

## Hungary

### Technical Support and Investment Project for the Phaseout of Ozone Depleting Substances

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Project Document  
October 1995



THE WORLD BANK



**CURRENCY EQUIVALENT**

(August 1995)

Hungarian Forint 125.00 = US\$1.00

**WEIGHTS AND MEASURES**

The metric system is used throughout this report.

**GLOSSARY OF ABBREVIATIONS**

CB	Corvin Bank
CEE	Central and Eastern Europe
CFC	Chlorofluorocarbon
CTC	Carbon Tetrachloride
FA	Financial Agent
FSU	Former Soviet Union
GEF	Global Environment Facility
GET	Global Environment Trust Fund
GIS	Geographic Information System
GOH	Government of Hungary
HCFC	Hydrochlorofluorocarbon
HF	Hungarian Forint
HFC	Hydrofluorocarbon
ICB	International Competitive Bidding
IEM	Institute for Environmental Management
IS	International Shopping Procedures
LIB	Limited International Bidding
MERP	Ministry for Environment and Regional Policy
MFMP	Multilateral Fund for the Implementation of the Montreal Protocol
MP	Montreal Protocol on Substances that Deplete the Ozone Layer
NBF	Not Bank-Financed
NBH	National Bank of Hungary
NCB	National Competitive Bidding
NS	National Shopping Procedures
OD	Operational Directive
ODP	Ozone-Depleting-Potential
ODS	Ozone Depleting Substances
OORG	Ozone Operations Resource Group
PAA	Project Administration Agreement
PCE	Perchloroethylene
PIM	Project Implementation Manual
PIU	Project Implementation Unit
PU	Polyurethane
SDR	Special Drawing Right
SOE	Statement of Expenditures
STAP	Scientific and Technical Advisory Panel
TAG	Technical Advisory Group
TCE	1,1,1-Trichloroethane
UNEP	United Nations Environment Program
USD	United States Dollar
3R	Recovery, Reclamation, and Recycling

**HUNGARY: FISCAL YEAR (FY)**

January 1 to December 31



**Part I: Project Summary**



**HUNGARY**  
**TECHNICAL SUPPORT AND INVESTMENT PROJECT**  
**FOR THE PHASEOUT OF OZONE DEPLETING SUBSTANCES**

**GRANT AND PROJECT SUMMARY**

**Recipient:** Hungary

**Beneficiary:** Ministry for Environment and Regional Policy and  
Investment Sub-Project Beneficiaries

**Grant Amount:** US\$6.9 million

**Terms:** Grant

**Financing Plan:**

Source	Local	Foreign	Total
	(US\$ Million)		
GET Grant	1.825	5.075	6.900
Participating Enterprises	0.631	0.862	1.493
<b>TOTAL</b>	<b>2.456</b>	<b>5.937</b>	<b>8.393</b>

**Economic Rate of Return:** Not calculated, though substantial economic and environmental benefits

### Hungary ODS Phaseout - Summary of Sub-Project Data and Costs

Sub-Project	Sector	Types of ODS Used	Annual ODS Use (Tons of ODS)	Annual ODP Phaseout <sup>1</sup>	Percentage of Exports to Non-GEF Countries	Incremental Capital Cost <sup>2</sup>	Incremental Operating Cost <sup>2</sup>	Total Project Cost	Requested GEF Grant
1. Project Implementation Unit	Institutional	-	-	-	-	\$77,410	\$195,590	\$273,000	\$244,500
2. Refrigeration Association	Refrigeration	CFC-11/12 CFC-502	450.00	450.00	0.00	\$2,042,670	\$0	\$2,042,670	\$1,415,495
3. Frigolux	Refrigeration and Foam	CFC-11/12 CFC-502	15.60	15.60	0.00	\$572,864	\$0	\$572,864	\$476,064
4. Hajdusági Ipari és Kereskedelmi Társaság	Foam	CFC-11	63.00	63.00	15.00	\$1,071,000	\$335,202	\$1,406,202	\$998,642
5. Metalucon	Foam	CFC-11	45.60	45.60	0.00	\$698,562	\$186,046	\$884,608	\$724,319
6. Metisol	Foam	CFC-11	80.00	80.00	0.00	\$441,207	\$0	\$441,207	\$346,022
7. Mediroll	Aerosol-Propellant	CFC-12	107.00	107.00	0.00	\$15,379	\$42,874	\$58,253	\$53,399
8. Auto-mobil	Aerosol-Propellant	CFC-11 TCE	92.00 47.60	96.76	0.00	\$19,537	\$63,975	\$83,512	\$83,512
9. MMG-AM	Solvent	TCE CFC-113	87.00 3.50	12.20	9.91	\$1,506,100	(\$272,921)	\$1,233,179	\$1,205,800
10. Hitelap	Solvent	TCE	32.00	3.20	8.13	\$193,940	(\$14,151)	\$179,789	\$179,789
11. Tisza Shoe	Solvent	CFC-11 TCE	3.70 19.86	5.69	35.20	\$211,390	(\$35,342)	\$176,048	\$131,617
12. Finomméchanikai	Solvent	CFC-113	1.45	1.16	0.00	\$39,150	(\$5,580)	\$33,570	\$33,570
13. BRG Radiotechnikai	Solvent	CFC-113	1.50	1.20	0.00	\$0	\$22,845	\$22,845	\$22,160
14. Rutitex	Solvent	CFC-11 CFC-113	7.61 0.33	6.42	0.00	\$355,120	(\$14,720)	\$340,400	\$340,400
15. Fire Protection Association	Fire Extinguisher	H-1211 H-1301	85.13 1.43	269.70	0.00	\$321,000	\$0	\$321,000	\$321,000
<b>Subtotal</b>	-	-	<b>1,144.31</b>	<b>1,157.53</b>	-	<b>\$7,565,329</b>	<b>\$369,152</b>	<b>\$8,069,057</b>	<b>\$6,576,289</b>
Financial Agent Fee (2.50% of Grant Request for Sub-Projects 2-15)	-	-	-	-	-	-	\$158,295	\$158,295	\$158,295
Contingency (2.52% of Grant Request for Sub-Projects 1-15)	-	-	-	-	-	-	\$165,416	\$165,416	\$165,416
<b>Total</b>	-	-	<b>1,144.31</b>	<b>1,157.53</b>	-	<b>\$7,565,329</b>	<b>\$692,863</b>	<b>\$8,392,768</b>	<b>\$6,900,000</b>

1/ Ozone-Depleting-Potential (ODP) is a concept which has been developed to aggregate the impacts of all ozone depleting substances (ODS) on the ozone layer. Since not all ODS are equally damaging to the ozone layer, their effects on the ozone layer must be weighted by the appropriate damage factor. For example, CFCs are ten times as damaging as 1,1,1-Trichloroethane (TCE), so TCE only receives a weight of 0.10.

2/ Incremental costs are defined as those costs of ODS phaseout which would not have been incurred in the absence of the Montreal Protocol. Estimates of incremental capital and operating costs are based on the methodology developed by the Montreal Protocol and Global Environment Facility.



## **HUNGARY**

### **TECHNICAL SUPPORT AND INVESTMENT PROJECT FOR THE PHASEOUT OF OZONE DEPLETING SUBSTANCES**

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#### **INTRODUCTION**

1. The Vienna Convention for the Protection of the Ozone Layer (1985) and the Montreal Protocol on Substances that Deplete the Ozone Layer (1987) (MP) are international environmental agreements which call for the phaseout of substances that deplete the stratospheric ozone layer. More than 100 countries representing over 95 percent of world consumption of these substances have ratified the Montreal Protocol and Vienna Convention. The Montreal Protocol with its amendments and adjustments now mandates the complete phaseout of production and consumption of a number of ozone depleting substances (ODS) in developed and most developing countries by January 1, 1996.

3. All industrialized countries in the world have undertaken comprehensive national programs to develop cost-effective strategies to phase out the use of these substances in the various end-user sectors. The largest family of ODS is chlorofluorocarbons (CFCs) which are widely used in various industrial applications including: domestic, commercial and industrial refrigeration and air conditioning, flexible and rigid insulation foam, and in numerous applications such as aerosol propellants and solvents, among others.

4. Hungary is fully committed to the complete phaseout of the consumption of regulated substances by 1996 as mandated by the Montreal Protocol and its amendments. Hungary acceded to the Vienna Convention and the Montreal Protocol in 1989, and the London Amendments to the Montreal Protocol in November, 1993. It formally ratified the Copenhagen Amendments in May 1994. However, Hungary has not been designated as a developing country under the Montreal Protocol, and is therefore not eligible for financial assistance from the Multilateral Fund for the Implementation of the Montreal Protocol (MFMP). Global Environment Facility (GEF) resources will therefore be required to finance the Project under the Reduction of the Ozone Layer Depletion component.

5. Hungary has been actively planning its ODS phaseout strategy since 1992. A comprehensive Country Program for the Phaseout of Ozone Depleting Substances in Hungary was undertaken, with Bank support, and completed in October 1994. This study served as the basis for establishing the priorities for the Hungarian Government, and for identifying key policy and regulatory measures which would be required to support a cost effective phaseout, which would also minimize disruptions to the industrial sectors which utilize ODS. The activities proposed for funding under this Project are among those priorities identified in the Country Program.

#### **ODS SECTOR BACKGROUND**

6. All ODS in Hungary are imported from the European Union, mainly the United Kingdom, Germany, France, the Netherlands, and Italy. In addition, approximately 10 percent of ODS used in Hungary were exported in final products in 1993. For a few enterprises, the export market has effectively dictated the phaseout of ODS in advance of national legislation. Recovery and recycling of ODS will be required as of July 1, 1995 in the refrigeration and fire fighting sectors which together account for over 1/3 of ODS consumption. Thus far, the weakest area of phaseout has been in the solvents sector due to its considerably more fragmented nature.

7. In 1993, consumption of regulated ODS was approximately 2,224 metric tons. Compared to 1991, total annual ODS consumption fell by 43 percent, and was equivalent to 2,140 ozone-depleting-potential (ODP) in weighted tons. In terms of annual ODS consumption and ODP equivalent, Chlorofluorocarbons (CFCs) account for roughly three-quarters of the total. Consequently, the focus of the project should be on phasing out the use of CFCs. Refrigerator and freezer production and servicing account for approximately 43 percent of CFC use, and 33 percent of national ODS consumption. In addition, approximately 55 percent of the ODS used in the foam sector are for insulation for refrigeration devices. Consequently, refrigeration products and servicing account for roughly 49 percent of national ODS consumption. The remaining ODS consumption is quite evenly distributed with aerosols, foams, halons, and solvents each accounting for 11-15 percent.

## **RATIONALE FOR GEF INVOLVEMENT AND PROJECT ELIGIBILITY**

8. Most countries in Central and Eastern Europe (CEE) and the former Soviet Union (FSU) are not eligible for assistance from the Multilateral Fund for the Implementation of the Montreal Protocol (MFMP). Nevertheless, the total production and consumption of ODS in the CEE and FSU countries is equal to that of all the developing countries (including China, India, Brazil, and Thailand) which are eligible for MFMP assistance, and therefore ODS phaseout projects in Central and Eastern Europe represent an opportunity to achieve significant global environment benefits through the adoption of cost-effective technological interventions.

9. This Project has been developed and structured based on specific ODS phaseout requirements in Hungary (as outlined in the Country Program) and the general project eligibility criteria guidelines of the Montreal Protocol and the GEF Scientific and Technical Advisory Panel (STAP). Funding for this stratospheric ozone layer protection project is requested from the GEF on the basis that Hungary:

- (a) is eligible for GEF assistance;
- (b) is not classified as a developing country and is not eligible for funding from the Multilateral Fund for the Implementation of the Montreal Protocol;
- (c) has completed the preparation of a Country Program; and
- (d) has ratified the Vienna Convention and Montreal Protocol.

10. The Project consists of three components as follows: (i) an Institutional Strengthening Component; (ii) a Recovery, Reclamation, and Recycling Component (3R Component) for ODS used as refrigerants; and (iii) an Investment Component comprising thirteen Sub-Projects. It is consistent with international efforts in the field of ODS phaseout. The Sub-Projects are deemed to be effective and are essential interventions in order to quickly and successfully phase out the use of the controlled substances. This project will be among the first comprehensive and planned ODS phaseout program to be implemented in Central and Eastern Europe (the Czech Republic project is currently under implementation, and the Slovenian one under preparation).

## **PROJECT OBJECTIVES**

11. The principal objective of the Project is to assist Hungary in the phaseout of ODS consumption in a cost effective manner by the year 1996, as mandated by the Montreal Protocol and its amendments and adjustments. Specifically this Project will assist Hungary to:

- a. support the phaseout of the consumption of chlorofluorocarbons (CFCs) through adoption of new cost-effective CFC-free technologies;
- b. phase in the operation of a national network for recovery/reclamation/recycling (3R) of refrigerants (CFC-12 and CFC-11); and
- c. through institutional strengthening improve the capability of the Ministry for Environment and Regional Policy (MERP) to manage and oversee the phaseout of ODS in Hungary.

GEF support will provide an incentive for the early adoption of ODS phaseout activities and capture additional environmental and economic benefits which would otherwise either be lost or delayed. By focussing on the key sectors and enterprises, the project will phase out 1158 tons of ODP per year or roughly 54 percent of ODP weighted annual ODS consumption in Hungary.

## **PROJECT ELIGIBILITY AND DETERMINATION OF SUB-PROJECT INCREMENTAL COSTS**

12. For all GEF-funded ozone phaseout projects, the specific eligibility criteria developed for projects to be funded by the Multilateral Fund for the Implementation of the Montreal Protocol (MFMP) are used. The GEF Participants, which approved the funding of this Project, are also Parties to the Montreal Protocol and most of the GEF contributors are contributors to the MFMP. The application of the project eligibility criteria assured a fair and consistent assessment of the nature of activities which could be funded and of the maximum level of funding which could be allocated (i.e., the incremental costs of ODS phaseout). Incremental costs, as defined by the Parties to the Montreal Protocol, are the capital and operating costs incurred by the Participating Enterprise which they would otherwise not have incurred in the absence of the Montreal Protocol. The investment Sub-Projects proposed in this Project meet the project eligibility criteria established by the Parties to the Montreal Protocol, and were subject to the technical review and approval of the Ozone Operations Resource Group (OORG) which reviews all Sub-Projects financed by the GEF and the Montreal Protocol.

13. The level of funding for each Sub-Project was determined on the basis of the incremental costs at the Sub-Project level. The grant amount requested for each Sub-Project may be less than the incremental costs of the Sub-Project for several reasons: (i) operating savings are projected to accrue to the Participating Enterprise during Sub-Project implementation; (ii) the Participating Enterprise may be less than 100% Hungarian owned, so the grant amount must be pro-rated to the percentage of local ownership; (iii) the grant amount for any Participating Enterprise which exports a portion of its production to non-GEF eligible countries must be reduced based on the percentage of exports<sup>1</sup>. Other factors which must be considered in determining the Sub-Project incremental cost include, but are not limited to, the level of technology upgrade achieved by the Sub-Project, the impact on production capacity, and the cost of substitute materials. For all the Sub-Projects proposed as part of this Project, counterpart contributions have been made by the Participating Enterprises in terms of time for the preparation of the project documents and, in most cases, in the implementation of the Sub-Project, either through management time or through direct investment.

14. The Sub-Projects were selected on the basis of eligibility criteria from the list of potential Sub-Projects which had been identified during the preparation of the Country Program. The Sub-Projects were selected on the basis of their impact on ODS consumption, their potential for minimizing the impact

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<sup>1</sup> The grant amount for Participating Enterprises which export to non-GEF eligible countries is calculated as follows: (i) Participating Enterprises which export more than 70% of their production are ineligible for GEF support; (ii) companies which export less than 10% of their production are eligible for 100% financing of incremental costs; and (iii) companies which export between 10% and 70% of their production are eligible for financing of incremental costs based on the following formula -- Grant Amount = Incremental Costs \* (1.10 - Percentage of production which is exported to non-GEF eligible countries).

of ODS phaseout on the economy. The Participating Enterprises were selected on the basis of their capacity to undertake the Sub-Projects, their technological leadership positions, or their special situation within the context of ODS consumption (e.g., the Hungarian Association of Refrigeration and Air-Conditioning Enterprises). From a review of the financial situation of the participating enterprises and discussions with the Hungarian authorities it is clear that some enterprises are experiencing what appears to be short-term financial difficulty based on 1994 data, but the firms are about average by Hungarian standards and appear to have acceptable medium-term prospects. On balance, the financial status of the selected project enterprises is adequate to justify project participation.

15. Additional counterpart contributions are expected during the implementation phase of the Project, and these are estimated at \$1.5 million for the Project -- \$0.028 million for the Institutional Strengthening Component, \$0.628 million for the 3R Component, and \$0.837 million for the thirteen investment Sub-Projects of the Investment Component. The proposed level of funding represents a conservative but fair estimate of the incremental costs which will be incurred by the Participating Enterprises. The assessment of incremental cost for the national recycling scheme (the 3R Component) was determined on the basis of the analysis of cash flows of all participants and GEF funding determined on the basis of ensuring an adequate return on the investment for all those participating.

16. It is therefore proposed that the Project cost of US\$8.4 million be funded by the GEF in the amount of \$6.9 million under its Reduction of Ozone Layer Depletion component. Of this amount, about US\$1.1 million (17%) will be in the form of retroactive financing, beginning from August 1993 when project preparation was initiated, since many of the Participating Enterprises already had to undertake substantial investments in order to be able to comply with the terms of the Montreal Protocol by 1996 (see Schedule B and Summary Table of Technical Report). Funds would be provided as a grant from the GEF to the Government of Hungary and channelled to the Participating Enterprises under the 3R and Investment Components through the NBH and the Corvin Bank. The estimated costs are to be considered incremental costs net of any potential savings. Proceeds of the grant will not be utilized for transfer payments, such as taxes and duties.

## **PROJECT DESCRIPTION AND COSTS**

17. The project consists of (i) an Institutional Strengthening Component (Sub-Project 1); (ii) a Recovery, Reclamation, and Recycling Component (3R Component) for ODS used as refrigerants (Sub-Project 2); and (iii) an Investment Component comprising thirteen Sub-Projects (Sub-Projects 3-15). Below is a description of each of these components. Comprehensive Sub-Project descriptions are provided in the Technical Report.

### **I. Institutional Strengthening Component**

18. **Sub-Project 1 -- Project Implementation Unit.** The MERP will set up an ODS Phaseout Project Implementation unit (PIU) to be supported by a Technical Advisory Group (TAG) of specialists who will be appointed by the PIU. The PIU will coordinate the implementation of the Project, oversee procurement and disbursement for Sub-Projects 1-15 in compliance with World Bank guidelines, and in close cooperation with the Corvin Bank (CB), supervise project activities according to the requirements of the World Bank and the MERP. As necessary, the PIU will arrange for technical assistance and consultants to assist in project implementation, and provide support to facilitate cooperation among government institutions and the consumers of ODS. The PIU will be responsible for calling meetings of the TAG, which will be responsible for assisting small users not covered under the Project, and advising the PIU and Participating Enterprises concerning any changes in ODS Phaseout technologies and their implications for Sub-Project implementation and training of staff at the Participating Enterprises.

The TAG will not, however, identify new investment Sub-Projects. Finally, the PIU will be responsible for establishing the computerized monitoring system for monitoring ODS consumption together with the Institute for Environmental Management (IEM). Funding for this Sub-Project amounts to US\$244,500 to cover salaries (for additional staff who are not civil service employees), office equipment and the costs of the monitoring during implementation of the Sub-Projects.

## II. 3R Component

19. **Sub-Project 2 -- Reduction of the emission of ozone depleting freon gases through recovery, reclamation, and recycling of refrigerants.** The objective of the Sub-Project is to decrease the amount of CFC-11, CFC-12 and CFC-502 since consumption of these substances is expected to be 750 tons in 1993. These substances are used and discharged during the maintenance and repairs of domestic, commercial, and industrial refrigerators, and air conditioners. Under the Sub-Project, the Hungarian Association of Refrigeration and Air Conditioning Enterprises will establish a national network to remove these ozone depleting substances from refrigerators and to collect and recycle them. There are approximately 2000 qualified refrigerator fitters in Hungary, and it is expected that the Association will work with 75-80 percent of the qualified refrigerator fitters. Under this Sub-Project, the refrigerator fitters will receive training for the new closed system repair and maintenance technology which will be required to operate the recovery, reclamation, and recycling scheme for refrigerants which is expected to recycle 450 tons of CFCs per year. The total cost of the Sub-Project is US\$2,042,670. The Association will cover US\$627,175 of the total incremental cost of the Sub-Project, and the GEF Grant will cover US\$1,415,495.

## III. Investment Component

20. **Sub-Project 3 -- Phaseout of ozone depleting substances in the manufacturing of refrigerators and freezers at Frigolux Ltd.** The objective of the project is to phase out the consumption of various ODS by 90 percent per year. Present consumption includes 3.8 tons of CFC-12 and 0.85 tons of CFC-502 refrigerant, as well as 11 tons of blowing agent CFC-11 which will be eliminated by replacing the blowing agent (CFC-11) used for rigid polyurethane (PU) foam insulation with cyclopentane (temporarily with HFC-134A), and replacing CFC-12 refrigerant with HFC-134A, and CFC-502 with HFC 404A and/or HFC-507. For these changes new filling equipment, vacuum pumps, gas detectors, and temperature control units are to be procured and put into service. The Sub-Project includes training, which is necessary for the implementation of the new technologies, and some elements of servicing. The first phase of the Sub-Project was carried out between June 1994 and December 1994. In the first phase, the phaseout of the ODS was not complete, since the emission of ozone depleting substances equivalent to about 1.8 tons of ODP continued. By the end of the second phase (through 1996), ozone depleting substances will not be used. The total cost of the Sub-Project is estimated at \$572,864. Frigolux Ltd. will cover US\$96,800 of the total incremental cost of the Sub-Project from its own sources, while the remaining incremental costs of the Sub-Project (US\$476,064) are to be financed by the GEF grant.

21. **Sub-Project 4 -- CFC-11 free polyurethane foam processing for the heat-insulation of hot water storage tanks at the Hajdusagi Iparmuvek Company.** The objective of the Sub-Project is to phase out annual consumption of 63 tons of CFC-11 PU-blowing-agent propellant through construction alterations, the establishment of a storing park, and the installation of a foaming machine which uses high pressure water/CO<sub>2</sub> as propellant. During the first ten months (January-October 1994), the high pressure foaming machine using water/CO<sub>2</sub> as propellant (which is necessary for the new process which will not use foams with CFC-11) was put into operation. In the first phase, technological experiments and heat loss tests were also carried out with the foams which do not contain CFC-11. In the second project phase from November 1994 to December 1995, the foaming in form or pillory is to be worked out and inaugurated, and the construction modifications are to be planned and carried out depending on the results

of heat loss tests. In the third phase between January and December 1996, the transportation and storage system of the polyurethane base are to be rationalized. Construction modifications to maintain the quality in CFC-free polyurethane (PU) foam manufacturing will also be carried out. The total cost of the Sub-Project is estimated at \$1,406,000. Hajdusagi Iparmuvek Company will cover US\$407,560 of the total incremental cost of the Sub-Project from its own sources, while the remaining incremental costs of the Sub-Project (US\$998,642) are to be financed by the GEF grant.

22. **Sub-Project 5 -- Phaseout of ozone depleting CFC-11 freon in sandwich panel production at Metalucon Ltd.** The objective of the Sub-Project is to phase out annual consumption of 45.6 tons of CFC-11 freon blowing agent. In the first phase of the Sub-Project the CFC-11 freon will be substituted with the much lower ozone depleting HCFC-141b blowing agent. To carry out this change, new foaming equipment which uses the new blowing agent will be procured, and the temperature adjustment of the electric heating of the foaming frames will be assessed. In the second phase of the Sub-Project, cyclopentane will be substituted for HCFC-141b blowing agent. The first phase of the Sub-Project is planned to be executed in 1995-1996, and the second phase in 1997. The most important parts of the first phase are the procuring and putting into service of the foaming equipment, the stirrer, the tanks, and the injection device, and the realization of the electric heating and temperature adjustment of the foaming frames. In the second phase of the Sub-Project the implementation of the cyclopentane blowing agent will be possible without any investment cost because the equipment installed under the first phase can be converted to use cyclopentane. The Sub-Project will also include training for employees. The total cost of the Sub-Project is estimated at \$884,608. Metalucon Ltd. will cover US\$160,289 of the total incremental cost of the Sub-Project from its own sources, while the remaining incremental costs of the Sub-Project (US\$724,319) are to be financed by the GEF grant.

23. **Sub-Project 6 -- Phaseout of ozone depleting CFC-11 freon in sandwich panel production at Metisol Ltd.** The objective of the Sub-Project in the first phase is to substitute for annual use of 80 tons of CFC-11 blowing agent with HCFC-141b blowing agent. This will entail necessary technological changes, reconditioning certain equipments, changing the temperature adjustment, and technical assistance. This will entail necessary technological changes, procurement and installation of high pressure blowing presses and heating containers, air control on the shop floor, reconditioning certain equipments, technical assistance, and training for employees. During the second phase of the Sub-Project in 1997, the phaseout of the consumption of ozone depleting substances will be complete. The execution of the first phase of the Sub-Project took seven months from June-December 1994. The total cost of the Sub-Project is estimated at \$441,207. Metisol Ltd. will cover US\$95,185 of the total incremental cost of the Sub-Project from its own sources, while the remaining incremental costs of the Sub-Project (US\$346,022) are to be financed by the GEF grant.

24. **Sub-Project 7 -- Phaseout of CFC propellant in gas-sterilizer cartridge production using ethylene oxide at Mediroll Ltd.** The objective of the Sub-Project is to phase out annual consumption of 107 tons of CFC 12 with HCFC-124 propellant and to carry out the development work, obligatory sterilizing tests, chemical and microbiological testing, and determination of the most effective gas mixture. The Sub-Project will be carried out in two phases. The first phase should take four months, and the second twelve months. The total cost of the Sub-Project is estimated at \$58,253. Mediroll Ltd. will cover US\$4,854 of the total incremental cost of the Sub-Project from its own sources, while the remaining incremental costs of the Sub-Project (US\$53,399) are to be financed by the GEF grant.

25. **Sub-Project 8 -- Phaseout of CFC-11, CFC-12, and 1,1,1-Trichloroethane solvents and propellants at Auto-Mobil Ltd.** The objective of the Sub-Project is to phase out annual consumption of 28 tons of CFC-11, 64 tons of CFC-12, and 47.6 tons of 1,1,1-Trichloroethane ozone depleting substances through the application of other propellants such as propane-butane gas and compressed air. The project entails conversion of propellant containers and other equipment, and safety training for staff.

The planning phase of the project was between June 1, 1994 and September 31, 1994, and its investment phase between October 1, 1994 and December 31, 1995. The total cost of the Sub-Project is estimated at \$83,512, of which the entire amount will be financed by the GEF Grant.

26. **Sub-Project 9 -- Modification of cleaning technology of automatic and electronic parts of oil and gas pipelines, substituting for CFC and 1,1,1-Trichloroethane solvents with water based solution at MMG-AM Ltd.** The objective of the Sub-Project is to phase out annual consumption of 87 tons of 1,1,1-Trichloroethane and 3.5 tons of CFC ozone depleting substances by conversion to a water-based solution using washing technology. During the execution of the Sub-Project seven modern ultrasonic washing appliances will be bought and installed. These new appliances use water based solution, and will be substituted for eight degreasing washing appliances which employ 1,1,1-Trichloroethane and CFCs. The investment Sub-Project also includes: (i) ventilation systems, which are to be installed at the washing appliances, (ii) a recirculating water-using rinsing appliance, and (iii) a solution desalting appliance, which is based on reverse osmosis. The realization of the Sub-Project should take eight months. The Sub-Project is divided into three phases. In the first phase preparatory research and development works (experimental degreasing with modern water based washing solution, experimental soldering, etc.), planning tasks, and tasks related to ordering will be executed. The second phase consists of the installation and of the new appliances. In the third phase of the Sub-Project the operating parameters of the new appliances will be set. The total cost of the Sub-Project is estimated at \$1,233,179 of which \$1,205,800 amount will be financed by the GEF Grant.

27. **Sub-Project 10 -- Phaseout of 1,1,1-Trichloroethane photoresistant developer with alkalic solution in the manufacturing of printed circuit panels at Hitelap Ltd.** The objective of the Sub-Project is to phase out the annual consumption of 32 tons of 1,1,1-Trichloroethane through new equipment to be used in alkaline soluble photoresistant development, stripping, and developing in water based solution and washing with water. The Sub-Project will substitute for the old developer and washer by procuring and putting into service modern equipment. New wastewater cleaning equipment is to be installed to improve the treatment of sewage water. The execution of the Sub-Project will take eight months. It will consist of planning, and putting into operation the alkalic developer, the washer, and the coagulant filter -- including the introductory operation. The total cost of the Sub-Project is estimated at \$179,789 of which the entire amount will be financed by the GEF Grant.

28. **Sub-Project 11 -- Conversion from release agent solvent to solvent free release agent substance, and from the consumption of 1,1,1-Trichloroethane to water based cleaning in polyurethane sole producing at Tisza Shoe Company.** The objective of the Sub-Project is to phase out annual consumption of 3.7 tons of CFC-11 solvent, 16.78 tons of 1,1,1-Trichloroethane washing liquid, and 5.6 tons release agent which contains 1,1,1-Trichloroethane through the application of a new release agent, installation of a new sprinkler device, and use of a water-solution washer. The new release agent is completely solvent free, and consists of a mixture of waxes and silicon oils. A wastewater treatment facility must be installed and the ventilation system updated. The execution of the Sub-Project will take ten months. In the first phase of the Sub-Project (April 1 to June 30, 1995) the alternative substances, technologies, and equipments are to be chosen, tests are to be carried out, and permits are to be obtained. In the second phase of the Sub-Project the old equipments are to be detached, the new strewing equipment, water-using washer, and water treatment facility are to be installed, the ventilation is to be up-dated, and the staff is to be trained (July 1 to October 31, 1995). In the final phase, the new technologies are to be installed and checked November 1 to December 31, 1995). The total cost of the Sub-Project is estimated at \$176,000 of which \$131,617 will be financed by the GEF Grant.

29. **Sub-Project 12 -- Conversion from open system vapor phase washing with CFC-113 to closed system washing with perchloroethylene at Fovarosi Finommechanikai Ltd.** The objective of the Sub-Project is to phase out annual consumption of 1.50 tons of CFC-113 ozone depleting substances

by switching over from an open freon system using washing to a closed system based on perchloroethylene washing. The Sub-Project will be realized in three phases. During the first phase, the alternative cleaning technologies and cleaning substances will be evaluated, and experimental production will be done with the selected substances. In the second phase of the Sub-Project, the freon-using washer will be detached, the two renewed closed system perchloroethylene-using washers will be installed and put into service, the staff will be trained in the new technology, and the operating parameters of the new washing technology will be set. In the third phase a closed system of perchloroethylene-based washing will be applied and the technology will be tested. The total cost of the Sub-Project is estimated at \$33,570, of which the entire amount will be financed by the GEF Grant.

30. **Sub-Project 13 -- Conversion to soldering with residue free fluxic soldering tin instead of cleaning with freon after soldering at the BRG Radiotechnikai Company.** The objective of the Sub-Project is to phase out annual consumption of 1.5 tons of CFC-113 ozone depleting substance through the implementation of the modern MULTICORE soldering tin, which makes washing with freon unnecessary. Although the composition of the flux of the modern MULTICORE-made soldering tin makes the washing after soldering unnecessary, its application increases the soldering time, and therefore the working time and the consumption of electric energy. For this reason BRG must employ 32 people instead of 30 for soldering jobs, in order to avoid that the new technology decrease its output. The duration of the Sub-Project is one month, and the Sub-Project is divided into three phases. During the first phase, alternative soldering substances and cleaning technologies were evaluated and trial producing was done with the chosen substances. In the second phase the staff was trained for the new soldering technology, the materials and the soldering edges needed for the new technology were procured. In the third phase the new soldering technology is to be tested in manufacturing. The total cost of the Sub-Project is estimated at \$22,845 of which \$22,160 will be financed by the GEF grant.

31. **Sub-Project 14 -- Conversion from freon-using cloth cleaning machines to perchloroethylene-using machines at the Rutitex Company.** The objective of the Sub-Project is to phase out annual consumption of 7.9 tons of CFC-11 and CFC-113 freon ozone depleting substances through the substitution for freon-based cleaners with new perchloroethylene-based cleaners. During the Sub-Project four closed system perchloroethylene-based cleaners will be bought. The execution of the Sub-Project will take six months. The total cost of the Sub-Project is estimated at \$340,400 of which the entire amount will be financed by the GEF Grant.

32. **Sub-Project 15 -- Regenerating and closed system draining of extinguishing gases at the member companies of the Fire-Protection Association.** The Fire-Protection Association was established in 1994 by the decision of the Elzett Safety Technology Company, Fajro Automatics and Fire-Protection Equipment Producing Ltd., and the Fire-Protection Education and Research Institution. The objective of the Sub-Project is to recycle 2,764 tons of halon 1211 and 159 tons of halon 1301 extinguishant. As a benefit of the Sub-Project the emission of 85.13 tons of halon 1211 and 1.43 tons of halon 1301 extinguishant would discontinue by putting into service regenerating devices, closed system draining devices, and other additional devices (evaluating and measuring instruments, etc.). The realization of the Sub-Project will take four months. In the first phase the old equipment will be dismantled and the new ones will be installed at Elzett and Fajro. The second phase will be carried out in two months and will consist of the training of the controlling staff. The total cost of the Sub-Project is estimated at \$321,000 and will be totally financed by the GEF Grant.

33. The incremental cost of the Project has been determined to be US\$8.4 million, which represents about 29 percent of the national incremental costs which will be assumed by Hungary economy in phasing out ODS. Of this total \$7.6 million (91%) is incremental capital costs, and \$0.8 million (9%) is incremental operating costs. The national incremental costs were estimated in the Country Program for the phaseout of ozone-depleting-substances.



## PROJECT IMPLEMENTATION ARRANGEMENTS

34. The Ministry for Environment and Regional Policy (MERP), through the Project Implementation Unit (PIU), will act as general program coordinator for the Project. The MERP will liaise with other ministries on policies and industrial strategy issues, and, through its PIU, be responsible for day-to-day management of project implementation. The PIU was established by the MERP approximately twelve months before Project Appraisal. Moreover, since the PIU has practically the status of a government entity, the Corvin Bank will not be responsible for disbursement to the PIU under Sub-Project 1. Instead, disbursement for this Sub-Project will be made directly to the Central Environmental Protection Fund of the MERP.

35. The Corvin Bank (CB) was selected by the MERP to manage, on behalf of the recipient as its agent, the local funds administration for the 3R and Investment Components. The emphasis in selection of the CB by the MERP was based on its ability to disburse and administrate project funds and its familiarity with the World Bank procurement procedures. To ensure smooth disbursement, early involvement of the CB in supervision will be required. The CB will assume the day-to-day responsibilities related to procurement, disbursement, and it will assist the PIU in the supervision of Sub-Project implementation for Sub-Projects 2-15. The CB will provide at least one staff person with experience in procurement in World Bank projects, and procurement advice will also be provided by the World Bank Resident Mission in Budapest.

36. A Project Administration Agreement (subject to Bank review), which clearly spells out the responsibilities of each organization, will be established between the recipient represented by the Ministry of Finance (MoF) and MERP on one part, and the CB on the other part. Agreement on the Project Administration Agreement will be a condition for negotiations, and its signature a condition for effectiveness. A fee of 2.50 percent will be paid on Sub-Projects 2-15. This fee will be split between the CB and the National Bank of Hungary (NBH). For each Sub-Project a Sub-Grant Agreement between the CB and each of the Participating Enterprises will be prepared. Each Participating Enterprise has prepared a Sub-Project Document which will form the basis of a Sub-Grant Agreement between the CB and the Participating Enterprise. The Sub-grant Agreements will include reporting provisions, annexes on disbursement, and provisions related to environmental protection and worker safety. Signed Sub-Grant Agreements will be a condition of disbursement for each investment Sub-Project, and preparation of a pro-forma draft Sub-Grant Agreement will be a condition of negotiations.

37. Standard Bank disbursement procedures will be followed, with established limits on initial deposit and replenishment levels, statements of expenditures, and Bank procurement review levels. The CB will review the progress of the Sub-Projects and make recommendations on disbursements to suppliers and consultants. On the basis of an agreement between the recipient and NBH, the Special Account will be held with the NBH. Though the Multilateral Fund procedures allow for complete retroactive financing of ODS-phaseout expenditures incurred in a country after the Montreal Protocol comes into force, more restrictive IBRD rules limiting retroactive financing have been applied to this project. Project expenditures incurred after August 1993 are eligible for retroactive financing, provided the procurement procedures outlined in Schedule B are followed. Retroactive financing shall be limited to no more than 40% of total project expenditures financed by the GEF grant. It is expected that by October 1995 the enterprises will have incurred expenses worth \$ 1.1 million, or about 17% of the total GEF grant financing, which will be financed retroactively. For expenditures to be retroactively financed, the procurement process should be consistent with Bank procedures, and all records should be available to the Bank for review.

38. Monitoring and evaluation of the Project will require that the PIU prepare quarterly reports to be submitted to the World Bank for the duration of project supervision. A standard format for these

quarterly supervision reports is being developed by the GEF, and will be explained to and agreed upon with the PIU. The quarterly reports will summarize issues related to procurement, disbursement, technical aspects of project implementation, accounting and auditing information, environmental and safety issues, and any changes in the legal and regulatory framework. Inputs for the quarterly report will be provided by the CB and the Participating Enterprises. The quarterly reports will be reviewed by the World Bank task manager, and discussed during supervision missions.<sup>2</sup>

39. A Project Implementation Manual (PIM) has been provided, and includes the relevant Bank guidelines on procurement, disbursements, use of consultants, financial reporting, auditing, sample bidding documents, and other project-specific documents. In addition, detailed Project Implementation Plans were prepared by each of the Participating Enterprises during Appraisal. Finally, a one week training course on project implementation and management was held in Budapest in mid-January 1995, and was attended by staff of the PIU, the CB, and the NBH.

## **PROJECT BENEFITS**

40. The project's major benefit will be to assist Hungary to achieve its objective of completely phasing out the use of ODS as early as is technically feasible. The project will help the Government implement an accelerated ODS phaseout program by providing financing for priority Sub-Projects which will result in the phaseout of 1158 tons of ODP annually (or about 54 percent of Hungary's total ODP-weighted annual consumption of ODS).

41. The project consists of Sub-Projects which will contribute to maximizing the useful life of equipment which currently rely on the availability of CFC for their continued use. This will contribute to reducing the country's economic cost of phasing out the use of the controlled substances, and minimizing the economic dislocation associated with ODS phaseout. In addition, the project will enable firms with exports to adjust in a timely manner to non-ODS products as requested by importers from industrialized countries. These companies export around 10 percent of their annual ODS consumption. Finally, implementing the 3R Sub-Project will reduce ODS emissions which originate during servicing of refrigeration and air conditioning systems by as much as 450 tons per year, and will extend the useful life of equipment utilizing ODS which otherwise would be discarded for lack of ODS for maintenance purposes.

## **PROJECT RISKS AND MITIGATION MEASURES**

42. Management structure and ownership of most of the companies which would be assisted under this project could change in the future. Nevertheless, the risks associated with any future financial problems of some companies would be mitigated through a review of the financial status of each Participating Enterprise during supervision. The Participating Enterprises have good prospects for increased profitability based on their position within their respective industrial sectors, and the fact that they will be undertaking these necessary new investments for the phaseout of ODS technologies. Implementation of the new technologies will also make any state enterprises more attractive candidates for privatization.

43. The risk associated with insufficient institutional capacity should be adequately offset by the

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<sup>2</sup> The first supervision mission is scheduled for October 1995, and 12 staff weeks per year have been allocated for World Bank Supervision of the Project.

establishment of the Project Implementation Unit (PIU) and Technical Advisory Group (TAG) to assist in the implementation of the Sub-Projects and Country Program for ODS Phaseout. The work of the PIU and TAG will be essential to help industry make the transition to ODS substitutes instead of continued use of ODS. Monitoring of compliance with ODS regulations will also be of paramount importance for project success. Under the Institutional Strengthening Component, the MERP will be responsible for monitoring the compliance with ODS regulations. To address this problem, the Ministry of Environment will develop an ODS monitoring system, ensure that a system of fines is in place to discourage continued use of ODS, and ensure that regulations governing the use of ODS are strictly enforced.

44. Finally, experience in national 3R programs is limited to only a few countries, although many are now under development. The limited experience to date has indicated that, initially, the amounts of CFC recovered will be small, and that the most important aspect of the program is to provide adequate financial and economic incentives to the servicing sector. A condition for disbursement for this component will therefore be that the product fees and the methods for their collection are in place.<sup>3</sup> The financial sustainability of the 3R scheme will be monitored closely in order to react to market conditions (price and availability of CFCs) which will influence the short and medium term profitability of the operation. Project risk is being mitigated by placing the financial risk with the enterprises which are most capable of assuming it, and by ensuring that the incentive to the servicing sector is sufficient to encourage widespread recovery of CFC through maintenance activities. Presently, the incentives scheme consists of product fees of 250 Hungarian Forints/kg of CFCs, and 100 Hungarian Forints/kg of HCFCs.

## REGULATORY FRAMEWORK

45. Stratospheric Ozone Layer protection has been accorded high priority by the Government of Hungary as an important global environmental issue. The requirements of the Montreal Protocol were incorporated into national law by issue of a Ministerial decree in 1992 and amended in 1993 and 1994. The principal components of the decree were deadlines for ODS phaseout in each sector of consumption, bans on new equipment which used controlled substances, requirements for authorization to import controlled substances, obligatory reporting on the use of controlled substances, and penalties for violating regulations. The decree adopts the ODS phaseout schedule of the Montreal Protocol and its amendments and adjustments, and is fully consistent with the provisions of the Montreal Protocol on limitations on trade in the controlled substances.

## ENVIRONMENTAL ASSESSMENT

46. Sub-Projects 2-15 were prepared on the basis of, and will be subject to, local environmental regulations and the Bank's project environmental review procedures. The Sub-Projects consist of light industrial projects which have been classified as category B on the basis of the Bank's project environmental classification system (OD 4.01), and based on previous classification of similar projects.

47. The MERP has provided its environmental clearance for all of the proposed activities to be implemented under the Project. The Project provides for resources to retain the services of international consultants for supervision of project implementation, including health and safety considerations, and these will be addressed during the first supervision mission planned for September 1995. International health and safety standards should be observed, with particular emphasis on the design and operation of

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<sup>3</sup> Collection of product fees (250 HF/kg for CFCs and 100 HF/kg for HCFCs) is expected to begin in September 1995. The exact sharing of these product fees between the State EcoFund and the Refrigeration Enterprises will be determined at a later date. See Table 3-1 of the Technical Report for a detailed breakdown of the incentives scheme.

cyclopentane tanks. Adequate safeguards for worker health and safety will be a condition of disbursement for any Sub-Project, and project supervision will include guidance to ensure that safety and environmental conditions in the Participating Enterprises are consistent with international practices for the new technologies which will be employed to phase out ODS.

## **AGREEMENTS REACHED AND RECOMMENDATIONS**

48. During negotiations the following assurances were obtained from Government:

- (a) a part of the proceeds of the grant will be made available to CB, under terms acceptable to the Bank, including a financial agency fee of 2.50% of the amount disbursed to finance Sub-project 2-15 (para. 36);
- (b) all measures necessary to ensure that each Participating Enterprise complies with the relevant requirements for ODS phaseout activity will be taken (para. 46);
- (c) PIU and CB will maintain reporting and accounting practices acceptable to the Bank (para. 38 and 39).

49. The execution of the Project Administration Agreement between CB, MoF and MERP would be a condition of effectiveness (para. 36).

50. Conditions of disbursement would be:

- (a) signing of a Sub-Grant Agreement between the CB and the Participating Enterprise(s) responsible for the corresponding Sub-Project (para. 36);
- (b) Government's certification to the Bank that adequate environmental and safety precautions are in place for any Sub-Project (para. 47);
- (c) establishment of CFCs product fees and collection system for the 3R Component (para. 44).

**HUNGARY**  
**TECHNICAL SUPPORT AND INVESTMENT PROJECT**  
**FOR THE PHASEOUT OF OZONE DEPLETING SUBSTANCES**  
**PROJECT COSTS AND FINANCING PLAN**

Sub-Project Title and Description		Financed by Hungary	Local (by GEF)	Foreign (by GEF)	Sub-Project Costs (US\$ Million)	Proposed GEF Grant (US\$ Million)
1.	Project Implementation Unit	0.028	0.244	0.001	0.273	0.245
2.	Reduction of the emission of ozone depleting freon gases through recovery, reclamation, and recycling of refrigerants	0.628	0.253	1.162	2.043	1.415
3.	Phaseout of ozone depleting substances in the manufacturing of refrigerators and freezers at Frigolux Ltd.	0.097	0.170	0.306	0.573	0.476
4.	CFC-11 free polyurethane foam processing for the heat-insulation of hot water storage tanks at Hajdusagi Iparmuevek Company.	0.407	0.399	0.600	1.406	0.999
5.	Phaseout of ozone depleting CFC-11 freon in sandwich panel production at Metalucon Ltd.	0.161	0.119	0.605	0.885	0.724
6.	Phaseout of ozone depleting CFC-11 freon in sandwich panel production at Metisol Ltd.	0.095	0.037	0.309	0.441	0.346
7.	Phaseout of CFC propellant in gas-sterilizer cartridge production using ethylene oxide at Mediroll Ltd.	0.005	0.052	0.001	0.058	0.053
8.	Phaseout of CFC-11, CFC-12, and 1,1,1-Trichloroethane solvents and propellants at Auto-Mobil Ltd.	0.000	0.084	0.000	0.084	0.084
9.	Modification of cleaning technology of automatic and electronic parts of oil and gas pipelines, substituting for CFC and 1,1,1-Trichloroethane solvents with water based solution at MMG-AM Ltd.	0.027	0.037	1.169	1.233	1.206
10.	Phaseout of 1,1,1-Trichloroethane photoresistant developer with alkalic solution in the manufacturing of printed circuit panels at Hitelap Ltd.	0.000	0.010	0.170	0.180	0.180
11.	Conversion from release agent solvent to solvent free release agent substance, and from the consumption of 1,1,1-Trichloroethane to water based cleaning in polyurethane sole producing at Tisza Shoe Company.	0.044	0.000	0.132	0.176	0.132
12.	Conversion from open system vapor phase washing with CFC-113 to closed system washing with perchloroethylene at the Fovarosí Finommechanikai Ltd.	0.000	0.034	0.000	0.034	0.034
13.	Conversion to soldering with residue free fluxic soldering tin instead of cleaning with freon after soldering at the BRG Radiotechnikai Company.	0.001	0.020	0.002	0.023	0.022
14.	Conversion from freon-using cloth cleaning machines to perchloroethylene-using machines at the Rutitex Company.	0.000	0.000	0.340	0.340	0.340
15.	Regenerating and closed system draining of extinguishing gases at the member companies of the Fire-Protection Association	0.000	0.043	0.278	0.321	0.321
<b>Subtotal for Component 1 -- Sub-Project 1</b>		<b>0.028</b>	<b>0.244</b>	<b>0.001</b>	<b>0.273</b>	<b>0.245</b>
<b>Subtotal for Component 2 -- Sub-Project 2</b>		<b>0.628</b>	<b>0.253</b>	<b>1.162</b>	<b>2.043</b>	<b>1.415</b>
<b>Subtotal for Component 3 - Sub Project 3-15</b>		<b>0.837</b>	<b>1.005</b>	<b>3.912</b>	<b>5.754</b>	<b>4.917</b>
<b>Subtotal for Components 1-3</b>		<b>1.493</b>	<b>1.502</b>	<b>5.075</b>	<b>8.070</b>	<b>6.577</b>
Other: Financial Agent Fee (2.50% of Grant Request for Sub-Projects 2-15)		0.000	0.158	0.000	0.158	0.158
Other: Contingency (2.52% of Grant Request for Sub-Projects 1-15)		0.000	0.165	0.000	0.165	0.165
<b>Total</b>		<b>1.493</b>	<b>1.825</b>	<b>5.075</b>	<b>8.393</b>	<b>6.900</b>



**HUNGARY**  
**TECHNICAL SUPPORT AND INVESTMENT PROJECT**  
**FOR THE PHASEOUT OF OZONE DEPLETING SUBSTANCES**

**PROCUREMENT AND DISBURSEMENT ARRANGEMENTS**

**A. Procurement**

1. Procurement of goods, works, and services will be in accordance with relevant Bank Guidelines. The Project Implementation Unit (PIU), which was established by the Ministry for Environment and Regional Policy (MERP) in July 1994, will be responsible for the day-to-day management of project implementation. The PIU will provide support to the enterprises participating in the project and, by providing a link between them and the World Bank, will ensure that the project will be carried out in a timely and efficient manner. The Corvin Bank (CB) was selected by MERP to manage the funds administration, based on its ability to disburse and administrate project funds and its familiarity with the World Bank procurement procedures. The CB will be responsible for ensuring that the procurement methods proposed by the Participating Enterprises are in accordance with World Bank Guidelines (January 1995).

**(a) Works**

- (i) Contracts for civil works up to US\$200,000 equivalent would be awarded on the basis of national shopping (NS) procedures, where quotations would be obtained from at least three qualified suppliers<sup>4</sup>

**(b) Goods**

- (i) Contracts over US\$500,000 equivalent would be awarded on the basis of international competitive bidding (ICB) procedures; domestic preference will apply;<sup>5</sup>
- (ii) Contracts between US\$50,000 and US\$500,000 equivalent would be awarded on the basis of the Bank's international shopping (IS) procedures where price quotations would be obtained from at least three qualified suppliers from at least two countries
- (iii) Contracts below US\$50,000 equivalent would be awarded on the basis of national shopping (NS) procedures where quotations would be obtained from at least three qualified suppliers

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<sup>4</sup> The use of National Shopping procedures for works is justified on the ground that: a) the project must be completed by a certain date for the country to fulfill the Montreal Protocol mandate; and b) the country has a very strong construction industry which can perform at very competitive prices.

<sup>5</sup> However, no procurement package has a contract value higher than the threshold. No ICB procurement is expected in the project.

- (iv) Direct contracts (DC) would be awarded on the basis of negotiations with the technology supplier. The Bank's prior approval for each case of direct contracting would be necessary.

**(c) Consultants**

- (i) Consultant services for engineering studies, technical assistance, study tours and training programs would be procured in accordance with the "Guidelines for the Use of Consultants by World Bank" published by the World Bank in August 1981<sup>6</sup>.

2. The following contracts and bid packages will be subject to the Bank's prior review:

- (i) ICB packages<sup>7</sup>
- (ii) The first two NS contracts for works; the first two IS contracts for goods; and all DC procurement
- (iii) Terms of References for all consulting services; short list, terms of reference, letter of invitation and award decisions for consultant contract over US\$100,000 equivalent for firms and US\$50,000 equivalent for individuals.

3. All other contracts for goods, works and consultant services which are financed through this grant will be subject to ex-post review by the Bank in order to verify compliance with Bank procurement guidelines. Information on procurement would be periodically provided to the World Bank task manager by the PIU.

4. Retroactive Financing. Project expenditures incurred after August 1993 are eligible for retroactive financing, provided the above procurement was carried out in accordance with Bank Guidelines (January 1995). Retroactive financing shall be limited to no more than 40% of total project expenditures financed by the GEF grant. It is expected that by October 1995 the enterprises will have incurred expenses worth \$ 1.1 million, or about 17% of the total GEF grant financing, which will be financed retroactively. For expenditures to be retroactively financed, the procurement process should be consistent with Bank procedures and all records should be available to the Bank for review.

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<sup>6</sup> Short-term contracts for highly specialized assignments will be carried out by individual consultants, major assignments will be contracted through short-listing of consulting firms.

<sup>7</sup> See note 5.



**Summary of Proposed Procurement Arrangements  
(US\$ Equivalent)**

Project Element	Procurement Method			NBF	Total Cost
	ICB	LIB	Other		
<b>1. Works</b>					
1.1 Minor building and facility services retrofit	- (-)	- (-)	155,837 (155,837) <sup>a</sup>	187,637	343,474 (155,837)
<b>2. Goods</b>					
2.1 Equipment (including installation costs)	- (-)	- (-)	5,205,761 (5,205,761) <sup>b</sup>	922,725	6,128,486 (5,205,761)
2.2 Materials	- (-)	- (-)	156,239 (156,239) <sup>b</sup>	54,310	210,549 (156,239)
<b>3. Consultancies</b>					
3.1 Engineering Studies	- (-)	- (-)	77,330 (77,330) <sup>c</sup>	45,375	122,705 (77,330)
3.2 Technical Assistance (including consultants and additional staff required)	- (-)	- (-)	60,509 (60,509) <sup>c</sup>	22,665	83,174 (60,509)
3.3. Training program	- (-)	- (-)	231,980 (231,980) <sup>c</sup>	70,616	302,596 (302,596)
3.4 Other Services (public awareness)	- (-)	- (-)	40,940 (40,940) <sup>c</sup>		40,940 (40,940)
<b>4. Miscellaneous</b>					
4.1 Budget of the PIU	- (-)	- (-)	167,090 (167,090) <sup>d</sup>	28,500	195,590 (167,090)
4.2 Incremental Operating Cost for Sub-Projects 2-15	- (-)	- (-)	480,649 (480,649) <sup>e</sup>	160,849	641,495 (480,649)
4.3 Financial Agent Fee	- (-)	- (-)	158,295 (158,295) <sup>f</sup>		158,295 (158,295)
<b>Sub-Total</b>	- (-)	- (-)	6,734,627 (6,734,627)	1,492,677	8,227,304 (6,734,627)
4.4 Contingency	- (-)	- (-)	165,373 (165,373) <sup>g</sup>	-	165,373 (165,373)
<b>Total</b>	- (-)	- (-)	6,900,000 (6,900,000)	1,492,677	8,392,677 (6,900,000)

Note: Figures in parentheses are the respective amounts financed by the GEF Grant. NBF: Not Bank-Financed, to be financed by Participating Enterprises.

- a - Funds will cover the costs of minor civil works required to retrofit existing facilities (building reconstruction, foundation and mounting works, plumbing, wiring works, etc.), to be procured through national shopping. 16 procurement packages range between US\$ 4,000-20,000; 2 packages range between US\$ 100,000-150,000.
- b - To be procured in accordance with procurement limits agreed upon in Schedule B. It consists of International Shopping: US\$ 4.9 million; and National Shopping: US\$ 600,000. 21 procurement packages range between US\$50,000-500,000; 13 procurement packages range between US\$1,000-50,000.
- c - Consultants' services (engineering support, material compatibility studies, on-site installation assistance, training in the operation and safety of new equipment, study tours abroad, public awareness campaign, etc.) to be procured in accordance with World Bank guidelines: "Use of Consultants by World Bank Borrowers and by the World Bank as Executing Agency Washington, D.C., August 1981". 17 procurement packages range between US\$1,000-100,000; 1 package above US\$100,000.
- d - Funds will cover the costs of office equipment (US\$ 77,000) salaries, and other operational expenses (US\$ 111,000) of the Project Implementation Unit (PIU) for a period of three years. Disbursements will be made on the basis of an agreed budget between the PIU and the World Bank.
- e - Incremental Operating Costs estimated during Sub-Project Preparation. Supporting evidence to be provided every six months when disbursement for incremental operating costs is requested.
- f - Fee for services provided by the Financial Agent (2.50 percent of the value of Sub-Projects 2-15) will be paid in accordance with agreed schedule: 0.25 percent upon Sub-Grant Agreement signature, 2.00 percent pro-rata to disbursements, and 0.25 percent upon project completion.
- g - Physical and price contingencies for the Project are estimated at 3.2% of the Grant Request for Sub-Projects 1-15.

**B. Disbursement**

6. The table below sets forth the categories of items to be financed out of the proceeds of the GET Grant, the allocation of the amounts of the GET Grant to each category, and the percentage of expenditures for items to be financed in each category:

Category	Amount of the Grant Allocated (Expressed in Special Drawing Right (SDR) Equivalent)	Percentage of Expenditures to be Financed
Works	110,000	85%
Goods:		100% of foreign expenditures; 100% of local expenditures (ex-factory cost); and 85% of local expenditures for other items procured locally
- Subproject 2	760,000	
- Subprojects 3-15	2,880,000	
Consultants' Services and Training	280,000	100%
Operating Costs	550,000	100%
Unallocated	120,000	
<b>Total</b>	<b>4,700,000</b>	

7. The Project is expected to be disbursed within a period of two calendar years. The Trustee will disburse against 100% of eligible foreign expenditures; 100% of eligible local expenditures (ex-factory cost); and 85% of other eligible local expenditures for grant financed goods and services contracts. The CB will assume the day-to-day responsibilities related to disbursement for the 3R and Investment Components (Sub-Projects 2-15). Disbursement to the PIU under Sub-Project 1 will be made directly to the Central Environmental Protection Fund of MERP. Standard Bank disbursement procedures will be followed, with established limits on initial deposit and replenishment levels, statements of expenditures, and Bank procurement review levels. Funds will be deposited in a Special Account which will be held with the National Bank of Hungary (NBH). Disbursement procedures have been established as follows:

- (a) **Between the World Bank, the Ministry for Environment and Regional Policy, and the Corvin Bank:** The Trustee will deposit an initial amount up to US\$700,000 to a Special Account which the MoF will open in the NBH. Requests for reimbursement will be made by the NBH based on Statement of Expenditures (SOEs) for contracts with a value of up to US\$500,000 for goods, US\$200,000 for works, US\$100,000 for consulting firms' services and US\$50,000 for individual consultants' services. The minimum application size for payments directly from the Loan Account or for issuance of Special Commitments is 20% of the Special Account Authorized Allocation. Terms, conditions, and schedule for disbursement for Sub-Projects under the 3R and Investment Components must be included in the Sub-Grant agreements between the Corvin Bank and each Participating Enterprise; and
- (b) **The Corvin Bank and the Sub-Grant Recipient:** For contracts up to US\$500,000 for goods, US\$200,000 for works, US\$100,000 for consulting firms and US\$50,000 for individual consultants, the Corvin Bank will recommend to NBH to disburse to the Sub-Grant recipient for eligible expenses without prior review by the World Bank. Disbursement will follow the guidelines established in the Disbursement Handbook published by the World

Bank. Details of the disbursement procedures will be included in the initial Disbursement Letter to be issued by the World Bank.

8. Expenses incurred for activities of the Corvin Bank will be covered through the Special Account.

9. The conditions of disbursement are that (i) a Sub-Grant Agreement must be signed between the Corvin Bank and the Participating Enterprise(s) responsible for the corresponding Sub-Project before disbursement can begin for that Sub-Project; (ii) the Government must certify to the Bank that adequate environmental and safety precautions are in place for any Sub-Project before disbursement for that Sub-Project can begin; and (iii) for the 3R Component, the product fees on CFCs must be established and the system for their collection in place.

**ESTIMATED DISBURSEMENT**  
(US\$ )

	<b>FY96</b>	<b>FY 97</b>	<b>FY98</b>
Annual	4,400,000	2,000,000	500,000
Cumulative	4,400,000	6,400,000	6,900,000



**HUNGARY**  
**TECHNICAL SUPPORT AND INVESTMENT PROJECT**  
**FOR THE PHASEOUT OF OZONE DEPLETING SUBSTANCES**

**TIMETABLE OF KEY PROJECT PROCESSING EVENTS**

(a)	Time Taken to Prepare:	20 months
(b)	Prepared By:	MERP and World Bank
(c)	First Presentation to the Bank:	November 1993
(d)	Appraisal Mission Departure:	May 1995
(c)	Negotiations:	September 1995
(d)	Board Approval:	October 1995
(e)	Signature of Grant Agreement:	November 1995
(f)	Planned Date of Effectiveness:	November 1995
(g)	Expected Date of Completion:	June 1997
(h)	Expected Date of Closing:	December 1997

---

The Bank project team was led by Mark Kosmo (Environmental Economist/Task Manager, EC2AU) and included David Gibson and Camerun Murdoch (consultants from WS Atkins, England). The peer reviewers were Bilal Rahill, Jessica Poppele and Ajay Mathur (ENVGC). The external reviewers were Mike Jeffs (ICI Polyurethan), Geno Nardini (Instituto Mexicano del Aerosol), Lambert Kuijpers (Technical University of The Netherlands), Bryan Baxter (British Aerospace), Ivar Isaakson (Scientific and Technical Advisory Panel Reviewer).



**HUNGARY**  
**TECHNICAL SUPPORT AND INVESTMENT PROJECT**  
**FOR THE PHASEOUT OF OZONE DEPLETING SUBSTANCES**

**PROJECT IMPLEMENTATION SCHEDULE AND SUPERVISION PLAN**

**PROJECT IMPLEMENTATION SCHEDULE**

Planned Date of Signature: November 1995

Planned Date of Effectiveness: November 1995

Expected Date of Completion: June 1997

**I. Institutional Strengthening Component**

Sub-Project 1	Project Implementation Unit for the Phaseout of Ozone Depleting Substances	July 1994 - December 1997
	Phase 1 - Preparation of the Project: Preparation of project documents	July 1994 - September 1995
	Phase 2 - Assisting the Implementation of the Project	October 1995 - December 1997

**II. 3R Component**

Sub-Project 2	Reduction of the emission of ozone depleting freon gases through recovery, reclamation, and recycling of refrigerants:	
	Component for Training Service Technicians	August 1994 - December 1995
	Component for recycling investments and organizing the national ODS - Recycling Network	July 1995 - March 1996

**III. Investment Component**

Sub-Project 3	Phaseout of ozone depleting substances in the manufacturing of refrigerators and freezers at Frigolux Ltd.:	
	Phase 1 - Installation of the new equipments, foaming with HFC 134a	July 1995 - January 1996
	Phase 2 - Installation of the ventilation and leakage detection systems, foaming with cyclopentane	January 1996 - January 1997

- Sub-Project 4      CFC-11 free polyurethane foam processing for the heat-insulation of hot water storage tanks at the Hajdusagi Iparmuvek Company:
- Phase 1 - Installation of the high pressure foaming machine,  
technological experiments      January - October 1994
- Phase 2 - Developing the constructional modifications  
of the new products      November 1994 - December 1995
- Phase 3 - Rationalizing the storage system      January - December 1996
- Sub-Project 5      Phaseout of ozone depleting CFC-11 freon in sandwich panel production at Metalucon Ltd.:
- Phase 1 - Procuring and installing the new equipments, realization of  
the temperature adjustment of the foaming frames      September 1995 - January 1996
- Phase 2 - Foaming with cyclopentane: adjustment  
of the technology training      January - December 1996
- Sub-Project 6      Phaseout of ozone depleting CFC-11 freon in sandwich panel production at Metisol Ltd.:
- Phase 1 - Investment and installation of the high pressure blowing machine and other  
equipments      October 1995 - 1996
- Phase 2 - Foaming with waterbase/CO mix      January 1997
- Sub-Project 7      Phaseout of CFC propellant in gas-sterilizer cartridge production using ethylene oxide  
at the Mediroll Ltd.:
- Component 1 - Laboratory tests      July 1994 - December 1995
- Component 2 - Sterilization tests, chemical examinations      1995 - 1996
- Sub-Project 8      Phaseout of CFC-11, CFC-12, and 1,1,1-Trichloroethane solvents and propellants at  
Auto-Mobil Ltd.:
- Phase 1 - Planning      June 1994 - September 1994
- Phase 2 - Investment phase      October 1994 - December 1995
- Sub-Project 9      Modification of cleaning technology of automatic and electronic parts of oil and gas  
pipelines, substituting for CFC and 1,1,1-Trichloroethane solvents with water based  
solution at MMG-AM Ltd.:
- Phase 1 - Evaluate alternative equipment models, materials, run compatibility tests,  
assessment of the environmental impacts      June 1995



Phase 2 - Installing and testing the Tauss equipments for the Budapest Works, doing the necessary process changes  
September 1995

Phase 3 - Installing and testing the new cleaning equipments for the Bicske, Kecskemét, and Szekszard Works, and the Roll equipment for the Budapest Work, test runs  
December 1995

Phase 4 - Training the employee, monitoring the new cleaning procedures, adjusting the equipments, installing two Cleaning Systems in the Kecskemét Work, optimizing the cleaning process  
March 1996

Phase 5 - Monitoring the new cleaning technology, training  
June 1996

Sub-Project 10 Phaseout of 1,1,1-Trichloroethane photoresistant developer with alkalic solution in the manufacturing of printed circuit panels at Hitelap Ltd.

Sub-Project 11 Conversion from release agent solvent to solvent free release agent substance, and from the consumption of 1,1,1-Trichloroethane to water based cleaning in polyurethane sole producing at Tisza Shoe Company:

Phase 1 - Testing the alternative technologies, planning  
April-June 1995

Phase 2 - Procuring the strewing equipment, the washer, waste water treating equipment  
July 1 - November 30, 1995

Phase 3 - Installing the new technological processes, test runs  
December 1995

Sub-Project 12 Conversion from open system vapor phase washing with CFC-113 to closed system washing with perchloroethylene at the Fovarosi Finommechanikai Ltd.:

Phase 1 - Evaluating the alternative cleaning technologies, experimental production  
July-August, 1995

Phase 2 - Installing the two renewed washers  
September-October 1995

Phase 3 - Testing the closed system washing  
November-December 1995

Sub-Project 13 Conversion to soldering with residue free fluxic soldering tin instead of cleaning with freon after soldering at the BRG Radiotechnikai Company:  
December 1995

Phase 1 - Evaluating the alternative soldering substances and cleaning technologies

Phase 2 - Training the staff for the new soldering technology, procuring the necessary materials and instruments

Sub-Project 14 Conversion from freon-using cloth cleaning machines to perchloroethylene-using machines at the Rutitex Company:

	Phase 1 - Preparation of the investment procurement, selecting the cleaning machine	July-October 1995
	Phase 2 - Procuring and installing 4 dry cleaning machines working with perchloroethylene	November 1995-January 1996
	Phase 3 - Technological trials, test runs	February-April 1996
Sub-Project 15	Regenerating and closed system draining of extinguishing gases at the member companies of the Fire-Protection Association:	
	Phase 1 - Removing old equipments and installing the new ones at FAJRO and ELZETT enterprises, putting into service	April 1996
	Phase 2 - Training the operators	June 1996

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## PROJECT SUPERVISION PLAN

Approximate Date	Activity	Skill Requirements	Estimated Staff-weeks
FY 96	<b>Project Launch Mission (11/1995)</b> - Review workplan and budget - Project effectiveness	Operations	2
	<b>Supervision Missions (2/1996, 6/1996)</b> - Review project implementation systems (PMU and CB's activity) - Review progress in ODS phaseout - Review ODS phaseout monitoring system - Review safety measures - Review training component - Review 3R component performance - Review status of procurement - Review status of disbursement	Operations Procurement ODS Technical	6
FY 97	<b>Supervision Mission (12/1996)</b> - Review project implementation progress (ODS phaseout, training, 3R component) - Review accounting, procurement and disbursement - Auditing	Operations ODS Technical	2
	<b>Supervision Mission (6/1997)</b> - Accounting, disbursement - Auditing - Project impact assessment - Preparation of ICR	Operations	2



## **Part II: Technical Annexes**



**HUNGARY**  
**TECHNICAL SUPPORT AND INVESTMENT PROJECT**  
**FOR THE PHASEOUT OF OZONE DEPLETING SUBSTANCES**

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**HUNGARY**  
**TECHNICAL SUPPORT AND INVESTMENT PROJECT**  
**FOR THE PHASEOUT OF OZONE DEPLETING SUBSTANCES**

**TECHNICAL REPORT**  
**SUMMARY TABLE**

Sub-Project Title and Description	Participating Enterprises	Sub-Project Impact and Benefits	Type of ODS Used	Sub-Project Costs (US\$ Million)	Proposed GEF Grant (US\$ Million)	Retroactive Financing (US\$ Million)
1. Project Implementation Unit for the Phaseout of Ozone Depleting Substances	Project Implementation Unit, MERP	-	-	0.273	0.245	0.045
2. Reduction of the emission of ozone depleting freon gases through recovery, reclamation, and recycling of refrigerants	Hungarian Association of Air Conditioning and Refrigeration Enterprises	Recycling of up to 450 tons/yr of CFC-11, CFC-12, and CFC-502 refrigerants	CFC-11 CFC-12 CFC-502	2.043	1.415	0.307
3. Phaseout of ozone depleting substances in the manufacturing of refrigerators and freezers at Frigolux Ltd.	Frigolux Ltd.	Phaseout of 15.60 tons of ODP	CFC-11 CFC-12 CFC-502	0.573	0.476	0.000
4. CFC-11 free polyurethane foam processing for the heat-insulation of hot water storage tanks at the Hajdusagi Iparmuvek Company	Hajdusagi Iparmuvek Company	Phaseout of 63.00 tons of ODP	CFC-11	1.406	0.999	0.300
5. Phaseout of ozone depleting CFC-11 freon in sandwich panel production at Metalucon Ltd.	Metalucon Ltd.	Phaseout of 45.60 tons of ODP	CFC-11	0.884	0.724	0.000
6. Phaseout of ozone depleting CFC-11 freon in sandwich panel production at Metisol Ltd.	Metisol Ltd.	Phaseout of 80.00 tons of ODP	CFC-11	0.441	0.346	0.000
7. Phaseout of CFC propellant in gas-sterilizer cartridge production using ethylene oxide at the Mediroll Ltd.	Mediroll Ltd.	Phaseout of 107.0 tons of ODP	CFC-12	0.058	0.053	0.031
8. Phaseout of CFC-11, CFC-12, and 1,1,1-Trichloroethane solvents and propellants at Auto-Mobil Ltd.	Auto-Mobil Ltd.	Phaseout of 96.76 tons of ODP	CFC-11 TCE	0.084	0.084	0.075
9. Modification of cleaning technology of automatic and electronic parts of oil and gas pipelines, substituting for CFC and 1,1,1-Trichloroethane solvents with water based solution at MMG-AM Ltd.	MMG-AM Ltd.	Phaseout of 12.20 tons of ODP	TCE CFC-113	1.233	1.206	0.245
10. Phaseout of 1,1,1-Trichloroethane photoresistant developer with alkalic solution in the manufacturing of printed circuit panels at Hitelap Ltd.	Hitelap Ltd.	Phaseout of 3.20 tons of ODP	TCE	0.180	0.180	0.000

Sub-Project Title and Description	Participating Enterprises	Sub-Project Impact and Benefits	Type of ODS Used	Sub-Project Costs (US\$ Million)	Proposed GEF Grant (US\$ Million)	Retroactive Financing (US\$ Million)
11. Conversion from release agent solvent to solvent free release agent substance, and from the consumption of 1,1,1-Trichloroethane to water based cleaning in polyurethane sole producing at Tisza Shoe Company	Tisza Shoe Company	Phaseout of 5.69 tons of ODP	CFC-11 TCE	0.176	0.132	0.019
12. Conversion from open system vapor phase washing with CFC-113 to closed system washing with perchloroethylene at the Fovarosi Finommechanikai Ltd.	Fovarosi Finommechanikai Ltd.	Phaseout of 1.16 tons of ODP	CFC-113	0.034	0.034	0.000
13. Conversion to soldering with residue free fluxic soldering tin instead of cleaning with freon after soldering at the BRG Radiotechnikai Company	BRG Radiotechnikai Company	Phaseout of 1.20 tons of ODP	CFC-113	0.023	0.022	0.005
14. Conversion from freon-using cloth cleaning machines to perchloroethylene-using machines at the Rutitex Company	Rutitex Company	Phaseout of 6.42 tons of ODP	CFC-11 CFC-113	0.340	0.340	0.000
15. Regenerating and closed system draining of extinguishing gases at the member companies of the Fire-Protection Association	Elzett Safety Tech. Company, Fajro Automatics, Fire Protection Equip. Producing Ltd., Fire Protection Education & Research Institution	Phaseout of 269.70 tons of ODP	H-1211 H-1301	0.321	0.321	0.018
<b>Subtotal for Component 1 – Sub-Project 1</b>	-	-	-	<b>0.273</b>	<b>0.245</b>	<b>0.045</b>
<b>Subtotal for Component 2 – Sub-Project 2</b>	-	-	-	<b>2.043</b>	<b>1.415</b>	<b>0.307</b>
<b>Subtotal for Component 3 – Sub-Projects 3-15</b>	-	-	-	<b>5.754</b>	<b>4.917</b>	<b>0.693</b>
<b>Subtotal for Components 1-3</b>	-	-	-	<b>8.070</b>	<b>6.577</b>	<b>1.045</b>
Other: Financial Agent Fee (2.50 percent of Grant Request for Sub-Projects 2-15)	-	-	-	0.158	0.158	0.000
Other: Contingency (2.52 percent of Grant Request for Sub-Projects 1-15)	-	-	-	0.165	0.165	0.052
<b>TOTAL</b>	-	<b>Phaseout of 1,157.53 tons of ODP</b>	-	<b>8.393</b>	<b>6.900</b>	<b>1.097</b>

**HUNGARY**  
**TECHNICAL SUPPORT AND INVESTMENT PROJECT**  
**FOR THE PHASEOUT OF OZONE DEPLETING SUBSTANCES**

**INTRODUCTION**

The project consists of (i) an Institutional Strengthening Component; (ii) a Recovery, Reclamation, and Recycling Component (3R Component) for ODS used as refrigerants; and (iii) an Investment Component comprising thirteen Sub-Projects in a number of sectors. Below is a description of each of these components. The Institutional Strengthening Component comprises Sub-Project 1, the 3R Component comprises Sub-Project 2, and the Investment Component comprises Sub-Projects 3-15.

**SUB-PROJECT NO. 1 - Sub-Project Implementation Unit for the Phaseout  
of Ozone Depleting Substances**

**INSTITUTIONAL STRENGTHENING**

***A. SUB-PROJECT DESCRIPTION***

**Background**

1.1 The PIU was established by the MERP in July 1994. It has assisted in the preparation of the project with the Participating Enterprises, the Government of Hungary, the World Bank, and consultants. A staff of one person has been employed since mid-1994, but an additional staff person to assist in financial aspects of project implementation is expected to be added before the GEF Grant is signed.

**Sub-Project Objectives**

1.2 The PIU will provide support to the Participating Enterprises, the MERP, and the Corvin Bank (CB) by overseeing all aspects of day-to-day project management. By serving as a link between the World Bank and the Participating Enterprises, the PIU will ensure that the Project will be carried out in a timely and more efficient manner. Its efforts will help to promote the phaseout of 1158 tons (in ODP equivalent) of annual ODS consumption. Based on the advice of the PIU, a Technical Advisory Group (TAG) will be appointed by the MERP to provide guidance to ODS users on the technical aspects of investment Sub-Project implementation.

***B. SUB-PROJECT EXECUTION***

1.3 The PIU will coordinate the implementation of the Project, and in close cooperation with the Corvin Bank (CB), supervise project activities according to the requirements of the World Bank and the

**MERP.** The Corvin Bank will supervise procurement and disbursement of the GEF grant for Sub-Projects 2-15 in compliance with World Bank guidelines. As necessary, the PIU will arrange for technical assistance and consultants to assist in project implementation, and provide support to facilitate cooperation among government institutions and the consumers of ODS.

**1.4 The PIU will provide the following services:**

- Coordinating communication between the World Bank, the MERP, the CB, the Participating Enterprises, and other government institutions (responsibility of the PIU);
- Providing information on ODS substitutes and alternative phaseout technologies, and supervision of technical aspects of investment Sub-Project implementation (responsibility of the PIU with input from the TAG);
- Organizing training, workshops, and seminars for Sub-Project managers and small ODS users, arranging for technical consultants to provide advice, and advising Participating Enterprises concerning any changes in ODS Phaseout technologies (responsibility of the PIU with input from the TAG);
- Dissemination of information to the general public, design and implementation of the regulatory framework governing ODS use, and monitoring compliance with ODS regulations (responsibility of the MERP with input from the PIU);
- Reviewing procurement practices of Participating Enterprises to ensure that they are in compliance with World Bank guidelines (responsibility of the CB);
- Preparation of disbursement requests and monitoring of expenditures of Participating Enterprises to ensure that disbursement and use of funds is in compliance with World Bank guidelines (responsibility of the CB);
- Open and maintain the Special Account, submit audited annual financial statements regarding the use of the GEF Grant funds, and submit quarterly progress reports to the MERP and PIU regarding project procurement and disbursement (responsibility of the CB);
- Overseeing implementation of investment Sub-Projects to ensure timely implementation of Project Implementation Plans, ensuring adequate environmental protection and safety precautions are being taken by the Participating Enterprises, and establishing a reporting system on project implementation to be followed by each of the Participating Enterprises (responsibility of the PIU); and
- Preparation of quarterly reports summarizing the status of Sub-Project implementation, technical issues, procurement methods used for each procurement package, amounts disbursed, accounting and auditing, environmental and safety issues, and any changes in the

legal and regulatory framework (responsibility of the PIU with input from the CB and Participating Enterprises).<sup>8</sup>

**C. INCREMENTAL COSTS OF THE SUB-PROJECT**

1.5	The incremental investment cost of the phaseout of ODS	US\$77,410
	The incremental operating cost of the phaseout of ODS (2 years, discounted)	US\$195,590
	Total incremental cost of the Sub-Project	US\$273,000

**Sub-Project Financing**

1.6 The Ministry for Environment and Regional Policy will cover overheads up to US\$28,500 of the total incremental cost of the Sub-Project. It is proposed that the remaining incremental cost of the project be financed by the GEF grant.

Proposed GEF Grant	US\$244,500
Financed by Hungary	US\$ 28,500

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<sup>8</sup> The GEF is currently preparing Monitoring and Evaluation Guidelines for ODS Phaseout Projects which will include a standard format for quarterly supervision reports to be prepared by implementing agencies. These guidelines are expected to be finalized by September 1995.

**SUB-PROJECT NO. 2 - Reduction of the Emission of Ozone Depleting Freon Gases Through Recovery, Reclamation, and Recycling of Refrigerants**

**REFRIGERATION**

**A. SUB-PROJECT DESCRIPTION**

**Background**

2.1 The Association of the Refrigerating and Air Conditioning Enterprises was established in 1993, currently the Association represents the interests of 182 companies - these companies include more than 900 refrigerator repair shops, which each have six refrigerator fitters, on average.

2.2 There are about 450-460 refrigerator services in the country, and about 2000 qualified fitters work. It is expected, that the Association will work with 75-80 percent of the qualified fitters under this Sub-Project.

**Sub-Project Objective**

2.3 The objective of the Sub-Project is to decrease the amount of CFC-11, CFC-12 and CFC-502 since consumption of these substances was 750 tons in 1993. These substances are used and discharged during the maintenance and repairs of domestic, commercial, and industrial refrigerators, and air conditioners.

2.4 The Sub-Project will be implemented by the Association with a view to provide each of its 182 member Service Centers with the skills and equipment required to establish a national network to remove ozone depleting substances from refrigerators and to collect and recycle them.

2.5 During the Sub-Project the companies of the Association will first establish the material conditions and requirements for closed system repairing. Meanwhile, on the national level, about 2000 qualified refrigerator fitters will be trained in the new closed system repair and maintenance technology. The training will be both theoretical and practical.

**B. SUB-PROJECT EXECUTION**

**Schedule**

2.6 Sub-Project duration: 15 months

Parts of the Sub-Project:

- Training of 2000 refrigeration and air conditioning service technicians
- CFC recycling investments
- Organizing the national ODS recycling network
- Increasing public awareness

2.7 The Association of the Refrigerating and Air Conditioning Companies will carry out the Sub-Project execution on its own site. The CB and the MERP will supervise the use of the GEF grant.



**C. INCREMENTAL COSTS OF THE SUB-PROJECT**

2.8	The incremental investment cost of the phaseout of ODS	US\$2,042,670
	The incremental operating cost of the phaseout of ODS (2 years, discounted)	US\$ 0
	Total incremental cost of the Sub-Project	US\$2,042,670

**Sub-Project Financing**

2.9 The Association will cover US\$627,175 of the total incremental cost of the Sub-Project. It is proposed that the remaining incremental cost of the project be financed by the GEF grant.

Proposed GEF Grant	US\$1,415,495
Participating Enterprise Contribution	US\$ 627,175

**D. BENEFIT OF THE SUB-PROJECT**

2.10 As a result of the implementation of the Sub-Project the amount of the ozone depleting substances used in refrigeration services will decrease by 450.00 tons in 1996. In the future this amount will increase due to the increase in the volume of recycled substances.

**FINANCIAL CASH FLOW FOR 3R COMPONENT (\$US Million)**

	1994	1995	1996	Total
1. Investment Cost	0.070	1.487	0.486	2.043
2. Operating cost	0.000	0.000	0.000	0.000
3. Total Costs of 3R Component (Row 1 + Row 2)	0.070	1.487	0.486	2.043
4. Proposed GEF Grant	0.000	0.973	0.442	1.415
5. Total Revenues from Taxes on CFCs and HCFCs	0.000	0.231	0.926	1.157
6. Total Revenue from 3R Component (Row 4 + Row 5)	0.000	1.204	1.368	2.572
7. Net Cash Flow from 3R Component (Row 6 - Row 3)	-0.070	-0.283	0.882	0.529
8. Total Revenues from Product Fees on CFCs and HCFCs to be collected by State Ecofund (Row 5)	0.000	0.231	0.926	1.157
9. Revenues from Product Fees on CFCs and HCFCs Retained by State Ecofund	0.000	0.196	0.786	0.982
10. Revenues from Product Fees on CFCs and HCFCs Rebated to Refrigeration Enterprises (Row 8 - Row 9)	0.000	0.035	0.140	0.175
11. Own Contribution of Refrigeration Enterprises to 3R Component	0.070	0.071	0.486	0.627
12. Proposed GEF Grant (Row 4)	0.000	0.973	0.442	1.415
13. Total Contribution to Financing of 3R Component (Row 10 + Row 11 + Row 12)	0.070	1.079	1.068	2.217
14. Total Costs of 3R Component (Row 3)	0.070	1.487	0.486	2.043
15. Net Cash Flow for 3R Component -- Including Contribution of Refrigeration Enterprises, but not Including Revenues Retained by State Ecofund (Row 13 - Row 14)	0.000	-0.408	0.582	0.174
16. Net Cash Flow for Refrigeration Enterprises -- Not Including Contribution of Refrigeration Enterprises (Row 10 + Row 12 - Row 14) or (Row 15 - Row 11)	-0.070	-0.479	0.096	-0.453
17. Net Cash Flow for State Ecofund (Row 9)	0.000	0.196	0.786	0.982
18. Net Cash Flow from 3R Component -- Not Including Contribution of Refrigeration Enterprises, but Including Revenues Retained by State Ecofund (Row 7) or (Row 16 + Row 17)	-0.070	-0.283	0.882	0.529

Note: Estimates are based on the projected cash flow associated with the 3R Component. Collection of product fees (250 HF/kg for CFCs and 100 HF/kg for HCFCs) is expected to begin in September 1995. The exact allocation of product fees between the State EcoFund and the Refrigeration Enterprises will be determined at a later date.

**SUB-PROJECT NO. 3 - Phaseout of Ozone Depleting Substances in the Manufacturing of Refrigerators and Freezers at Frigolux Ltd.**

**REFRIGERATION AND FOAM SECTOR**

***A. SUB-PROJECT DESCRIPTION***

**Background**

3.1 The Frigolux Ltd. used to belong to the MIRKOZ Diesel and Cooling Technology Cooperative Society as a factory unit in Csongrad. In 1990, it became independent as a cooperative society, and in 1992 it became a limited liability company. The main products of Frigolux are: shop-type food freezers, refrigerators and vitrines, ice-cream-machines for retail use, and domestic refrigerators. The company produced nearly 8600 refrigerators in 1993. The revenue of the company was 390 million HF (3.9 million USD) in 1993.

**Sub-Project Objectives**

3.2 The objective of the Sub-Project is to phase out the consumption of various ODS by 90 percent per year. Present consumption includes 3.8 tons of CFC-12 and 0.85 tons of CFC-502 refrigerant, as well as 11 tons of blowing agent CFC-11 which will be eliminated by replacing the blowing agent (CFC-11) used for rigid polyurethane (PU) foam insulation with cyclopentane (temporarily with HFC-134A), and replacing CFC-12 refrigerant with HFC-134A, and CFC-502 with HFC 404A and/or HFC-507. For these changes new filling equipment, vacuum pumps, gas detectors, and temperature control units are to be procured and put into service. The Sub-Project includes training, which is necessary for the implementation of the new technologies, and some elements of servicing.

***B. SUB-PROJECT EXECUTION***

3.3 The first phase of the Sub-Project was carried out between June 1994 and December 1994. In the first phase, the phaseout of the ODS was not completed, since the emission of ozone depleting substances equivalent to about 1.8 tons of ODP will continue. The Sub-Project includes the procurement and installation of one high pressure PU-foaming mixer, heating and ventilation for the foaming workshop, refrigerant charging equipment, vacuum pumps, electronic leak detectors, and refrigerating system dew-point testers. At the end of the second phase (through 1996) ozone depleting substances will not be used. Particular attention will be given to ensure that the design and operation of cyclopentane storage tanks is up to international safety standards.

3.4 Frigolux Ltd. will carry out Sub-Project execution on its own site. The CB and the MERP will supervise the use of the GEF grant.

**C. INCREMENTAL COSTS OF THE SUB-PROJECT<sup>9</sup>**

3.5	The incremental investment cost of the phaseout of ODS	US\$572,864
	The incremental operating cost of the phaseout of ODS (2 years, discounted)	US\$ 0
	Total incremental cost of the Sub-Project	US\$572,864

**Sub-Project Financing**

3.6 Frigolux Ltd. will cover US\$96,800 of the total incremental cost of the Sub-Project from its own sources. The remaining incremental costs of the project are to be financed by the GEF grant.

Proposed GEF Grant	US\$476,064
Participating Enterprise Contribution	US\$ 96,800

**D. BENEFIT OF THE SUB-PROJECT**

3.7 As a result of the implementation of the first phase of the Sub-Project, the reduction in emission of ozone depleting substances will be equivalent to 15.60 tons of ODP per year.

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<sup>9</sup> The cost-effectiveness of this project is \$30.71/kg-ODP, which is within the range of cost-effectiveness of similar projects supported by the Multilateral Fund of the Montreal Protocol (with an average cost-effectiveness of \$29.32/kg-ODP).

**SUB-PROJECT NO. 4 - CFC-11 Free Polyurethane Foam Processing for the Heat-Insulation of Hot Water Storage Tanks at the Hajdusagi Iparmuvek Company**

**FOAM SECTOR**

***A. SUB-PROJECT DESCRIPTION***

**Background**

4.1 The activity of the Hajdusagi Iparmuvek Company involves manufacturing and merchandising of household appliances. Besides automatic washing machines and hot-water-tanks, the company produces traditional washing machines, spin-dryers, open system water heaters and surface radiators.

4.2 The net income of the company in 1993 was 42.6 million USD, and 19 percent of this originated from exports. The number of employees is 1,950. In the last few years the company has undertaken many positive steps for environmental protection and quality assurance.

**Sub-Project Objectives**

4.3 The objective of the Sub-Project is to phase out annual consumption of 63 tons of CFC-11 PU-blowing-agent propellant through construction alterations, new technologies, the establishment of a storing park, and the installation of a foaming machine which uses high pressure water/CO<sub>2</sub> as propellant.

4.4 The high pressure foaming machine which is to be installed will operate with a water/CO<sub>2</sub> propellant foam system. This machine has to have 500 kg/hour polyalcohol + 700 kg/hour isocyanide foaming capacity and the amount of foam to be propelled into the system is to be 1.5-8.5 kg/piece. Heat loss inspections and technological examinations will be performed. Construction modifications to maintain the quality in CFC-free polyurethane (PU) foam manufacturing will be carried out.

***B. SUB-PROJECT EXECUTION***

4.5 The execution of the Sub-Project will take 36 months. During the first ten months (January-October 1994), the high pressure foaming machine, which uses water/CO<sub>2</sub> as propellant instead of foams with CFC-11, will be put into operation. In the first phase, technological experiments and heat loss tests are also going to be carried out with the foams which do not contain CFC-11. In the second project phase from November 1994 to December 1995, the foaming in form or pillory is to be worked out and inaugurated, and the construction modifications are to be planned and carried out depending on the results of the heat loss tests. In the third phase between January and December 1996, the transportation and storage system of the polyurethane base are to be rationalized.

4.6 The Hajdusagi Iparmuvek Company will control and conduct the Sub-Project execution, while the CB and the MERP will supervise the use of the GEF grant.

**C. INCREMENTAL COSTS OF THE SUB-PROJECT<sup>10</sup>**

4.7	The incremental investment cost of the phaseout of ODS	US\$1,071,000
	The incremental operating cost of the phaseout of ODS (2 years, discounted)	US\$ 335,202
	Total incremental cost of the Sub-Project	US\$1,406,202

**Sub-Project Financing**

4.8 The Hajdusagi Iparmuvek Company will cover \$407,358 of the total incremental cost of the Sub-Project. The remaining incremental cost of the Sub-Project is proposed to be financed by the GEF grant.

Proposed GEF Grant	US\$ 998,642
Participating Enterprise Contribution	US\$ 407,358

**D. BENEFIT OF THE SUB-PROJECT**

4.9 The Sub-Project will reduce the emission of ozone depleting substances by 63.00 tons of ODP per year.

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<sup>10</sup> The cost-effectiveness of this project is \$15.85/kg-ODP, which is within the range of cost-effectiveness of similar projects supported by the Multilateral Fund of the Montreal Protocol (with an average cost-effectiveness of \$17.2/kg-ODP).

**SUB-PROJECT NO. 5 - The Phaseout of Ozone Depleting CFC-11 Freon in  
Sandwich Panel Production at Metalucon Ltd.**

**FOAM SECTOR**

**A. SUB-PROJECT DESCRIPTION**

**Background**

5.1 Metalucon Ltd. is a property of the HUNGALU Hungarian Aluminum Industrial Company. Out of the 550 million Hungarian Forints (HF) revenue of the company in 1993, 101 million Hungarian Forints came from the production of sandwich panels. The company has 160 employees, 30 of which work in the sandwich panel manufacturing industrial unit that began operations in 1981. Currently they produce 30 thousand m<sup>2</sup> of sandwich panels, but a few years ago the production was over 100 thousand m<sup>2</sup>. The company delivers most of its sandwich panel products to the building industry and to refrigerating plants. In the future, the production of the company is expected to increase.

**Sub-Project Objectives**

5.2 The objective of the Sub-Project is to phase out annual consumption of 45.6 tons of CFC-11 freon blowing agent. In the first phase of the project the CFC-11 freon will be substituted with the much less ozone depleting HCFC-141b blowing agent. To carry out this change, new foaming equipment which uses the new blowing agent will be procured, and the temperature adjustment of the electric heating of the foaming frames will be assessed. In the second phase of the Sub-Project, cyclopentane will be substituted for HCFC-141b blowing agent.

**B. SUB-PROJECT EXECUTION**

5.3 The first phase of the Sub-Project is planned to be executed in 1995-1996, and the second phase in 1997. Only the first phase contains investment cost. The most important parts of the first phase are the procuring and putting into service of the foaming equipment, the stirrer, the tanks, and the injection device, and the realization of the electric heating and temperature adjustment of the foaming frames. In the second phase of the Sub-Project the implementation of the cyclopentane blowing agent will be possible without any investment cost because the equipments installed under the first phase can be converted to use cyclopentane. The Sub-Project also includes a training program for employees. Particular attention will be given to ensure that the design and operation of cyclopentane storage tanks is up to international safety standards.

5.4 Metalucon Ltd. will conduct the Sub-Project execution on its own site, while the CB and the MERP will supervise the use of the GEF grant.

**C. INCREMENTAL COSTS OF THE SUB-PROJECT<sup>11</sup>**

5.5	The incremental investment cost of the phaseout of ODS	US\$698,562
	The incremental operating cost of the phaseout of ODS	US\$186,046
	Total incremental cost of the Sub-Project	US\$884,608

**Sub-Project Financing**

5.6 Metalucon Ltd. will cover \$160,289 of the total incremental cost of the project. The remaining incremental cost of the Sub-Project is proposed to be financed by the GEF grant.

Proposed GEF Grant	US\$724,319
Participating Enterprise Contribution	US\$160,289

**D. BENEFIT OF THE SUB-PROJECT**

5.7 The Sub-Project will reduce the emission of ozone depleting substances by 45.60 tons of ODP. After the first phase the emissions will decrease by 17.70 tons of ODP per year.

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<sup>11</sup> The cost-effectiveness of this project is \$17.08/kg-ODP, which is within the range of cost-effectiveness of similar projects supported by the Multilateral Fund of the Montreal Protocol (with an average cost-effectiveness of \$17.2/kg-ODP).



**SUB-PROJECT NO. 6 - The Phaseout of Ozone Depleting CFC-11 Freon in  
Sandwich Panel Production at Metisol Ltd.**

**FOAM SECTOR**

**A. SUB-PROJECT DESCRIPTION**

**Background**

6.1 Metisol Ltd. was established in 1990, but the company that established it - the ALUTROSZT Factory of Aluminum Structures - had 22 years experience with the production of sandwich panels. The main products of Metisol are still the rigid polyurethane foam panels and variant corrugated sheets, which produce 85 percent of its revenue. The production is 80,000 m<sup>2</sup> per year, and the total capacity is 90,000 m<sup>2</sup>.

6.2 The revenue of Metisol is around 180 million forints, and by the market forecasts it will increase. The company employs 30 people.

**Sub-Project Objectives**

6.3 The objective of the Sub-Project in the first phase is to substitute for annual use of 80 tons of CFC-11 blowing agent with HCFC-141b blowing agent. This will entail necessary technological changes, procurement and installation of high pressure blowing presses and heating containers, air control on the shop floor, reconditioning certain equipments, technical assistance, and training for employees. During the second phase of the Sub-Project in 1997, the phaseout of the consumption ozone depleting substances will be complete.

**B. SUB-PROJECT EXECUTION**

6.4 The execution of the first phase of the Sub-Project will take seven months from June to December 1995. During this time, the initial investments and training will be completed.

6.5 Metisol Ltd. will conduct the Sub-Project implementation on its own site, and the CB and the MERP will supervise the use of the GEF grant.

**C. INCREMENTAL COSTS OF THE SUB-PROJECT**

6.6	The incremental investment cost of the phaseout of ODS	US\$441,207
	The incremental operating cost of the phaseout of ODS	US\$ 0
	Total incremental cost of the Sub-Project	US\$441,207

**Sub-Project Financing**

6.7 Metisol Ltd. will cover US\$95,185 of the total incremental cost of the Sub-Project. The remaining incremental cost of the Sub-Project is proposed to be financed by the GEF grant.

Proposed GEF Grant	US\$346,022
Participating Enterprise Contribution	US\$ 95,185

***D. BENEFIT OF THE SUB-PROJECT***

6.8 As a result of the realization of the Sub-Project, the emission of ozone depleting substances will decrease by 80.00 tons of ODP per year.

**SUB-PROJECT NO. 7 - Phaseout of CFC Propellant in Gas-Sterilizer Cartridge  
Production Using Ethylene Oxide at Mediroll Ltd.**

**AEROSOL-PROPELLANT SECTOR**

**A. SUB-PROJECT DESCRIPTION**

**Background**

7.1 Mediroll Ltd. employs 19 people. After the reorganization of the Medicor Company, Mediroll Ltd. became an independent company, established by the employees of the Development Department of the incorporation. This department developed the gas-sterilizers and the GP-1 and GP-3 sterilizing cartridges, and they produced the filler equipment. A small-scale plant was established in the Petőfi Agricultural Cooperative Society (Moricgat) for the filling of the cylinders. Mediroll Ltd., in the course of a contract with the Ministry of Welfare, elaborated the filling technology and its equipments and they carried out some tests with new gas compositions (propellants). About 4500 thermosensitive plastic (e.g., catheter) sterilizing equipments are used in Eastern Europe.

**Sub-Project Objectives**

7.2 The objective of the Sub-Project is to phase out annual consumption of 107 tons of CFC 12 with HCFC-124 propellant and to carry out the development work, obligatory sterilizing tests, chemical and microbiological testing, and determination of the most effective gas mixture.

**B. SUB-PROJECT EXECUTION**

**Schedule**

7.3 The Sub-Project will be carried out in two phases. The first phase should take four months, the second one twelve months.

7.4 Mediroll Ltd. will conduct and carry out the Sub-Project execution on its own site, while the CB and the MERP will supervise the use of the GEF grant.

**C. INCREMENTAL COSTS OF THE SUB-PROJECT**

7.5	The incremental investment cost of the phaseout of ODS	US\$15,379
	The incremental operating cost of the phaseout of ODS (amount per year)	US\$42,874
	Total incremental cost of the Sub-Project	US\$58,253

**Sub-Project Financing**

7.6 Mediroll Ltd. will cover US\$4,854 from its own sources, with the remaining part of the incremental investment cost of the Sub-Project to be financed by the GEF grant.

Proposed GEF Grant	US\$53,399
Participating Enterprise Contribution	US\$ 4,854

***D. BENEFIT OF THE SUB-PROJECT***

7.7 The Sub-Project will reduce the emission of ozone depleting substances by 107.00 tons of ODP per year.

**SUB-PROJECT NO. 8 - Phaseout of CFC-11, CFC-12, and 1,1,1-Trichloroethane Solvents  
and Propellants at Auto-Mobil Ltd.**

**AEROSOL-PROPELLANT SECTOR**

**A. SUB-PROJECT DESCRIPTION**

**Background**

8.1 The Auto-Mobil Chemical Ltd. produces domestic, industrial, and automobile aerosols, filling 1-1.2 million canisters yearly. The canisters are purchased from the Matravideki Metal Works. About 20 percent of the production is transported to Middle-Eastern markets.

8.2 The aerosol products can be used for cleaning and testing of printed circuit panels, and removing of dirt from connecting surfaces in the electronic industry. In households, siliconic aerosol products can be used for protection of rubber objects, for anti-staticising, and for making an object water-resistant. In industry, the siliconic aerosol products can be used as release agents. Domestic products also include a drain declogger preparation which is popular.

8.3 Two PAMASOL filling devices fill the aerosol canisters.

**Sub-Project Objectives**

8.4 The objective of the Sub-Project is to phaseout annual consumption of 28 tons of CFC-11, 64 tons of CFC-12, and 47.6 tons of 1,1,1-Trichloroethane ozone depleting substances through the application of other propellants such as propane-butane gas and compressed air. The project entails conversion of propellant containers and other equipment, and safety training for staff.

**B. SUB-PROJECT EXECUTION**

**Schedule**

8.5 The planning phase of the Sub-Project was between June 1, 1994 and September 31, 1994, and its investment phase between October 1, 1994 and December 31, 1995.

8.6 Auto-Mobil Ltd. will control and conduct the Sub-Project execution on its own site, while the CB and the MERP will supervise the use of the GEF grant.

**C. INCREMENTAL COSTS OF THE SUB-PROJECT**

8.7	The incremental investment cost of the phaseout of ODS	US\$19,537
	The incremental operating cost of the phaseout of ODS (2 years, discounted)	US\$63,975
	Total incremental cost of the Sub-Project	US\$83,512

**Sub-Project Financing**

8.8 The total incremental cost of the Sub-Project is proposed to be financed by the GEF grant.

Proposed GEF Grant	US\$83,512
Participating Enterprise Contribution	US\$ 0

***D. BENEFIT OF THE SUB-PROJECT***

8.9 The Sub-Project will reduce the emission of ozone depleting substances by 96.76 tons of ODP per year.

**SUB-PROJECT NO. 9 - Modification of Cleaning Technology of Automatic and Electronic Parts of Oil and Gas Pipelines at MMG-AM, Substituting CFC and 1,1,1-Trichloroethane Solvents with Water-Based Solution**

**SOLVENT SECTOR**

**A. SUB-PROJECT DESCRIPTION**

**Background**

9.1 MMG-AM is the largest device and automation producing company in Hungary on the basis of both the number of employees and the volume of the production. The manufacturing of ready-made controlling and technical safety systems represents 40-50 percent of the income.

9.2 In addition to the up-to-date assembly workshops, the company has a modern metal foundry, a plastic processing factory, a pressing, a hammering and a metal-working unit. The central factory of MMG-AM is in Budapest and there are altogether three other factories in the towns of Bicske, Kecskemet, and Szekszard.

**Sub-Project Objectives**

9.3 The objective of the Sub-Project is to phase out annual consumption of 87 tons of 1,1,1-Trichloroethane and 3.5 tons of CFC ozone depleting substances by conversion to a water-based solution using washing technology. During the execution of the Sub-Project seven modern ultrasonic washing appliances will be bought and installed. These new appliances use water based solution, and will be substituted for eight 1,1,1-Trichloroethane and CFC applying ultrasonic component degreasing washing appliances in four factory units. The old appliances will be detached. The investment project also includes: (i) ventilation plants, which are to be installed at the washing appliances, (ii) a recirculating water-using rinsing appliance, and (iii) a solution desalting appliance, which is based on reverse osmosis.

**B. SUB-PROJECT EXECUTION**

9.4 The realization of the Sub-Project should take eight months. The project is divided into three phases. In the first phase preparatory research and development works (experimental degreasing with modern water based washing solution, experimental soldering, etc.), planning tasks, and tasks related to ordering will be executed. The second phase consists of the detachment and removal of the old appliances, and the installation and of the new appliances. In the third phase of the project the operating parameters of the new appliances will be set.

9.5 The execution of the Sub-Project will be directed by the central organization of MMG-AM, and each investment in the factory units will be carried out by the factory units themselves. The CB and the MERP will oversee the use of the GEF grant.

**C. INCREMENTAL COSTS OF THE SUB-PROJECT**

9.6	The incremental investment cost of the phaseout of ODS	US\$1,506,100
	The incremental operating savings of the phaseout of ODS	

(2 years, discounted)	US\$ -272,921
Total incremental cost of the Sub-Project	US\$1,233,179

**Sub-Project Financing**

9.7 It is proposed that MMG contribute \$27,379, and that the remaining incremental cost of the Sub-Project be financed by the GEF grant.

Proposed GEF Grant	US\$1,205,800
Participating Enterprise Contribution	US\$ 27,379

***D. BENEFIT OF THE SUB-PROJECT***

9.8 The Sub-Project will reduce the emission of ozone depleting substances by 12.20 tons of ODP per year.



**SUB-PROJECT NO. 10 - Phaseout of 1,1,1-Trichloroethane Photoresistant Developer with Alkalic Solution During the Manufacturing of Printed Circuit Panels at Hitelap Ltd.**

**SOLVENT SECTOR**

**A. SUB-PROJECT DESCRIPTION**

**Background**

10.1 Hitelap Printed Circuit Panel Designing and Producing Ltd. produces printed circuit panels for electronic companies. More than 250 Hungarian partners use 80-85 percent of the manufactured circuit panels, and the remaining panels are exported. The net revenue of Hitelap Ltd. was 174 million HF and it employed 80-85 people in 1993.

10.2 At the present time, Hitelap Ltd. uses a solid photoresistant developed in 1,1,1-Trichloroethane solvent and washed in methylene chloride solvent in the production of its printed circuit panels. The two types of the developing and washing devices used are the process developer and process stripper.

**Sub-Project Objectives**

10.3 The objective of the Sub-Project is to phase out the annual consumption of 32 tons 1,1,1-Trichloroethane ozone depleting substance through new equipment to be used in alkaline soluble photoresistant development, stripping, and developing in water based solution and washing with water. The project will substitute for the old developer and washer by procuring and putting into service modern equipment. New wastewater cleaning equipment is to be installed to improve the treatment of sewage water.

**B. SUB-PROJECT EXECUTION**

**Schedule**

10.4 The execution of the Sub-Project will take eight months. It will consist of planning, procuring, and putting into operation the alkalic developer, the washer, the coagulant filter -- including the introductory operation.

10.5 Hitelap Ltd. will conduct the Sub-Project execution on its own site, while the CB and the MERP will supervise the use of the GEF grant.

**C. INCREMENTAL COSTS OF THE SUB-PROJECT**

10.6	The incremental investment cost of the phaseout of ODS	US\$193,940
	The incremental operating savings of the phaseout of ODS (2 years, discounted)	US\$-14,151
	Total incremental cost of the Sub-Project	US\$179,789

**Sub-Project Financing**

10.7 The total incremental cost of the Sub-Project is proposed to be financed by the GEF grant.

Proposed GEF Grant	US\$179,789
Participating Enterprise Contribution	US\$ 0

***D. BENEFIT OF THE SUB-PROJECT***

10.8 The Sub-Project will reduce the emission of ozone depleting substances by 3.20 tons of ODP per year.

**SUB-PROJECT NO. 11 - Conversion From Release Agent Solvent to Solvent Free Release Agent Substance, and from the Consumption of 1,1,1-Trichloroethane to Water-Based Cleaning in Polyurethane Sole Producing at Tisza Shoe Company**

**SOLVENT SECTOR**

***A. SUB-PROJECT DESCRIPTION***

**Background**

11.1 The Tisza Shoe is the largest company in the Hungarian shoe industry, with revenue in 1993 of 22.5 million USD. The company employs 2,700 people. Besides different kinds of footwear, it produces rubber and plastic soles. Plastic processing factory units belong to the company, and primarily produce Polyvinyl Chloride (PVC), and polyurethane and polymer products.

11.2 Sole casting is one function of the Plastic-sole-producing division. This division of the company has a machinery capacity to produce 700 thousand pairs of polyurethane soles per year.

**Sub-Project Objectives**

11.3 The objective of the Sub-Project is to phase out annual consumption of 3.7 tons of CFC-11 solvent, 16.78 tons of 1,1,1-Trichloroethane washing liquid, and 5.6 tons release agent which contains 1,1,1-Trichloroethane, through the application of a new release agent, installation of a new sprinkler device and use of a water-solution washer.

11.4 The new release agent is completely solvent free. It consists of a mixture of waxes and silicon oils (type: 8650/7 Keck 152/1). For the pulverization and strewing of this new substance the implements in hand are not suitable, and therefore new strewing-homogenizing implements have to be procured.

11.5 After the implementation of a 1,1,1-Trichloroethane solvent vapor using sole washer, the degreasing of the soles is done by a closed, semi-automatic, water-using washer. In relation to this, a wastewater treatment facility has to be installed and the ventilation system has to be updated.

***B. SUB-PROJECT EXECUTION***

11.6 The execution of the Sub-Project will take ten months. In the first phase of the Sub-Project (April 1 to June 30, 1995) the alternative substances, technologies and equipments are to be chosen, tests are to be carried out, and permits are to be obtained. In the second phase of the Sub-Project the old equipments are to be detached, the new strewing equipment, water-using washer, and water treatment facility are to be installed, the ventilation is to be up-dated, and the staff is to be trained (July 1 to October 31, 1995). In the final phase, the new technologies are to be installed and checked (November 1 to December 31, 1995).

11.7 The Tisza Shoe Company will conduct the Sub-Project execution on its own site, while the CB and the MERP will supervise the use of the GEF grant.

**C. INCREMENTAL COSTS OF THE SUB-PROJECT**

11.8	The incremental investment cost of the phaseout of ODS	US\$211,390
	The incremental operating savings of the phaseout of ODS (2 years, discounted)	US\$-35,432
	Total incremental cost of the Sub-Project	US\$175,958

**Sub-Project Financing**

11.9 The total incremental cost of the Sub-Project proposed to be financed by the GEF grant is adjusted according to the percentage of the firm under Hungarian ownership (99.7%). Tisza Shoe will also contribute to other Sub-Project costs totalling \$44,431.

Proposed GEF Grant	US\$131,617
Participating Enterprise Contribution	US\$ 44,431

**D. BENEFIT OF THE SUB-PROJECT**

11.10 The Sub-Project will reduce the emission of ozone depleting substances by 5.69 tons of ODP per year.

**SUB-PROJECT NO. 12 - Conversion From Open System Vapor Phase Washing With CFC-113  
to Closed System Washing with Perchloroethylene at Fovarosi Finommechanikai Ltd.**

**SOLVENT SECTOR**

**A. SUB-PROJECT DESCRIPTION**

**Background**

12.1 The main products of the company are razor blades, automatic electronic products (e.g., switches, instruments), and household products. The most important products are the razor blades, since they account for 40 percent of the production value. The company plans to produce 20 million razor blades in the next year.

12.2 The production value of the Fovarosi Finommechanikai Ltd. was 1.25 million USD in 1993. The company employs 120 people. A significant percentage of the production of the company is sold on the national market.

**Sub-Project Objectives**

12.3 The objective of the Sub-Project is to phase out annual consumption of 1.45 tons of CFC-113 ozone depleting substances by switching over from an open freon system using washing to a closed perchloroethylene system based on washing. The new perchloroethylene based washing technology will be carried out by putting into service two renewed closed system, perchloroethylene using washers. These washers will still have enough washing capacity to degrease the razor blades before coating and to degrease the electric parts before installation. Before the implementation of the new cleaning substances, proper checks will be done to decide whether the components treated by the new washing technology meet the prescribed requirements.

**B. SUB-PROJECT EXECUTION**

12.4 The execution of the Sub-Project will take six months. The Sub-Project will be realized in three phases. During the first phase, the alternative cleaning technologies and cleaning substances will be evaluated, and experimental production will be done with the selected substances. In the second phase of the Sub-Project, the freon-using washer will be detached, the two renewed closed system perchloroethylene-using washers will be installed and put into service, the staff will be trained for the new technology, and the operating parameters of the new washing technology will be set. In the third phase the closed system perchloroethylene-based washing will be applied and the technology will be tested.

12.5 The Fovarosi Finommechanikai Ltd. will control and conduct the Sub-Project execution on its own site, while the CB and the MERP will supervise the use of the GEF grant.

**C. INCREMENTAL COSTS OF THE SUB-PROJECT**

12.6	The incremental investment cost of the phaseout of ODS	US\$39,150
	The incremental operating savings of the phaseout of ODS	

(2 years, discounted)	US\$ -5,580
Total incremental cost of the Sub-Project	US\$33,570

### **Sub-Project Financing**

12.7 The total incremental cost of the Sub-Project is proposed to be financed by the GEF grant.

Proposed GEF Grant	US\$33,570
Participating Enterprise Contribution	US\$ 0

### ***D. BENEFIT OF THE SUB-PROJECT***

12.8 The Sub-Project will reduce the emission of ozone depleting substances by 1.16 tons of ODP per year.

**SUB-PROJECT NO. 13 - Conversion to Soldering With Residue Free Fluxic Soldering Tin  
to Avoid Cleaning With Freon After Soldering at the BRG Radiotechnikai Company**

**SOLVENT SECTOR**

**A. SUB-PROJECT DESCRIPTION**

**Background**

13.1 The BRG Radiotechnikai Company produces electronic equipments for Hungarian state-owned and private companies, and for foreign companies. Its production consists of portable electronic devices for establishing radio connection. BRG produces 200-300 thousand parts per year, which are built into the electronic devices. These parts have to be washed, using freon, before mounting.

13.2 The ownership of the company is 97 percent Hungarian, with the remaining 3 percent Austrian. The company employs 400 people, and its revenue in 1993 reached 8 million USD, based on producing about 6000 radio devices. About 70 percent of the revenue comes from export, and most of the foreign costumers are from the former Soviet Union.

**Sub-Project Objectives**

13.3 The objective of the Sub-Project is to phase out annual consumption of 1.5 tons of CFC-113 ozone depleting substance through the implementation of the modern MULTICORE soldering tin, which makes washing with freon unnecessary.

13.4 Although the composition of the flux of the modern MULTICORE-made soldering tin makes the washing after soldering unnecessary, its application increases the soldering time, and therefore the working time and the consumption of electric energy. For this reason BRG must employ 32 people instead of 30 for soldering jobs, in order to avoid that the new technology decrease the output.

**B. SUB-PROJECT EXECUTION**

13.5 The duration of the Sub-Project is one month, and the Sub-Project is divided into three phases. During the first phase alternative soldering substances and cleaning technologies were evaluated and trial producing was done with the chosen substances. In the second phase the staff was trained for the new soldering technology, the materials and the soldering iron edges needed for the new technology were procured. The technology was modified on the basis of the quality check. In the third phase the new soldering technology is tested in manufacturing.

13.6 The BRG Radiotechnikai Company will conduct the Sub-Project execution on its own site, while the CB and the MERP will supervise the use of the GEF grant.

**C. INCREMENTAL COSTS OF THE SUB-PROJECT**

13.7	The incremental investment cost of the phaseout of ODS	US\$	0
	The incremental operating cost of the phaseout of ODS		

(2 years, discounted)	US\$22,845
Total incremental cost of the Sub-Project	US\$22,845

**Sub-Project Financing**

13.8 The total incremental cost of the Sub-Project proposed to be financed by the GEF grant is adjusted according to the percentage of the firm under Hungarian ownership (97%).

Proposed GEF Grant	US\$22,160
Participating Enterprise Contribution	US\$ 685

***D. BENEFIT OF THE SUB-PROJECT***

13.9 The Sub-Project will reduce the emission of ozone depleting substances by 1.20 tons of ODP per year.



**SUB-PROJECT NO. 14 - Conversion From Freon-Using Cloth Cleaning Machines to  
Perchloroethylene-Using Machines at the Rutitex Company**

**SOLVENT SECTOR**

**A. SUB-PROJECT DESCRIPTION**

**Background**

14.1 The Rutitex Company and its precursor have been engaged in washing and dry cleaning in Budapest for 40 years. The company runs several laundries, and owns a dry cleaning plant. They clean 530,000 kg of clothes per year. Approximately 480,000 kg of this is cleaned using perchloroethylene, and 50,000 kg is cleaned using CFC-11 and CFC-113.

**Sub-Project Objectives**

14.2 The objective of the Sub-Project is to phase out annual consumption of 7.9 tons of CFC-11 and CFC-113 freon ozone depleting substances through the substitution of freon-using cloth-cleaners with new perchloroethylene-based cleaners. During the project four closed system perchloroethylene-based cleaners will be bought.

**B. SUB-PROJECT EXECUTION**

14.3 The execution of the project will take eight months. The Rutitex Company will conduct the Sub-Project execution on its own site, while the CB and the MERP will supervise the use of the GEF grant.

**C. INCREMENTAL COSTS OF THE SUB-PROJECT**

14.4	The incremental investment cost of the phaseout of ODS	US\$355,120
	The incremental operating savings of the phaseout of ODS	US\$ -14,720
	Total incremental cost of the Sub-Project	US\$340,400

**Sub-Project Financing**

14.5 The total incremental cost of the Sub-Project is proposed to be financed by the GEF grant.

Proposed GEF Grant	US\$340,400
Participating Enterprise Contribution	US\$ 0

**D. BENEFIT OF THE SUB-PROJECT**

14.6 The Sub-Project will reduce the emission of ozone depleting substances by 6.42 tons of ODP per year.

**SUB-PROJECT NO. 15 - Regenerating and Closed System Draining of Extinguishing Gases at the  
Member Companies of the Fire-Protection Association**

**FIRE EXTINGUISHER SECTOR**

**A. SUB-PROJECT DESCRIPTION**

**Background**

15.1 The Fire-Protection Association was established in 1994 by the decision of the Elzett Safety Technology Company, Fajro Automatics and Fire-Protection Equipment Producing Ltd., and the Fire-Protection Education and Research Institution.

15.2 The Fire-Extinguisher Factory Unit of the Elzett Safety Technology Company is one of the three largest fire-extinguisher producing factories in Hungary, since its proportion of the national market is 35-40 percent. The revenue of the company was 1 million USD in 1994 and it has 64 employees. Approximately 55 percent of the revenue came from the halon extinguishant using devices.

15.3 Fajro Ltd. produces and services fire-extinguishers which contain halon 1301 gas. The revenue of the company was 2 million USD in 1993, and the number of employees 94. The professional training base of the Fire-Protection Association, the Fire-Protection Education and Research Institution, has been working on fire-protection research for several decades.

**Sub-Project Objectives**

15.4 The objective of the Sub-Project is to recycle 2,764 tons of halon 1211 and 159 tons of halon 1301 extinguishant in Hungary, and in compliance with the decrees of the MERP. As a benefit of the project the emission of 122.55 tons of halon 1211 and 2.51 tons of halon 1301 extinguishant would discontinue by putting into service regenerating devices, closed system draining devices, and other additional devices (evaluating and measuring instruments, etc.). For this the professional training of the user and controlling staff would be necessary.

**B. SUB-PROJECT EXECUTION**

15.5 The realization of the Sub-Project will take four months. In the first phase the old equipment will be removed and the new ones will be installed at Elzett and Fajro. At the end of the first phase of the Sub-Project the new equipment has to be put into service. The second phase will be carried out in two months and will consist of the training of the controlling staff.

15.6 The investments during the Sub-Project will be conducted by the companies on their own sites. The CB and the MERP will supervise the use of the GEF grant.

**C. INCREMENTAL COSTS OF THE SUB-PROJECT**

15.7	The incremental investment cost of the phaseout of ODS	US\$321,000
	The incremental operational cost of the phaseout of ODS	US\$ 0
	Total incremental cost of the Sub-Project	US\$321,000

**Sub-Project Financing**

15.8 It is proposed that the project be totally financed by the GEF grant.

Proposed GEF Grant

US\$321,000

***D. BENEFIT OF THE SUB-PROJECT***

15.9 The Sub-Project will reduce the emission of ozone depleting substances by 269.70 tons of ODP per year.





