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Certified Quality Management System

Terminal Umbrella Project for the Phase-out of OD Solvents

Awareness and training programme on ODS solvent phase out for small scale enterprises (SMEs) in Romania

UNIDO Contract No. 2004/188

Final Report

Table of Contents

Table of Contents	2
List of Abbreviations.....	3
1. INTRODUCTION.....	4
2. NATIONAL STRATEGY AND ACTION PLAN FOR OD SOLVENT PHASE-OUT	8
2.1. Montreal Protocol phase out schedule for Article 5 countries.....	8
2.2. Romanian Legislation related to OD Solvent phase-out in compliance with the Montreal Protocol and its Amendments	10
Adoption of legislation, and subsidiary rules and regulations	10
Interpretation of legal instruments	12
Use of penalties and other enforcement tools	13
2.3. National Strategy and Action Plan for OD Solvents Phase-out in Romania	13
Objectives of the Strategy	14
Key Objectives of the Strategy.....	15
3. AWARENESS PROGRAM AND ACTION PLAN FOR OD SOLVENTS PHASE-OUT IN ROMANIA.....	18
3.1. Objectives of awareness activities.....	18
3.2. Target Groups.....	19
4. AWARENESS AND SUPPORT ACTIVITIES FOR THE IMPLEMENTATION OF OD SOLVENTS PHASE-OUT ACTION PLAN.....	21
Identification of potential beneficiaries of awareness and training program	21
Establishment of communication channels with the target groups	21
Elaboration of awareness materials.....	22
Training and Technical assistance activities	23
Distribution of awareness materials	24
5. SURVEY ACTIVITIES ON OD SOLVENT PHASE-OUT	25
Results on CTC phase-out survey activities.....	26
6. CONCLUSIONS.....	32
ANNEX I	List of Investigated CTC End-Users, Applications, CTC Consumptions and Status of CTC Phase-Out
ANNEX II	Electronic copy of the Presentation "Montreal Protocol and Ozone Layer Protection" – Romanian version – for the Ministry of Education and Research
ANNEX III	Electronic copy of the video clip "Save nature! Protect the environment! Protect our health!" - campaign initiated by the Romanian Ministry of Environment and Water Management

List of Abbreviations

Article 5 Country - According to the Montreal Protocol (art. 5, paragraph 1), the 10 years grace period is accorded to developing countries, which had an annual consumption of controlled substances (see Annex A) smaller than 0.3 kg per capita. These countries were nominated as Article 5 countries. Romania is classified as an Article 5 country.

E.P.A.	Environmental Protection Agency
CFCs	Chlorofluorocarbons, substances listed under the Annex A of Montreal Protocol
CTC	Carbon tetrachloride
G.O.	Governmental Ordinance
G.D.	Governmental Decision
HCFCs	Hydrochlorofluorocarbons, listed under Annex C of the Montreal Protocol
HES	Health, Environment & Safety
ICIM	National Research and Development Institute for Environment Protection
MCF	Methyl Chloroform (1,1,1 trichloroethane)
MF	Multilateral Fund for the implementation of the Montreal Protocol
M.O.	Ministerial Order
MP	Montreal Protocol
MEWM	Ministry of Environment and Waters Management
NEPA	National Environmental Protection Agency
NOU	National Ozone Unit
NGOs	Non-governmental organizations
ODS	Ozone Depleting Substances
ODP	Ozone Depleting Potential
UNIDO	United Nations Industrial Development Organization
SSE	Small Size Enterprise

1. INTRODUCTION

Romania has ratified the Vienna Convention on the Preservation of Ozone Layer, the Montreal Protocol on ozone depleting substances and its Amendments from London, Copenhagen, Montreal and Beijing.

This emphasizes the Romanian Government's strong commitment to take the necessary measures to protect the stratospheric ozone layer.

According to the Montreal Protocol (Article 5, para 1), the 10 years grace period is accorded to developing countries, which had an annual consumption of controlled substances (see Annex A) smaller than 0.3 kg per capita. These countries were nominated as Article 5 countries.

According to the London Amendments, any Party operating under Article 5, para 1, shall not exceed an annual calculated level of consumption of the controlled substances in Annex A of 0.3 kilograms per capita and an annual calculated level of consumption of the controlled substances in Annex B of 0.2 kilograms per capita.

Romania has been categorized as an Article 5 country and as such is eligible for funding from the Multilateral Fund.

In 2003 Romania updated its Country Program having the financial support of the Multilateral Fund, with the technical assistance of UNIDO as implementing agency. The ODS phase-out strategy developed under the Country Program outlined the directions to achieve an orderly and affordable phase-out of remaining ODS uses. The Strategy is part of the on-going process of fulfilling Romania's commitment to protect the Earth's ozone layer.

The objective of the strategy is to minimize and avoid the ultimate ODS releases into the atmosphere. The National Action Plan elaborated under the Up-dated Country Program contained a number of projects for which the Romanian Government was likely to seek assistance from the Multilateral Fund in order to achieve OD solvents phase-out, as follows:

Table 1: Projects for which the Romanian Government looked for assistance from the Multilateral Fund in order to achieve OD solvents phase-out

No	Project title	Sector	ODS to be phased-out
	CONSUMPTION		
1.	Sectorial phase-out of solvent consumption: phase-out of CTC at Chimcomplex Onesti ^{**} , phase-out of CTC at Arpechim Pitesti ^{***} phase-out of CTC for metal degreasing	solvent	72.75 MT (consumption in the sector in 2001)
	PRODUCTION		
2.	Conversion of the CTC production capacity to other chlorinated solvents at OLTCHIM Ramnicu Valcea	solvent	production capacity is 40.000 MT (production in 2001 was 1,735.50 MT)
3.	Conversion of the production capacity to phase-out CTC as a by-product at Chimcomplex Onesti	solvent	during production process 320 MT of mixture containing 25% CTC is obtained as a by-product

There was a need, under Romania's phase out programme for the Montreal Protocol, for updating and renewing the solvent sector strategy originally developed under the Country Program for Romania.

In order to prepare the OD solvents phase out strategy, Romania has been the beneficiary of an umbrella project funded by Multilateral Fund for the implementation of Montreal Protocol, having UNIDO as implementing agency (MP/ROM/03/105 – Terminal umbrella project for the phase-out of ODS solvents).

The objectives of this project are:

- Identification and survey of the remaining companies consuming CFC-113, Methyl chloroform and Carbon tetrachloride as solvents in cleaning operations or as process agent
- provision of technical assistance in phasing-out ODS solvents through training and awareness programme, under the Montreal Protocol Agreement
- Identification and survey of the alternatives applied by the identified companies in order to phase-out OD solvent use.

This project was promoted by the Ministry of Environment and Water Management through the Ozone Unit, in close cooperation with the National R&D Institute for Environmental Protection,

which evaluated the existing data and elaborated the Strategy and Action Plan for OD Solvents Phase-out in SSEs in Romania.

In 1999 the Romanian legal framework banned the use of ODS as solvents in all industrial applications except the use of CTC in closed systems.

In 2001, the activities identified in Romania in the solvent sector were the following:

- Electronics
- Dry Cleaning
- Metal degreasing

In 2002, following the restrictions imposed by the national legislation, CTC was the only OD solvent still used in Romania. CTC was mainly used in rubber peeling, metal degreasing appliances and for analytical purposes. CTC was also used as a process agent to obtain monochloroacetic acid, octyl chloroformiat (DOF), diethylhexylperoxycarbamate (DEHPC), at Oltchim Ramnicu Valcea.

The main company using CTC in the metal degreasing process was Arpechim Pitesti. The company manufactures industrial gases including Nitrogen and Oxygen and operates cylinder-filling equipment. CTC was used as degreasing agent for oxygen cylinders and filling line components. In 2002 the company consumed 2.5 MT of CTC.

In the electronics sector the main solvent used for the cleaning of electronic components and metallic parts was CFC-113. Until 2001, small consumptions of CFC-113 based on import were reported and starting 2002 it was completely replaced. At present, alcohol based solvents are used in electronics industry.

The production of methyl chloroform (MCF) stopped in 1997 and no consumption has been reported since 2002.

The initiation of the project for CTC phase-out in the SSEs in Romania was motivated by the discrepancies between the CTC amount placed on the market by the national producer Oltchim SA and the reported consumptions for the SSEs sector:

Table 1: *Distribution of CTC consumption during 2000 –2002*

Year	Consumption (placed on the marked) MT		Consumption (reported by the identified SSEs) MT
	Degreasing / Cleaning	Process Agent	
2000	152.02	111.78	7.83
2001	72.75	65.35	6.03
2002	11.80	179	No detailed survey conducted

2. NATIONAL STRATEGY AND ACTION PLAN FOR OD SOLVENT PHASE-OUT

2.1. MONTREAL PROTOCOL PHASE OUT SCHEDULE FOR ARTICLE 5 COUNTRIES

A schedule for the phase out of the ODS used as solvents was established by the Montreal Protocol.

The following tables illustrate the breakdown of Consumption, Import, Export and Production for each group of substances used as solvents in Romania and the related phase out schedule.

Table 2: Consumption, Import, Export and Production of Annex A, Group I Substances (MT)

Annex A, Group I (CFC-11; CFC-12; CFC-113; CFC-114; CFC-115)	Consumption	Import	Export	Production
1995	558.20	518.20	0.00	40.00
1996	764.00	764.00	0.00	0.00
1997	733.79	733.79	0.00	0.00
1998	591.55	592.04	0.49	0.00
1999	342.62	343.63	1.01	0.00
2000	363.53	363.53	0.00	0.00
2001	193.58	193.58	0.00	0.00
2002*	359.38	359.38	0.00	0.00
2003*	362.55	362.55	0.00	0.00
Base level (Average 1995-1997)	685.33			13.33
Freeze July 1, 1999	Achieved			Achieved
50% reduction January 1, 2005	342.67			6.67
85% reduction January 1, 2007	102.80			2.00
100% reduction January 1, 2010				

* - Consumption data for 2002 and 2003 included stocks that were not placed on the market

(100.13 MT CFCs at 31 December 2002 and 130.55 MT CFCs stocks at 31 December 2003).

Table 3 shows the relevant data for CFC- 113 only:

Table 3: Consumption, Import, Export and Production of CFC- 113

Year	Consumption in the solvent sector (tonnes)	Production (tonnes)	Import (tonnes)	Export (tonnes)	Stock (tonnes)
1995	-	-	-	-	-
1996	6,00	-	6,00	-	-
1997	0,05	-	0,05	-	-
1998	2,25	-	2,25	-	-
1999	18	-	18	-	-
2000	-	-	-	-	-
2001	0,08	-	0,08	-	-
2002	-	-	-	-	-
2003	-	-	-	-	-
2004	-	-	-	-	-

Table 4: Consumption, Import, Export and Production of Annex B, Group II Substances (MT)

Annex B Group II CTC	Consumption*	Import	Export	Production	Stock
1993	1745.00	48.00	6361.00	8058.00	
1994	1,052.00		2,198.00	6,213.00	2,963.00
1995	290.00		5,682.00	4,241.00	1,232.00
1996	491.00		2,126.00	2,617.00	1,232.00
1997	283.00		10,313.50	10,133.00	768.50
1998	213.30		7,737.00	9,509.00	2,327.20
1999	196.00		13,270.50	12,640.00	1,500.70
2000	263.80		4,905.60	4,769.40	1,100.70
2001	138.10		1,721.90	1,735.50	976.20
2002	190.80		1041.00	1018.00	762.40
2003	157.28	0.01	0	181.82	786.93
2004	162.53	0	0	160.00	-
Base level (Average 1998-2000)	224.37				
85% reduction January 1, 2005		33.66			
		Achieved			
100% reduction January 1, 2010		Could be achieved if financial assistance is obtained			

Consumption data for 2002, 2003 and 2004 include the following quantities used as process agents: 179 MT CTC in 2002, 143 MT CTC in 2003 and 148.48 CTC in 2004 that are exempted by the Montreal Protocol.

Table 5: Consumption, Import, Export and Production of Annex B, Group III Substances (MT)

Annex B Group III 1,1,1-trichloroethane (methyl chloroform)	Consumption	Import	Export	Production
1993	553.00	454.00	0	99.00
1995	60.50	0	0	60.50
1996	129.00	0	0	129.00
1997	29.36	0.24	0	29.12
1998	0.23	0.23	0	0
1999	0.19	0.19	0	0
2000	0.23	0.23	0	0
2001	0.12	0.12	0	0
2002	0	0	0	0
2003	0	0	0	0
2004	0	0	0	0
Base level (Average 1998-2000)	0.22			0
Freeze January 1, 2003	Achieved			
30% reduction January 1, 2005	0.15 Achieved			
70% reduction January 1, 2010	0.07			
100% reduction January 1, 2015				

In 1999 the Romanian legal framework banned the use of ODS as solvents in all industrial applications except the use of CTC in closed systems.

2.2. ROMANIAN LEGISLATION RELATED TO OD SOLVENT PHASE-OUT IN COMPLIANCE WITH THE MONTREAL PROTOCOL AND ITS AMENDMENTS

ADOPTION OF LEGISLATION, AND SUBSIDIARY RULES AND REGULATIONS

The legal framework now in place in Romania includes legislation discharging the requirements of the Vienna Convention and additional legislation adopted in Romania thereafter. At the end of 2004 the legislative framework for the control of OD Solvents includes the following instruments:

- Law no 84/93 for the accession of Romania to the Convention for the Protection of the Ozone Layer, adopted in Vienna on 22 March 1985 and of the Protocol on the substances

that deplete the ozone layer, adopted in Montreal on 16 September 1987 and for the acceptance of the Amendment to the Montreal Protocol on the substances that deplete the ozone layer, adopted at the second Meeting of the Parties, London 27-29 June 1990;

- Law no 9/2001 for the approval of the Government Ordinance for the acceptance of the Amendment to the Montreal Protocol on substances that deplete the ozone layer, adopted in Copenhagen on 25 November 1992 ;
- Law no 150/2001 for the acceptance of the Amendment to the Montreal Protocol adopted in Montreal;
- Governmental Decision no 340/1992 regarding the procedure for wastes import and other hazardous substances for human health and environment, as amended;
- Governmental Decision no 91/1995 for the completion of the Denomination and Classification of Goods in the Romanian Customs Import Tariff, for the description and classification of ozone depleting substances, amended by GD 810/1999;
- Governmental Decision no 243/1995 for the establishment of the National Committee for the Protection of the ozone layer;
- Ministerial Order no 506/1996 for the approval of the procedures for regulating the import and export activities of substances, products and equipment listed in the Annexes of the Montreal Protocol on substances that deplete the ozone layer;
- Law no 159/2000 for the approval of the Government Ordinance no. 89/1999 regarding the trade regime and restrictions introductions to the use of halogenated hydrocarbons that deplete the ozone layer;
- Annual Order of the Minister of Waters and Environment Protection regarding the contingents for consumption and production of ODS.
- Ministerial Order no.1112 / 2002 issued by the Minister of Waters and Environment Protection and the Minister of Finances, (Customs National Authority) regarding the designation of the cross-border customs offices for import/export of ODS.
- Governmental Decision no 58 / 2004 for the approval of the Up-dated National Program for ODS phase out
- It is necessary to underline that Romanian legislation fully adopted the Montreal Protocol provisions and it is now in the process of enforcement of these provisions. On the other hand, the planning schedule for the EU legislation transposition has been up-dated to accelerate the approximation with EU environmental acquis
- Decree no. 536 / 2005 for the acceptance by the Romanian Parliament of the Beijing Amendment to the Montreal Protocol for ODS
- Law no. 281 / 2005 for the approval of the Beijing Amendment to the Montreal Protocol for ODS

INTERPRETATION OF LEGAL INSTRUMENTS

Import and export of ODS in bulk is allowed only on the basis of an environmental agreement issued on a case-by-case basis, representing the licensing system required by the Convention. In order to obtain this agreement, the applicant has to present the following documentation: declaration stating the sector for which the import is intended, quality certificate, license for the import of hazardous substances. The above stated actions are allowed only for basic domestic needs (M.O. no 506/1996, art. 2 of the Procedure for regulating the import/export activities of substances, products and equipment listed in the Annexes to the Montreal Protocol regarding ODS.)

Import of recovered, recycled and reclaimed substances listed in Annexes A, B and C of the Montreal Protocol and the re-export of ODS are banned (GO. No 89/1999, art. 3 (1) e.

Transport and storage of ODS must be carried out in recipients that are safe, reusable and labelled accordingly (GO no 89/1999, art.14)

ODS Import from and export to Non-Parties are banned (GO. 89/1999 art. 3 (1) a)

Import from and export to Non-Party countries of equipment that contain, function or are designed to function, and products that contain CFCs are banned (GO 89/1999, art. 3 (1) b)

The use and placing on the market of cleaning agents and solvents that contain one or more substances listed in Annexes A, B and C of the Montreal Protocol are prohibited, excepting some cases. (GO 89/1999, art. 7)

The CFCs production in Romania is completely stopped starting with 1996. Romania has no capacities to produce HCFCs.

ODS discharge into the atmosphere is forbidden (GO no. 89/1999, art. 11.1)

Mixing of different ODS in the recovery and regenerating processes is forbidden

Recovery of ODS is mandatory: in equipment maintenance, during dismantling of equipment and following the use as cleaning agents or solvents. The users of ODS for cleaning or as solvents have the responsibility to recover and/or destroy these substances (GO no. 89/1999, art. 11.2,3)

ODS recovery, reclaim or destruction are allowed only with specialized equipment and in authorized units. (GO no. 89/1999, art. 11.4)

Maintenance of equipment containing ODS is allowed only to qualified and certified technicians. (Article 11 (7) and (8) – G.O. 89 / 1999).

The ODS importers and exporters are obliged to label the containers with the inscription: "Contain substances that deplete the ozone layer" (Art. 10 (1) – G.O. 89/1999).

The producers, importers and exporters of equipment and products that contain ODS are obliged to label their products with the inscription: "Contain substances that deplete the ozone layer" (Art. 10 (2) – G.O. 89/1999).

Equipment and products that are safe for the Ozone Layer are labelled with the inscription: "Ozone Friendly" (Article 10 (5) – G.O. 89/1999).

USE OF PENALTIES AND OTHER ENFORCEMENT TOOLS

According to the Government Ordinance no 89/1999 regarding the trade system and restrictions for chlorinated fluorinated hydrocarbons that deplete the ozone layer, the General Customs Directorate has the obligation to transmit within 30 days from the end of the year a statistical report on the situation of import and export for the precedent year, including information on the nature, and the commercial, technical and chemical denomination of ODS, the quantities, the related country, the registration number of the environmental agreement.

In the same time, according to the same GO, all companies that produce, import, export or use ODS are obliged to report statistical data on their activities. The Data are centralized by National Ozone Unit, taking into account the annual reports of Local Environmental Protection Agencies and the annual statistics of the ODS import/export based on the licensing system.

Specific provisions for penalizing non-compliance are built into the legislation detailed above. The primary sanctions are administrative; monetary fines, suspension of environmental agreements, suspension of production permits and bans on handling ODS or ODS equipment for a period of up to 3 years.

2.3. NATIONAL STRATEGY AND ACTION PLAN FOR OD SOLVENTS PHASE-OUT IN ROMANIA

Romania, being one of the pre-accession countries to the European Union, has made significant efforts to overcome the negative environmental effects of the rapid industrialization and intensive agriculture during the last four decades. Romania is under process of accession to EU and environmental issues cover one of the most important areas of the government decision.

The Law 137/1995 (Law of Environment Protection) modified by Law 294/2003, and Law 655/2001 (Law of Atmosphere Protection) are the main legal acts defining the environmental problems related to atmosphere protection in accordance with international and EU requirements. Among the most important environmental problems, the ozone depleting substances are recognized to possess harmful effects on humans and environment beyond their toxic properties.

In the stratosphere the molecules of halogenated solvents break down by the action of solar ultraviolet radiation and release their constituent halogen atoms. Because of cascade reactions, an individual halogen atom can on average destroy nearly a thousand ozone molecules before it is converted into a form harmless to ozone.

In stratosphere, where 90 percent of our planet's ozone resides, ozone absorbs UV radiation, shielding living organisms on Earth from their harmful effects. Stratosphere Ozone layer depletion allows the harmful radiation to strike Earth affecting human health and ecosystems.

That is why the Romanian Government is conscious of the need for global action on ODS and signed by its representative the Vienna Convention and its Protocols and Amendments. As a signatory to these agreements Romania has obligations in relation to protecting the environment, reducing emissions and protecting ambient air quality. These obligations are summarised as follows:

- to draw up ODS inventories
- to implement ODS phase out schedules
- to design and to implement Country Program for the phase-out of ODS
- to report periodically to the Secretariat of Vienna Convention and its subsidiary bodies
- to restrict the use of certain substances in specified equipment (Annex D of the Montreal Protocol)

OBJECTIVES OF THE STRATEGY

The overall objective of the strategy was the final phase out of the OD Solvents from remaining applications in the SSEs sector in Romania.

In 2004, ICIM in cooperation with NOU elaborated the National Strategy for OD solvents phase-out in Romania, in the framework of the Terminal umbrella project for the phase-out of ODS solvents– MP/ROM/03/105.

This strategy promoted sustainable development, defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". In

relation to atmosphere protection and ambient air quality, sustainable development principles must be taken into account because if air pollution is not controlled, it has an increasing impact on quality of life, and ultimately on the life expectancy of the population of the country. But at the same time, a balance has to be struck between achieving the aims of sustainable development and on imposing unacceptable economic and social costs on industry and society. Sustainable development must take into consideration the economic impact associated with all plans and strategies.

The National Action Plan for the phase out of the OD Solvents, that is a part of this Strategy, defined the measures to achieve the goals of this Strategy in a sustainable way.

The strategy was based on six key objectives. The key objectives were focused on a common approach to solving the key problems related to human health and environment protection – problems caused by OD Solvents production and use.

KEY OBJECTIVES OF THE STRATEGY

Two main kind of objectives were distinguished:

- A. Monitoring objectives
- B. Awareness raising related objectives

Measures specify steps necessary for the achievement of the (less concrete) key objectives. There are technical, economical, institutional, procedural and informative measures.

An action should be undertaken for the implementation of an individual measure or of a package of measures in order to achieve the objectives. An action is undertaken within a certain frame by an appointed and responsible party.

No single objective or measure is sufficient to achieve the final OD solvent – related to human health and environment protection goals. Therefore a package of objectives, measures and action was finally proposed. There were three ways which the measures and actions were directed:

- encouraging the use of viable alternatives to OD solvents
- improving monitoring activities
- raising awareness between users and consumers about the benefits for human health and for the environment of the OD solvents phase out

Table 6: Key objectives, measures and actions for OD Solvents phase-out in Romania

	KEY OBJECTIVES	MEASURES	ACTIONS
A	Key objective 1: Updating the list of OD Solvents user	1.1 Identification of remaining OD solvent users	1.1.1: Examination of the last updated list of OD Solvents users and traders, existing at the National Ozone Unit 1.1.2: Examination of the list periodically elaborated by the local EPAs on the current OD solvent users identified based on inspections and environmental permits issued 1.1.3: Gathering the relevant data related to OD solvents import and export, from the Customs Authority
		1.2 Make contact with the OD solvent users	1.2.1: Get into direct contact with the identified OD solvents users 1.2.2: Maintaining of contact with the identified OD solvents users through the local EPAs 1.2.3: Performing of inspections to OD solvents users facilities
	Key objective 2: Continuous monitoring of OD Solvents consumption	2.1 Periodical updating of the national database on OD solvent production, consumption, import and export	2.1.1: Collecting and processing of data related to OD solvent production, consumption, import and export in order to continuously update the national database 2.1.2: Dissemination of questionnaires concerning the evolution of OD solvents consumption
		2.2 Preparation of periodical reports on OD solvent production, consumption, import and export	2.2.1: Preparation of periodical reports on OD solvent production, consumption, import and export
	Key objective 3: Assessment of the contribution of the activities related to OD solvents use, on atmospheric emissions	3.1 Establishing of a methodology nationally approved for OD Solvents atmospheric emission assessment	3.1.1: Training programs for preparing OD solvents atmospheric emissions inventories 3.1.2: Elaboration of annual OD Solvents atmospheric emission inventories 3.1.3: National validation by the stakeholders, of the national emission inventories
B	Key objective 4: OD Solvents User awareness related to the near deadline for OD Solvents complete elimination	4.1 Dissemination among users of the information regarding the MP provisions and national legislation related to OD Solvents phase-out	4.1.1: Organizing of seminars 4.1.2: Setting up of information campaign through mass-media, Internet sites and distribution of brochures and posters
		4.2 Training of local EPAs regarding the enforcement of the national legislation related to OD solvent phase-out	4.2.1: Organizing of seminars, training sessions and maintaining a permanent contact with NOU
	Key objective 5: Information, dissemination and	5.1 Training activities and technical assistance on viable alternatives on OD solvents use	Action 5.1.1: Organizing of seminars, training sessions on viable alternatives on OD solvents use

Technical support for OD Solvents complete phase-out by viable alternatives	5.2 Awareness campaigns on viable alternatives on OD solvents use	5.2.1: Setting up of information campaign through mass-media, Internet sites and distribution of brochures and posters 5.2.2: Maintaining of permanent contact between OD solvents users and technical advisers through the local EPAs and NOU
	5.3 Implementation of the projects identified in the updated Country Program for the solvent sector	5.3.1: Designing of projects to implement viable alternatives on OD solvents use 5.3.2: Survey and reporting on projects implementation and outcomes
Key objective 6: Public awareness related on the negative effects of OD Solvents	6.1 Awareness campaigns on the negative effects of OD Solvents on human health and environment	6.1.1: Setting up of information campaign through mass-media, Internet sites and distribution of brochures and posters

The implementation of the National Strategy and Action Plan for OD Solvents phase-out in Romania created the basis for early compliance with the Montreal Protocol provisions.

3. AWARENESS PROGRAM AND ACTION PLAN FOR OD SOLVENTS PHASE-OUT IN ROMANIA

3.1. OBJECTIVES OF AWARENESS ACTIVITIES

The program related to increasing awareness was focused on:

- Solvent sector phase out plan and related regulations,
- Non-ODS technology options, availability of alternatives and technology transfer for the use of alternatives,
- Participation in phase out activities including training, information exchange etc.

Survey reports indicated that most enterprises using OD solvents were not aware of phase out deadlines or assistance available under the Multilateral Fund for phasing out OD solvents and shifting to non-OD alternatives. Therefore, awareness mechanisms had to be designed to access the end users, most of them SSEs, through stakeholders offering information and technical assistance related to the available alternatives on the Romanian market. It was also important to inform the stakeholders on the status of the phase out activities and initiatives of the private sector in countries having similar economic situation.

In addition, enterprises also needed information on the acceptable alternatives to OD solvents, relating to technical and commercial aspects.

The needs of the solvent sector, suitable to be addressed through the awareness program, are tabulated below:

Table 7: Key needs of solvent sector

Needs		
Immediate needs (less than one year)	Short term needs (1-3 years)	Long term needs (3-7 years)
<ul style="list-style-type: none"> ▪ Awareness regarding Montreal Protocol ▪ Regulatory and legal aspects ▪ Attract participation in phase out activities and adoption of non-OD solvents ▪ Effect of CTC on human and environmental health 	<ul style="list-style-type: none"> ▪ Regulatory and legal aspects ▪ Encourage participation in phase out activities and adoption of non-OD solvents ▪ Effect of CTC on human and environmental health 	<ul style="list-style-type: none"> ▪ Awareness on non- OD solvents, their availability and adoption ▪ Information on impact of phase-out activities in solvent sector by involving the educational system to provide sustainability to the awareness program. ▪ Effect of CTC on human and environmental health

3.2. TARGET GROUPS

The National OD Solvents Phase-out Strategy included a survey component on the OD solvents end uses. This survey revealed the need of addressing the awareness program objectives to different target groups, depending on the size of the companies and their field of activity.

The National Awareness Program was targeting the public on broader parameters including the harmful effects of ODS and depletion of Ozone Layer and subsequently built awareness and public opinion to purchase non ODS products. But given the short time frame to address the solvent sector phase out, concentrated awareness was required targeting the industry on aspects pertaining to the industry. Moreover, focus was also required on provision of alternative technology options, assistance in shifting to non-OD solvent, good practices.

The National OD Solvents Phase-out Strategy revealed the existence of four target groups:

- Large Industrial Plants
- SSEs
- New founded companies developing activities using solvents
- Public involved in connected activities

Each of the identified target groups needed specific information in terms of technical aspects and also regarding the institutions and organizations to which they have to exchange information on a permanent basis.

The target groups were addressed through local environmental authorities, direct contacts with ICIM and distribution of awareness materials, relevant information posted on the site of the Ministry of Environment and Water Management, articles published in specific environmental publications.

The Action Plan comprised activities to be carried out under the National Phase-out Program in order to enable Romania to completely phase-out the use of CTC in the country in line with the MP obligations applicable to developed countries, including EU Member States. The proposed plan entailed non-investment activities and technical assistance to completely phase out the CTC use by the end of the OD Solvents phase-out project.

The enterprises involved in the solvent industry generally agreed that there are alternatives to replace all OD solvents. Methyl chloroform and CFC 113 have been totally phase-out by 2002, while CTC was still used in some applications in small size enterprises, most of them consisting in cleaning activities at oxygen plants and filling stations.

The Action Plan on Public Awareness, elaborated by ICIM in cooperation with NOU, in order to achieve the objectives of the awareness programme, is presented in the table below:

Table 8: Action Plan on Public Awareness Program

No.	Action	Responsibilities
1.	Use of direct communication channels / Use of "distribution" network (info exchange with EPAs) to support phase out	MEWM ICIM Bucharest
2.	Training for capacity building in solvents sector	MEWM ICIM Bucharest
3.	Technical assistance provided to end-users about good practices in using alternative technologies/recovery/ recycling	MEWM ICIM Bucharest
4.	Elaboration and distribution of questionnaires for OD solvents consumers and trade units	NEPA, local EPAs ICIM Bucharest
5.	Elaboration and distribution of awareness materials on viable alternative to OD solvents	MEWM ICIM Bucharest Collaborators
6.	Participation of the ICIM experts and NOU officers in the awareness activities promoted by the private sector, by NGOs and at the international fairs and exhibitions: Press release on MP related activities	MEWM ICIM Bucharest
7.	Other training activities	MEWM ICIM Bucharest

4. AWARENESS AND SUPPORT ACTIVITIES FOR THE IMPLEMENTATION OF OD SOLVENTS PHASE-OUT ACTION PLAN

In order to implement the OD Solvent Phase-out Action Plan in Romania, ICIM Bucharest in cooperation with NOU and having the support of NEPA developed a series of awareness and training activities:

IDENTIFICATION OF POTENTIAL BENEFICIARIES OF AWARENESS AND TRAINING PROGRAM

The following target groups for awareness and training have been identified:

- CTC end-users – SSEs and Large industrial users,
- Representatives of authorities responsible for environmental protection, and
- Public.

ESTABLISHMENT OF COMMUNICATION CHANNELS WITH THE TARGET GROUPS

The following methods were considered by ICIM in approaching the target groups:

CTC end-users : ICIM established direct contact with all identified CTC end-users in order to provide knowledge pertaining to phase-out requirements, Government interventions, rules and regulation, new technologies etc. This was the channel of communication preferentially used as the pressure of OD solvent phase-out is directed to the CTC users.

CTC end-users were also approached through the local EPAs, which have responsibilities in permitting procedures for the activities with impact on environment (including activities which involve OD solvents use).

Besides, this target group could also access relevant information on this issue from the Internet sites of the Ministry of Environment and Water Management.

Representatives of environmental protection authorities:

ICIM decided to approach this target group using direct contact with the designated persons in the local EPAs responsible for the activities related to the Montreal Protocol. The regional and territorial authorities for environmental protection played a key role in the implementation of clean alternatives, national awareness program objectives and also survey activities.

Public:

The relevant information on OD Solvents health and environment effects reached the public through the information distributed by the local EPAs, that have direct contact with local public and NGOs, or through the Internet site of Ministry of Environment and Water Management.

Special attention was paid to long-term measures regarding public education. The Ministry of Environment and Water Management set an agreement with the Ministry of Education and Research that contains provisions regarding the introduction in the scholar curricula, of issues related to the Montreal Protocol and ODS use and phase-out.

ELABORATION OF AWARENESS MATERIALS

ICIM elaborated the following awareness materials:

- National Strategy for OD Solvents Phase-out (in cooperation with NOU), which was edited as a brochure distributed at Meeting of the Regional Ozone Network For Europe And Central Asia, held in Bucharest in March 2005.
- the content of the brochure „Ozone Depleting Solvents Phase-out in Small Size Enterprises in Romania" and the message of the poster regarding CTC phase-out, both in Romanian and English version. The brochure contains information on the Montreal Protocol provisions and the Legislative Framework concerning OD Solvents use and phase-out in Romania, the characteristics of Carbon Tetrachloride - a good solvent with harmful effect on ozone layer, Viable alternatives for CTC phase-out and Internet Sites of interest. ICIM subcontracted brochures and posters print and distribution.
- A presentation in Romanian language to be submitted by the Ministry of Environment to the Ministry of Education and Research, in the framework of the Protocol agreed between the two authorities. This material offers relevant information on the ozone layer, the Vienna Convention and Montreal Protocol and on OD Solvents, to support the development of an adequate scholar curriculum. An electronic copy of this presentation is attached to the present report.
- ICIM also contributed to the elaboration of a video clip illustrating the harmful effects of ozone layer depletion due to OD Solvents use and promoting actions for ozone layer protection. The video clip is part of the campaign "Save nature! Protect the environment! Protect our health!" initiated by the Ministry of Environment and Water Management. An electronic copy of this video clip, in .jpg format, is attached to the present report. The video was posted on the website of the Ministry of Environment and Water Management.

TRAINING AND TECHNICAL ASSISTANCE ACTIVITIES

The objectives of the Awareness Program promoted by NOU of Romania in cooperation with ICIM included increasing awareness on the Montreal Protocol, on OD Solvents and their harmful side effects, and also on ODS rules and regulations, in order to provide inputs for CTC phase-out. The campaign had to provide general awareness regarding usage of OD solvents. The National Awareness Program was targeting the public - on broader parameters including the harmful effects of ODS, and Ozone Layer depletion and non ODS use, and also the local EPAs - for institutional and legislative strengthening. But given the short time to address the solvent sector phase out, concentrated awareness addressed the industry, as it was thought as a key to facilitate switchover CTC use to non-OD alternatives.

In order to identify the training and technical assistance needs, a national survey on the status of CTC use and phase-out was initiated by ICIM in cooperation with NOU and NEPA. The data were collected through the local EPAs and centralised by ICIM.

In the process of data validation and completion, certain aspects were revealed:

- existence of few CTC end-users not aware about the near deadline for CTC phase-out;
- existence of few CTC end-users highly reticent to CTC replacement at oxygen or hydrogen station, due to security reasons or past accidents;
- the need for HES information on the alternative chlorinated solvents, including removal of exhausted solvents;
- the need for information concerning the obligation for reporting and destroying the remnant CTC.

ICIM contacted each of the identified companies, informing them about the mandatory and fast requirement for CTC replacement, about the most applied alternative in the field and sent informative materials (brochure, presentations from the National Training Workshop on "Viable Alternatives to Ozone Depleting Solvents" held in Romania in 2004", STOC assessments). On the request of interested companies, ICIM provided information on viable alternatives for CTC replacement, highlighting the advantages but also the specific issues to be taken into account. ICIM facilitated the contact with companies with the same profile successfully phased-out CTC, and made recommendations for known suppliers of equipment and non-OD chemicals. ICIM also provided information on HES aspects related to the use of non-OD chlorinated solvents and informed the interested companies about the legal requirement for controlled removal of (exhausted) chlorinated solvents and about the possibility of their destruction by incineration or co-incineration.

ICIM maintained direct contact with the identified CTC users until CTC phase-out was completed.

In order to improve the knowledge of the officers in charge with permitting and inspection activities at local level, NOU provided training and guidelines regarding the Montreal Protocol legislation in place and information to be collected for the annual reports and ICIM distributed awareness material interesting the public and the CTC users (brochures, posters).

DISTRIBUTION OF AWARENESS MATERIALS

Distribution of awareness materials was performed using the following channels:

- brochures and posters elaborated by ICIM and CD's containing the information provided during the seminars "Viable Alternatives for to Ozone Depleting Solvents" were sent to the local EPAs, both as direct receptors of information and as distributors to the CTC end-users under their jurisdiction. Local EPAs were also considered as an interface to the public and NGOs.
- brochures and posters elaborated by ICIM and CD's containing the information provided during the seminars "Viable Alternatives for to Ozone Depleting Solvents" were sent to environment protection compartment in the Ministry of Economy and Trade, accompanied by a letter issued by NOU showing the importance of the legal requirements, environmental and health aspects involved in OD Solvents phase out and highlighting the status of OD Solvents phase-out in Romania.
- Brochures, posters and a presentation containing information on the ozone layer, the Vienna Convention and Montreal Protocol and on OD Solvents, was sent to the Ministry of Education and Research to support the development of an adequate scholar curriculum.
- ICIM also distributed directly to the CTC end-users information provided during the seminars "Viable Alternatives for to Ozone Depleting Solvents" and links to websites of interest.
- The brochure elaborated by ICIM and the video clip promoting the campaign "Save nature! Protect the environment! Protect our health!" initiated by the Ministry of Environment and Water Management was posted on the Ministry web-site.

5. SURVEY ACTIVITIES ON OD SOLVENT PHASE-OUT

The National Strategy for OD Solvent Phase-out identified the need to continue the survey activities on SSEs started by NOU at the beginning of the umbrella project.

In order to improve the existing information, a survey was conducted to build a detailed database on SSEs final users and their respective consumptions for 2003, 2004 and to establish CTC consumption and total phase-out during 2005.

The up dating of the list of small size users (inventory) started in July 2004. The data collection has been done using the following informational sources:

- The producer's report on the quantities placed on the domestic market;
- The data and information provided by the up-dated Country Programme;
- The data registered in the Local Environmental Protection Agencies databases as a result of conducting permitting and inspection of activities having environmental impact
- Direct contact with CTC end-users.

During July - December 2004, ICIM Bucharest updated the inventory with the support of the National Environmental Protection Agency, Local EPA's and NOU. The results were compared to those found by the National Ozone Unit for the years 2000 – 2001, during the preparatory stage of the National OD Solvents Phase-out Project. The consumption data presented in the updated Country Programme for the period 2000 -2001 show that large quantities of CTC have been placed on the market for solvent uses, both for industrial degreasing processes and small size applications. There is a large difference between the identified end uses in SSEs consumption and the total reported quantity placed on the market, keeping in mind that most of the industrial applications converted to alternatives during that period. It can be concluded that more than 50% of the small size users were not individually registered at that time. Table 9 shows the distribution of CTC consumption as quantities placed on the market by the major distributors compared with the total quantity reported by the identified SSEs.

Table 9: Distribution of CTC consumption during 2000 –2004

Year	Consumption (placed on the marked) MT		Consumption (reported by the identified SSEs) MT
	Degreasing / Cleaning	Process Agent	
2000	152.02	111.78	7.83
2001	72.75	65.35	6.03
2002	11.80	179	No detailed survey conducted
2003	14.28	143	13.92
2004	0	148.48	5.40

It was observed that the number of CTC users decreased considerably after 2001 due to the implementation of Law no.159/2000 provisions, which introduced severe restrictions. In the same time, the Ozone Unit provided guidance to the territorial authorities for environment, in charge with permitting procedures, in order to introduce these restrictions in the issued environmental permits. This cooperation had an immediate effect shown by the reduction of the consumption.

In 2004, the identified SSEs used CTC from the amounts previously acquired, because following the enforcement of the Law no.159/2000 the place on the market of CTC was stopped.

During 2005, ICIM Bucharest continued the survey activities on all SSEs identified as CTC end-users in order to supervise CTC phase-out. Each individual company was directly contacted by ICIM in order to validate the data previously reported and to fill in the gaps regarding the chosen alternatives for CTC phase-out.

RESULTS ON CTC PHASE-OUT SURVEY ACTIVITIES

During 2004, CTC was still used for:

- dry cleaning,
- metal degreasing,
- process agent*, and
- laboratory applications*,

*) application still permitted by the Montreal Protocol.

Dry cleaning

The sector includes around 450 small and medium-sized dry cleaning units, the majority being private owned. Until 1989 the dry cleaning shops had used CTC. Since 1990 CTC has been replaced mainly by perchlorethylene.

The use of better quality fibbers in textile industry led to increased efficiency for dry cleaning, subsequently decreasing the amount of used solvent. Soaps and detergents were also used as alternatives to CTC, where possible and efficient.

In the end of 2004, there were only two CTC users left in textile industry: SC EMA SA Piatra Neamt and SC ASCO Bacau. They used in 2004 the total quantity of 143 kg CTC.

SC ASCO Bacau replaced CTC with detergents and soap in the end of 2004.

In 2005, SC EMA SA Piatra Neamt phased out CTC use, replacing it with non OD solvent. The company uses now better quality fibbers that increased textile fibbers cleaning efficiency and minimised the amount of solvent for dry cleaning. The unit still have a stock of 400 Kg CTC following to be destroyed under control.

Metal degreasing

In 2003 - 2004, CTC was still used as a degreasing agent in oxygen stations for oxygen cylinders and for the components of filling lines. These users were highly reserved in using alternative solvents because advanced cleaning is mandatory in order to avoid explosion.

The main company using solvents in the metal degreasing process was S.N.P. Petrom - Arpechim, Pitesti Branch. The company manufactures industrial gases including Nitrogen and Oxygen and operates cylinder-filling equipment. CTC was used as degreasing agent for oxygen cylinders and filling line components. In 2004, the company obtained technical and financial assistance from the Multilateral Fund. The on-going CTC phase-out project identified perchloroethylene as the suitable alternative for CTC. The project will be completed in 2005.

Metallic parts/surfaces degreasing was another application where CTC was still used in 2004. A total consumption of 841 kg CTC was registered for 16 companies, in 2004. During 2004, 14 companies shifted to perchloroethylene or trichloroethylene, and the other two stopped this activity.

In 2005, the following companies were identified as CTC users :

- Oxygen Plant - Hunedoara (currently SC Mittal Steel SA Hunedoara) used CTC as degreasing agent for the oxygen cylinders and lines cleaning. At the end of 2004, the unit had a stock of 70.5 kg CTC. The entire amount of CTC was used during the first semester of 2005. CTC use

was phased-out in the mid of 2005, halogenated solvents (trichloroethylene /perchloroethylene) being chosen as alternative;

- SC Electrocentrale Oradea SA – power generation unit, used CTC for degreasing fittings and vents at the hydrogen station. Degreasing was performed in open system each two years, requiring about 20 kg of CTC. The unit was informed about the degreasing methods used in similar installations in Romania, consisting in a multistep procedure (oxygen removal with CO₂, followed by cleaning with detergents, trichloroethylene, acetone or alcohol based solvents). The unit initiated actions (contact with other hydrogen station owners) for complying with legal demands. Starting July 2005, the unit does not use CTC anymore and has no stock of CTC.
- SC Uzina Constructoare de Masini Resita SA – engineering company. The company used 55 kg of CTC in 2004, and 34 kg CTC in 2005 for degreasing activities in its Oxygen Plant. The unit was highly reticent to CTC replacement at the oxygen station due to a past accident during a trial performed at this plant. Perchloroethylene and trichloroethylene were indicated as alternatives. Units performing the same degreasing activity were indicated for contact. The environmental protection responsible was noticed that CTC lack on the market would be another pressure on choosing a viable alternative. The unit initiated activities to identify the best alternative, in order to comply with legal requirements. The unit declared CTC phase out, the stock of 208 kg CTC following to be destroyed under control.

Other appliances

Rubber peeling. A special mention have to be made in connection to the solvent formulation resulting as by-product at Chimcomplex Borzesti Company and used as rubber peeling agent in the same company. These annual quantities of about 100 – 150 MT formulation containing 18 - 30% CTC (depending on raw materials quality) have been classified as hazardous wastes and then forbidden to be used in opened systems applications. According to the National Waste Management Plan, elaborated with the technical assistance of German Government and approved by the Romanian Government in 2004, these hazardous wastes will be eliminated by controlled incineration or co-incineration. The responsibility for this elimination belongs to the company. Due to this fact, the respective quantities of CTC were not further registered as consumption although safely stored stocks still exist. The local EPAs have the responsibility to check the elimination of these stocks in compliance with the national legislation. This application is under technical supervision of UNIDO for an appropriate technological solution.

Hydroinsulating materials production. By-product containing 15.38% CTC from Chimcomplex was used by SC Mateo SRL for the production of a hydroinsulating material. The amount of residue contracted in 2003 was of 394 MT of by-product. The current amount of 347 MT of by-product with 15.38 % CTC is in the custody of SC Chimcomplex as stock to be destroyed. The

use of the CTC containing by-product for hydroinsulating material production at SC Mateo SRL is not authorised by the local EPA.

Process agent. CTC production at Oltchim Ramnicu Valcea is used only as process agent within the unit, in order to obtain monochloroacetic acid, octyl chloroformiat (DOF), diethylhexylperoxycarbamate (DEHPC).

In 2004, CTC production was of 160 MT. The whole amount of CTC reported by SC OLTCHIM SA was used as process agent in company's own installations. CTC production stopped during 2004 and it will be restarted when needed as process agent only.

CTC delivery on the market stopped in 2004.

During January - April 2005, the amount of 35,99 MT CTC used only as process agent, was provided from the existents stock. The stock of CTC on 01.05.2005 was of 57,2 MT.

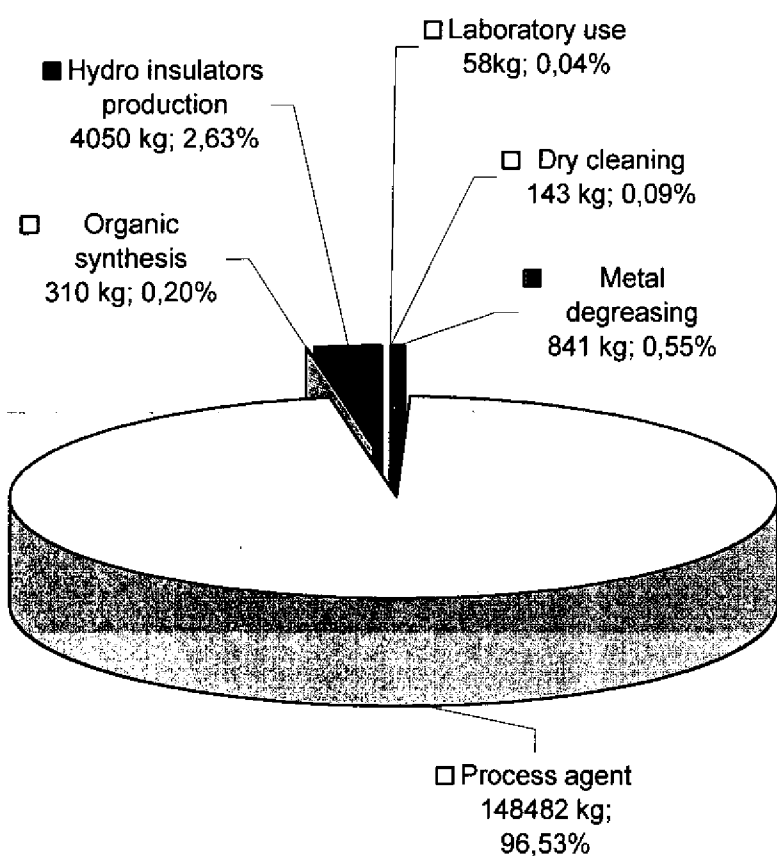
Organic synthesis. During 2003 – 2004, SC Azur Timisoara used CTC for organic synthesis. CTC use stopped in 2004 being replaced by dichloroethane.

Laboratory appliances. CTC use in laboratory appliances was not investigated as it is considered essential use still permitted by the Montreal Protocol. However, from the total of 63 companies registered as present or former CTC consumers, 8 economic agents were identified using CTC for lab appliances, but only 4 of them reported consumptions in 2004, in a total amount of 58 kg CTC.

Table 10: CTC consumption breakdown for 2004

Application	No. of identified CTC consumers	CTC consumption breakdown for 2004 (kg)
<i>Dry cleaning</i>	2	143
<i>Metal degreasing</i>	16	841
<i>Other appliances</i>		
Process agent	1	148482
Organic synthesis	1	310
Hydro insulating material production	1	4050
Laboratory use	4	58

Fig. 1 : Breakdown of CTC consumptions identified for 2004



According to the results of the survey, only 2 companies still used CTC in 2005: SC Uzina Constructoare de Masini Resita SA and SC Mittal Steel SA Hunedoara – as degreasing agent in the oxygen plant. CTC consumption in 2005 was of 104.5 kg. Both units stopped CTC use in 2005. The previously mentioned consumption does not include the laboratory use and does not take into consideration the quantities of by-products and process agent. ***This quantity complies with the provision of the Montreal Protocol regarding the reduction schedule for Annex B Group II – CTC.***

Table 11: Reduction schedule for Annex B Group II – CTC

Annex B Group II CTC	Consumption MT
Base level (Average 1998-2000)	224.37
85% reduction January 1, 2005	33.66 Achieved

The list of the investigated CTC end-users, applications, CTC consumptions and applied alternatives is presented in Annex 1.

6. CONCLUSIONS

In the framework of Romania's phase out program for the Montreal Protocol, it was identified the need to elaborate a National Strategy and Action Plan for OD Solvents phase-out, and to develop an Action Plan to raise awareness for OD Solvents phase-out. Implementation of the Action Plan for OD Solvents phase-out involved survey and monitoring activities of end-users, while the awareness program was focused on training and technical assistance activities.

ICIM in cooperation with NOU developed the National Strategy and Action Plan for OD Solvents phase-out and designed the Awareness Program.

The Awareness Program promoted by NOU of Romania in cooperation with ICIM aimed increasing awareness on: the Montreal Protocol, on OD Solvents and their harmful side effects, on ODS rules and regulations, on OD solvents usage and also on the viable alternatives to those solvents. The National Awareness Program was targeting the public - on broader parameters including the harmful effects of ODS, Ozone Layer depletion and non ODS use, and also the local EPAs - for institutional and legislative strengthening. But given the short time to address the solvent sector phase out, concentrated awareness addressed the industry, as it was thought as a key to facilitate switchover CTC use to non-OD alternatives.

ICIM elaborated brochures, posters and CD's containing information on the above mentioned issues and distributed them to the local EPAs, both as direct receptors of information and as distributors to the CTC end-users under their jurisdiction.

The relevant information on OD Solvents health and environment effects reached the public through the information distributed by the local EPAs, that have direct contact with local public and NGOs, or through the Internet site of Ministry of Environment and Water Management.

Special attention was paid to long-term measures regarding public education. The Ministry of Environment and Water Management set an agreement with the Ministry of Education and Research that contains provisions regarding the introduction in the scholar curricula, of issues related to the Montreal Protocol and ODS use and phase-out. Brochures, posters and a presentation elaborated by ICIM and containing information on the ozone layer, the Vienna Convention and Montreal Protocol and on OD Solvents, was sent to the Ministry of Education and Research to support the development of an adequate scholar curriculum.

ICIM contributed to the implementation of the National Strategy and Action Plan for OD Solvents phase-out by conducting a survey for the identification of remaining users in Romania and quantities of CTC to be phased-out. Survey covered all industrial units in various sub-sectors involved in cleaning and process agent applications consuming ODS and also included the national CTC manufacturer.

As result of the survey activities, the previous discrepancies between the CTC amounts placed on the market and the quantities reported by the end-users no longer existed in 2003. Starting 2004, the only CTC producer in Romania stopped CTC placement on the market. The entire CTC consumption registered in 2004 was based on the existing stocks.

The training and technical assistance activities focused on the CTC end-users accelerated CTC phase-out, contributing to the compliance with the requirements of Montreal Protocol Phase-out schedule.

According to the results of the survey, only 2 companies still used CTC in 2005 as degreasing agent in oxygen plants. The operators of oxygen and hydrogen stations were the most reticent to CTC replacement due to security reasons or past accidents. CTC consumption in 2005 was of 104.5kg. **Both units stopped using CTC in 2005.** The previously mentioned consumption does not include the laboratory use and does not take into consideration the quantities of by-products and process agent. This quantity complies with the provision of the Montreal Protocol regarding the reduction schedule for Annex B Group II – CTC.

Survey results show that CTC was phased out in Romania in 2005. Most of previous CTC users chose other chlorinated solvents as alternatives, but following the latest findings, non-solvent alternatives seem to be more frequently applied due to the impact of halogenated solvents on health, safety and environment.

List of Investigated CTC End-Users, Applications, CTC Consumptions and Applied Alternatives

No.	Agent	County	Application	CTC consumption identified in 2003 (kg)	CTC consumption identified in 2004 (kg)	CTC consumption in 2005 (kg)	Comments 2004	Comments 2005
1	SC AROMET SA	Buzau	CTC use in degreasing application at oxygen station	5	5	0	Identified in 2004; request for supplying with documentation about viable alternatives of OD solvents and related legal regulations	CTC replaced by perchloroethylene. Zero stock at 01.01.2005
2	SC ROTEC SA	Buzau	CTC use in degreasing application at oxygen station	15.9	0	0	Identified in 2004	Stock at 01.01.2005 -10 kg. CTC replaced by trichloroethylene, 15 kg trichloroethylene used in 2004
3	SC ENERGIA Constanta	Constanta	CTC and trichloroethylene in oxygen plant	0	0	0	CTC use phased-out in 2001	CTC use phased-out in 2001. 284 kg trichloroethylene used in 2004
4	SC MEFIN SINAIA	Prahova	Perchloroethylene and CTC Metal degreasing applications (spare parts of machine)	95	63	0	CTC use phased-out at the end of 2004	CTC phased out in 2004; CTC replaced by kerosene and ethylic alcohol
5	SC FERAL SRL Tulcea	Tulcea	CTC in degreasing application - oxygen station	0	0	0	Identified in 2004 as former user of CTC	Degreasing stopped; replacement by perchloroethylene is taken into consideration for potential future activities
6	SC REMAT SA	Tulcea	CTC in degreasing application - oxygen station	0	0	0	400 l CTC used in 2000; CTC phased-out due to its lack on the market	
7	SNP Petrom - Arpechim Pitesti	Arges	CTC in degreasing application - oxygen station	4282	0	0	CTC use phased-out	CTC replacement with perchloroethylene starting 2004; not used in 2004 - CTC replaced by perchloroethylene
8	PROEMAT - Pitesti	Arges	CTC cleaning applications - oxygen station	1000	340	0	Identified in 2004 CTC will be replaced by perchloroethylene	CTC has been replaced by perchloroethylene starting 2004
9	SC Uzina Constructoare de Masini Resita SA	Caras Severin	CTC in degreasing application (oxygen station); Perchloroethylene: other metal spare parts degreasing	76	55	34	request for legal and technical information. The environmental protection responsible was noticed that CTC lack on the market will be another pressure on choosing an viable alternative.	Highly reticent to CTC replacement at the oxygen station due to a past accident during a trial performed at this plant. 208 kg stock of CTC at 01.12.2005. Perchloroethylene and trichloroethylene were indicated as alternatives. Units performing the same degreasing activity were indicated for contact. The unit declared CTC phase out. the stock following to be destroyed under control
10	Electroputere DRSMG Craiova	Dolj	CTC/perchloroethylene - oxygen station spare parts degreasing	500	0	0	CTC phased out	CTC has been replaced by perchloroethylene starting 2004
11	SC REMPE SA Deva	Hunedoara	CTC oxygen station cleaning applications	31	25	0	the unit will stop this activity	The unit ceased the activity in 2005
12	SC GEROM INTERNATIONAL Aninoasa	Hunedoara	CTC oxygen station cleaning applications	27	30	0	Identified in 2004 In 2005 CTC will be replaced by trichloroethylene	CTC replaced by trichloroethylene in 2005

No.	Agent	County	Application	CTC consumption identified in 2003 (kg)	CTC consumption identified in 2004 (kg)	CTC consumption in 2005 (kg)	Comments 2004	Comments 2005
13	Oxygen Plant - Hunedoara (currently SC Mittal Steel SA Hunedoara)	Hunedoara	CTC oxygen station cleaning	28	58	70.5	70.5 kg CTC stock at the beginning of 2005. CTC use will stop in 2005	CTC replaced by trichloroethylene/perchloroethylene in 2005. Information on HES were provided. The entire amount of 70.5 kg CTC was used during the first semester of 2005.
14	SC Energomontaj Halanga Mehedinti	Mehedinti	Metallic surfaces degreasing	120	20	0	EPA sent notification for CTC replacement. The company will apply an acceptable alternative - probable oxygen plant closure and acquisition of a storage tank or acquisition of permitted solvents	CTC phased-out. Information on HES aspects related to trichloroethylene and perchloroethylene was provided
15	SC MEVA SA	Mehedinti	CTC cleaning applications - oxygen, CO2, Ar, acetilene plant	0.5	0	0	Identified in 2004 Oxygen plant closed. Storage equipment serviced by Linde Gaz	
16	SEVERNAV	Mehedinti	CTC degreasing applications - oxygen station	50	50	0	Identified in 2004 CTC will be replaced by trichloroethylene in 2005	CTC replaced by trichloroethylene
17	SC ARTROM SA Olt	Olt	CTC degreasing application - oxygen station	90	0	0	CTC phased out in 2004	CTC phased out, new solvent cleaning machine purchased in 2004. Starting 2004, the ecological solution of HELP SET 8 is used
18	SC OLTCHIM SA*	Valcea	CTC as process agent Perchloroethylene production CTC production O2 - N2 plant cleaning applications	143000	148482	N/A	* process agent At present, perchloroethylene is used at the Chlorinated solvents plant CTC production plant closed in 2003	The whole amount of CTC reported by SC OLTCHIM SA was used as process agent in company's own installations. CTC production at Oltchim is used only as process agent within the unit. CTC production in 2004 was of 160 MT. The stock was of 81.762 MT on 01.01.2004, respectively of 93.19 MT on 21.12.2004. CTC production stopped during 2004 and it will be restarted when needed as process agent only. CTC delivery on the market stopped in 2004. During January - April 2005, the amount of 35.99 MT CTC used only as process agent, was provided from the existents stock. The stock of CTC on 01.05.2005 was of 57.2 MT.
19	SC Electroltrale Oradea SA	Bihor	CTC degreasing applications - H2 station	13.5	25.5	0	Identified in 2004	Highly reticent for CTC replacement at the hydrogen station, for degreasing fittings and vents. Degreasing was performed in open system each two years and required about 20 kg of CTC. The unit was informed about the degreasing methods used in similar installations in Romania, consisting in a multistep procedure (oxygen removal with CO2, followed by cleaning with detergents, trichloroethylene, acetone or alcohol based solvents). The unit initiated actions (contact with other H2 station owners) for complying with legal demands. Starting July 2005, the unit does not use CTC anymore and has no stock of CTC.
20	SC SCORPION Oradea	Bihor	CTC degreasing applications - oxygen station	0	0	0	Identified in 2004 as former user of CTC	CTC has been replaced by tetrachloroethylene (perchloroethylene)

No.	Agent	County	Application	CTC consumption identified in 2003 (kg)	CTC consumption identified in 2004 (kg)	CTC consumption in 2005 (kg)	Comments 2004	Comments 2005
21	SC EMA SA Piatra Neamt	Neamt	CTC in textile cleaning application	21	63	0	Identified in 2004 request for legal and technical information	Information on technical and legal aspects concerning CTC phase-out was provided. Alternatives of perchloroethylene, detergents or soap were indicated. The unit phased out CTC use in 2005, replacing it with non OD solvent. The unit still have a stock of 400 Kg CTC following to be destroyed under control.
22	SC CHIMP-COMPLEX SA Borzesti*	Bacau	Solvent containing 18-30% CTC is obtained as byproduct	150 000kg by-product containing 25-30%CTC	120 000kg by-product containing 25-30%CTC	N/A	* CTC results as a by-product from methylene chloride production. The by-product was previously used as peeling agent within the unit. The by-product is stored within the unit, following to be destroyed.	Until 2004, the by-product resulting from methylene production and containing CTC was used for rubber peeling inside the unit. At present, the by-product is stored within the unit, following to be destroyed. This application is under technical expertise of UNIDO in order to identify the appropriate technical solution to minimise CTC production in the process.
23	SC MATEO SRL Onesti	Bacau	manufacturing of hydro-insulators	20900 kg by-product containing 15.38% CTC	26330 kg by-product containing 15.38% CTC	0	the amount of residue contracted in 2003 was of 394 290 kg by-product with 15.38 % CTC; the current amount of 347 060 kg by-product with 15.38 % CTC is in the custody of SC Chimcomplex (53 377.83 kg CTC), stock to be destroyed. This activity is not authorised by the local EPA.	This activity isn't authorised and won't be authorised by the local EPA.
24	SC SILCOTUB SA	Zalau	CTC applications Oxygen plant	30	0	0	During 01.01.-30.06.2003 CTC was replaced by trichloroethylene (trichloroethylene consumption of 60 kg). Since July 2003, the oxygen station was rented to SC Remat and it was closed in 2004.	
25	SC Electroturris SA Turmu Magurele	Alexandria	Oxygen station - degreasing	0	0	0	In 2004 the company's assets were liquidated. At present, the oxygen station is being preserved. Since 2003, CTC has been replaced with perchloroethylene. CTC is used only for laboratory analysis.	
26	SC Electrocontact SA	Botosani	Metal surfaces degreasing	0	0	0	CTC was replaced by perchloroethylene in 2001	
27	CN ROMARM UM Orastie SA	Hunedoara	Metal degreasing for metal testing	15	0	0	application stopped	
28	SC FAVOR Vidra SA Orastie	Hunedoara	Testing of leather during processing	8.5	0	0	application stopped	
29	SC Terapia SA	Iasi	Pharmaceutical plant	2	0	2	SC Terapia SA is a pharmaceutical unit where double distilled alcohol is the only solvent used ; at present CTC is used for laboratory activities only	about 2 kg CTC - only laboratory use
30	SC TOMIRIS SA	Iasi	Textile cleaning	15	0	0	CTC phased out	

No.	Agent	County	Application	CTC consumption identified in 2003 (kg)	CTC consumption identified in 2004 (kg)	CTC consumption in 2005 (kg)	Comments 2004	Comments 2005
31	SC NICOLINA SA	Iasi	Oxygen manometers and tubes degreasing	0	0	0	CTC phased out in 2002	CTC acquisition stopped in 1998, being evaluated as too expensive. Only permitted solvents are used at present (white spirit, technical alcohol, a.s.o). CTC was replaced by technical alcohol in 2003.
32	SC REMAR Pascani	Iasi	Oxygen manometers and tubes degreasing	57	0	0	CTC phased out	
33	SC PETROTUB SA Roman	Piatra Neamt	Oxygen plant degreasing Detaining CTC nor in use	10	10	10	The stock of 350 kg CTC was returned to Olchim in 2003 only laboratory use at present	about 10 kg CTC - only laboratory use
34	SC AZOCHIM SA Savinesti	Piatra Neamt	Metal surfaces degreasing	0	0	0	Former CTC user CTC use replaced with gas oil	
35	SC ARO SA Campulung	Pitesti	Cars producer - Metal degreasing	23	0	0	only laboratory use of CTC	no functional unit
36	SC Petrouliai Campina	Ploiesti	Degreasing oxygen cylinders	10	0	0	CTC phased out	Trichloroethylene is used for oxygen cylinders degreasing
37	SC Progresul SA	Ploiesti	Oxygen manometers and tubes degreasing	25	0	0	In 2004 no substances regulated by GO 89/1999 was used	
38	SC Ubermar SA	Ploiesti	Oxygen station degreasing/cleaning process	8	5	0	CTC will be replaced by substances with similar degreasing properties	CTC replaced by non OD substances
39	SC PETROBRAZI SA	Ploiesti	Metal pieces degreasing	50	39.3	40	CTC use for oxygen plant degreasing stopped; only laboratory use starting 2003	CTC use for O ₂ , N ₂ plant degreasing stopped; O ₂ , N ₂ plant in standby regime since 2003; only laboratory use of CTC starting 2003
40	SC TIMKEN Ploiesti	Ploiesti	Organic substances extraction	4	0	0	only laboratory use of CTC for the determination of the processing fluids concentration; no longer used method (3 kg stock)	
41	UPETROM	Ploiesti	Oxygen station degreasing - cleaning process	480	0	0	CTC replaced by perchloroethylene on 22.10.2003; Replacement with trichloroethylene on December 2004	
42	SC Arsenal - Resita	Resita	Oxygen station degreasing - cleaning process	25	0	0	CTC phased out	CTC replaced with perchloroethylene
43	SC Caromet Caran Sebes	Resita	Oxygen station degreasing - cleaning process	0	84	0	the company was notified by the local EPA about the mandatory CTC replacement. CTC to be phased out in 2005	gasoline, toluene and perchloroethylene are used at present; the oxygen plant is in standby regime, a storage tank being used
44	CS Resita	Resita	Oxygen station degreasing - cleaning process; engine degreasing workshop	0	0	0	CTC phased out engine degreasing workshop closed	CTC replaced mainly by technical alcohol
45	SC UNIO SA	Satu Mare	Oxygen plant Degreasing/cleaning process	27	0	0	CTC phased out	CTC replaced by detergents only laboratory use
46	SC ALPROM Slatina	Olt	Oxygen plant Degreasing/cleaning process	3	3	3	CTC still used for laboratory analysis	
47	SC Romvag Slatina	Olt	Oxygen plant Degreasing/cleaning process	0	0	0	CTC phased out in the middle of 2002	

No.	Agent	County	Application	CTC consumption identified in 2003 (kg)	CTC consumption identified in 2004 (kg)	CTC consumption in 2005 (kg)	Comments 2004	Comments 2005
48	SC Termica SA	Suceava	Hydrogen station Cleaning/degreasing component parts	25	10	0	CTC to be replaced in 2005; ethylic alcohol was acquired in order to replace CTC in 2005	CTC replaced by ethylic alcohol
49	SC LINDE GAZ ROMANIA SRL Timisoara	Timis	Oxygen station degreasing - cleaning process	0	0	0	CTC replaced by trichloroethylene in 2003	
50	SC AKER	Tulcea	Metal degreasing/cylinders, parts	16.25	22.82	0	Small amounts of CTC used in 2003 and 2004 only for special ducts (acetylene). Metallic parts degreasing with non-OD solvents. Oxygen plant closed on 12.06.2003. Oxygen supplied by Linge Gaz. 297 kg CTC and 1512 kg exhausted CTC in stock - problem to be solved when a company to overtake and destroy CTC will be identified.	297 kg CTC and 1512 kg exhausted CTC in stock - problem to be solved when a company to overtake and destroy CTC will be identified.
51	Gironde CONF SRL	Bucuresti	Textile cleaning	31	0	0	CTC phased out	
52	MegaConstruct	Bucuresti	Metal degreasing/cleaning	55	0	0	Metal degreasing/cleaning activity stopped in 2003	
53	Vulcan SA	Bucuresti	Metal degreasing/cleaning	26	0	0	CTC phased out	
54	Nuclear Vacuum SA	Ilfov	Metal degreasing/cleaning	120.4	0	0	CTC phased out	CTC replaced by perchloroethylene
55	SC Industria Sarnei SA Campia Turzii	Cluj	Oxygen station degreasing - cleaning process Laboratory analysis	33	6	6	only laboratory use starting 2001	Trichloroethylene is used for oxygen station degreasing/cleaning processes; Trichloromethane use for certain analyses, but small amounts of CTC are still used for laboratory purposes where no alternative was found.
56	SC Termoelectrica SA	Ploiesti	Degreasing	7	0	0	No substance regulated by the GO 89/1999 was used in 2004	
57	SC Moldovin SA Vaslui	Vaslui	Degreasing agent - oxygen plant	3	20	0	Trichloroethylene or tetrachloroethylene will be used	CTC phased-out; Trichloroethylene and tetrachloroethylene are used as alternatives
58	SC HIPERION SA STEI	Bihar	CTC Degresare instalatie producere oxigen		27	0	Identified in 2004 CTC to be replaced by perchloroethylene in 2005	CTC replaced by perchloroethylene
59	AGA CUG GAZ	Cluj	Oil removal from filtering material	400	0	0	CTC phased out	
60	S.C. Arteca S.A. Jilava	Ilfov	Metal surfaces degreasing	0	0	0	CTC previously used for reinforcement bars degreasing was replaced by perchloroethylene (perchloroethylene consumption in 2004 - 140 000 kg)	
61	SC Azur Timisoara	Timis	production of organic compound	2400	310	0	zero stock. CTC replaced by dichloroethane in 2004	
62	SC TEROM SA IASI	Iasi	production of polyester fibers and foils	350	0	0	CTC phased out	CTC replaced by technical alcohol

No.	Agent	County	Application	CTC consumption identified in 2003 (kg)	CTC consumption identified in 2004 (kg)	CTC consumption in 2005 (kg)	Comments 2004	Comments 2005
63	SC ASCO BACAU	Bacau	Textile cleaning	92	80	0	CTC to be replaced with detergents and soap	CTC replaced with detergents and soap in the end of 2004
	TOTAL (without stocks, byproduct and process agent)			13920	5402	165.50		TOTAL CTC consumption in 2005 (maintaining the CTC laboratory consumption for 2004)
	TOTAL (without stocks, byproduct, process agent and laboratory)			13822	5344	104.50		TOTAL CTC consumption in 2005, except laboratory use