMENTUL in Brasov employs 600 people and produces annually about 22 m bearings of which 17 m are exported. The main solvent used is CTC. Finally, S.C. ALPECHIM Pitesti employs 75 people in an oxygen and nitrogen production and bottling sector. The main solvent used as a metal degreasing element is CTC.

Dry Cleaning

The sector comprises around 450 small and medium-sized dry cleaning plants, the majority being state-owned. Until 1989 the dry cleaning shops used CTC. Since 1990, most CTC was replaced by perchlorethylene.

Electronics

In the electronics sector the main solvent used is CFC-113. It is utilized for the cleaning of electronic components and metallic parts. The consumption of CFC-113 was in 1993, however, only around one tonnes.

In Romania the main manufacturers of electronic components are IPRS in Baneasa (Bucharest) and MICRO-ELECTRONICS, Bucharest (see Map 5) and they satisfy almost all of the demand in Romania.

2.2.3.5 Fire Extinguishants

The main enterprises that use halons are (see Map 6):

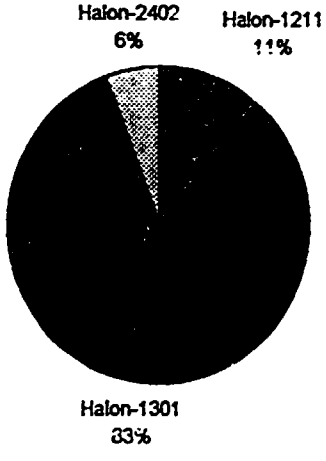
- TAROM S.A., Bucharest
- NAVROM S.A., Constanta

Halon-1301 is the most used followed by Halon-1211 (see Chart 2.10).

TAROM, the Romanian airline, has 10 employees in the fire fighting sector who ensure maintenance and loading of fire extinguishing equipment. Around 65% of the fire extinguishers are installed in the motor are of the aircrafts while the remaining is found in the passenger and crew cabins.

NAVROM, S.A., the Romanian sea transport operator, has 25 employees engaged in the fighting sector.

Chart 2.10: Halons Use, 1993 (ODP-weighted)



2.3 Institutional Framework

Till now, two ministries have played a key role in designing, implementing and monitoring a realistic and cost-effective ODS phaseout strategy in Romania. The two ministries are: MWFEP and the Ministry of Industries.

Other Government agencies, NGO's and consumer groups have played only a marginal role, if any. ODS producing and consuming enterprises have been involved indirectly through the Ministry of Industries.

However, numerous other Government agencies will have to contribute to ODS phaseout. They comprise foremost the Ministry of Commerce, the Ministry of Agriculture and Food, the Ministry of National Defence, the Ministry of Internal Affairs, the Ministry of Research and Technology and the Ministry of Foreign Affairs.

Below follows a brief description of MWFEP and the Ministry of Industries with the emphasis laid on the role and responsibilities of each in ODS phaseout since January 1993 when Romania ratified the Montreal Protocol.

2.3.1 MWFEP

MWFEP was established in 1989 on the basis of the Department of Environmental Problems. Today, it operates in accordance with Government Decision No. 457 of July 1994. It comprises four functional departments and the State Environmental Inspection. The four functional departments are: General Department for Development, Resources and Public and International Relations, Department of Environmental Protection Strategy and Regulation, Monitoring Department and Department of Programmes for Ecological Re-generation. The State Environmental Inspection has an office in each county which, among others, takes part in customs clearance.

According to Government Decision No. 457 the number of employees in MWFEP at a national level may not exceed 200 (Article 4, paragraph 3). This is a consequence of the attempt to keep public expenditure down.

MWFEP is overall responsible for implementing legislation in the field of water, forests and environment.

According to Government Decision No. 457 MWFEP has the following responsibilities of particular relevance to the development of an institutional framework capable of supporting the ODS phaseout strategy selected:

- MWFEP is overall responsible for negotiating, implementing and monitoring international agreements, conventions and protocols concerning the environment. MWFEP will negotiate all international environmental agreements (Article 2, paragraph 4), be held responsible for the development of the legal framework following international environmental agreements ratified by the Romanian Government (Article 2, paragraph 5) and ensure that international environmental agreements ratified by the Romanian Government will be implemented (Article 3, paragraph 22).

- MWFEP is overall responsible for the coordination of Government actions aimed at pollution prevention and abatement and clean-up of past contamination. MWFEP is responsible for developing "all sort of cooperation" between Government agencies and other agencies (Article 2, paragraph 7).

- MWFEP has a general veto right within its sphere of competence. MWFEP has to approve all import licences, manufacturing technologies, equipment and technical assistance programmes within its sphere of competence (Article 2, paragraph 10).

According to Government Decision No 437 of August 1992 MWFEP is the lead agency in ODS Phaseout in Romania. Thus, MWFEP is accountable for phaseout of each group of controlled substances in accordance with the maximum levels allowed by the Montreal Protocol, control of trade in controlled substances and collection of production and consumption data and reporting to the United Nations Environment Programme (UNEP).

MWFEP is also the main originator of legislative initiatives concerning the Montreal Protocol.

2.3.2 Ministry of Industries

The Ministry of Industries is undergoing a turbulent period of restructuring. Since 1989, it has been subject to 12 major reorganizations. Today, it operates on the basis of Government Decision No. 794 of December 1992. It comprises three functional departments, eight sectoral departments and four attached agencies. The three functional departments are: Department of Restructuring, Development and Economic Reform, Department of Material and Financial Resources Correlation and Department of Management, Legislation and Human Resources. Among the eight sectoral departments are: Department for Chemical and Petrochemical Industry and Department for Electronics, Electrotechnics and Fine Mechanics.

Prior to 1989, more than 10 branch ministries existed, employing a total of 10,000 employees. In addition, the branch ministries employed 26,000 civil servants, researchers and scientists in 250 so-called sub-centres, mostly in Bucharest. Immediately after the revolution, the branch ministries were merged to form a single Ministry of Industry and Resources (later renamed the Ministry of Industries) with 3,000 employees. At the same time the sub-centres were liquidated or converted into commercial companies. Staff reductions have continued and, today, the Ministry has approximately 700 employees.

The Ministry of Industries is in charge of elaboration of industrial development policies, strategies and programmes and implementation of the Government strategy in the various industrial sectors within its field of competence, including electronics, electrotechnics and fine mechanics and chemistry and petrochemistry.

The Ministry of Industries has been made responsible for the contacts to the individual enterprises on ODS phaseout related matters. All the large ODS producing and consuming enterprises are still state-owned, though they belong to state holding companies. Thus, the Ministry of Industries plays a role in their development.

The establishment of the State Ownership Fund (SOF) and the Private Ownership Funds (POF) has, however, reduced the influence of the Ministry on the enterprise sector. The funds have the direct control over the enterprises and execute the privatisation strategy formulated by the National Agency for Privatisation.

2.4 Policy Framework

The policy framework within which ODS phaseout will be managed is characterized by the ongoing transition to market economy. The old policy framework built on command and control methods has more or less collapsed, whereas the new policy framework build on a combination of administrative instruments, economic instruments and voluntary agreements are not yet in place. No doubt, the transition will continue into the next century.

With regard to ODS phaseout, it is considered necessary to maintain consistent with the achievements made during the last couple of years in establishing a new policy framework. The achievements made concern foremost the development of new administrative instruments regulating the behaviour of the economic agents and the

start-up of a dialogue between the Government agencies on one side and the enterprise sector on the other side. Unsurprisingly, economic methods do not yet play a significant role in the existing policy framework in Romania.

2.5 Government and Industry Response to the Protocol

Romania became a Party to the Montreal Protocol on 27 January 1993, when the country simultaneously ratified the Vienna Convention, the Montreal Protocol and the London Amendments. The ratification did entry into force on 27 April 1993. The country classifies under the Montreal Protocol as an Article 5 country.

Today, almost all Central and Eastern European countries are Parties to the Protocol. An overview of the status of ratification by Central and Eastern European countries, including the CIS countries, is provided in Table 2.7.

Although Romania has not yet ratified the Copenhagen Amendments, the Romanian Government intends to do so before 1 January 1996, thereby emphasising its strong commitment to protect the stratospheric ozone layer.

The Romanian Government fully acknowledges that the main obligations under the Montreal Protocol are:

- to phase out production and consumption of each group of controlled substances (CFC, halon, CTC, MCF, etc) according to the maximum levels allowed by the Montreal Protocol;
- to cease trade in controlled ODS with countries that are not Parties to the Protocol (this obligation entered into force from 1 January 1993); and
- to collect and report production and consumption data on a regular basis to the United Nations Environment Programme (UNEP).

As a Party to the Montreal Protocol, and having ratified the London Amendments, Romania is obliged to meet the time schedules that were agreed for CFC, halon, CTC and MCF in Copenhagen in 1992, whether or not the country ratifies the Copenhagen Amendments. However, having obtained status of an Article 5 country Romania is allowed a ten-year grace period with regard to ODS used to meet basic domestic needs. Romania is obliged to meet the tight requirements of the Copenhagen Amendments with regard to ODS used in export products.

When Romania ratifies the Copenhagen Amendments it will be obliged to limit its use of HCFC and methyl bromide (a disinfectant used mainly in the agricultural sector). The reduction schedule for HCFC compared to the base level is a freeze by 1996, a 35% reduction by 2004, 65% reduction by 2010, 90% reduction by 2015, 99% reduction by 2020 and 100% phaseout by 2030. The base level is calculated as 3% of the ODP weighted CFC consumption plus the ODP weighted consumption of HCFC in 1989.

Further details on the obligations following the Montreal Protocol are provided in Appendix III.

The Romanian Government has taken firm actions to fulfil its obligations following the Montreal Protocol. Furthermore, at all ODS producing and consuming enterprises there is a great knowledge of the implications of the Montreal Protocol. They fully understand the necessity of implementing ODS replacement projects.

Table 2.7: Status of Ratification in Central and Eastern Europe as of January 1, 1995 of the Montreal Protocol, the London Amendment and the Copenhagen Amendment

	Montreal Protocol (1987)	London Amendment (1990)	Copenhagen Amendment (1992)
Belarus	October 31, 1988	-	-
Bosnia and Herzegovina	March 6, 1992	-	-
Bulgaria	November 20, 1990	-	-
Croatia	October 8, 1991	-	-
Czech Republic	January 1, 1993	-	-
Hungary	April 20, 1989	June 16, 1993	May 17, 1994
Poland	July 13, 1990	-	-
Romania	January 27, 1993	January 27, 1993	-
Russian Federation	November 10, 1988	January 13, 1992	-
Slovakia	May 28, 1993	April 15, 1994	-
Slovenia	July 6, 1992	December 8, 1992	-
The former Yugoslav Republic of Macedonia	March 10, 1994	-	-
Turkmenistan	November 11, 1993	March 15, 1994	-
Ukraine	September 20, 1988	-	-
Uzbekistan	May 18, 1993	-	-
Yugoslavia	January 3, 1991	-	-
Czechoslovakia	June 21, 1990	-	-
USSR	November 10, 1988	-	

Source: UNEP.

2.5.1 Government Responses

Deliberately, the Romanian Government has concentrated its efforts on institutional strengthening in order to develop an institutional framework capable of supporting the ODS phaseout strategy selected and the implementation of a regulatory framework ensuring compliance with Article 4 of the Montreal Protocol. Article 4 of the Montreal Protocol imposes trade restrictions on products containing or produced using controlled substances.

Furthermore, the Romanian Government has requested technical assistance from UNIDO and the Danish Environmental Protection Agency in developing the ODS Country Programme for Romania and in preparing ODS replacement projects at enterprise level. This technical assistance was received in 1994-95.

An overview of existing ODS regulations introduced by the Romanian Government is provided in Appendix IV.

Institutional Strengthening

The Romanian Government has urged MWFEP, which is the lead agency on issues related to the Montreal Protocol, to ensure an institutional strengthening of the ODS phaseout activities in close co-operation with the Ministry of Industries, which is responsible for the contacts to the individual enterprises on ODS phaseout related matters. This has proven to be most difficult, foremost due to lack of dedicated financial resources.

MWFEP has designated its Department of Environmental Protection Strategy and Regulation with overall responsibility for designing, monitoring and implementing the ODS phaseout strategy subject to guidelines from the Romanian Government and MWFEP. Moreover, the MWFEP has designated its Project Implementation Unit, which belongs to the Department of Programmes for Ecological Re-generation, to assist the Department of Environmental Protection Strategy and Regulation in its daily work with ODS phaseout.

The Ministry of Industry has designated its General Directorate for Research, Development and Ecology, which belongs to the Department of Restructuring, Development and Economic Reform, with responsibility for the contacts to the individual enterprises on ODS phaseout related matters.

In all, three civil servants are engaged with ODS phaseout. One in the Department of Environmental Protection Strategy and Regulation, MWFEP, one in the Project Implementation Unit, the Department of Programmes for Ecological Re-generation, MWFEP, and one in the General Directorate for Research, Development and Ecology, the Department of Restructuring, Development and Economic Reform, the Ministry of Industries. However, each of them are only engaged with ODS phaseout on a part time basis, which is insufficient.

Recently, the Romanian Government has approved a Government Order, titled *Proiect - Guvernul Romaniei - Hotarire privind constituirea, organizarea si functionarea Comitetului National pentru Protectia Stratului de Ozon* (The Government of Romania - Decision concerning the establishment, organization and functioning of the National Committee for the Protection of the Ozone Layer), which is a first attempt to establish an institutional set-up ensuring effective ODS phaseout action at the country level. It envisages the creation of an inter-ministerial committee, titled "the National Committee for the Protection of the Ozone Layer" (CNPSO), having the role of promoting the measures and the actions necessary for the application of the Montreal Protocol in Romania.

It is conceived that the State Secretary in MWFEP in charge of the Department of Environmental Protection Strategy and Regulation and the Department of Programmes for Ecological Re-generation will become Chairman of CNPSO, thereby ensuring the status of CNPSO as a consultative body closely attached to MWFEP.

Furthermore, the Government Order envisages the establishment of two permanent bodies under CNPSO:

- the Ozone Secretariat (STO) which should act as a national focal point; and
- the Groups of Technical Experts in which technical, economic and legal experts prepares proposals on ODS related matters.

The Government Order is attached *in extenso* as Appendix V.

Compliance with Article 4

According to Article 4 of the Montreal Protocol, Romania is obliged to impose trade restrictions on countries that have not yet ratified the Montreal Protocol. These trade restrictions comprise restriction on trade with ODS, products containing ODS and, if feasible, products produced with, but not containing, ODS.

Consequently, the Romanian Government and MWFEP has promoted the implementation of a regulatory framework ensuring compliance with Article 4 of the Montreal Protocol through Government Decision No. 340 of June 1992, Government Decision No. 437 of August 1992 and Ministry Instruction No. 14570 of August 1992.

According to Government Decision No. 340 of June 1992 and Government Decision No. 437 of August 1992 import of goods which are dangerous for the health of the population and the environment will only be permitted if it respects the regulation for these goods. Annex 2 of Government Decision No. 437 of August 1992 entails a list of goods which are dangerous for the health of the population and the environment. On the list one finds "hydrocarbons and substances obtained from this". However, no specific reference to ODS is made.

MWFEP, the National Committee for Standards, the Ministry of Health, the Ministry of Industries and the Ministry of Agriculture and Food participate in the customs clearance of these goods. MWFEP participates through its offices at county level. There is a customs clearance office in each county. Permission to import these goods are granted to companies, not individuals, in the form of an import licence, titled "Certificate of Ability". Import licences are issued by the Ministry of Commerce. It is obliged to respond within 5 days to an application. The period of a certificate is, since January 1995, four months. For some licences there are quotas, so that there exist competitions such as "first-come - first-get" or according to the quantity imported in the previous period. MWFEP has to sanction the issue of import licences concerning goods mentioned in Government Decision No. 340 of June 1992 and Government Decision No. 437 of August 1992. Penalties for making an illegal import are severe. The importers must report monthly to the Central Statistical Office. If not, they loose their certificate.

According to Ministry Instruction No. 14570 MWFEPs offices at county level which are subordinated the State Environmental Inspection are mandated to implement Article 4 of the Montreal Protocol. They will stop import of ODS or products containing ODS, eg refrigerators, if it stems from countries which are non-Parties.

With regard to the import of ODS the issue of a "Certificate of Ability" is aimed at ensuring that the importer is capable of handling chemical substances and has the necessary storing facilities. As mentioned above, any company, but not individuals, can apply for a certificate. Customers, however, do not need a certificate to buy ODS from the importers. According to Romanian importers and custom officials an effective customs declaration system is in place. The procedure is that the importer declares the content of shipment when reaching the border. The customs officer compares the declaration with the bill and performs occasional checks. Nevertheless, it is Romanian Government's point of view that the system may be improved.

Industry Responses

ODS phase-out project preparation is currently ongoing in all ODS user and producer sectors. The enterprises are very motivated and the quality of the technical and scientific personnel is high.

The main barrier to a rapid conversion of the ODS producing and consuming enterprise is the lack of domestic funding. The difficult economic situation in Romania does not have much funding for the many pressing investment needs neither in the state budget, nor in the enterprises. Furthermore, the lack of a fully fledged

capital market in Romania and the inaccessibility of the international capital markets for Romanian enterprises precludes enterprises from financing even projects which would be economically self-sustainable is most other countries.

Hence for the implementation of ODS phase-out projects in Romania to be economically feasible within the foreseeable future, it is of utmost importance for the country to receive international financial assistance in this area. Only with external financial support will further ODS phase-out project implementation occur.

3 Implementing Phase Out

This Chapter outlines the ODS phaseout strategy, which the Romanian Government has selected on the basis of an analysis of the current situation in Romania to ensure an ODS phaseout in compliance with the Montreal Protocol. Key features are the Action Plan, the indication of projects for which the Romanian Government is likely to seek assistance from the Multilateral Fund, including an institutional strengthening project aimed at increasing the management capabilities of the Romanian Government, and the monitoring arrangements.

3.1 Strategy Statement by Government

It is a strategic objective of the Romanian Government to ensure an ODS phaseout in compliance with the Montreal Protocol. Thus, the Romanian Government would like to confirm its strong commitment to the Montreal Protocol and the London Amendment, which the country ratified simultaneously on January 27, 1993.

This objective will be followed in such a way as to minimize economic costs to the country in ODS phaseout.

When the Montreal Protocol first came into effect, there was some concern that the cutback in production and use of the regulated ODS would reduce the quality and/or increase the price of goods and services produced with or containing/utilizing these substances, and lead to widespread chaos in those sectors dependant on these chemicals. There is now widespread agreement that, to date, innovations to substitute the regulated substances with non-ODS alternatives have been rapid, effective and, in many cases, economical. Nevertheless, only the easiest substitution has been completed, partly because replacement of the remaining ODS applications, especially refrigeration and some rigid foam and solvents applications, is much more difficult and expensive.

However, it is the Romanian Government's point of view that the key challenges of ODS phaseout in Romania are only partly of a technical nature. There are several non-technical factors which must be addressed and, in many cases, need more consideration than the technical issues. Technical substitution options exist or are under development in Romania though sometimes the technology is not up-to-date compared with Western standards.

Probably, the scarcity of capital and the deficiencies in the institutional set-up are the two most important challenges to completion of the necessary R&D and to successful implementation of the ODS phaseout strategy.

In the following, the technical and managerial feasible phase-out schedule is assessed for each of the ODS user sectors on the basis of the ongoing project preparation, sponsored by the Multilateral Fund and bilateral sources, and taking into account the international experience concerning the time required to implement ODS phase-out projects. Furthermore, the phaseout-schedule for each group of controlled substances is presented.

Refrigeration Sector

Total phase-out for the domestic and commercial refrigeration manufacturing sectors could be attained by January 1, 1998, taking into consideration the necessity to change all production lines. However, due to the substantial progress made within the domestic refrigeration sector, a substantial replacement of ODS consumption within the two sectors is envisaged to take place already in mid-1996. Likewise, total phase-out for industrial refrigeration sectors could be attained by 1 January 1998.

Within the refrigeration servicing sector the key problem is to develop and implement a well functioning scheme for recovery of refrigerants, and (depending on the feasibility of a drop-in replacement in the commercial refrigeration sector) recycling and reclaiming of refrigerants. Obviously, the refrigeration servicing sector will need a supply of CFC (new or recycled) for a longer period to avoid premature scrapping of the outstanding stock of refrigeration equipment. It is envisaged that a scheme for recovery will be in full operation by January 1, 2000. Till then, the refrigeration servicing sector will need a supply of new CFC. In the subsequent 10 years, the refrigeration servicing sector will need a supply of recycled CFC. This will mainly be for servicing of domestic refrigeration equipment as the outstanding stock of commercial refrigeration equipment is expected to be retrofitted with HFC-134a in the period 1995-2000.

Aerosol Sector

Total phase-out for the aerosol sector could be attained by 1 January 1998. The key problem within this sector seems to be the implementation of an adequate personnel training aimed to meet the new safety guidelines and flammability risks.

Foam Sector

The use of ODS in rigid foam production is primarily within the refrigeration insulation sector. Here, the alternative non-ODS technology is likely to be primarily cyclopentane based foam blowing. Where design considerations allow it, CO_2/water is a cheaper alternative, but this is expected mainly to be feasible within commercial refrigeration insulation. The flexible foam sector is characterized by the availability of proved and cost effective alternatives and a quick phase-out should be possible here. Flexible foam application of CFC can be phased out by 1996 whereas rigid foam could be converted during 1995-1997 and a total phase-out should be obtainable by 1 January 1998.

Solvent Sector

The feasible ODS phase-out date for the solvents sector is difficult to estimate, but it seems likely that a total phase-out within metal degreasing and dry cleaning could be attained by January 1, 1997 and within electronics by 1 January 1999. The reason for the expedite of total phase-out within metal degreasing and dry cleaning is that the technical constraints here are easy to overcome and that substantial already has been made. The reason for the delay of total phase-out within electronics is foremost the present inadequacy of practical indigenous experience in Romania with alternative substances such as xylene and benzene which are toxic and flammable.

Fire Extinguishing Sector

ODS consumption within fire extinguishing is very limited. Conversion of the production of portable fire extinguishers to ODS free extinguishants such as CO_2, dry chemicals or water typically takes about 2 years. The production of alternative fire fighting agents, such as blends of various inert gasses, for stationary equipment will also have to be planned. In parallel with this retrofit technologies should be developed, tested and implemented and a scheme for recovery and eventual recycling of halons should be implemented to secure a supply of halons in existing equipment that has not been retrofitted. It is estimated that a total phase-out within this sector could be attained by 1 January 1997.

ODS Production

The likely adverse effect on the major ODS consumers in Romania from quick closure of production facilities is significant. If ODS supplies are cut off before a user industry has had time to test and implement an alternative technology, this industry is forced to stop production of ODS based products until the alternative technology can be implemented. This may cause severe unemployment problems, losses in market shares, shortages on the market for end user products, etc. Hence, coordination between the ODS consumer sector phase-out projects, the alternative substance phase-in projects and ODS production capacity shut-down is crucial to the successful completion of the ODS phase-out effort in Romania.

Tables 3.1 and 3.2 below provides an overview of the achievable ODS phase-out strategy by sectors and substances, respectively, pursued by the Romanian Government. This strategy is based on the assumptions that fastest technically feasible phase-out is followed and that international funding for project implementation is made available to the enterprises in late 1995, at latest.

Table 3.1: Achievable ODS Phase-out Strategy in Romania by Sectors

	Consumption in 1993 (ODP Tonnes)	Date of 100% Phase-out[1]
Total	1,558.3	January 1, 2000
Refrigeration Sector	181.7	January 1, 1988
- Domestic Refrigeration	60.3	January 1, 1998[3]
- Commercial Refrigeration	55.0	January 1, 1998[3]
- Industrial Refrigeration	5.1	January 1, 1998
Refrigeration Servicing Sector	61.3	January 1, 2000
- Domestic Refrigeration[2]	41.4	January 1, 2000[4]
- Commercial, Industrial and Transport Refrigeration	19.9	January 1, 2000[4]
Aerosol Sector	926.7	January 1, 1999
- Personal Care	675.5	January 1, 1998
- Others	251.3	January 1, 1998
Foam Sector	266.7	January 1, 1998
- Rigid Foam	243.7	January 1, 1998
- Flexible Foam	23.0	January 1, 1996
Solvents Sector	156.8	January 1, 1999
- Metal Decreasing and Electronics	75.1	January 1, 1999
- Others	76.7	January 1, 1997
Fire Extinguishants	31.4	January 1, 1997

Notes: 1) The ODS phase-out strategy is based on the assumptions that fastest technically feasible phase-out is followed and that international/MF funding of project implementation is made available to the enterprises in early 1996, at latest.
2) Including the category unspecified.
3) A substantial drop in ODS consumption is envisaged to take place in mid-1996.
4) Could possibly be reduced by one year. Note that recycled CFC will be used for servicing up to 2010.

Table 3.2: Achievable ODS Phase-out Strategy in Romania by Substances

Substances	Consumption in 1993 (ODP Tonnes)	Planned Consumption Till Complete Phaseout (ODP Tonnes)	Year of Complete Phaseout
CFC-11	267.2	534.4	1998
CFC-12	1,102.5	3,307.5	2000
CFC-113	60.8	152.0	1999
CFC-114	0.5	1.0	1998
Halon-1211	3.6	5.4	1997
Halon-1301	26.0	39.0	1997
Halon-2402	1.8	2.7	1997
CTC	73.0	182.5	1999
MCF	22.5	56.3	1998
HCFC-22	0.4	0.6	1997
Total	1,558.3	4,281.4	2000

3.2 Action Plan

3.2.1 Government Actions

To facilitate compliance with the Montreal Protocol, the Romanian Government will implement a regulatory regime for ODS production, consumption and trade, making use of administrative and economic instruments as well as additional measures, including institutional strengthening.

In the following the Government actions selected are described. The criteria for selecting the Government actions have been effectiveness and that the action can be implemented in a short period of time. Thus, the actions are based on existing legal framework, institutional structures and revenue raising instruments.

The instruments which the Romanian Government will implement to support ODS phaseout are as follows:

Administrative instruments

- Improvement of customs subclassifications
- Improvement of ODS import licenses
- Introduction of ODS production licenses
- Ban on reexport of ODS
- Sector specific bans on ODS consumption
- Bans on import of selected ODS based goods corresponding to the domestic sector specific bans on ODS consumption

- Compulsory ODS treatment

Economic instruments

- Non-compliance measures
- Economic support of ODS phaseout activities

Additional measures:

- Institutional strengthening (cf. Section 3.3)
- Monitoring arrangements
- Voluntary agreements with ODS import organisations and ODS producing and consuming enterprises
- Introduction of an accreditation system (certificates) for refrigeration servicing technicians
- Awareness campaign
- Revision of industry norms and standards, including safety standards

Deliberately, the Romanian Government has chosen, as a starting point, not to introduce taxes, charges and levies on imports, production or uses of specific substances to affect market preferences. The reason is, that the deficiencies in the institutional set-up, including the lack of experience in operating extra-budgetary funds such as environmental funds, will make it very difficult to implement these measures, at least in the near future.

It is important to stress that the proposed economic instruments complement the administrative instruments, and that they cannot stand alone. Furthermore, these administrative and economic instruments must be supported by a formalized reporting and enforcement system.

Below, the administrative and economic instruments as well as the additional measures, except institutional strengthening and monitoring arrangements which are dealt with in Sections 3.3 and 3.6, respectively, are described in more detail.

Improvement of customs subclassifications

In the official statistics, imports are at present registered at a 6-digit level compared with a 8-level (EU compatible) generally. This means that imports of ODS which is possible at the 8-digit are included with other chemicals at the 6-digit-level, and therefore no data are immediately available. This setup will, however, be changed in 1995 and so imports of ODS for 1995 (or 1996) will be distinctly represented.

Improvement of ODS import licenses

Import and production licences are the most efficient way of ensuring compliance with the country's phaseout strategy and hence achievement of the required environmental effect. Furthermore, they are easy to implement because they can be based on the existing legal framework for environmental policy. Finally, licences are expected to be acceptable to the enterprises as long as the allowed ODS production is enough to satisfy the demand for these substances according to a realistic and cost-effective phaseout plan.

Though Romanian importers and custom officials claim that an effective customs declaration system is in place, it is the Romanian Government's point of view that the system may be improved. Consequently, an

amendment will be made to Government Decision No. 340 of June 1992 and Government Decision No. 437 of August 1992. The amendment will ensure that a specific reference to ODS is made in the list of goods which are dangerous for the health of the population and the environment. Furthermore, the Ministry of Commerce will be mandated to design a licensing system for ODS to be approved by the MWFEP.

Introduction of ODS production licenses

In accordance with the achievable ODS phaseout strategy in Romania outlined in Section 3.1 above, the Romanian Government will issue ODS production licenses for the two ODS producing enterprises.

Ban on reexport of ODS

In accordance with the Montreal Protocol a ban on reexport of ODS will be introduced as soon as possible.

Sector specific bans on ODS consumption

Sector specific bans will be imposed on all ODS using sectors. The sector specific bans will promote cost-effectiveness in the phaseout strategy by banning the use of CFC in the non-pharmaceutical aerosol sector first, secondly in the non-refrigeration foam sector - allowing more CFC to be used in sectors that are regarded as essential and expensive to replace (such as refrigeration). Finally, the bans may be acceptable to enterprises, if they will be informed well in advance of the cut-off date so that they may use this information in the planning process. The schedule of bans on sector specific ODS use should follow the achievable ODS phaseout strategy in Romania outlined in Section 3.1 above.

Bans on import of selected ODS based goods

The introduction of sector specific bans on ODS consumption should be accompanied by an import ban for similar products containing ODS.

Compulsory ODS treatment

Compulsory recovery and recycling of CFC, HCFC, CTC and MCF should be implemented, and ODS sensors and other measures for reducing leakages should be introduced. Transport of recycled ODS should be controlled and an institutional framework for this should be set up.

Non-compliance measures

A non-compliance fee for imposition on enterprises which fail to comply with the import and production licenses and the sector specific bans on ODS consumption will be introduced. The non-compliance fee is easy to introduce because it follows the already existing practices.

It is probable that the enterprises will oppose the fee, but if the licences and bans are reasonable giving the enterprises enough time to convert their production to ODS free technology, there is no reason why they should not comply with the allowed levels.

Economic support of ODS phaseout activities

The Romanian Government is prepared, through the State budget, to offer substantial economic support for necessary R&D connected with ODS phaseout.

The Romanian Government has initiated a *Research Programme regarding the Changes in the Ozone Layer and the Protection of its Quality* which in 1994 received funds of 1.2 bn Lei. The total budget for environmental research was around 10 bn Lei. In 1995, however, it is expected that round 0.7 bn Lei only will be available for the ODS research. The main beneficiaries of the funds have been:

- under the MWFEP: ICIM, INMH and IRCM;
- under the Ministry of Industries: ICPIAF, ICPAO, ICCF and PROCHEMA; and
- under the Ministry of Agriculture: ICA and ICPP.

The themes of the 1995-96 research include:

- an inventory of sources of ODS and monitoring of the concentration of ODS in the atmosphere;
- ecological and socio-economic effects from a deteriorated ozone layer;
- policies and strategies for eliminating ODS; and
- a national database with information on research activities, regulations etc.

The research programme will be extended to include the fiscal years 1997 and 1998.

Furthermore, the Romanian Government will, through the issue of Government guarantees, assist enterprises in obtaining credits in the commercial banking sector for financing, partly or entirely, ODS replacement projects.

Monitoring arrangements

An important additional regulatory action is the development of an effective monitoring and enforcement system. This is required in order for Romania to meet its obligations under the Montreal Protocol, ie monitoring the annual ODS consumption, monitoring the effectiveness of the Action Plan and monitoring the implementation of projects identified in the Action Plan.

A formalized data collection system should be set up whereby ODS industries are required to report regularly (annually) to the ODS Secretariat (cf. below) or an independent body. Questionnaires should be prepared and sent to the enterprises and collected by the local offices subordinated the State Environmental Inspection. Regular inspections at the production sites should also be organised.

Voluntary agreements

Agreements between industries/enterprises and MWFEP are necessary documents for the levying of charges. However, they are not needed to impose sector bans and licences. Furthermore, they may promote a dialogue and exchange of information which is extremely important in order to achieve a cost-effective and realistic ODS phaseout strategy which takes into consideration the required adjustments needed at the level of the producer and user industries. As such, agreements are a useful tool in determining the level of production licences for each enterprise and the time schedule for the sector specific bans.

The agreements are in line with existing environmental regulation in Romania and as such they can be implemented immediately without further legislation. Furthermore, agreements have been practised with

success in other environmental fields and they are likely to be accepted by enterprises, because the obligations of the enterprise are clarified with the environmental authorities.

Furthermore, information dissemination and continuous dialogue especially with the ODS industries is proposed as a top priority action, in order to allow the industries to adjust their production plans to the ODS phaseout strategy and to avoid imposing restrictions or regulations that will have severe adverse effects on production, employment and human safety. Both before and after approval of a certain measure, it is most important that the affected enterprises are informed. To be effective, the regulations should be a help to the ODS industries, not a spoke in their wheel. Therefore, a good dialogue between the MWFEP and the ODS industries is essential.

Introduction of an accreditation system (certificates) for refrigeration servicing technicians

Accreditation of service technicians to ensure that refrigeration service personnel are aware of the ozone problems and methods to reduce ODS consumption at service by improving maintenance and service procedures and by recovery/recycling of refrigerants. The scheme may also be applied in the service sector for fire fighting equipment.

Awareness campaign

Awareness building directed at the general public comprising information dissemination and product labelling. The purpose of this measure is first of all to influence the demand for ODS based products and to make people understand the necessity of phasing out ODS.

Revision of industry norms and standards, including safety standards

Modification of certain product standards and norms in support of the introduction of non-ODS alternatives in some applications should be considered if requested by involved enterprises, eg purity specifications in the solvents sector and for recycled/reclaimed refrigerants and occupational health standards. These norms and standards should only be introduced after careful consultation with the affected and involved industries and other relevant bodies.

The actions have been evaluated and selected on the basis of the following five criteria:

- Environmental efficiency
- Implementation in a short period of time
- Incentive/behaviourial effect on enterprises
- Mobilization of non-budget resources
- Acceptability for enterprises

Table 3.1 shows the role of each of the administrative and economic instruments in meeting the five criteria.

Table 3.3: Evaluation of Actions to be used in ODS Regulation

Evaluation Criteria / Instruments	Environmental efficiency (ODS reduction)	Implementation in a short period of time	Incentive effect	Mobilization of non-budgetary resources	Acceptability for enterprises
Improvement of customs subclassifications	+	+ +	-	-	+
Improvement of ODS import licenses	+ +	+ +	-	-	+
Introduction of ODS production licenses	+ +	+	-	-	+
Ban on reexport of ODS	+	+ +	-	-	+
Sector specific bans on ODS consumption	+	+	-	-	+
Bans on import of selected ODS based goods corresponding to the domestic sector specific bans on ODS consumption	+	+	-	-	+
Non-compliance measures	-	+	+	+	+
Economic support of ODS phaseout activities	+ +	+	+	-	+

Note: "+" signifies that evaluation criterion is met, "-" that evaluation criterion is not met or instrument does not influence the criterion and "+ +" that it is not possible to meet the criterion without implementing the instrument in question.

3.2.2 Projects

Table 3.4 summarises the 14 investment projects which have been identified by June 1995 for funding by the Multilateral Fund. Five of these are ready for submission to the Executive Committee of the Multilateral fund in July 1995.

The projects have to been developed by the enterprises with assistance from consultants from UNIDO, ICPIAF and COWIconsult.

Table 3.4: Status of Romanian ODS Phaseout Projects, June 1995

Sector	Enterprise	ODS consumption 1994 (1993) tonnes	ODS Phaseout Plan	Investment costs 1000 USD	NPV of 4 years Incr. Oper. Costs 1000 USD	Unit Abatement Costs USD/kg-yr	Grant Request 1000 USD	Status of Progress
Refrigeration - domestic	1. ARCTIC S.A. Gaesti	CFC-12 (52.5) CFC-11 (150.0)	CFC-12 to HFC-134a and CFC-11 to HCFC-141b took place Nov 1994. Plans to use cyclopentane	2,369	(six months): 1,451	8.48	4,317	Ready for submission, June 1995
Refrigeration - domestic	2. U.M. SADU Gorj	CFC-12 (9.0) CFC-11 (30.0)	CFC-12 -> HFC-134a (for thermostates not yet clear) CFC-11 -> HCFC-141b	CFC-12: Refr. 457	CFC-12 (lifetime): 514		971	Preliminary proposal ready
Refrigeration - commercial	3. S.C. FRIGOCOM S.A. Bucharest	CFC-12 45.0 CFC-11 6.5	CFC-12 -> HCFC-22 CFC-11 -> HCFC-141b	475	(lifetime) 18		418	Preliminary proposal ready
Refrigeration - com. & ind.	4. S.C. TEHNOFRIG S.A. Cluj	CFC-12 3.4 CFC-11 1.4	CFC-12 -> HFC-134a CFC-11 -> HCFC-141b	1,283	1,064		1,678	Preliminary proposal ready
Refrigeration - servicing: com. & dom.	5. COMSERVICE S.A. Cluj	CFC-12 .2)	CFC-12 -> HFC-134a					to be developed
Refrigeration - servicing: industrial	6. ICPIAF S.A. Cluj	CFC-12 (0.5)	training project for recovery and recycling, and conversion to non-ODS servicing	1,360			1,360	Preliminary proposal ready
Refrigeration - servicing: transport	7. TRANSFRIGOTREN Bucharest	CFC-12 10.4	CFC-12 -> HFC-134a	182.6	38	23.36	274.5	Ready for submission, June 1995

Table 3.4: *continued*

Sector	Enterprise	ODS consumption 1994 (1993) tonnes	ODS Phaseout Plan	Investment costs (USD)	NPV of 4 years Incr. Oper. Costs 1000 USD	Unit Abatement Costs USD/kg-yr	Grant Request 1000 USD	Status of Progress
Foam - rigid	8. METAPLAST S.A. Buzau	CFC-11 (21.5)	CFC-11 -> HCFC-141b					no documents as yet
Foam - flexible	9. SPUMOTIM S.A. Timisoara	CFC-11 (29.4)	CFC-11 -> CO_2 foam-blowing					Ready for submission, June 1995
Foam - semi-rigid	10. CHIMICA S.A. Orastie	CFC-11 12.0	CFC-11 -> HCFC-141b (or possibly CO_2)					Preliminary proposal ready
Aerosol	11. FARMEC S.A. Cluj	CFC-12 100.0 CFC-114 1.0	CFC -> Butane-propane	2,543		0.52	2,543	Ready for submission, June 1995
Solvents - metal degr.	12. S.C. RULMENTUL Bartad	CFC-113 (50.0) MCF (3.0)	Conversion to alcohol-based metal degreasing					Preliminary proposal ready ?
Institutional strengthening	13. MINISTRY OF ENV. Bucharest	na						Ready for submission, June 1995
Information dissemination	14. TERRA NOSTRA Bucharest	na						Preliminary proposal ready

3.3 Roles in Implementing the Strategy

The Romanian Government acknowledges that the current institutional set-up in support ODS phaseout is insufficient. In order to overcome this deficiency, the Romanian Government intends to establish a clear division of powers and responsibilities between various agencies involved in ODS phaseout and to implement an substantial institutional strengthening, partly with assistance from the Multilateral Fund.

In accordance with Government Decision No. 437 of August 4, 1992, the MWFEP is the lead agency in ODS Phaseout in Romania. However, numerous other Government agencies will have to contribute to ODS phaseout. Furthermore, the Romanian Government would like to emphasize the necessity of establishing an on-going dialogue with industries, research institutes and NGOs on issues connected with ODS phaseout.

In developing an institutional framework in Romania for supporting the ODS phaseout, emphasis has been placed on developing a structure which as much as possible builds on existing Government agencies and ensures the inclusion of ODS technical and economic expertise outside the Government agencies, especially at the Research and Development Institute for Food and Refrigeration Industries (ICPIAF), at the Research and Engineering Institute for Environment (ICIM) and at the industry level, in order to facilitate an expedite and efficient development of ODS replacement projects at industry level. Furthermore, emphasis has been placed on developing a structure which meets the criteria of acceptability for enterprises.

The Romanian Government will ensure the creation of an inter-ministerial committee, titled "the National Committee for the Protection of the Ozone Layer" (CNPSO), having the role of promoting the measures and the actions necessary for the application of the Montreal Protocol in Romania. It will be an advisory body to MWFEP comprising representatives of Government agencies involved in ODS phaseout. CNPSO will not comprise representatives of non-Government agencies.

CNPSO gives, inter alia, the possibility to discuss urgent problems and conflicts, to disseminate information on ODS phaseout, and to receive immediate response on economic and administrative measures just prepared. Thus, CNPSO should ensure an expedite approval by the Romanian Government of Draft Government Orders regarding ODS phaseout which are put forward by MWFEP following thoroughly discussions with relevant Government agencies involved in ODS phaseout.

The coordination of the work of the CNPSO will be ensured by the MWFEP through the State Secretary in charge of the Department of Environmental Protection Strategy and Regulation in his capacity of Chairman and through a Vice-Chairman elected for a two-year period among the ranks of the other members.

The tasks of the CNPSO follow from the Draft Government Order titled "Decision concerning the establishment, organization and functioning of the National Committee for the Protection of the Ozone Layer". It is attached as Appendix V.

Furthermore, the Romanian Government will ensure the creation of two permanent bodies:

- the Ozone Secretariat (STO) under guidance of MWFEP; and
- the Groups of Experts under guidance CNPSO.

STO will be responsible for designing, monitoring and implementing the ODS phaseout strategy subject to guidelines from the Romanian Government and MWFEP, including the issue of import/production licenses, the impose of sector specific bans and the administration and allocation of economic support of ODS

replacement projects at industry level from Romanian and international sources. Furthermore, it will act as a secretariat for CNPSO and the Groups of Experts. The tasks of STO follow from Box 3.1 below.

STOs major attention will be devoted to preparing and introducing legislative measures, information dissemination and open dialogue between government agencies, industries and others involved in ODS phaseout.

Taking into account the status of MWFEP as the lead agency in ODS phaseout in Romania, as well as the progress already made within MWFEP in establishing a know-how on problems facing the ODS producers and user industries, on collaboration with other Government agencies involved in ODS phaseout and on possible regulatory instruments, MWFEP will appoint the staff personnel of STO. The staff personnel who will work on a full time basis will comprise at least three Government officials and a secretary. They will be appointed be MWFEP. The majority of the staff personnel of STO will come from MWFEP. The Department of Environmental Protection Strategy and Regulation, MWFEP, will supervise the work of STO.

Taking into account the substantial knowledge present at ICPIAF on ODS phaseout, especially data collection and assistance to enterprises in preparing ODS replacement projects in collaboration with foreign ODS experts, monitoring and assistance to enterprises in preparing ODS replacement projects is envisaged to be delegated to ICPIAF on a contract basis. If necessary, the Romanian Government/MWFEP may decide to delegate other tasks from STO to Romanian ODS experts on a contract basis.

The Groups of Experts will work under guidance by CNPSO. They will comprise ODS experts from foremost ODS producing and consuming enterprise, research institutes and NGOs in Romania, they will work on an ad-hoc basis, and they will prepare material to be discussed at the regular meetings of CNPSO.

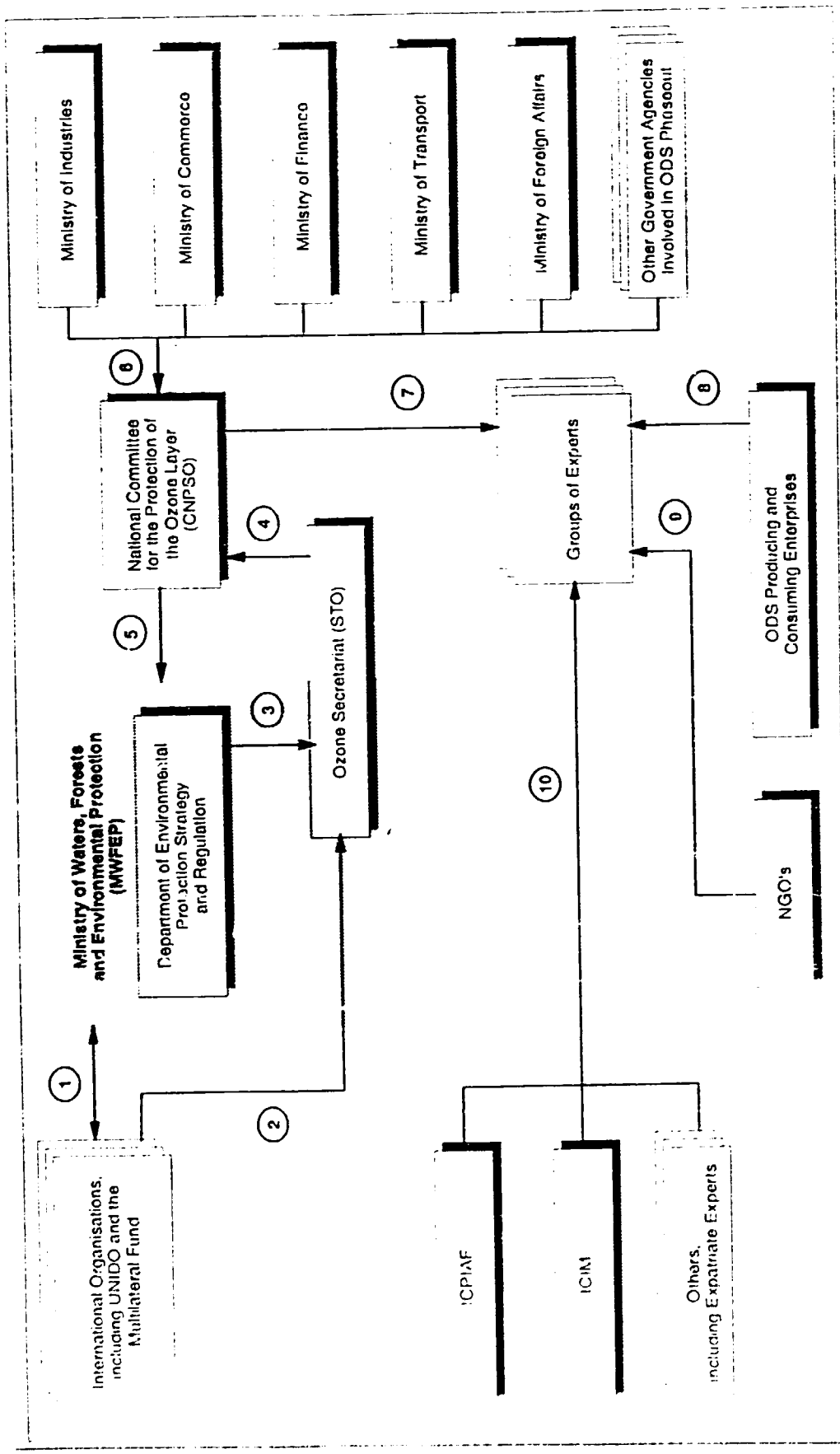
The institutional set-up is illustrated in Figure 3.1 below.

Box 3.1 Assignments of STO

STO will act as a national focal point in ODS phaseout having the following assignments:

- following and supervising the overall ODS phaseout activities and progress;
- updating the Romanian ODS Country Programme on a regular basis through the preparation of a Country Programme Amendment describing any relevant information on the development of ODS consumption patterns in Romania and the institutional set-up for ODS phaseout that has occurred subsequent to the preparation of the Country Programme;
- submitting the Romanian ODS Country Programme and any Amendment to the Montreal Protocol Executive Committee;
- submitting ODS replacement projects eligible for funding to the Multilateral Fund;
- acting as a secretariat for CNPSO;
- ensuring a liaison office for Government agencies involved in ODS phaseout;
- ensuring a dialogue framework for MWFEP, other Government agencies, including the Ministry of Industries, industries and NGOs;
- rising up public awareness for the importance of ozone layer preservation, including information dissemination concerning the progress of ODS phaseout, both worldwide and in Romania;
- communicating with the Montreal Protocol Executive Committee, the Secretariat and UNIDO;
- communicating with other Article 5 countries and other Central and Eastern European Countries on ODS phaseout activities;
- monitoring and collecting of ODS import/export data and local consumption by individual enterprises, possible through the regional environmental offices subordinated MWFEP;
- reviewing sub-projects to ensure that they are consistent with the national strategy defined in the Country Programme and meet eligibility criteria for projects financed by the Multilateral Fund;
- preparing and introducing legislative and administrative measures supporting ODS phaseout, including import licenses for ODS, sector specific bans on ODS use and sanctions upon enterprises not complying with the ODS phaseout schedules;
- handling environmental issues related to the implementation of the ODS replacement projects, in particular ensuring that Romanian requirements for Environmental Impact Assessment are observed, and monitoring implementation of mitigation activities;
- coordinating the provision of technical assistance to the enterprises;
- submitting quarterly reports to UNIDO on progress in project implementation, highlighting any problem areas, using formats to be provided in a Project Implementation Manual; and
- reporting to UNIDO any urgent implementation problem and all current and expected implementation bottlenecks.

Figure 3.1: Management Structure for the Romanian ODS Phaseout



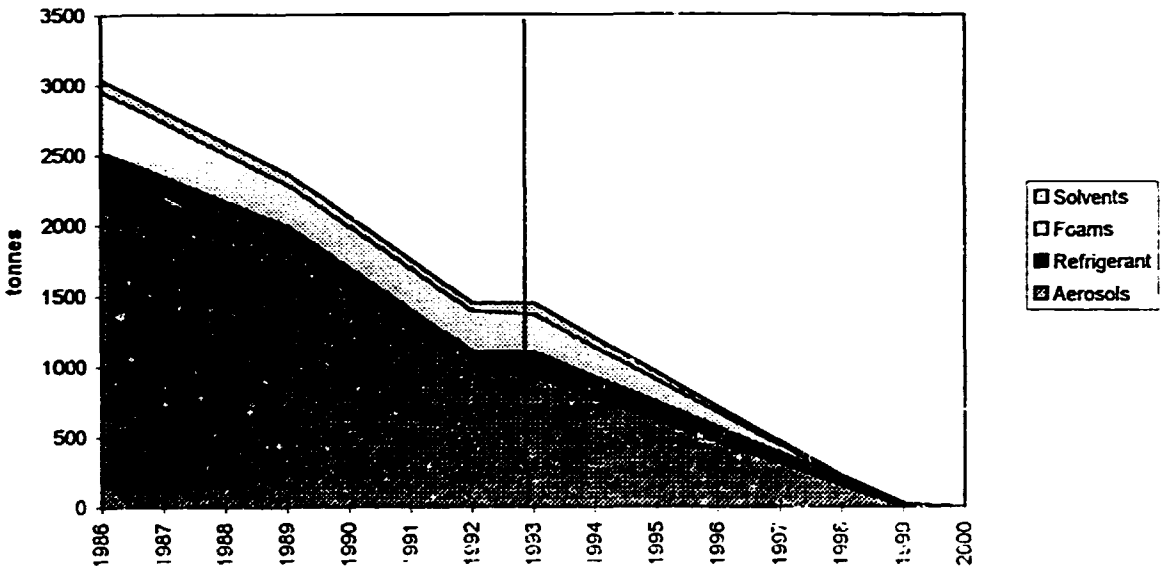
Notes: 1) Ongoing dialogue between international organisations and MWFEP on ODS phaseout issues. 2) Information flow from international organisations to STO et vice versa. 3) Guidance of STO. 4) Calling in meetings, preparing agendas of the meetings, etc. 5) Recommendations to MWFEP. 6) Representatives of Government agencies involved in ODS phaseout. 7) Guidance of the Groups of Experts. 8) Representatives of ODS producing and consuming enterprises. 9) Representatives of NGO's. 10) ODS technical experts.

3.4 Timetable and Consumption Implications

Tables 3.1 and 3.2 in Section 3.1 provided an overview of the achievable ODS phase-out strategy by sectors and substances, respectively, pursued by the Romanian Government. This strategy is based on the assumptions that fastest technically feasible phase-out is followed and that international funding for project implementation is made available to the enterprises in late 1995, at latest.

The timetable and consumption profile of this strategy can be summarised by Chart 3.1. Similar profiles are expected for halons, CTC and MCF. The main single break in the curves (which in the chart are made smooth) is expected when the aerosol (FARMEC in Cluj) conversion takes place. The strategy therefore supposes that ODS in Romania will be phased out totally six years in advance of the ten-year grace period time limit which exists for Romania as an Article 5 country.

Chart 3.1: CFC Consumption by Sector in Romania, 1986-93, and Planned Phaseout Schedule



3.5 Budget and Financing Programme

Table 3.4 in Section 3.2 showed (where available) estimates of the absolute costs and unit abatement costs of Romanian ODS phaseout projects at enterprise level indicated as of June 1995.

Of the 14 projects indicated the following 5 are ready for submission for funding to the Multilateral Fund at of mid-June:

1. FARMEC S.A., Cluj, aerosols, conversion from CFC-12 to butane-propane as propellant. The project will phase out an annual consumption of 700 tonnes CFC as a cost-effectiveness of 0.52 USD/kg.

2. ARCTIC S.A., Gaesti, domestic refrigeration, conversion from CFC-12 to HFC-134a as refrigerant and CFC-11 to cyclopentane as foam-blowing agent. The project will phase out annual consumption of more than 200 tonnes of CFCs at a cost-effectiveness of 8.48 USD/kg.

3. SPUMOTIM S.A., Timisoara, flexible foam, conversion from CFC-11 to CO_2 foam-blowing. The project will phase out an annual consumption of around 30 tonnes of CFC.

4. S.C. TRANSFRIGOTREN INTERNATIONAL S.A., Oras-Buftea (Bucharest), transport refrigeration, conversion from CFC-12 to HFC-134a as refrigerant. The project will phase out an annual consumption of 10.4 tonnes of CFCs at a cost-effectiveness of 23.36 USD/kg.

5. The Institutional Strengthening project.

The four enterprise projects account for around 60% of total ODP-weighted ODS consumption in Romania more than 65% of the total CFC use.

Their cost-effectiveness varies, however, considerably, with the aerosol conversion having by far the lowest unit abatement costs.

APPENDIX I

List of Institutions and People Visited

Government Agencies

Ministry of Waters, Forests and Environmental Protection

Name	Address	Telephone and Fax Number
Mr Ioan Jelev State Secretary	Bd. Libertatii, 12 Bucharest 5	Tel: (401) 631 60 44 Fax: (401) 312 04 03 / 312 42 27
Mr Dumitru Mihu Director	Bd. Libertatii, 12 Bucharest 5	Tel: (401) 631 64 90 Fax: (401) 631 64 90
Ms Carmen Dumitrescu Montreal Protocol Expert	Bd. Libertatii, 12 Bucharest 5	Tel: (401) 631 62 14
Mr Florin Alexandru Project Coordinator Projects Implementation Unit	Bd. Libertatii, 12 Bucharest 5	Tel: (401) 631 64 94 / 312 25 99 Fax: (401) 312 42 27 / 631 61 82
Mr Mihai Lesnic Scientific Director	Spl. Independentei 294 77 748 Bucharest	Tel: (401) 312 13 93 Fax: (401) 312 13 93
Ms Adriana Gheorghe Project Officer Projects Implementation Unit	Bd. Libertatii, 12 Bucharest 5	Tel: (401) 631 65 12 Fax: (401) 312 42 27

Ministry of Commerce

Name	Address	Telephone and Fax Number
Mr Cosmin Dobran Multilateral Relations Director-ate	17, Apolodor Str. Bucharest 5	Tel: (401) 312 03 90 Fax: (401) 312 23 42
Mr Antohi Florian Multilateral Relations Director-ate	17, Apolodor Str. Bucharest 5	Tel: (401) 312 03 90 Fax: (401) 312 23 42
Mr Ion Marin Head of Marketing Strategy Office	17, Apolodor Str. Bucharest 5	Tel: (401) 631 49 05 Fax: (401) 781 50 70

Ministry of Industries

Name	Address	Telephone and Fax Number
Mr Paul Blair General Director	Calea Victoriei, 152 70179 Bucharest 1	Tel: (401) 659-51-40 Fax: (401) 312-03-21
Mr Alexandru Georgescu Director Ecological Service	Calea Victoriei, 152 70034 Bucharest 1	Tel: (401) 659 41 91
Ms Jenica Minastirla Department of Fertilizer and Inorganic Products	Calea Victoriei, 152 70034 Bucharest 1	Tel: (401) 650 65 27 Fax: (401) 650 38 85
Ms Cristiana Ion R&D and Ecological Division	Calea Victoriei, 152 71101 Bucharest 1	Tel: (401) 659 51 40 / 659 41 91 Fax: (401) 612 07 21
Ms Doina Constantinescu R&D and Ecological Division	Calea Victoriei, 152 71101 Bucharest 1	Tel: (401) 659 51 40 / 659 41 91 Fax: (401) 612 03 21
Mr Vladimir Gheorghevici Expert Engineer Department of Metalurgical Industry	Calea Victoriei, 152 70034 Bucharest 1	Tel: (401) 659 20 55 Fax: (401) 312 59 56
Mr Vlad Ciolac Department of Chemistry	Calea Victoriei, 152 70034 Bucharest 1	
Mr Lucian Ursea Expert Department of Electrotechnic, Electronic and Fine Mechanic	Calea Victoriei 152 78034 Bucharest 1	Tel: (401) 659 68 80 / 650 50 20 Fax: (401) 650 27 30
Mr Andrei Moraru Senior Advisor Foreign Relations Department	Calea Victoriei, 152 70034 Bucharest 1	Tel: (401) 650 28 60 Fax: (401) 312 96 69

Cluj Customs Office

Name	Address	Telephone and Fax Number
Mr Doru Ciuban Inspector de Specialitate	B-dul Muncii nr 8 3400 Cluj-Napoca	Tel: (401) 659-51-40 Fax: (401) 312-03-21

International Organizations

UNIDO

Name	Address	Telephone and Fax Number
Mr Octavian George Negru Head of Bucharest Office Joint UNIDO Romanian Centre	Bd. N. Balcescu, 16 70121 Bucharest	Tel: (40-1) 614 52 64 Fax: (40-1) 312 52 64

Research Institutes

National Institute of Meteorology and Hydrology (INMH)

Name	Address	Telephone and Fax Number
Mr Vasile Cuculeanu Scientific Director	Sos. Bucharest-Ploiesti, 97 71581 Bucharest 1	Tel: (401) 312 98 42 Fax: (401) 312 98 43
Mr Mircea Cristian Frimescu Scientific Secretary	Sos. Bucharest-Ploiesti, 97 71581 Bucharest 1	Tel: (401) 633 02 92 Fax: (401) 312 98 43

R&D Institute for Food and Refrigeration Industries (ICPIAF)

Name	Address	Telephone and Fax Number
Mr Gheorghe Lazanu General Director	Str. Fabricii de Chibrituri, 13-21 3400 Cluj-Napoca	Tel: (40-064) 13 02 38 Fax: (40-064) 19 42 11
Mr Eugen Lemnian Head of Refrigeration Department	Str. Fabricii de Chibrituri, 13-21 3400 Cluj-Napoca	Tel: (40-064) 13 02 38 Fax: (40-064) 19 42 11
Mr Sabin Bobos Chief of Designing Group Refrigeration Department	Str. Fabricii de Chibrituri, 13-21 3400 Cluj-Napoca	Tel: (40-064) 13 02 38 Fax: (40-064) 19 42 11
Mr Nicolae Olteanu Chief of Designing Group Refrigeration Department	Str. Fabricii de Chibrituri, 13-21 3400 Cluj-Napoca	Tel: (40-064) 13 02 38 Fax: (40-064) 19 42 11
Ms Mihaela Veres Head of CO_2 Projects	Str. Fabricii de Chibrituri, 13-21 3400 Cluj-Napoca	Tel: (40-064) 13 02 38 Fax: (40-064) 19 42 11
Mr Sorin Macovescu Head of Technical Committee	Str. Fabricii de Chibrituri, 13-21 3400 Cluj-Napoca	Tel: (40-064) 13 02 38 Fax: (40-064) 19 42 11

Institute of Environmental Research and Engineering (ICIM)

Name	Address	Telephone and Fax Number
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Mr Ion Moroianu Senior Researcher	Spl. Independentei 294 7703 Bucharest 6	Tel: (401) 637 30 20 Fax: (401) 312 18 93
Ms Rodica Serban Senior Researcher Head of Air Pollution Laboratory	Spl. Independentei 294 7703 Bucharest 6	Tel: (401) 637 30 20 Fax: (401) 312 18 93
Ms Vlaicu Elena	294, Spl. Independentei Bucharest 6	Tel: (401) 637 30 20/269 Fax: (401) 312 13 93

Enterprises

ODS Producing Enterprises

S.C. OLTCHIM S.A.

Name	Address	Telephone and Fax Number
Mr Emil Plavitu Development Director	1 Uzinei str. 1000 RM. Valcea	Tel: (050) 710 250 Fax: (050) 715 030/(068) 151 951
Mr Iuliu N. Habean Dipl. Engineer Development Department	1 Uzinei str. 1000 RM. Valcea	Tel: (050) 710 250 Fax: (050) 715 030/(068) 151 951
Ms Roxana Baloi Interpreter	1 Uzinei str. 1000 RM. Valcea	Tel: (050) 710 250 Fax: (050) 715 030/(068) 151 951

BICAPA S.A.

Name	Address	Telephone and Fax Number
Mr Suciu Grigore General Director	Str. Avram Iancu, 144 3225 Tirnaveni	Tel: (955) 42351 Fax: (955) 43600
Mr Chindris Ovidiu Director MEA	Str. Avram Iancu, 144 3225 Tirnaveni	Tel: (065) 440356 Fax: (065) 443600/199756

ODS Importers

CHIMEXIM S.A.

Name	Address	Telephone and Fax Number
Ms Geta Cetacli Manager of Export-Import	10-12 Republicii Bd PO Box 1-74 Bucharest	Tel: (40-01) 613 04 40/614 22 69 Fax: (40-01) 615 51 77

MIDAL

Name	Address	Telephone and Fax Number
Mr Ion Maracine General Manager	68 Stirbei Voda St Bucharest	Tel: (40-01) 615 50 70 Fax: (40-01) 614 84 72

ODS Consuming Enterprises

Refrigeration Sector

ARCTIC S.A.

Name	Address	Telephone and Fax Number
Mr Traian Novolan General Manager	210, 13 Decembrie st. 0150 Gaesti	Tel: (40-045) 71 24 78/71 05 65 Fax: (40-045) 71 16 23
Mr George Ene Chief of Export-Import Department	Cal. Rahovei str., 296 Bucharest	Tel: (401) 420 27 13 Fax: (401) 420 27 12
Ms Doina Drumea Chief Designer	210, 13 Decembrie st. 0150 Gaesti	Tel: (40-045) 71 05 65 Fax: (40-045) 71 16 23
Ms Aurora Bulea Translator	210, 13 Decembrie st. 0150 Gaesti	Tel: (40-045) 71 05 65 Fax: (40-045) 71 16 23

U.M. SADU

Name	Address	Telephone and Fax Number
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Mr Iuliana Hoara Marketing Department	Str. Parangului 1 Bumbesti-Jiu Gorj County	Tel: (40-053) 21 57 64/21 82 37 Fax: (40-053) 21 66 94/21 67 17

S.C. TEHNOFRIG S.A.

Name	Address	Telephone and Fax Number
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Ms Mioara Radu Department of Refrigeration Equipment Design	F-cii de Chibrituri Str., 5-11 3400 Cluj-Napoca	Tel: (40-064) 13 24 88/13 60 15 Fax: (40-064) 13 20 22

COMSERVICE S.A.

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Name	Address	Telephone and Fax Number
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TRANSFRIGOTREN

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Aerosol Sector

FARMEC S.A.

Name	Address	Telephone and Fax Number
Mr Turdeanu Liviu General Manager	str. H. Barbusse, 16 3400 Cluj-Napoca	Tel: (40-064) 13 20 66/19 42 32 Fax: (40-064) 19 44 68
Mr Marin Kevorkian Technical Director	str. H. Barbusse, 16 3400 Cluj-Napoca	Tel: (40-064) 13 20 66/19 42 32 Fax: (40-064) 19 44 68
Ms Florica Ghilea Head of Aerosol Department	str. H. Barbusse, 16 3400 Cluj-Napoca	Tel: (40-064) 13 20 66/19 42 32 Fax: (40-064) 19 44 68
Ms Maricara Haragis Financial Manager	str. H. Barbusse, 16 3400 Cluj-Napoca	Tel: (40-064) 13 20 66/13 63 08 Fax: (40-064) 19 44 68
Ms Rodica Misca Chief Quality Control & Chemical Analysis Department	str. H. Barbusse, 16 3400 Cluj-Napoca	Tel: (40-064) 13 20 66/19 42 32 Fax: (40-064) 19 44 68

Foam Sector

METAPLAST S.A.

Name	Address	Telephone and Fax Number
Mr Ion Sarivan Technical Director	Alea industriei, 5 5100 Buzau	Tel: (40-038) 42 72 10 Fax: (40-044) 11 66 49
Mr Vasile Constantinescu General Director	Alea industriei, 5 5100 Buzau	Tel: (40-038) 42 72 10 Fax: (40-044) 11 66 49

SPUMOTIM S.A.

Name	Address	Telephone and Fax Number
Mr Ioan Pantea Technical and Production Manager	Calea Buziasului, 22 1900 Timisoara	Tel: (40-96) 18 37 40/18 49 00 Fax: (40-96) 19 11 07

CHIMICA S.A.

Name	Address	Telephone and Fax Number
Mr Boxdog Mihail Technical Director	Str. Codrului 24 2600 Orastie	Tel: (40-54) 64 12 50/64 16 70 Fax: (40-54) 64 22 52
Mr Bianu Adrian Head of Polyerethane Department	Str. Codrului 24 2600 Orastie	Tel: (40-54) 64 12 50/64 16 70 Fax: (40-54) 64 22 52

Non-Government Associations

Terra Nostra

Name	Address	Telephone and Fax Number
Mr Strambu Bogdan Director		Tel: (40-1) 746 02 34
Mr Cornel Calin Lencar Engineer		Tel: (40-1) 659 07 71

APPENDIX II

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APPENDIX III

Montreal Protocol Revisions

1 Background

Ozone in the stratosphere absorbs most of the sun's harmful ultraviolet radiation. Concentrations of man-made chemicals called chlorofluorocarbons (CFC) and of halon are depleting the ozone layer, allowing increasing penetrations of some biologically harmful light in the UV-B range to get through. Changes in the UV climate of the earth pose a threat to human health, plant life, aquatic ecosystems, air quality, and materials.

Table 1 Impact of Increased UV-B Radiation

1.	**Human Health**
1.1	Suppression of the immune system
1.2	Increased damage to the eyes, especially cataracts
1.3	Increase in incidence of skin cancer
2.	**Terrestrial Plants**
2.1	Reduced yield in certain crop varieties, e.g. soybeans
2.2	Reduced growth in terms of plant height and leaf area
2.3	Reduced biodiversity of forests and other terrestrial ecosystems
3.	**Aquatic Ecosystems**
3.1	Damage to plant and animal plankton, reduced biomass production, and, thereby, a reduced food supply to humans
3.2	Change in species composition and biodiversity
4.	**Tropospheric Air Quality**
4.1	Increased photochemical smog
5.	**Materials Damage**
5.1	Degradation of materials, particularly plastics or polymer-based materials used outdoors

Being a green-house gas, CFC also contributes to the global warming problem.

2 The Montreal Protocol

The worldwide concern for the depletion of the ozone layer led to the international adoption of the Montreal Protocol on Substances that Deplete the Ozone Layer, the first global agreement addressing a

Table 2 Ozone Depleting Substances Regulated under the Montreal Protocol

Annex A, Group I: Fully Halogenated Chlorofluorocarbons		
		ODP[1]
CFC-11	$CFCl_3$	Trichlorofluoromethane
		1.0
CFC-12	CF_2Cl_2	
		Dichlorodifluoromethane
		1.0
CFC-113	$C_2F_3Cl_3$	
		1,1,2-Trichlero-1,2,2-trifluoroethane
		0.8
CFC-114	$C_2F_4Cl_2$	
		1,2-Dichlorotetrafluoroethane
		1.0
CFC-115	C_2F_5Cl	
		Chloropentafluoroethane
		0.6
Annex A, Group II: Halon		
Halon-1211	CF_2BrCl	
		Bromochlorodifluoromethane
		3.0
Halon-1301	CF_3Br	Bromotrifluoromethane
		10.0
Halon-2402	$C_2F_4Br_2$	
		Dibromotetrafluoroethane
		6.0

Note: 1) Ozone Depleting Potential as contained in Annex A of the Montreal Protocol of September 1987.

global environmental problem. The Protocol was signed in Montreal, Canada on September 16, 1987 and entered into force on January 1, 1989.

The chemicals first controlled by the Montreal Protocol were sub-divided into two groups (Annex A, Group I, and Annex A, Group II), as listed in Table 2 above.

In all, the Protocol comprises 20 articles. Below follows a brief overview of the 5 articles (Articles 2, 3, 4, 5 and 7) of particular importance to Romania.

Article 2: Control Measures

Parties to the Protocol committed themselves to freeze their production and use of CFC (Annex A, Group I) at 1986 consumption levels, effective from July 1, 1989, and, further, to reduce consumption by 20% compared with 1986 levels by July 1, 1993, and 50% by July 1, 1998. For halon (Annex A, Group II) a freeze at 1986 levels was called for by 1992.

Article 3: Calculation of Control Levels

Control is based not on the volume of production and consumption but on "calculated levels" of production and consumption, where "calculated levels" are arrived at by weighting the volume of production and consumption with the Ozone Depleting Potential (ODP) of the different regulated chemicals.

Article 4: Control of Trade with Non-Parties

Parties to the Montreal Protocol have agreed to a ban on imports of controlled substances from non-Parties, effective from January 1, 1990. Parties have further agreed not to export controlled substances to non-Parties, effective from January 1, 1993.

Trade restrictions are imposed on products containing or produced using controlled substances, and Parties are discouraged from exporting technology for production or utilisation of controlled substances.

Article 5: Special Situation of Developing Countries

A ten-year grace period in compliance with control measures was allowed developing country Parties whose annual calculated level of consumption of the controlled substances listed in Annex A (cf. Table 2) is less than 0.3 kg per capita. These countries were hereafter referred to as Article 5 countries.

It must, however, be emphasized that the ten-year delay applies only to ODS-uses that are intended to meet basic domestic needs. The ODS-use in production for export must be phased out according to the Protocol as it applies to non-Article 5 countries.

Developing country Parties will be given access to environmentally safe alternative substances and technology, and to subsidies, aid, credits, guarantees or insurance programmes to facilitate a shift to alternative substances and technology.

Article 7: Reporting of Data

Parties to the Protocol committed themselves to provide to the Secretariat, within three months of becoming a Party, statistical data on production, imports and exports of each of the controlled substances for the year 1986, or the best possible estimates of such data if actual data are not available.

Furthermore, the Protocol requires that each Party provides statistical data to the Secretariat on its annual production (with separate data on amounts destroyed by technologies to be approved by the Parties), imports and exports to Parties and non-Parties, respectively, of such substances for the year during which it becomes a Party and for each year thereafter. It must forward the data no later than nine months after the end of the year to which the data relate, i.e. before October 1 in the following year.

3 London Amendments to the Montreal Protocol

Since the signing of the Montreal Protocol in September 1987, scientists have concluded that the deterioration in the ozone layer over the Antarctic is taking place much more rapidly than originally projected. It was soon politically realized that more stringent measures were necessary.

The international community has come up with various proposals regarding the options for global compliance to the Protocol, which substances should be controlled, and how stringent the measures to be adopted and implemented should be.

The Protocol was amended in June 1990 in London implying a more stringent timetable for the phasing out of ozone depleting substances (cf. Table 6). In addition, a number of new substances were included in the Protocol by the Parties' approval of two new annexes (Annex B, Groups I-III, and Annex C, Group I).

Additional CFCs as well as methyl chloroform (MCF) and carbon tetrachloride (CTC) were added to the list of controlled substances (Annex B, Groups I-III). A number of CFC alternatives with low ozone depleting potential, namely HCFCs, were identified as transitional substances with a non-binding ban by year 2040 (Annex C, Group I). Production and consumption of transitional substances were to be monitored. The new substances included in the Protocol at the London meeting are listed in Table 3 below.

Trade restrictions with non-Parties were expanded to cover the additional controlled substances.

Article 5 countries, allowed a ten-year grace period in compliance with control measures, committed themselves to the additional requirement that the annual calculated level of consumption of additional CFCs, MCF and CTC combined does not exceed 0.2 kg per capita (cf. Box 1).

Box 1 Article 5, para 1 and 2, in the London Amendments

1. Any Party that is a developing country and whose annual calculated level of consumption of the controlled substances in Annex A is less than 0.3 kilograms per capita on the date of the entry into force of the Protocol for it, or any time thereafter until 1 January 1999, shall in order to meet its basic domestic needs, be entitled to delay for ten years its compliance with the control measures set out in Articles 2A to 2E.

2. However, any Party operating under paragraph 1 of this Article shall exceed neither an annual calculated level of consumption of the controlled substances in Annex A of 0.3 kilograms per capita nor an annual calculated level of consumption of the controlled substances of Annex B of 0.2 kilograms per capita.

Among the major amendments to the Montreal Protocol were the provisions covering the so-called "Ozone Fund," an interim multilateral fund which endeavours to:

- finance country specific studies to identify Article 5 countries' needs for cooperation;
- facilitate technical cooperation to meet the identified needs;
- distribute information and relevant materials, and hold workshops, training sessions, and other related activities, for the benefit of developing countries; and
- meet incremental costs incurred by Article 5 countries to enable their compliance with the control measures of the Protocol.

Table 4 provides an indicative list of incremental costs which may be financed by the Interim Multilateral Fund or, in the case of non-Article 5 countries with a per capita income of less than USD 4,000, by the Global Environment Facility (GEF). The Interim Multilateral Fund was founded in London in 1990 on the basis of a contract between countries to work together on ODS phaseout. This contract was reaffirmed in Copenhagen in 1992 with the transition of the Multilateral Fund from its interim to permanent status.

In evaluating requests for financing incremental costs, the most cost-effective and efficient options, minimizing capital abandonment, deindustrialization and loss of export revenues, will be selected. The funding of incremental costs is intended as an incentive for early adoption of ozone protecting technologies.

Table 3 Additional ODS Included in the London Amendments to the Montreal Protocol

Annex B, Group I: Other Fully Halogenated Chlorofluorocarbons		ODP
CFC-13	CF_3Cl	1.0
CFC-111	C_2FCl_5	1.0
CFC-112	$C_2F_2Cl_4$	1.0
CFC-211	C_3FCl_7	1.0
CFC-212	$C_3F_2Cl_6$	1.0
CFC-213	$C_3F_3Cl_5$	1.0
CFC-214	$C_3F_4Cl_4$	1.0
CFC-215	$C_3F_5Cl_3$	1.0
CFC-216	$C_3F_6Cl_2$	1.0
CFC-217	C_3F_7Cl	1.0
Annex B, Group II: Carbon Tetrachloride		**ODP**
Carbon Tetrachloride (CTC)	CCl_4	1.1
Annex B, Group III: Methyl Chloroform		**ODP**
Methyl Chloroform (MCF) 1,1,1-trichloroethane	$C_2H_3Cl_3$	0.1
Annex C, Group I: HCFC (Transitional Substances)		**ODP**
HCFC-21[1]	$CHFCl_2$	0.04
HCFC-22[1]	CHF_2Cl	0.055
HCFC-31	CH_2FCl	0.02
HCFC-121	C_2HFCl_4	0.04
HCFC-122	$C_2HF_2Cl_3$	0.08
HCFC-123	$C_2HF_3Cl_2$	0.06
HCFC-123[1]	$CHCl_2CF_3$	
HCFC-124	C_2HF_4Cl	0.04
HCFC-124[1]	$CHFClCF_3$	
HCFC-131	$C_2H_2FCl_3$	0.05
HCFC-132	$C_2H_2F_2Cl_2$	0.05
HCFC-133	$C_2H_2F_3Cl$	0.06
HCFC-141	$C_2H_3FCl_2$	0.07
HCFC-141b[1]	CH_3CFCl_2	
HCFC-142	$C_2H_3F_2Cl$	0.07
HCFC-142b[1]	CH_3CF_2Cl	
HCFC-151	C_2H_4FCl	0.005
HCFC-221	C_3HFCl_6	0.07
HCFC-222	$C_3HF_2Cl_5$	0.09
HCFC-223	$C_3HF_3Cl_4$	0.08
HCFC-224	$C_3HF_4Cl_3$	0.09
HCFC-225	$C_3HF_5Cl_2$	0.07
HCFC-225ca[1]	$CF_3CF_2CHCl_2$	
HCFC-225cb[1]	CF_2ClCF_2CHClF	
HCFC-226	C_3HF_6Cl	0.10
HCFC-231	$C_3H_2FCl_5$	0.09
HCFC-232	$C_3H_2F_2Cl_4$	0.10
HCFC-233	$C_3H_2F_3Cl_3$	0.23
HCFC-234	$C_3H_2F_4Cl_2$	0.28
HCFC-235	$C_3H_2F_5Cl$	0.52
HCFC-241	$C_3H_3FCl_4$	0.09
HCFC-242	$C_3H_3F_2Cl_3$	0.13
HCFC-243	$C_3H_3F_3Cl_2$	0.12
HCFC-244	$C_3H_3F_4Cl$	0.14
HCFC-251	$C_3H_4FCl_3$	0.01
HCFC-252	$C_3H_4F_2Cl_2$	0.04
HCFC-253	$C_3H_4F_3Cl$	0.03
HCFC-261	$C_3H_5FCl_2$	0.02
HCFC-262	$C_3H_5F_2Cl$	0.02
HCFC-271	C_3H_6FCl	0.03

Note: 1) Identifies the most commercially viable substances with ODP values listed against them to be used for the purposes of the Protoco

Table 4 Incremental Costs Which May be Covered by the Multilateral Fund

1.	**Supply of Substitutes**
1.1	Cost of conversion of existing production facilities
1.2	Costs arising from premature retirement or enforced idleness
1.3	Cost of establishing new production facilities for substitutes
1.4	Net operational cost, including the cost of raw materials
1.5	Cost of import of substitutes
2.	**Use in Manufacturing as an Intermediate Good**
2.1	Cost of conversion of existing equipment and product manufacturing facilities
2.2	Cost of patents and designs and incremental cost of royalties
2.3	Capital cost
2.4	Cost of retraining
2.5	Cost of research and development
2.6	Operational costs, including the cost of raw materials
3.	**End-Use**
3.1	Cost of premature modification or replacement of user equipment
3.2	Cost of collection, management, recycling, and, if cost effective, destruction of ozone depleting substances
3.3	Cost of providing technical assistance to reduce consumption and unintended emission of ozone depleting substances

4 Copenhagen Amendments to the Montreal Protocol

Following the 2nd meeting of the Parties in London in June 1990, several countries including the EC committed themselves to phasing out the use of regulated ODS earlier than required by the London Amendments. Combined with new scientific evidence of the enlarging hole in the ozone layer and the discovery of additional ozone depleting substances, these factors led to the adoption of the Copenhagen Amendments at the 4th meeting of the Parties in November 1992.

According to the Copenhagen Amendments, CFC, carbon tetrachloride and methyl chloroform have to phased out by 1996, and halon by 1994. Furthermore, a phaseout schedule was determined for HCFC, thereby becoming a controlled substance, and HBFCs and methyl bromide (a disinfectant used in the agricultural sector) were added to the list of controlled substances (Annex C, Group II, and Annex E, Group I). It was decided to ban the use of HBFCs by 1996. These substances have a positive ODP but there are, at present, no known uses of HBFCs.

The names, chemical formulas and ODPs of the regulated HBFCs and methyl bromide are provided in Table 5.

Article 5, regarding the special privileges of developing countries, and Article 7, regarding reporting of data, were changed in Copenhagen. Most important, the Article 5 countries committed themselves to develop an ODS phaseout strategy for the controlled substances listed in Annexes C and E before January 1, 1996, and each Party producing ODS agreed to provide to the Secretariat statistical data on its annual production of each of the controlled substances listed in Annexes A, B, C and E and, separately, for each substance imports from and exports to Parties and non-Parties, respectively.

In Boxes 2 and 3 below, Articles 5 and 7 of the revised Protocol are reproduced *in extenso*. These Articles are binding for Romania although the country has not yet ratified the Copenhagen Amendments.

Finally, an indicative list of measures that might be taken in respect of non-compliance with the Protocol was adopted in Copenhagen, refer to Annex V of the Report of the Fourth Meeting of the Parties to the Montreal Protocol. The measures comprise:

- appropriate assistance to the non-complying countries, including assistance for the collection and reporting of data, technical assistance, technology transfer and financial assistance, information transfer and training;
- issuing cautions or warnings; and
- suspension of specific rights and privileges under the Protocol, including those concerned with for example trade and financial mechanisms.

The non-compliance procedure is described in Annex IV of the Report of the Fourth Meeting of the Parties to the Montreal Protocol.

5 Trade Restrictions

According to Article 4 of the Montreal Protocol, Romania is obliged to impose trade restrictions on countries that have not ratified the Montreal Protocol (non-Parties). These comprise restriction on trade with ODS, products containing ODS and, if feasible, products produced with, but not containing, ODS.

The Montreal Protocol defines "non-Parties" as follows: "A non-Party with respect to a particularly controlled substance is a state or regionally economic integrated organization that has **not** agreed to be bound by the control measures in effect for that substance". Any country who has ratified the Montreal Protocol is considered a Party with respect to CFC and halon.

According to the Montreal Protocol with Amendments three lists of products have to be elaborated. These are:

- a list of ODS (so-called "controlled substances");
- a list of products containing ODS; and
- a list of products produced with but not containing ODS.

The first two lists have been elaborated and are in force. The last one has not but by January 1, 1994, the Parties shall determine the feasibility of banning or restricting, from states not Party to the Protocol, the import of products produced with, but not containing, CFC and halon. If feasible, the Parties shall elaborate a list of such products, and possibly by 1995 ban the import of those products from non-Party States.

The trade restrictions that are already in effect comprise:

- Ban on import of controlled substances from non-Parties (effective January, 1990).

- Ban on export of controlled substances to non-Parties (effective January, 1993).

- Ban on import of products containing controlled substances from non-Parties (effective 1993).

Among the major decisions of the Sixth Meeting of the Parties, which was held in Nairobi in October 1994, was a decision on the supply of controlled substances to Article 5 Parties. It says that each Article 5 Party that requires controlled substances from another Party should address a letter to the Government of the supplying Party, within 60 days of such imports, specifying the quantity of the substances imported and stating that they are to be used for the purposes of meeting its basic domestic needs. Each Party supplying the controlled substances is requested to provide the Secretariat with an annual summary of the letters received from Article 5 Parties.

Box 2 Article 5 in the Copenhagen Amendments

1. Any Party that is a developing country and whose annual calculated level of consumption of the controlled substances in Annex A is less than 0.3 kilograms per capita on the date of the entry into force of the Protocol for it, or any time thereafter until 1 January 1999, shall in order to meet its basic domestic needs, be entitled to delay for ten years its compliance with the control measures set out in Articles 2A to 2E.

1 bis. The Parties shall, taking into account the review referred to in paragraph 8 of this Article, the assessment made pursuant to Article 6 and any of the relevant information, decide by 1 January 1996, through the procedure set forth in paragraph 9 of Article 2:

(a) With respect to paragraphs 1 to 6 of Article 2F, what base year, initial levels, control schedules and phase-out date for consumption of the controlled substances in Group I of Annex C will apply to Parties operating under paragraph 1 of this Article;

(b) With respect to Article 2G, what phase-out date for production and consumption of the controlled substances in Group II of Annex C will apply to Parties operating under paragraph 1 of this Article; and

(c) With respect to Article 2H, what base year, initial levels and control schedules for consumption and production of the controlled substance in Annex E will apply to Parties operating under paragraph 1 of this Article.

2. However, any Party operating under paragraph 1 of this Article shall exceed neither an annual calculated level of consumption of the controlled substances in Annex A of 0.3 kilograms per capita nor an annual calculated level of consumption of the controlled substances of Annex B of 0.2 kilograms per capita.

3. When implementing the control measures set out in Articles 2A to 2E, any Party operating under paragraph 1 of this Article shall be entitled to use:

(a) For controlled substances under Annex A, either the average of its annual calculated level of consumption for the period 1995 to 1997 inclusive or a calculated level of consumption of 0.3 kilograms per capita, whichever is the lower, as the basis for determining its compliance with the control measures;

(b) For controlled substances under Annex B, the average of its annual calculated level of consumption for the period 1998 to 2000 inclusive or a calculated level of consumption of 0.2 kilograms per capita, whichever is the lower, as the basis for determining its compliance with the control measures.

4. If a Party operating under paragraph 1 of this Article, at any time before the control measures obligations in Articles 2A to 2H become applicable to it, finds itself unable to obtain an adequate supply of controlled substances, it may notify this to the Secretariat. The Secretariat shall forthwith transmit a copy of such notification to the Parties, which shall consider the matter at their next Meeting, and decide upon appropriate action to be taken.

5. Developing the capacity to fulfil the obligations of the Parties operating under paragraph 1 of this Article to comply with the control measures set out in Articles 2A to 2E, and any control measures in Articles 2F to 2H that are decided pursuant to paragraph 1 *bis* of this Article, and their implementation by those same Parties will depend upon the effective implementation of the financial co-operation as provided by Article 10 and transfer of technology as provided by Article 10A.

6. Any Party operating under paragraph 1 of this Article may, at any time, notify the Secretariat in writing that, having taken all practicable steps it is unable to implement any or all of the obligations laid down in Articles 2A to 2E, or any or all obligations in Articles 2F to 2H that are decided pursuant to paragraph 1 *bis* of this Article, due to the inadequate implementation of Articles 10 and 10A. The Secretariat shall forthwith transmit a copy of the notification to the Parties, which shall consider the matter at their next Meeting, given due recognition to paragraph 5 of this Article and shall decide upon appropriate action to be taken.

7. During the period between notification and the Meeting of the Parties at which the appropriate action referred to in paragraph 6 above is to be decided, or for a further period if the Meeting of the Parties so decides, the non-compliance procedures referred to in Article 8 shall not be invoked against the notifying Party.

8. A Meeting of the Parties shall review, not later than 1995, the situation of the Parties operating under paragraph 1 of this Article, including the effective implementation of financial co-operation and transfer of technology to them, and adopt such revisions that may be deemed necessary regarding the schedule of control measures applicable to those Parties.

9. Decisions of the Parties referred to in paragraphs 4, 6 and 7 of this Article shall be taken according to the same procedure applied to decision-making under Article 10.

6 Adjustments and Amendments

As a Party to the Montreal Protocol, and having ratified the London Amendments, Romania is obliged to follow the time schedules that were agreed for CFC, halon, CTC and MCF in Copenhagen, 1992, whether or not Romania ratifies the Copenhagen Amendments.

Tightening of the phaseout schedules for controlled substances that were already included in the Protocol since the last meeting of the Parties are regarded as adjustments (not amendments), which automatically apply to countries that have ratified the treaty where these substances were first included. An amendment to the Protocol is the inclusion of new controlled substances such as HCFC and methyl bromide in the Copenhagen Amendments.

Thus, as long as Romania does not ratify the Copenhagen Amendments, the country is not required to limit its production and consumption of HCFC, HBFC and methyl bromide but it is **not** freed from its obligations to phase out CFC, halon, MCF and CTC before in accordance with the Copenhagen Amendments.

An overview of the original Montreal Protocol and the two amendments in London and Copenhagen, respectively, is presented in Table 6. The reduction schedules in the grey area are obligatory to Romania as of January 1, 1995 with regard to ODS use in export production. As an Article 5 country Romania has a ten-year grace period in compliance with control measures with regard to ODS uses that are intended to meet basic domestic needs.

Box 3 Article 7 in the Copenhagen Amendments

1. Each Party shall provide to the Secretariat, within three months of becoming a Party, statistical data on its production, imports and exports of each of the controlled substances in Annex A for the year 1986, or the best possible estimates of such data where actual data are not available.

2. Each Party shall provide to the Secretariat statistical data on its production, imports and exports of each of the controlled substances

   - in Annexes B and C, for the year 1989;
   - in Annex E, for the year 1991,

   or the best possible estimates of such data where actual data are not available, not later than three months after the date when the provisions set out in the Protocol with regard to the substances in Annexes B, C and E respectively enter into force for that Party.

3. Each Party shall provide to the Secretariat statistical data on its annual production (as defined in paragraph 5 of Article 1) of each of the controlled substances listed in Annexes A, B, C and E and, separately, for each substance,

   - Amounts used for feedstocks,
   - Amounts destroyed by technologies approved by he Parties, and
   - Imports from and exports to Parties and non-Parties respectively,

   for the year during which provisions concerning the substances in Annexes A, B, C and E respectively entered into force for that Party and for each year thereafter. Data shall be forwarded not later than nine months after the end of the year to which the data relate.

3 *bis* Each Party shall provide to the Secretariat separate statistical data of its annual imports and exports of each of the controlled substances listed in Group II of Annex A and Group I of Annex C that have been recycled.

4 For Parties operating under the provisions of paragraph 8 (a) of Article 2, the requirements in paragraphs 1, 2 and 3 and 3 *bis* of this Article in respect of statistical data on imports and exports shall be satisfied if the regional economic integration organization concerned provides data on import and export between the organization and States that are not members of that organization.

Table 5 Additional ODS Included in the Copenhagen Amendments to the Montreal Protocol

Annex C, Group II: HBFCs		ODP
HBFC-22B1	$CHFBr_2$	1.00
	CHF_2Br	0.74
	CH_2FBr	0.73
	C_2HFBr_4	0.8
	$C_2HF_2Br_3$	1.8
	$C_2HF_3Br_2$	1.6
	C_2HF_4Br	1.2
	$C_2H_2FBr_3$	1.1
	$C_2H_2F_2Br_2$	1.5
	$C_2H_2F_3Br$	1.6
	$C_2H_3FBr_2$	1.7
	$C_2H_3F_2Br$	1.1
	C_2H_4FBr	0.1
	C_3HFBr_6	1.5
	$C_3HF_2Br_5$	1.9
	$C_3HF_3Br_4$	1.8
	$C_3HF_4Br_3$	2.2
	$C_3HF_5Br_2$	2.0
	C_3HF_6Br	3.3
	$C_3H_2FBr_5$	1.9
	$C_3H_2F_2Br_4$	2.1
	$C_3H_2F_3Br_3$	5.6
	$C_3H_2F_4Br_2$	7.5
	$C_3H_2F_5Br$	14
	$C_3H_3FBr_4$	1.9
	$C_3H_3F_2Br_3$	3.1
	$C_3H_3F_3Br_2$	2.5
	$C_3H_3F_4Br$	4.4
	$C_3H_4FBr_3$	0.3
	$C_3H_4F_2Br_2$	1.0
	$C_3H_4F_3Br$	0.8
	$C_3H_5FBr_2$	0.4
	$C_3H_5F_2Br$	0.8
	C_3H_6FBr	0.7
Annex E, Group I: Methyl Bromide		**ODP**
Methyl Bromide	CH_3Br	0.7

Table 6 Reduction Schedules for ODS Production and Consumption

	Montreal Protocol September 1987	London Amendments June 1990	Copenhagen Amendments November 1992
CFC 11, 12, 113, 114, 115	Base year 1986 Freeze by 1989 - 20% by 1993 - 50% by 1998	Base year 1986 Freeze by 1989 - 50% by 1995 - 85% by 1997 - 100% by 2000	Base year 1986 Freeze by 1989 - 75% by 1994 - 100% by 1996
Halon 1211, 1301, 2402	Base year 1986 Freeze by 1992	Base year 1986 Freeze by 1992 - 50% by 1995 - 100% by 2000	Base year 1986 Freeze by 1992 - 100% by 1994
Other fully halogenated CFC 13, 111, 112, 211, 215, 216, 217	No regulation	Base year 1989 - 20% by 1993 - 85% by 1997 - 100% by 2000	Base year 1989 - 85% by 1995 - 100% by 1996
Carbon tetrachloride CCl_4	No regulation	Base year 1989 - 85% by 1995 - 100% by 2000	Base year 1989 - 85% by 1995 - 100% by 1996
Methyl chloroform (CH_3CCl_3)	Nc regulation	Base year 1989 Freeze by 1993 - 30% by 1995 - 70% by 2000 - 100% by 2005	Base year 1989 Freeze by 1993 - 50% by 1994 - 100% by 1996
HCFC 21,22,31,121,122,123,124,131,132,133-,141,142,151,221,222,223,224,225,2-26,231,232,233,234,235,241,242,243,2-44,251,252,253,261,262,271	No regulation	Transitional substances non-binding ban by 2040	Base year 1989 [1] Freeze by 1996 - 35% by 2004 - 65% by 2010 - 90% by 2015 - 99% by 2020 - 100% by 2030
HBFCs	No regulation	No regulation	Base year 1989 - 100% by 1996
Methyl bromide (CH_3Br)	No regulation	No regulation	Base year 1991 Freeze by 1995

Note: 1) Base = 3% of calculated level of CFC consumption (ODP weighted) plus calculated level of HCFC in 1989.

APPENDIX IV

List of ODS Regulations

Regulation	Authority	Date of Approval	Title
Decision No. 340	Government	20 June 1992	Decision concerning the imports of waste materials of all sorts and other environmentally dangerous goods
De ision No. 437	Government	4 August 1992	Decision for modification and completion of the Government Decision nr. 340/1992 concerning the imports of waste materials of all sorts and other environmentally dangerous goods
Instruction No. 14570	MWFEP	18 August 1992	Instructions concerning applications in Romania of the Vienna Convention concerning protection of the ozone layer and of other protocols and amendments following this Convention
Decree No. 140	President	26 July 1993	Decree concerning approval and ratification by the Parliament of the Vienna Convention concerning protection of the ozone layer, adopted on March 22, 1985, and the Montreal Protocol concerning substances that deplete the ozone layer, adopted on September 16, 1987, and the Amendment to the Protocol concerning substances that deplete the ozone layer, adopted in London on June 27-29, 1990
Decree No. 209	President	30 November 1993	Decree concerning approval of the Law according to which Romania becomes a Party to the Vienna Convention concerning protection of the ozone layer, adopted on March 22, 1985, and the Montreal Protocol concerning substances that deplete the ozone layer, adopted on September 16, 1987, and the Amendment to the Protocol concerning substances that deplete the ozone layer, adopted in London on June 27-29, 1990
Law No. 84	Parliament	3 December 1993	Law according to which Romania becomes a Party to the Vienna Convention concerning protection of the ozone layer, adopted on March 22, 1985, and the Montreal Protocol concerning substances that deplete the ozone layer, adopted on September 16, 1987, and the Amendment to the Protocol concerning substances that deplete the ozone layer, adopted in London on June 27-29, 1990
Decision No. 457	Government	29 July 1994	Decision concerning the organization and the functioning of the MWFEP

APPENDIX V

MONITORUL OFICIAL AL ROMÂNIEI

Anul VII — Nr. 87 | PARTEA I LEGI, DECRETE, HOTĂRÂRI ŞI ALTE ACTE | Marţi, 9 mai 1995

SUMAR

HOTĂRÂRI ALE GUVERNULUI ROMÂNIEI

GUVERNUL ROMÂNIEI

HOTĂRÂRE
privind înfiinţarea, organizarea şi funcţionarea Comitetului Naţional pentru Protecţia Stratului de Ozon

Guvernul României h o t ă r ă ş t e :

Art. 1. — (1) Se înfiinţează Comitetul Naţional pentru Protecţia Stratului de Ozon, organism interministerial fără personalitate juridică, a cărui activitate este coordonată de

(2) Comitetul Naţional pentru Protecţia Stratului de Ozon promovează măsurile şi acţiunile necesare aplicării pe teritoriul României a prevederilor Convenţiei de la Viena privind

protocoalelor şi amendamentelor ulterioare la această convenţie, ratificate de România.

Art. 2. — Autoritatea administraţiei publice centrale în domeniu este Ministerul Apelor, Pădurilor şi Protecţiei Mediului, care depozitează, deţine şi difuzează informaţiile specifice, controlează şi supraveghează pe teritoriul României modul de aplicare, de către instituţiile publice şi agenţii economici, a prevederilor Convenţiei de la Viena şi a protocoalelor ulterioare la care România este parte, precum şi a legislaţiei interne specifice.

Art. 3. — (1) Comitetul Naţional pentru Protecţia Stratului de Ozon este alcătuit din reprezentanţi ai ministerelor ale căror activităţi au legătură cu producerea, comercializarea şi utilizarea substanţelor menţionate în anexele Protocolului de la Montreal, adoptat în anul 1987, şi ale amendamentelor ulterioare, a echipamentelor şi a produselor finite care conţin în interiorul lor substanţele în cauză sau care sunt obţinute cu ajutorul acestor substanţe.

(2) Comitetul Naţional pentru Protecţia Stratului de Ozon este alcătuit din reprezentanţi ai: Ministerului Apelor, Pădurilor şi Protecţiei Mediului, Ministerului Industriilor, Ministerului Transporturilor, Ministerului Afacerilor Externe, Ministerului Comerţului, Ministerului Apărării Naţionale, Ministerului de Interne — Comandamentul Trupelor de Pompieri, Ministerului Finanţelor, Ministerului Agriculturii şi Alimentaţiei.

(3) Membrii Comitetului Naţional pentru Protecţia Stratului de Ozon, cel puţin unul din fiecare minister având funcţie de decizie, sunt numiţi prin ordinul ministrului apelor, pădurilor şi protecţiei mediului, la propunerea ministerelor prevăzute la alin. (2), în termen de 15 zile de la publicarea prezentei hotărâri în Monitorul Oficial al României.

Art. 4. — Conducerea Comitetului Naţional pentru Protecţia Stratului de Ozon este asigurată de secretarul de stat, coordonatorul activităţii de protecţie a mediului din Ministerul Apelor, Pădurilor şi Protecţiei Mediului, în calitate de preşedinte, şi de un vicepreşedinte ales pe o perioadă de 2 ani din rândul celorlalţi membri, având acelaşi rang cu cel al preşedintelui.

Art. 5. — Comitetul Naţional pentru Protecţia Stratului de Ozon exercită următoarele atribuţii:

a) analizează şi propune spre aprobare Guvernului oportunitatea aderării României la actele internaţionale în domeniul protecţiei stratului de ozon, adoptate de către reuniunile conferinţei părţilor instituită în baza art. 6 al Convenţiei de la Viena şi reuniunile părţilor la Protocolul de la Montreal instituite în baza art. 11 al acestuia;

b) propune spre aprobare Guvernului încheierea de înţelegeri bilaterale şi regionale în domeniul activităţii cu substanţe aflate sub incidenţa Protocolului de la Montreal, echipamente şi produse finite care conţin în ele substanţele în cauză sau care sunt obţinute cu ajutorul acestor substanţe;

c) propune spre aprobare Guvernului măsurile de reducere, înlocuire, interzicere a producţiei şi consumului de substanţe aflate sub incidenţa Protocolului de la Montreal;

d) propune, în condiţiile legii, Programul naţional de cercetare ştiinţifică şi tehnologică privind protecţia stratului de ozon şi Programul naţional de înlocuire a substanţelor care epuizează stratul de ozon;

e) colaborează cu Ministerul Apelor, Pădurilor şi Protecţiei Mediului la elaborarea sau avizarea, după caz, a proiectelor de acte normative privind producţia, importul, exportul, reciclarea, recuperarea, regenerarea, distrugerea, înlocuirea, echipamentele şi produsele finite care conţin sau care sunt obţinute cu ajutorul acestor substanţe;

f) propune Ministerului Apelor, Pădurilor şi Protecţiei Mediului metodologii şi norme privind modul de raportare a activităţilor legate de protecţia stratului de ozon;

g) propune Comisiei Naţionale pentru Statistică termenele şi formularele de raportare a datelor statistice cerute de Secretariatul Ozonului din cadrul Programului Naţiunilor Unite pentru Mediu;

h) aprobă terminologia, definiţiile şi standardele tehnice în activităţile cu substanţele aflate sub incidenţa Protocolului de la Montreal;

i) avizează şi urmăreşte implementarea proiectelor tehnice în domeniu, având ca scop eliminarea producerii şi utilizării substanţelor aflate sub incidenţa Protocolului de la Montreal;

j) iniţiază programe de răspândire a informaţiilor, campanii de informare şi educare a publicului în domeniu;

k) urmăreşte aplicarea practică a programelor în domeniu, finanţate din surse externe sau de către mecanismul financiar pentru implementarea Protocolului de la Montreal, creat în baza art. 10 al acestuia;

l) identifică activităţile şi proiectele în domeniu susceptibile de a fi asistate şi finanţate din surse externe;

m) cooperează în realizarea atribuţiilor sale cu autorităţile administraţiei publice centrale şi locale, cu organizaţiile neguvernamentale profesionale, patronale, ecologiste, de tineret, precum şi cu alte organizaţii şi asociaţii, înfiinţate potrivit reglementărilor în vigoare.

Art. 6. — Lucrările Comitetului Naţional pentru Protecţia Stratului de Ozon se desfăşoară, semestrial sau ori de câte ori este necesar, la sediul Ministerului Apelor, Pădurilor şi Protecţiei Mediului.

Art. 7. — Comitetul Naţional pentru Protecţia Stratului de Ozon prezintă Guvernului, o dată la 2 ani, spre aprobare, un raport privind acţiunile pe care le-a întreprins în vederea aplicării art. 9 al Protocolului de la Montreal. Raportul se transmite Secretariatului Ozonului din cadrul Programului Naţiunilor Unite pentru Mediu.

Art. 8. — Comitetul Naţional pentru Protecţia Stratului de Ozon are ca organisme permanente de lucru:

– Secretariatul tehnic pentru protecţia stratului de ozon;

– Grupul de experţi tehnici, ştiinţifici, economici, financiari şi juridici.

Art. 9. — Secretariatul tehnic pentru protecţia stratului de ozon este alcătuit din trei membri: doi reprezentanţi ai Direcţiei strategii şi reglementări pentru protecţia mediului din cadrul Ministerului Apelor, Pădurilor şi Protecţiei Mediului şi un reprezentant al Ministerului Industriilor, numiţi prin ordin al ministrului respectiv.

Art. 10. — Secretariatul tehnic pentru protecţia stratului de ozon are următoarele atribuţii:

a) concentrează şi difuzează toate informaţiile din domeniu;

b) organizează fluxul informaţional cu Secretariatul Ozonului din cadrul Programului Naţiunilor Unite pentru Mediu şi cu alte organisme şi organizaţii internaţionale şi naţionale abilitate, privind activitatea pentru care a fost creat;

c) organizează colectarea şi asigură transmiterea informaţiilor, conform obligaţiilor ce decurg din textul Convenţiei de la Viena şi al protocoalelor ulterioare în legătură cu producţia, importul, exportul, consumul, utilizările, stocarea, reci-

A, B, C, E și a produselor finite specificate în anexa O ale Protocolului de la Montreal;

d) elaborează și transmite rapoartele solicitate de Secretariatul Ozonului din cadrul Programului Națiunilor Unite pentru Mediu;

e) asigură secretariatul pentru lucrările Comitetului Național pentru Protecția Stratului de Ozon și organizează întâlnirile grupurilor de experți;

f) propune Comitetului Național pentru Protecția Stratului de Ozon componența grupurilor de experți, de diferite specialități legate de problematica protecției stratului de ozon, alcătuite după modelul și structura grupurilor de lucru care asistă reuniunile părților la Convenția de la Viena și la Protocolul de la Montreal;

g) redactează și pregătește documentele care se supun discuției și aprobării Comitetului Național pentru Protecția Stratului de Ozon; corelează programele naționale sectoriale care au ca obiect protecția stratului de ozon;

h) întocmește raportul anual asupra activităților desfășurate și îl supune spre aprobare Comitetului Național pentru Protecția Stratului de Ozon;

i) asigură legătura Comitetului Național pentru Protecția Stratului de Ozon cu alte organisme internaționale relevante în domeniul protecției stratului de ozon;

j) pregătește participarea delegațiilor oficiale românești la reuniunile și conferințele internaționale ale părților la Convenția de la Viena și la Protocolul de la Montreal;

k) îndeplinește orice altă activitate de secretariat dispusă de Comitetul Național pentru Protecția Stratului de Ozon.

Art. 11. — (1) Grupul de experți tehnici, științifici, economici, financiari și juridici se constituie ca un organism de lucru pentru rezolvarea unor probleme specifice, cu un număr nelimitat de membri, alcătuit din specialiști ce își desfășoară activitatea în ministere, institute de cercetare și proiectare, institute de învățământ superior și unități economice cu activitate în domeniu, desemnați în acest scop prin ordin al ministrului sau prin decizie a conducătorului unității respective, în termen de 30 de zile de la publicarea prezentei hotărâri în Monitorul Oficial al României.

(2) Coordonarea grupului de experți este asigurată de secretarul de stat, coordonator al activității de protecție a mediului, din Ministerul Apelor, Pădurilor și Protecției Mediului.

(3) Componența grupului de experți este cea prevăzută în anexa la prezenta hotărâre.

Art. 12. — Grupul de experți este organizat pe secțiuni tehnice care se referă la următoarele domenii de activitate:

a) producerea frigului, aer condiționat, climatizare;

b) solvenți, aerosoli, acoperiri și adezivi;

c) haloni;

d) spume polimerice flexibile și rigide și alte materiale izolante;

e) protecția sanitară în agricultură și transporturi;

f) observații științifice și supravegherea stratului de ozon;

g) colectarea informațiilor și a datelor statistice privind substanțele aflate sub incidența Protocolului de la Montreal.

Art. 13. — Grupul de experți are următoarele atribuții:

a) furnizează Comitetului Național pentru Protecția Stratului de Ozon informațiile tehnice, utilizând orice date relevante în domeniu, inclusiv analiza documentelor internaționale emise de organismele abilitate și redactează rapoartele de opțiuni tehnice și tehnologice care stau la baza deciziilor acestuia;

b) întocmește programe prioritare de cercetare în domeniul protecției stratului de ozon;

c) analizează și elaborează proiecte de tehnologii alternative de înlocuire și alte tehnologii conexe pentru activități cu substanțele aflate sub incidența Protocolului de la Montreal;

d) propune proiecte și programe științifice sectoriale pentru înlocuirea, eliminarea și distrugerea substanțelor care epuizează stratul de ozon;

e) asigură observații sistematice și de cercetare asupra stratului de ozon din România;

f) asigură crearea, completarea și accesul la banca de date privind informațiile cu referire la substanțele aflate sub incidența Protocolului de la Montreal.

Art. 14. — Membrii Secretariatului tehnic pentru protecția stratului de ozon și ai Grupului de experți tehnici, științifici, economici, financiari și juridici sunt salarizați de unitățile la care sunt angajați.

Art. 15. — Persoanele juridice sau fizice care produc, importă, exportă, recuperează, reciclează, regenerează, stochează, comercializează sau utilizează substanțele menționate în anexele la Protocolul de la Montreal și în amendamentele sale acceptate ulterior, produsele finite și echipamentele care conțin în interiorul lor asemenea substanțe sau care sunt obținute cu ajutorul acestor substanțe au obligația de a raporta date statistice legate de activitatea respectivă, în condițiile legii.

Art. 16. — Persoanele juridice sau fizice menționate la art. 15 au obligația de a lua toate măsurile pentru supravegherea, limitarea și prevenirea oricăror emisii, dirijate sau accidentale, de substanțe aflate sub incidența Protocolului de la Montreal și a amendamentelor sale acceptate ulterior, în atmosferă. Se au în vedere inclusiv acele măsuri care constau în prevenirea producerii unor astfel de substanțe.

Art. 17. — (1) Persoanele juridice menționate la art. 15 au obligația de a elabora strategii proprii pe termene scurte sau medii, de maximum 3 ani, de limitare, înlocuire sau eliminare a substanțelor aflate sub incidența Protocolului de la Montreal, în conformitate cu legislația națională și internațională în domeniu, la care România a aderat sau este parte.

(2) Strategiile proprii se dezvoltă și se adaptează în funcție de reglementările care se vor adopta.

Art. 18. — Amendamentele, deciziile, anexele acestora, adoptate de către reuniunile conferinței părților la Convenția de la Viena și de către reuniunile părților la Protocolul de la Montreal, care implică îndeplinirea de către statul român a unor obligații concrete, fac obiectul reglementărilor specifice și se publică în Monitorul Oficial al României.

Art. 19. — Reprezentarea în Comitetul Național pentru Protecția Stratului de Ozon a instituțiilor nominalizate în anexa la prezenta hotărâre este obligatorie.

Art. 20. — (1) Următoarele fapte constituie contravenții, dacă nu au fost săvârșite în astfel de condiții încât, potrivit legii, să fie considerate infracțiuni, și se sancționează după cum urmează:

a) nerespectarea prevederilor art. 16, cu amendă de la 100.000 lei la 250.000 lei;

b) nerespectarea prevederilor art. 15, cu amendă de la 250.000 lei la 500.000 lei.

(2) Constatarea contravenţiilor şi aplicarea sancţiunilor se fac de către persoanele împuternicite de ministrul apelor, pădurilor şi protecţiei mediului, din cadrul Inspecţiei de Stat pentru Protecţia Mediului şi al unităţilor sale teritoriale.

(3) Contravenţiilor prevăzute în prezenta hotărâre le sunt aplicabile dispoziţiile Legii nr. 32/1968 privind stabilirea şi sancţionarea contravenţiilor.

Art. 21. — Anexa face parte integrantă din prezenta hotărâre.

PRIM-MINISTRU
NICOLAE VĂCĂROIU

Contrasemnează:
Ministrul apelor, pădurilor şi protecţiei mediului,
Aurel Constantin Ilie
Ministrul industriilor,
Dumitru Popescu
Ministru de stat, ministrul finanţelor,
Florin Georgescu
Ministru de stat, ministrul afacerilor externe,
Teodor Viorel Meleşcanu
Ministrul apărării naţionale,
Gheorghe Tinca
Ministrul transporturilor,
Aurel Novac
Ministrul comerţului,
Cristian Ionescu
Ministrul justiţiei,
Gavril Iosif Chiuzbaian
Ministru de interne,
Doru Ioan Tărăcilă
Ministrul agriculturii şi alimentaţiei,
Valeriu Tabără

Bucureşti, 17 aprilie 1995.
Nr. 243.

ANEXĂ

INSTITUŢIILE
reprezentate în Grupul de experţi tehnici, ştiinţifici, economici, financiari şi juridici

1. Ministerul Apelor, Pădurilor şi Protecţiei Mediului
   1.1. Membrii Secretariatului tehnic
2. Ministerul Industriilor
   2.1. Direcţia generală restructurare şi dezvoltare industrială
   2.2. Direcţia generală strategia industriei electronice şi electrotehnice
   2.3. Direcţia genorală strategia industriei chimice şi petrochimice
3. Ministerul Comerţului
   3.1. Direcţia generală de integrare şi relaţii multilaterale
   3.2. Direcţia generală de strategii şi administrarea politicii comerciale
4. Ministerul Agriculturii şi Alimentaţiei
5. Ministerul Apărării Naţionale
   5.1. Departamentul înzestrării şi logisticii armatei
   5.2. Comandamentul apărării civile
   5.3. Centrul de cercetări ştiinţifico de chimie militară
6. Ministerul de Interne — Comandamentul Trupelor de Pompieri
7. Ministerul Cercetării şi Tehnologiei
8. Ministerul Afacerilor Externe
   8.1. Direcţia O.N.U. şi organisme internaţionale
9. Institutul de Cercetări Alimentare — Laboratorul de tehnica şi tehnologia frigului pentru sectorul frig industrial
10. Institutul de Ingineria Mediului — Laboratorul de monitoring şi gestiune a aerului
11. Asociaţia Generală a Frigotehniştilor din România
12. Institutul Român de Standardizare
13. Institutul de Cercetări pentru Protecţia Plantelor — Laboratorul de fitofarmacie
14. Institutul de Cercetări şi Proiectări pentru Industria „Alimentară şi Tehnica Frigului Cluj
15. Comisia Naţională pentru Statistică
16. Institutul de Cercetări Produse Auxiliare Organice Medias
17. Institutul de Cercetări Chimico-Farmaceutice
18. Institutul Naţional de Meteorologie şi Hidrologie
19. Centrul de Studii, Experimentări şi Specializare P.S.I. al Ministerului de Interne
20. Institutul de Cercetări Economice.

APPENDIX VI

Programme for ODS Industry Seminar

Title: **Phaseout of Ozone Depleting Substances**
Place: **Bucharest**
Date: **November 22, 1994**

8:30 - 9:00 Registration.

9:00 - 9:15 Opening of Seminar.

- A presentation of the programme of the seminar will be made. MWFEP.

9:15 - 10:00 Status of the Montreal Protocol and the Phaseout of Ozone Depleting Substances.

- The background for the Montreal Protocol will be emphasized, the adjustments made will be mentioned, and the achievements made so far regarding the phaseout of ozone depleting substances in the world will be dealt with. UNIDO.

10:00 - 10:45 Challenges to a Phaseout of Ozone Depleting Substances in Romania.

- A situation analysis will be made, including present production and consumption volumes, government actions already taken and main difficulties ahead. MWFEP.

10:45 - 11:15 *Coffee Break.*

11:15 - 12:30 Preparation of a Cost-Effective Strategy and Action Plan for the Phaseout of Ozone Depleting Substances in a CEE Country.

- A presentation of the steps that typically have been taken in other CEE countries order to develop and implement a phaseout of ozone depleting substances. COWIconsult.

12:30 - 13:30 *Lunch.*

13:30 - 14:15 Project Selection Criteria, the Multilateral Fund Investment Project Cycle, Technical Review Process, and Overview of Elements of a Project Preparation Document.

- A detailed presentation of the steps that the enterprises will have to take in order to prepare a project, and an overview of the interphases between the enterprise and the outside world, including the Multilateral Fund. UNIDO.

14:15 - 15:00 Typical Fundable Reconversion Projects within Refrigeration and Foams.

- Presentation of a list of projects (project concepts or types) for which enterprises within refrigeration and foams -as well as enterprises producing ozone depleting substances - in other countries have asked for a grant from the Multilateral Fund. UNIDO.

15:00 - 15:45 Presentation of Phaseout Plans and Specific Projects to Eliminate the Use of Ozone Depleting Substances at the Enterprise Level.

- Representatives of selected Romanian enterprises within refrigeration and foams present their preliminary projects.

15:45 - 16:15 Experiences Made in Bulgaria

- A short presentations of the experiences made in Bulgaria with regard to the development of an ODS National Programme, the preparation of ODS Replacement projects and the preparation of and ODS Project Implementation Manual. COWIconsult.

16:15 - 17:15 Guidelines for Working Out a Project Preparation Document.

- The presentation will base itself on refrigeration sector. It is, however, of common interest to all participants. COWIconsult.

17:15 - 17:45 Questions and discussion.

- The participants in the seminar will be urged to ask questions to the representatives of MWFEP, UNIDO and COWIconsult

17:45 - 18:00 Closing Remarks.

- MWFEP.

APPENDIX VII

List of Participants in ODS Industry Seminar

Name	Organisation
Gătej Stefan	U.M. SADU - Gorj
Diaconescu D-tru	U.M. SADU - Gorj
Lăzărescu V.	U.M. SADU - Gorj
Frimescu Al.	INMH Bucureşti
Oprea Maria	ICECHIM Bucureşti
Cioca Ion	PETRODESIGN
Sdrula Nicolae	IRPOCHIM SA
Danciu Virgil	SC BICAPA SA
Komiveş Stefan	SC BICAPA SA
Blăjan Olimpiu	ICPAO-Medias
Szabo Rozalia	ICPAO-Medias
Mişca Rodica	FARMEC SA
Florin Alexandru	MAPPM
Zănescu Simion Ion	SC Frigotehnica SA
Sterian Veronica	SC Frigotehnica SA
Jelescu Lidia	SC Frigotehnica SA
Drumea Doina	ARCTIC Găeşti
Novolan Traian	ARCTIC Găeşti
Nistor Petru	ARCTIC Găeşti
Bulea Aurora	ARCTIC Găeşti
Ene Gheorghe	ARCTIC Găeşti
Vlaicu Elena	ICIM-Bucureşti
Mureşan Ion	IPROCHIM SA
Hera Dragoş	Univ. Technică, Fac. Inst.
Petrişor Mircea	SC PROCEMA SA
Radu Mioara	SC TEHNOFRIG SA
Oltean Nicolae	SC ICPIAF SA
Boboş Sabin	SC ICPIAF SA
Lemnian Eugen	SC ICPIAF SA
Macovescu Sorin	SC ICPIAF SA
Vereş Mihaela	SC ICPIAF SA
Melită Cătălina	Min. Ind.-D.P.O.I, Comp. ONUDI
Negru Octavian	Min. Ind.-D.P.O.I, Comp. ONUDI
Pantea Ioan	SC SPUMOTIM
Dumitrescu Carmen	MAPPM
Mânăstârlă V.	MI-DGSIChP
Ciolac Vlad	MI-DGSIChP
Dinulescu T. Constantin	ICECHIM, IC Pesticide
Paul Blair	Ministry of Industries
Christiana Ion	Ministry of Industries
Tamas Grof	UNIDO
Risto Ojala	UNIDO
Tim Jeppesen	COWIconsult
Jesper Karup Pedersen	COWIconsult
Peter G. Madsen	COWIconsult

APPENDIX VIII

The Romanian Economy in Transition

Romania is situated in the south-eastern part of Central Europe, surrounded by Bulgaria to the south, Serbia and Hungary to the west, Ukraine to the north and Moldavia and the Black Sea to the east. Its area of 237,500 sq km is populated by around 23m people, most of them living in the fertile plains of the south and east, especially the Danube valley.

Romania was for more than two decades, until December 1989, governed by Nicolae Ceausescu, widely regarded as the most repressive communist leader in the world. His reigning was in the beginning characterised heavy investment in industry and a variety of prestige schemes. This brought rapidly rising debts culminating in a rescheduling agreement requiring IMF assistance in 1982-83. Mr Ceausescu then embarked on a rigorous repayment effort, subordinating all national aims to export promotion. This path to self-sufficiency left Romania as one of the poorest European countries.

The ousting of this regime put Romania on a reform and restructuring track. This process has, however, left most industries operating between 30% and 70% of 1989 levels. Internal factors, such as shortages of funds, bureaucratic infighting and inconsistencies in the legal framework, have slowed the reform. At the same time, Romania has been inadequate in re-directing its exports to offset the collapse of the trade with the former Soviet Union and Yugoslavia, in particular. Recent restoring of Romania's most favoured nation status and admission to the Council of Europe should alleviate the problem.

In addition to phase-out steered changes, present and future consumption and production of ODS depend on the general economic situation and prospects for Romania. The aim of this appendix is therefore to give an overview of the Romanian economic situation to support the analysis in Section 2.1 of this report.

Recent Economic Indicators

Figure 1 illustrates how the recent Romanian GDP development compares with that of other CEE countries. The most striking difference is the later turnaround in growth with the large negative figure for 1992, at a time when the other countries had managed to halt the economic decline. Poland in particular has implemented successful reforms which have rendered positive growth in the last three years.

Figure 1: GDP Growth in CEE Countries

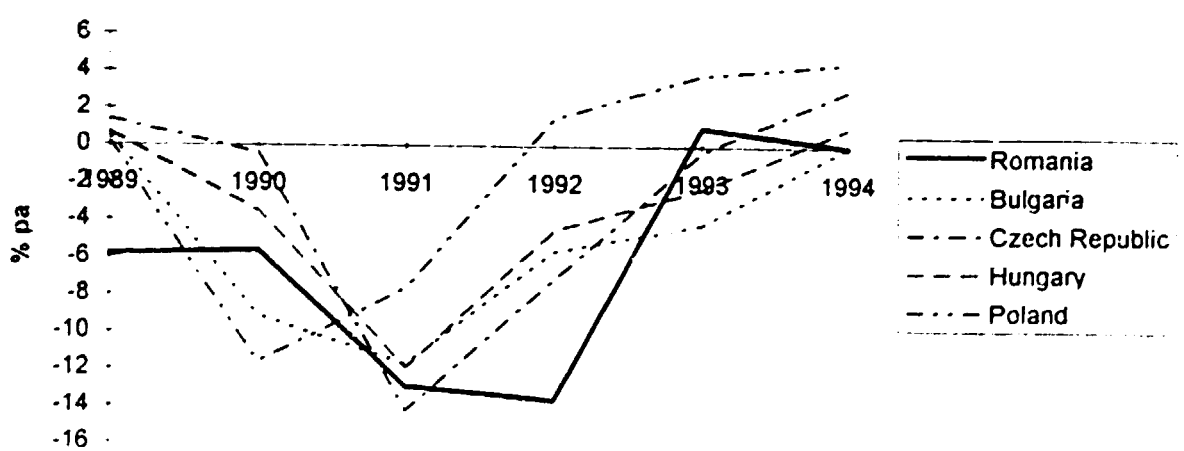

Table 1 shows that Romania in 1993 is estimated to have experienced GDP growth for the first time since the political reform. This progress has been supported by strong export growth, especially for consumer goods such as textiles, leather, footwear and furniture. Private consumption has continued to fall although at a lower rate than in 1992-93 and the investment fall seems to have bottomed out. This is also the case for industrial production, but inventories of finished goods have carried on rising, thus reaching about 75% of the monthly output.

Table 1: Selected Economic Indicators for Romania

	1988	1989	1990	1991	1992	1993	1994
Output and expenditure, % pa							
real GDP	-0.5	-5.8	-5.6	-12.9	-13.6	1.0	0.0
private consumption	1.6	0.6	8.0	-15.7	-9.8	-3.0	na
public consumption	11.5	1.2	14.0	10.0	2.9	-1.0	na
investment	-9.4	-1.6	-35.5	-26.0	-1.1	0.8	na
exports	8.6	-10.2	-44.6	-4.4	15.1	12.0	na
imports	-8.0	2.9	7.4	-14.1	9.4	5.6	na
industrial output	-3.1	-5.3	-23.7	-22.8	-21.9	1.3	na
agricultural output (grain)	9.1	-5.8	-6.6	12.5	-36.3	26.0	na
Prices and wages, % pa							
consumer prices	2.6	1.1	5.1	174.5	210.9	256.1	198.0
wages	2.5	3.9	10.6	121.2	170.0	202.1	na
Labour market and demography							
employment (% pa, end-year)	0.8	1.3	-1.0	-0.5	-5.4	-6.2	na
unemployment rate (end-year)	na	na	na	3.0	8.4	10.2	na
population (m, mid-year)	23.1	23.1	23.2	23.2	22.8	22.7	na
Monetary indicators							
exchange rate (lei/$, end-year)	14	14	35	189	460	1276	na
bank lending rate (end-year)	na	3	3	1[p]	52	86	na
Balances and external debt							
general government bal. (% of GDP)	5.9	8.4	1.2	0.6	-4.6	-0.1	na
trade balance (bn $)	3.6	2.6	-1.8	-1.3	-1.4	-1.1	na
current account balance (bn $)	3.6	2.9	-1.8	-1.3	-1.7	-1.5	-1.0
gross external debt (bn $, end-year)	1.7	-1.3	0.6	1.6	2.7	3.5	na

Sources: Economics of Transition, Volume 2 (4), 1994.
Romanian Business News - Quarterly Statistics Insert, October 1994.

Privatisation and Restructuring

Romania's first steps towards privatisation began with the establishment of the National Agency for Privatisation (NAP) in accordance with Law 15 of August 1990. NAP was charged with preparing, organising and coordinating the privatisation process and with encouraging the development of small and medium-sized enterprises[1]. NAP is subordinated to the Council for Coordination, Strategy and Economic Reform[2].

Under Law 15 of August 1990, state-owned enterprises were divided into two categories:

- *régies autonomes*, ie enterprises in strategically important sectors such as electricity, atomic energy, railways, etc, which were converted into self-sufficient administrations; and

- *commercial companies*, ie all other SOEs, which were transformed into, for example, joint stock or limited liability companies (see Box 1), intended for privatisation.

An ambitious privatisation law covering the commercial companies was enacted in August 1991. The privatisation programme entails:

- the free transfer of 30% of the commercial companies' shares to the Romanian population through the distribution of Certificates of Ownership in five Private Ownership Funds (POFs); and

- the sale of the remaining 70% by the State Ownership Fund (SOF), a central body subordinated to the Parliament.

One of the first measures adopted by SOF was the preparation of rules for the rapid privatisation of over 2,000 small commercial companies. The rules give priority to Management and Employee Buy-Outs (MEBOs). Only when the possibility of a MEBO has been ruled out, can the company be sold at public auction, where also foreign investors are allowed to participate. There is, however, considerable resistance to foreign participation, and much of the privatisation has been through MEBOs.

Considerable progress has been made in the restructuring and privatisation of two major sectors: agriculture and housing. Small-scale privatisation has been rapid, and an estimated 35% of GDP was generated by the private sector in 1994. Progress in large-scale privatisation is though still modest.

Bankruptcy procedures are still, in theory, covered by the 1887 Commercial Code and a decree from 1952. In practice, these procedures are not enforced. Adoption of a special bankruptcy law is still awaited.

The lack of progress might also affect the Romanian access to IMF funds because these depend on the achievement of some performance criteria and quantitative and structural benchmarks such as privatisation.

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[1] By virtue of Government Ordinance 25, public administration in the field of supporting and developing SMEs is now vested in the SME Development Division of the Romanian Development Agency (RDA), a specialized central body, subordinated to the Council for Coordination, Strategy and Economic Reform. The RDA's main objective is the attraction of inward investments.

[2] The Council, according to Governmental Decision 860, coordinates, guides and controls the implementation of the Government's strategy and program in the following fields: (1) global reform program and economic restructuring program; (2) structural adjustment and economic development program, and (3) privatization strategy, private sector development and other fields.

Box 1: Five Types of Commercial Companies

According to Law 31 of November 1990, the Company Law, there are five types of commercial enterprises:

- general partnerships (two or more general partners who manage the business of partnership and contribute capital to the partnership), *Societate in nume coleciv - SNC*;
- limited partnerships (one or more general partners who manage the business of partnership, and one or more limited partners who contribute capital to the partnership but do no participate in is management), *Societate in comandita simpla - SCS*;
- limited liability companies (registered capital cannot be lower than 100.000 lei; shareholders cannot exceed 50), *Societate cu Raspundere Limitata - SRL*;
- joint stock companies (registered capital cannot be lower than 1 million lei; shareholders cannot be lower than 5), *Societate anonima - SA*; and
- limited joint stock companies (general and limited partners).

Economic Policy and the Budget

The slow privatisation process is not alone in raising concern about the government's commitment to economic stabilisation. Bankruptcy and competition laws have been delayed, price 'guidelines' have been given with implied maximum prices for goods such as pork, chicken, edible oil, sugar and eggs. This latter measure involves a direct market interference, hence some reminiscence of pre-reform policies.

The government did, however, in 1993 succeed in joining the Council of Europe and, after a break of five years, the US restored most favoured nation (MFN) status to Romania. Many would-be US investors had forsaken investing in Romania until MFN status was restored. The change has also boosted bilateral trade and Romania has gained access to imports of state-of-the-art US technology.

Some tightening in both monetary and fiscal policies implies that the state budget deficit is in line with government targets, and is within the limits accepted by international creditors. The effects of restructuring and increased bankruptcies are, however, likely to squeeze revenues, while rising unemployment and capital investment plans will exert pressure on spending.

The trade gap has in the last three years remained fairly constant and it is expected to fall somewhat in the short term as the growth in exports exceeds that of imports. A real appreciation of the leu will, however, limit this development. International trade agreements on the other hand will enforce the improvements.

The external debt has risen as Romania is regaining access to the international loan market, but almost all of the pre-1990 debt had been repaid by the time of the overthrow of the Ceausescu regime. The size of the debt is therefore modest (equal to about 20% of GDP), hence the debt-servicing burden is still low.

Interest and Exchange Rates

The tightening of monetary policy has pushed up interest rates, but real rates are still negative. Only the rates on commercial bank overdrafts have reached the inflation level. The government's effort to satisfy IMF demands, ie positive real interest rates, must therefore continue. The increase in rates has, however, provoked intense opposition, especially from the government's nationalist allies, forcing the central bank governor to defend the decision as temporary.

The fall in the value of the leu has slowed and it has even in real terms become stronger. This is partly a result of the higher interest rates, the lower inflation and the more stable economy, but the believe in the leu has also been boosted by the establishment of an interbank foreign exchange market. This new system allows all authorized intermediates, such as banks and exchange offices, to sell and buy directly currencies, in unlimited amounts and at freely negotiated exchange rates.

Output and Employment Prospects

Recent data for the first nine months of 1994 show that **industrial** output continue to grow. Industrial output was 6% higher in September 1994 than in the same month the year earlier. A growth of 2.1% was registered in these nine month, dominated by equipment, radio and TV sets (121%), electric machines and appliances (56%), ready-made clothes and textiles, fur and leather (50%), furniture (11%) and footwear (11%). Prospects for these industries remain healthy.

According to the government's restructuring strategy more mines will be closed in the short term and in the steel industry jobs are set to be cut by 60% over the next eight years. The wood processing industry is another industry in difficulties.

After the drought-affected **agricultural** production level in 1992, the sector now shows healthy growth and employment increases. Not only the harvest has improved, livestock numbers are also on the rise. This improvement seems somewhat peculiar in the light of the many problems facing the sector. Price instability, energy and materials shortages, no renovations in the transport and distribution systems, and above all, the break-up of agricultural cooperatives and the intense legal wrangles over property titles have been highly disruptive and have reduced incentives for farmers uncertain of their status.

Following large contractions after 1989, employment in the **construction** sector has expanded again since 1993 as rebuilding of the infrastructure is taking place. The sector will also in the future benefit from the enlargements and modernisation of airports and roads, for example.

Within **transport**, however, the volume of commodities sent by rail has fallen by around two-thirds since 1989, while passenger transport has decreased by around a third due to motor transport competition and migration of the population to urban areas. The Romanian railways laid off 20,000 employees in 1994 and additional 40,000 jobs are expected to be cut over the next two years.

The economic recession since 1989 has meant a steep fall in **energy** use, not least electricity where production has fallen by around 30% in the last four years compared with the 1989 level. The former regime's effort in expanding the power generation capacity has resulted in a tremendous excess capacity which should be sufficient to support economic growth for many years. In addition, the first nuclear power station with a capacity of 700 MW is expected to be operational in 1995.

The **service** sector is still at its infancy, but developments in other countries in transition show that this will be the main growth sector for a long period.

Expenditure Outlook

Private consumption has in recent years been subdued by considerable falls in real wages as consumer prices have grown faster than wages. In addition, unemployment is on the increase. Privatisation and restructuring are likely to cause further lay-offs in the short term and thus the prospects of a consumer led recovery appears distant. A left-over of unfulfilled demand from the former regime will, however, promptly turn potential income increases into purchases.

The only genuinely positive demand component is the strong **export** growth, especially for consumer goods such as textiles, leather, footwear and furniture. The real appreciation of the leu will reduce this development somewhat, but the accomplishment of international trade agreements will enforce the trend.

Although recent years contraction in industrial production has resulted in a vast excess production capacity, there will still be a need for **investments**. Changing demand patterns and the restructuring process will require new generations of capital stock and thus make a part of the old equipment obsolete.

Wages and Prices

After several years of increasing inflation as a result of lax policies, the consumer price inflation rate fell last year and is expected to decline further in the near future. The implementation of a strict monetary policy, which is a requirement from the IMF, has taken its toll.

Nominal wages have reacted to this turnaround in inflation and in fact a fall was experienced in some month in autumn 1994. Real wages have therefore kept falling.

The Regional Picture

Romanian regions have not weathered the recession alike. The highest unemployment rates were in end-1994 recorded in the counties of Vaslui (21.2%), Bistrita-Nasaud (20.9%), Tulcea (18.7%), Botosani (17.7%) and Neamt (17.5%). The unemployment is insignificant in Gorj county (3.6%). Small rates were also registered in Bucharest (5.7%), Brasov (6.9%), Constanta (7.3%), Bihor (7.4%), Alba (7.8%) and Mehedinti (7.8%).

Bucharest and Brasov remain the centres for growth and so will act as the engines pulling the other regions through the troublesome period. Foreign investments, however, are not confined to these area. Examples include a bottling plant for Coca-Cola in Timisoara and a brewery in Blaj by the Belgian producer of Stella Artois.

APPENDIX IX

International ODS Regulation

The approval of the Montreal Protocol has spurred the introduction of numerous worldwide regulatory measures aiming at complying with the requirements of the Protocol at the least cost. Although some regulatory instruments are compulsory, eg the ban on import of controlled substances from non-Parties, the vast majority of available regulatory instruments are not.

This appendix gives an overview of the compulsory and available regulatory instruments. In addition, a review of the pros and cons of each available regulatory instrument is presented emphasising economies in transition.

Apart from the basic administrative and economic instruments (licences, bans, taxes, etc.) a number of supportive measures (modification of standards and norms, awareness building, accreditation of service technicians, emission control, etc.) are often applied and needed to ensure success in the implementation of the phaseout plan. These measures are briefly described. Finally, the general lessons to be learned from Central and Eastern European (CEE) countries are summarized.

Obviously, the differences between the CEE countries are large; such as the size of production, the state sectors' share of GDP, the dimension of the deficit on the state budget, the number of small and medium scale enterprises and the extent of the military-industrial complex. It is thus impossible for the Romanian authorities to simply copy a set of regulatory instruments suitable for supporting the ODS phaseout strategy in, for example, the Czech Republic. Romania has to make its own choice. Nevertheless, the general lessons to be learned from CEE countries are necessary for the choice of regulatory instruments in Romania.

1 Montreal Protocol Obligations

The main obligations under the Montreal Protocol are:

- to phase out production and consumption of each group of controlled substances (CFC, halon, CTC, MCF, etc.) according to the maximum levels allowed by the Protocol;
- to cease trade in controlled substances with countries that are not Parties to the Protocol (this obligation entered into force from January 1, 1993); and
- to collect and report production and consumption data on a regular basis.

2 Overview of Regulatory Instruments Applied in Selected Countries

The regulatory instruments are divided into the two groups: (I) administrative instruments, and (II) economic instruments.

I. The basic <u>administrative instruments</u>, are:

1) <u>Reduction targets:</u> explicit statements by the authorities to reach a certain reduction in the consumption and production of controlled substances by a specified date - these **may or may not be legally binding**.

2) <u>Sector specific bans</u>: ODS consumption is prohibited within a certain sectors from a certain date, eg a ban on the use of CFC in aerosols from 1 January 1996, with the possible exclusion of particular essential uses which may be maintained until a later date; they are **legally binding**.

3) Voluntary agreements: between the Government, ie the Ministry of Environment, and the industries to stop the production of a specific ODS based product by a given point in time; they are **not legally binding**.

4) Production/import licences: the issuing of a government licence required for the legal production and/or import of ODS; the licenses are **non-tradable**; in addition to this regulations of trade with non-Parties to the Montreal Protocol are demanded.

5) User licences/quotas: **non-tradable**; required by each ODS user in order to be able to buy ODS.

6) Reporting system: **obligations** of the user industries, producers/importers and distributors to keep record of and **to report** the amounts of ODS bought/sold and used.

7) Enforcement system: legal provisions to conduct **inspections** at producer or user sites; **sanctions** such as prison sentences, possibly withdrawal of production rights (fines are included under economic instruments).

The administrative instruments are all characterized by restrictions on the industry's use, production or import of the controlled substances combined with a monitoring and control system as well as a set of sanctions which can be imposed in the form of a non-compliance fee, withdrawal of a licence or a production right.

II. The basic economic instruments, include:

8) Production/import charges, including a possible licence fee: they serve two purposes. Firstly, they constitute an incentive to substitute ODS and make technological innovations as well as an incentive to recycle ODS and minimize the use of ODS during service, and secondly they serve as a source of finance, eg for investments in ODS free technology at industry level.

9) Economic support for substitute technology: a large variety of support schemes exist but the most common are: **price subsidies, investment support, R&D support, and charge/duty exemptions**; the economic support may be given through specific tax deductions, but it may also be given through grants or favourable loans offered by an investment fund set up by the Government.

10) Tradable permits: a market for the ODS production/import licences (or user licences) is created; it must emphasized, that there are many difficulties in determining the initial allocation of permits in a situation in which the industrial and trade structures are changing rapidly.

11) Non-compliance fees/fines: a part of the enforcement system; the fees/fines must have a deterrent effect - non-compliance should not be profitable because of too low non-compliance fees.

The application of regulatory instruments in the ODS phaseout of five selected countries or economic areas are shown in Table 1. The Parties comprise the EU, Denmark, Germany, the Netherlands, and USA, who utilise a wide range of regulatory instruments (both administrative and economic instruments) to control the consumption and production of ODS.

Table 1: Regulatory Instruments Applied in the ODS Phaseout in Selected Countries

I. ADMINISTRATIVE INSTRUMENTS:	EU	Denmark	Germany	Netherlands	USA
1. Stated reduction targets					
a. legally binding	X	X[1]	X[1]	X[1]	X
b. not legally binding		X		X	
2. Sector specific bans (legally binding)		X	X		X[3]
3. Voluntary agreements (not legally binding)				X	
4. Prod./import licence/quota	X				
5. User licences (non-tradable)				X	
6. Reporting system	X[2]	X	X	X	X[2]
7. Enforcement system					
a. inspections	X	X	X	X	X
b. specified sanctions		X	X		X
II. ECONOMIC INSTRUMENTS:					
8. Production/import charges		X			X
9. Economic support for substitute technology					
a. price subsidies					
b. investment support					
c. R&D support		X		X	
d. tax/duty exemptions					
10. Tradable permits [4]					
11. Non-compliance fees/fines		X	?	?	X

Notes:
1) The EU Regulation applies and is legally binding in all 12 member states.
2) Producers and importers/exporters of controlled substances only.
3) Applies only to the use of ODS in aerosols and a few other non-essential uses.
4) Tradable permits are not applied in any of the selected countries but it has been imposed in some developing countries, e.g. Mexico.

The European Union

The EU Regulation is legally binding and applies directly in all 15 Member States. In effect, this regulation constitutes sufficient implementation of the Montreal Protocol in all Member States but some countries have adopted stricter regulatory measures (mainly affecting the use of ODS for specific purposes) in order to accelerate the phaseout of ODS. The Commission of the European Union has also issued **recommendations** concerning the reduction of CFC use in the aerosol, refrigeration and foam sectors but these are not legally binding[1].

The EU Regulation contains quotas on imports of controlled substances from non-EU countries. Any import is subject to the presentation of an import licence. Regarding production regulation, each producer must ensure production levels in line with the general phaseout requirements set by the EU Regulation. However, a producer can exceptionally exceed the allowed production level for the purpose of **industrial rationalisation** both within a Member State, between Member States and between a Member State and a third Party under the Montreal Protocol.

[1] Commission Recommendation of 13 April 1989 on the Reduction of Chlorofluorocarbons by the Aerosol Industry. Commission Recommendation of 27 June 1990 on the Reduction of Chlorofluorocarbon Use in the Plastic Foam Industry.Commission Recommendation of 27 June 1990 on the Reduction of Chlorofluorocarbons Use in the Refrigeration Industry.

Producers, importers and exporters of controlled and transitional substances must report annually to the Commission their total production, quantities recycled and destroyed, stocks, imports and exports both of new and recycled ODS and amounts produced for use as raw materials. ODS consumption within the EU is controlled through the control of ODS **supply**. If it is considered necessary, the Commission may request that the competent authorities of the Member States undertake investigations of the production, import and export data. It is left to the Member States to take appropriate legal or administrative action in case of infringement of the provisions of the EU Regulation.

A tax proposal has been considered at the EU level but was rejected because the CFC consumption would be very limited anyway by the time the scheme would be implemented.

Denmark

The Danish ODS Action Plan consists of three major elements:

- a reduction plan for the use of ODS in the form of legally binding prohibitions.
- a tax on the import of CFCs and halons (there is no production of ODS in Denmark); and
- an R&D programme.

The **reduction plan** initially entered into force by order of 1 February 1990, imposing a gradual ban on the use of CFC for certain applications over the period 1990-99. The plan was based on a strategic analysis of the availability and costs of alternative control options and aimed at phasing out as early as possibly those applications where substitution costs were low and acceptable alternatives were available. An important feature of the Danish initiatives in ODS regulation is the continuous evaluation and adjustments of the reduction plan, based on updated information on the damages to the ozone layer and the technological developments of ODS alternatives. The reduction plan was revised February 1992 and again November 1992, where the anticipated Copenhagen Adjustments and Amendments to the Montreal Protocol were incorporated. Fines and more strict provisions (prison sentences of up to one year) apply to those who fail to comply with the reduction plan.

The Danish **CFC tax** has been in force since January 1989, and Denmark is the only EU country and one of a few countries in the World to have imposed a special tax on CFC (USA and Poland are other examples). It equals 30 DKK (= approximately 5 USD) per kg CFC or halon. The level of the tax has remained constant, and it applies to imports of all CFC and halon except when used as a solvent or in semi-rigid integral foam (structure foam)[2]. The total revenue from the tax equalled around USD 6.5 m over the period 1989-91.

The **Research and Development programme** was established in close association with the regulatory regime. R&D projects are carried out by the ODS-using industry and branch organisations with financial support from the Ministry of Environment. Results from the R&D programme are discussed at meetings between the Ministry and the industry, and the results are used as basis for revising the ODS reduction plan. USD 7.5 million were allocated to the R&D programme. Although the R&D programme is independent of the CFC tax, the programme costs have been covered more or less by the tax revenue, leaving the fiscal budget unaffected.

Germany

The German CFC and halon Prohibition Ordinance adopted in May 1991 is a legally binding regulation pertaining to specific uses (see Box 1). The German ordinance bans the sale and use - and partially production - of CFC gradually until 1995, uses of halon except essential uses are banned from January 1992, all uses of MCF and CTC

[2] When the production of flexible foam was still allowed to use CFC that application was also exempted from the tax.

are banned from 1993 and 1992, respectively, and the final use of HCFC-22 is banned from the year 2000. The ordinance is supported by a commitment of German ODS producers to phase out their production and to accept the return of substances controlled by the Montreal Protocol for their proper destruction. The German regulation is supplemented by a prohibition to release ODS into the atmosphere - best available technology must be used in emission control.

Box 1: Sector Specific Bans Imposed In Germany

Aerosols:

1 August 1991	Ban on use as propellant (including HCFC-22) except for a few pharmaceutical sprays and other products.

Foams:

1 August 1991	Ban on use (including HCFC-22) in foam packaging and table ware; and ban on use for poured-in-place foam.
1 August 1992	Ban on use in non-insulation and other foams.
1 January 1993	Ban on use of HCFC-22 in poured-in-place foam.
1 January 1995	Ban on use in insulation foams (rigid polyurethane and extruded polystyrene).
1 January 2000	Ban on use of HCFC-22 in insulating material and other foams.

Solvents:

1 January 1992	Ban on manufacture of ODS based solvents.
1 July 1992	Ban on sale of ODS based solvents.
1 January 1993	Ban on use in manufacturing plants; and ban in dry cleaning.

Refrigeration:

1 January 1992	Ban on use in new appliances and equipment with refrigerant content of 5 kg or more.
1 January 1994	Ban on use in new mobile refrigeration appliances and equipment with refrigerant content of 5 kg or more.
1 January 1995	Ban on use in new appliances and equipment with refrigerant content of less than 5 kg.
1 January 2000	Ban on new appliances and equipment containing HCFC-22.

The Netherlands

An important feature of the Dutch ODS policy is that the ODS regulation is **voluntary**. It is based on an agreement between the government, industry associations and local authorities by which the parties commit themselves to phase out ODS by 99.5% by the year 1995. A complete ban takes effect only as required by the EU Regulation or the Montreal Protocol whichever is the most strict. If the voluntary agreements lag behind international regulations, sanctions can be imposed.

The Dutch ODS regulation also includes **ODS user licences**. The companies which use ODS (including HCFC) must obtain a licence from the municipalities and provinces. The key criteria for granting of licences is compliance with the objectives for ODS reduction for the industrial sector in question, and in the case of refrigeration and fire fighting, meeting of the requirements to employ only certified technicians and to recover and recycle or destroy in a proper manner the used ODS.

USA

In the US, the Montreal Protocol is implemented at the Federal level through a 1990 amendment to the Clean Air Act which is a law addressing air pollution control in general and contains provisions concerning the protection of the ozone layer. The US regulation imposes legally binding reduction targets on the production of ODS which correspond to the Montreal Protocol regulations (exceptions are granted only for exports to developing countries which are party to the Protocol). Some legally binding regulations pertaining to specific uses of ODS are imposed but only in a few application areas, such as a ban on ODS (incl. HCFC from 1994) used as aerosol propellants, and a ban on non-essential uses such as CFC-containing party streamers, noise horns, and cleaning fluids for non-commercial photo and electronic equipment.

A US ODS tax is imposed on ODS raw material produced or imported, ODS contained or used in the production of imported products, and stocks of ODS held prior to the entry into force of the tax bill and subsequent increases in the tax rate. The tax rate is calculated on the basis of the following formula:

Tax = tax rate x ODP factor x amount of ODS in metric tonnes

The tax rate increases progressively according to the below schedule[3]:

1990:	USD 1.37	1995:	USD 3.10
1991:	USD 1.37	1996:	USD 3.55
1992:	USD 1.67	1997:	USD 4.00
1993:	USD 2.65	1998:	USD 4.45
1994:	USD 2.65	1999:	USD 4.90

Tax exemptions are granted in the following cases: recycled ODS, ODS used as feedstock, exports, ODS used in the production of rigid foam insulation, and halon (tax free in 1990, 0.25 USD/kg during 1991-1993 - hereafter treated as other ODS). The level of the US tax is fairly low compared to the Danish CFC tax except for halon.

Supportive Measures

In addition to the above mentioned basic administrative and economic instruments, many countries have implemented a set of supportive measures. The most common are listed below:

1) Modification of product standards and norms: for example in connection with fire protection codes, purity specifications in the solvents sector and for recycled/reclaimed refrigerants, hardness specifications for flexible foam, occupational health standards, etc.

2) Awareness building: **information dissemination** to the industry and the general public; **labelling**, for example, to encourage the consumers to buy ODS free products but also to inform of possible human risks of the alternative substance - typically used and required in the aerosol business. In many countries awareness building has had a significant effect on the demand for ODS based products. The most important examples of consumer influence are the reluctance to buy ODS containing aerosols, the campaign against CFC based fast food containers, and the consumer influence on the use of ODS in the solvents sector.

3) Accreditation of service technicians: to ensure that refrigeration service personnel are aware of the ozone problems and methods to reduce ODS consumption at service by improving maintenance and service procedures and by recovery/recycling of refrigerants; the scheme is often combined with a requirement that only accredited service technicians are allowed to service refrigeration equipment and that they must

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[3] CFC Alliance Special Bulletin: **The New CFC Tax**, December, 1989. Possible changes to the tax bill since this time have not been incorporated in this report.

possess the necessary tools for proper maintenance and recovery/recycling; the scheme may also be applied in the service sector for fire fighting equipment.

4) Emission control: requirement to recover and either recycle/reclaim or destroy/incinerate the ODS contained in existing equipment; an emission control programme may be implemented for **refrigerants, halon and ODS contained in closed-cell foam.** As the deterioration of the ozone layer has escalated and the regulation of ODS consumption has been tightened, it has become increasingly important to control potential ODS emissions from the large stock of ODS banked in existing refrigeration systems and fire fighting installations.

Both the US and EU countries have implemented the above mentioned supportive measures. In the US, emission control is only implemented for refrigerants but in Germany, the Netherlands and Denmark, emission control exists on halon and foams as well.

3 ODS Regulation in Selected CEE Countries

Overview of Initiatives

As shown in Table 2 most CEE countries have taken some policy initiatives to phase out the use of ODS. They have therefore some experience supporting an ODS phaseout strategy. It should be noted that actions taken in Hungary, Poland and Bulgaria in 1993. The most recent initiatives in the Czech Republic are briefly mentioned below.

Table 2: Major Government Initiatives in ODS Phaseout in Four CEE Countries as of End 1992

Initiatives	Czechoslovakia	Hungary	Poland	Bulgaria
Ratification of the Montreal Protocol	July 1950	April 1989	July 1990	October 1989
Legal measures for ODS phaseout	No legal measures approved yet, but: • Application specific bans have been prepared • User and import licences are being considered	Ministerial Decree approved in May 92: • Application specific bans • Import licences • Mandatory reporting of consumption > 100 kg • Emission control measures	• ODS tax approved in December 1991. No other legal measures approved yet, but: • Import licences being prepared • Import quotas are being considered • Application specific bans being considered	No legal measures have yet been approved or prepared, but a temporary administrative ban on CFC use in flexible foam and aerosols was imposed in 1992
Cooperation with ODS using industry	Extensive and rather informal consultations	Only few contacts so far, but more initiatives planned	Only few contacts so far, but more initiatives planned	Some contacts and information exchange
Economic support to ODS industry	Minor support for ODS replacement projects planned	None so far	None so far	None so far
Awareness raising	Little being done	Little being done	Little being done	Little being done
Monitoring of production & consumption	Regular, through customs and user surveys	Under implementation through mandatory reporting of consumption	Under preparation	None so far

By the end of 1992, Hungary had gone the furthest by establishing the overall legal and regulatory framework for implementing the Montreal Protocol. The legal and regulatory measures applied (and being prepared) are diverse, but application specific bans on the use of ODS after a certain date are likely to be adopted in all CEE countries. Licensing of ODS import is also likely to be a common element. The Governments' efforts in general awareness building on ODS issues have been somewhat limited. Monitoring

systems for ODS production and consumption are under way in most of the CEE countries, but there are general problems in implementing effective ODS monitoring.

Czech Republic

Following the separation of the Federation into the Czech and the Slovak Republics, a new national ODS legislation has been adopted in the Czech Republic. In July 1993, a bill was passed in the Czech Parliament which introduces a tax on the production and the import of ODS (CFCs, halons, CTC and MCF) of 100 Kc/kg (around 3.5 USD/kg), equivalent to a 200% tax on CFC. The law also introduces a framework for application specific bans on the use of ODS in the various user sectors.

Furthermore, the law contains a ban on the import of products containing CFC from January 1994. These bans will subsequently be issued by a regulation from the Ministry of Environment. User and import authorizations (called licenses) for all ODS were introduced in the Spring of 1993, but a number of practical problems have been experienced in implementing the system.

4 Pros and Cons of Each Regulatory Instrument

Each of the regulatory instruments, whether administrative or economic, has its advantages and disadvantages. This section evaluates the pros and cons of each available regulatory instrument with the emphasis laid on economies in transition. It is based on recent studies carried out by COWIconsult in the CEE countries within the field of ODS.[4]

The **advantages of the administrative instruments** are:

- **Environmental efficiency** (achieving environmental objectives), i.e. the allowed ODS use and production are specified directly. Sector-specific bans and licences are efficient means of meeting the ODS reduction requirements of the Montreal Protocol (provided that the regulations are combined with an effective monitoring and enforcement system).

- **Acceptability and, in some cases, administrative efficiency**. Administrative instruments are generally more easily accepted by the affected industry than economic instruments. An often heard argument against environmental taxes such as an ODS charge is that it is unfair to impose on the industry substitution costs and a tax at the same time. This is especially true in the CEE countries and the former Soviet Union where the enterprises face sincere financial difficulties. Obviously, this argument is only relevant during the period of implementation of the conversion projects. Administrative efficiency in terms of simple, logical and practical regulation may be achieved in the case of sector specific-bans and production/import licences, whereas it is much more difficult to achieve administrative efficiency in the case of user licences. This is due to the resources needed to administer a user licence system, the amount of detailed information required for the individual ODS user and the problems of control.

- **Flexibility**. Both bans and licences can easily be changed to accommodate new information about the severeness of the ozone problem (amendments to the Montreal Protocol) and the availability of suitable alternatives.

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[4] Cf. especially COWIconsult: Regional Considerations for the Phasing Out of Ozone Depleting Substances in Central and Eastern Europe. Lyngby, 1993. The study was carried out on behalf of the World Bank and the Commission of the European Communities in conjunction.

The **disadvantages of the administrative instruments** are:

- **Economic inefficiency**. The allowed ODS use is not automatically achieved at the lowest cost.

- **Full information is needed.** The level of information needed for the individual ODS industries is generally much higher for economic instruments. This is especially the case for user licences (information required on the specific application of ODS at specific industry level) but also in the case of application-specific bans (knowledge is needed on current technology employed in industries and plausible alternative technologies). On the other hand, production and import of ODS is normally concentrated in a few firms for which reason information required by a production and import licence system is limited.

The **advantages of the economic instruments** are:

- **Incentive to switch to ODS-free technology.** Introducing ODS charges and providing economic support for substitute technologies give user industries an incentive to reduce their consumption of ODS, thereby avoiding the charge and/or obtaining the subsidy. Tradable permits also provide an incentive to reduce ODS consumption because they will ideally be acquired by the enterprises which are able to switch to ODS-free technologies at the lowest costs.

- **Low substitution and administration costs.** Economic instruments can be implemented without full information about the individual user industries.

- **Fiscal effect.** A charge generates a revenue which may be used to finance a complementary economic support programme (support for R&D, investment support for ODS phaseout projects, etc.).

The **disadvantages of economic instruments** include:

- **Difficulties in controlling ODS consumption and production.** A charge alone is no guarantee that the ODS reduction targets are met. Market imperfections and uncertainty concerning price elasticities are reasons why taxes and economic support should be supplemented by administrative regulation such as sector-specific bans or import/production control. This is true in an economy in transition in particular.

- **Income distribution effects.** A charge tends to be passed on to the consumers of the ODS based product, the magnitude depending on the shape of the demand and supply functions. If auctioned, tradable permits have income distribution effects comparable with a tax. If, on the other hand, permits are issued for free among the producers and importers of ODS in proportion to their initial market shares, quasi-rents will be created to the benefit of existing companies at the expense of new companies. This problem is particularly relevant in economies in transition.

- **Acceptability problems.** As mentioned above, one of the key problems with a charge or a tradable permit system is that the industry is reluctant to accept any increases in production costs - administrative regulation is often preferred to a regulation where the industry has to pay for something that used to be free. The acceptability problems are found to be much more outspoken in the CEE countries than in the Western countries.

- **Trade distortions.** Economic instruments can generate international trade distortions (producers of similar ODS based products in other countries could have a competitive advantage because they do not have to pay the tax or buy the permit). For this reason, it is important that exports of ODS and products made with or containing ODS are exempted from tax payment (this is the case in the US, for example).

In comparison to Western countries the disadvantages of the administrative instruments are **more** significant in the CEE countries (because of the institutional shortcomings, including deficiency of effective monitoring and enforcement systems), whereas the disadvantages of the economic instruments are **much more** significant (because of the market imperfections, including lack of well-established "true" prices and still existing soft budget constraints). Furthermore, it is almost impossible in the CEE countries - due to the market imperfections, as well as the tight ODS phaseout schedules, which unavoidably reduce the general incentive of an economic instrument, e.g. an ODS charge - to adopt and implement economic instruments that will be behaviour regulating. Hence, the purpose of economic instruments in the CEE countries has mostly to be revenue raising, and they cannot stand alone but must be used in combination with administrative instruments.

5 Lessons to be Learned

On the basis of the above review of the pros and cons of regulatory instruments in ODS phaseout, and the characteristic features of economies in transition (institutional shortcomings and market imperfections), the following general lessons can be learned and recommendations can be made regarding the selection and implementation of these instruments in economies in transition:

- Regulatory instruments have to be **few, simple, manageable and easily understood**. If not, the probability that they will never be implemented is high.

- However, **successively** the regulatory instruments may become more detailed and comprehensive.

- Administrative instruments are most important. If well designed, they can ensure environmental efficiency. They have to comprise: (a) **reduction targets**, (b) **sector-specific bans**, (c) **voluntary agreements**, (d) **production/import licences** and (e) **monitoring and enforcement system**. Sector-specific bans are recommended in order to allow the most essential uses (refrigeration and some solvents and rigid foam applications) to be maintained until the latest possible date, and voluntary and realistic reduction requirements by individual user sectors are preferable because enforcement is likely to be weak in transitional economies. Production/import licences are recommended in order to facilitate monitoring and control. A monitoring and enforcement system must be designed to comply with the requirements of the Montreal Protocol, and absolutely necessary to ensure the success of both licences and sector-specific bans. The reason why user licenses are not recommended is that the information needed is excessive, and it is important to keep the regulatory instruments few.

- Economic instruments are needed for two purposes. Firstly, to raise additional funds supporting the ODS phaseout. Secondly, to tell the ODS producers and consumers how serious the matter is. They must comprise: (a) **ODS charges** (maybe gradually extended), and (b) **economic support**. The fiscal effect of an ODS charge tax, that is regularly increased according to a reliable price index (automatic indexation), is unduly important in transitional economies where other revenue raising instruments such as corporate and income taxes have not yet been properly developed and where public companies still play a dominant role; and economic support eg for research and development projects or investment in ODS free technologies are particularly relevant in transitional economies due to capital constraints. Tradable permits are not recommended. The main reason is the difficulties in determining the initial allocation of permits in a situation where industrial and trade structures are changing rapidly; and the risk of creating large quasi-rents in the case of auctioning.

- **Dialogue** between all affected parties especially the Ministry of Environment and ODS producers and consumers, are extremely important. The ODS phaseout takes place at the enterprises, not in the ministries.

- **Supportive measures** (modification of standards and norms, awareness building, accreditation of service technicians and emission control) are useful, particularly in transitional economies, to make the regulatory system of bans, licences and economic instruments work as smoothly and with as few problems as possible. However, these measures should not have first priority but should be implemented gradually as ODS phaseout projects are being prepared and the requirements of the user industries become more apparent following the above mentioned important dialogue.

- **A clear institutional setup and management structure** which can prove its effectiveness in implementing and monitoring the phaseout plan and managing the economic and technical support from international financing institutions must be given top priority.

APPENDIX X

Phaseout Options for ODS Producers

Romania has two ODS producing enterprises: OLTCHIM, which produces CTC and MCF, mainly CTC, and BICAPA, which produces CFC-11 and CFC-12, mainly CFC-12.

OLTCHIM, which in 1993 exported 79% of its CTC production, mainly to Greece, and which in 1993 sold 64% of its CTC production for domestic use to BICAPA, would like to increase and develop its PVC production, thereby phasing out its CTC and MCF production. Such an ODS replacement project falls, however, outside what is supportable from the Multilateral Fund.

Moreover, since OLTCHIM's exports to non-Article 5 countries exceed 70% of production, an ODS replacement project prepared for/by OLTCHIM is not eligible for funding, following the guidelines endorsed by the Executive Committee at its Fifteenth Meeting (see Box 1).

BICAPA, which did not produce CFC during the first ten months of 1994, considers a conversion to HFC-134a or HCFC-22. There is, however, not sufficient, uncovered demand for HFC-134a, neither on the domestic market nor in the neighbouring countries in the region, and a conversion to HCFC-22 is obviously a short term solution.

At the same time, both OLTCHIM and BICAPA are large employers in their respective local economies, Rimnicu Vilcea and Tirnaveni, thus large, abrupt redundancies will have wide economic and social consequences for the two communities.

How to assist the two ODS producers in the ODS phaseout process

There are two feasible ways out which have to be explored in more detail through negotiations between the Romanian Government and the Fund Secretariat:

- a full scale closing down operation, which could be co-financed by the Multilateral Fund; and
- a feasibility study of a production and business strategy, also possibly co-financed by the Multilateral Fund.

The key-word is *co-financed*. That is, the Romanian Government should commit itself to contribute to the financing of the above mentioned two projects.

It is recommended that MWFEP and Ministry of Industries, as soon as possible, initiate negotiations with OLTCHIM and BICAPA on the assistance to be offered to the two enterprises in the ODS phaseout process. Subsequently, the Government of Romania should initiate negotiations with the Fund Secretariat on this issue.

Box 1: Guidelines Endorsed by the Executive Committee

The Executive Committee at its Fifteenth Meeting endorsed the following guidelines regarding ODS replacement projects which benefit enterprises in Article 5 countries, such as Romania, exporting to non-Article 5 countries, such as Greece:

"In projects which benefit enterprises that export part of their production to non-Article 5 countries, the following rule shall apply:

1. Where exports to non-Article 5 countries correspond to or are less than 10 % of total production, the total incremental costs shall be covered.

2. Where exports to non-Article 5 countries exceed 10 % but do not exceed 70 %, there shall be a reduction equivalent to the percentage of total production represented by such exports less 10 %.

3. Where exports to non-Article 5 countries exceed 70 % of production, the project shall not be eligible.

4. The average of three years prior to submission of the project shall be used to determine production and exports to non-Article 5 countries.

5. Projects where the exports to non-Article 5 countries are in the form of agricultural or fisheries products shall be eligible for total incremental costs."

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