

Proposal for Review

Project Title:	Hungary: Project for the Phaseout of Ozone Depleting Substances
GEF Focal Area:	Ozone Depletion
Country Eligibility:	Acceded to the Montreal Protocol in 1989; GEF eligibility on basis of IBRD eligibility.
Total Project Cost:	US\$9.4 million
GEF Financing:	US\$6.9 million
Counterpart Financing:	US\$2.5 million
Cofinancing/Parallel Financing:	None
Associated Project:	None
GEF Implementing Agency:	World Bank
Executing Agency:	World Bank
Local Counterpart Agency:	Hungarian Ministry for Environment and Regional Policy and Investment Sub-Project beneficiaries
Estimated Starting Date:	September 1995
Project Duration:	Two Years
GEF Preparation Costs:	No PRIF or PPA resources were used

HUNGARY: PROJECT FOR THE PHASEOUT OF OZONE DEPLETING SUBSTANCES

COUNTRY/SECTOR BACKGROUND/CONTEXT

1. The Vienna Convention for the Protection of the Ozone Layer (1985) and the Montreal Protocol on Substances that Deplete the Ozone Layer (1987) are international agreements which call for the phaseout of substances that deplete the stratospheric ozone layer.

2. 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 an Article 5 country under the Montreal Protocol, and is therefore not eligible for financial assistance from the Multilateral Fund for the Implementation of the Montreal Protocol. Global Environment Facility (GEF) resources will therefore be required to finance the Project.

3. All ozone-depleting substances (ODS) in Hungary are imported from the European Union, mainly the United Kingdom, Germany, France, the Netherlands, and Italy. In addition, approximately 15% of ODS used in Hungary were exported in final products in 1993, and thus the export market has effectively dictated the phaseout of ODS in some enterprises in advance of national legislation. Recovery and recycling of ODS will be required as of January 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.

4. In 1993, consumption of regulated ODS was approximately 2,224 metric tons. Compared to 1991, total annual ODS consumption has fallen by 43%, and is now equivalent to 2,140 ozone-depleting-potential (ODP) in weighted tons. In terms of ODS consumption and ozone-depleting-potential, 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 account for approximately 43% of CFC use, and 33% of national ODS consumption. In addition, approximately 55% of the ODS used in the foam sector are for insulation for refrigeration devices. Consequently, refrigeration products account for roughly 49% of national ODS consumption. The remaining ODS consumption is quite evenly distributed with aerosols, foams, halons, and solvents each accounting for 11-15%.

PROJECT OBJECTIVES

5. The principal objective of the Project is to assist Hungary in the phaseout of ODS, as mandated by the Montreal Protocol and its amendments and adjustments, in a cost effective manner. More specifically, the goals of this Project are to: (i) support the phaseout of the consumption of chlorofluorocarbons (CFCs) through adoption of new cost-effective CFC-free technologies; (ii) phase in the operation of a national network for recovery/reclamation/recycling (3R) of refrigerants (CFC-

12 and CFC-11); and (iii) 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.

6. By focussing on the key sectors and enterprises, the project will phase out 1156.9 tons of ODP per year, or roughly 52% of ODP-weighted ODS consumption in Hungary. Approximately 39% of the phaseout under the Project will be accomplished through a recovery, reclamation, and recycling scheme in the refrigeration subsector, and an additional 23% in the halons subsector.

PROJECT DESCRIPTION

7. The proposed project will consist 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. These Components were designed in close cooperation between the Government of Hungary, Participating Enterprises, the World Bank, and international consultants. The Ministry for Environment and Regional Policy (MERP) will be primarily responsible for the implementation of the Institutional Strengthening Component, while the Hungarian Association of Air-Conditioning and Refrigeration Enterprises will be primarily responsible for the 3R Component, and the Participating Enterprises for the Sub-Projects which will comprise the Investment Component.

8. **Institutional Strengthening Component.** This component will set up an ODS Phaseout Project Implementation Unit (PIU) to be supported by a Technical Advisory Group (TAG). The PIU will coordinate the implementation of the Project, oversee procurement and disbursement for the investment Sub-Projects compliance with World Bank guidelines, and in close cooperation with the Financial Intermediary, supervise project activities according to the requirements of the World Bank and 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. Funding for this Sub-Project will be US\$244,500 to cover salaries for three staff, office equipment, and the cost of hiring international consultants for supervision and monitoring during implementation of the Sub-Projects.

9. **3R Component.** This component will cost approximately \$2.04 million, of which \$1.42 million is proposed to be financed by the GEF. The Association of Refrigerating and Air-Conditioning Enterprises which will be responsible for implementing the project will establish a national network to remove ODS from refrigerators and recycle them, through the training of approximately 1500-1600 refrigerator service technicians (75-80% of the total number of technicians). This component will lead to the annual phaseout of 450 tons of ODP weighted ODS consumption, or approximately 39% of the total under the project.

10. **Investment Component.** This component covers 13 investment Sub-Projects -- 6 solvents, 3 foams, 2 aerosols, 1 halons, and 1 refrigeration and foams -- for a total of \$6.19 million, of which \$5.04 million is proposed to be financed by the GEF. A variety of ODS-phaseout technologies will be implemented, but three Sub-Projects (HIM (Foams), MMG-AM (Solvents), and Metalucon

(Foams)) will account for roughly 60% of the financing required for this component. This component will lead to the annual phaseout of 704.1 tons of ODP -- 38% in halons, 29% in aerosols, 27% in foams, 4% in solvents, and 2% in refrigeration and foams.

11. **Key Project Documents.** Hungary completed a Country Program in fulfillment of its obligations under the Montreal Protocol. The project proposed here is based on the findings of the Country Program. Other documents include detailed sub-project descriptions which include financial and technical data, and the technical reviews of these sub-projects undertaken by specialists from the Ozone Operations Research Group (OORG). As well, a detailed technical annex has been prepared in draft for this project. All of these documents are available from the Regional Coordinator, ENVGC; fax # 202-522-3256.

RATIONALE FOR FUNDING UNDER THE GLOBAL ENVIRONMENT FACILITY

12. The Project would form a part of Hungary's ODS phaseout program some of which might not be implemented without Bank involvement. In addition to promoting the phaseout of ODS, one rationale for the project is that it will reduce the economic dislocation associated with ODS phaseout by assisting those enterprises which will be required to change their production technologies. The proposed Project is consistent with the Implementation Guidelines and Criteria for GEF funding established by the Executive Committee of the Montreal Protocol (MPEC), for which the Bank is also an implementing agency. The Project will be developed and structured on the basis of specific ODS phaseout requirements in Hungary, and the project eligibility criteria guidelines set forth by the Multilateral Fund for the Implementation of the Montreal Protocol.

SUSTAINABILITY AND PARTICIPATION

13. The investment program will focus on priority sectors and cost-effective measures which were defined in the Country Program for the phaseout of ODS, and will be complemented by changes in policies and regulations to ensure compliance with ODS phaseout targets (e.g., penalties for violation of regulations, obligatory reporting and monitoring requirements). Limited availability of ODS and ODS dependent components will work to ensure sustained future use of ODS recycling equipment and non-ODS technology. This will be primarily attributable to the phaseout of ODS production in Europe.

14. As part of the development of the Country Program, the Ministry of Environment undertook consultations with a broad spectrum of enterprises and interested parties, including other ministries: industry, economics, finance, NGO's, industry associations, and others. Enterprises were given the opportunity to participate in the project as long as they could provide the necessary data for project staff to evaluate their financial viability, technological capabilities and eligibility for financial assistance. Consultations with enterprises and other interested parties continued through a series of country workshops held under the aegis of the Montreal Protocol on project identification, preparation and implementation, as well as during actual project design.

15. The Project will be implemented within a limited time-frame. ODS phaseout projects which are successfully implemented will have a permanent ODS phaseout effect, and be in compliance with the requirements of the Montreal Protocol to completely phase out by 1996. In order to ensure long-term sustainability of the various project components (especially the 3R scheme), training and policy and regulatory measures, already under consideration by the MERP, will be introduced early in the project implementation period.

16. Furthermore, a careful review of the financial mechanism supporting the 3R project will be undertaken to further establish the project structures required to ensure Sub-Project sustainability. Part of the funds will be earmarked to cover some of the expected financial shortfall of the recycling center during its first two years of operation. It is essential, for long-term sustainability of this Sub-Project, that the incentive to the service sector (the front line in the 3R field) be strong enough for them to undertake the recovery process.

LESSONS FROM PREVIOUS BANK INVOLVEMENT AND TECHNICAL REVIEW

17. ODS Phaseout Projects utilizing GEF resources are being developed concurrently in the Slovakia, Slovenia, and other countries. Implementation arrangements based on environment ministry implementation with local financial agent assistance in fund administration have been established for most ODS phaseout operations, and these have been used in the design of the Project. With respect to the 3R Component, the Czech Republic is just beginning to initiate its recycling and recovery program. Implementation will be closely watched to cull lessons learned, and meetings of the Hungarian and Czech counterparts will be encouraged.

18. **Technical Review.** The project was reviewed by technical specialists from the STAP roster as well as experts who serve on the Ozone Operations Research Group (OORG). The OORG was initially set up by the World Bank to review sub-project proposals for funding by the Multilateral Fund of the Montreal Protocol. The 13 investment sub-projects have been cleared by the reviewers, as has the 3-R component. The institutional strengthening sub-components is being revised by the Ministry to conform to recommendations made by both OORG reviews and ENVGC's Montreal Protocol staff.

PROJECT FINANCING, BUDGET AND INCREMENTAL COSTS

19. It is proposed that the Project cost of \$9.4 million be funded in the amount of \$6.9 million by the Global Environment Facility (GEF). Funds would be provided as a grant from the GEF to the Government of Hungary (for the Institutional Strengthening Component), and a financial institution with demonstrated capabilities in handling investment projects for transfer to Sub-Project beneficiaries under the 3R and Investment Components. The Financial Intermediary will receive a fee of 2-3% on all money it disburses for its services.

20. Each Sub-Project involves incremental costs (i.e., those capital and operating costs which would not have occurred in the absence of the Montreal Protocol) and non-incremental costs (i.e.,

those costs which would have occurred regardless of the presence of the Montreal Protocol). All estimated costs for the Sub-Projects which are determined to meet the definition of incremental costs (as determined by the London Amendments to the Montreal Protocol), and for which financing is available, will be covered under grant funding, while the Participating Enterprises will be expected to finance the associated non-incremental costs of the Project.

21. 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 1154.1 tons of ODP annually (or about 52 percent of Hungary's total ODP-weighted use of ODS).

22. 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 regulated substances by converting equipment to alternative uses and technologies. In addition, the project will enable export-oriented firms to maintain their export markets by adjusting in a timely manner to non-ODS products as requested by importers from industrialized countries. These companies export around 10-15% of their ODS use.

ISSUES, ACTIONS, AND RISKS

23. Management structure and ownership of most of the companies which would be assisted under this project could change in the future. Although the financial viability of each of the Participating Enterprises was assessed earlier by the Economics Department of the MERP, the situation could change in the future. The financial situation of each of the Participating Enterprises will therefore be reassessed during appraisal to better ensure project sustainability.

24. Under the Institutional Strengthening Component, the MERP will be responsible for monitoring the use and phaseout of ODS in Hungary. To address this problem, the MERP will need to ensure that a system of fines is in place to discourage their use, and that use of ODS is strictly monitored and enforced.

25. 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 incentives to the servicing sector. A condition for disbursement for this component will be that these incentives will be in place in the form of economic and financial incentives/penalties. 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.

26. Other issues and actions which will need to be addressed includes project implementation procedures. Specifically, the PIU will need to be up and running by the time the project is approved, and a Project Administration Agreement (PAA) governing the working relationship between the Corvin Bank and the MERP is needed. For the PAA, the model used in the Czech Republic will be followed and has already been shared with the relevant authorities.

27. Finally, it will be important to ensure that an adequate framework has been developed by the MERP governing the incentives for the 3R Component. The services sector will need to have adequate economic and financial incentives through both recycling credits and penalties. The 3R Component for the Czech ODS Phaseout Project will be used as a model for developing the incentives framework. Most of the regulatory and incentives framework has already been developed by the Economics Department of the MERP in consultation with the World Bank's consultants.

INSTITUTIONAL FRAMEWORK AND PROJECT IMPLEMENTATION

28. **Project Implementation.** The Ministry for Environment and Regional Policy (MERP), through its 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.

29. The Corvin Bank (CB) was selected to be the Financial Intermediary (FI) on December 15, 1994, by the National Bank of Hungary (NBH). It will have the responsibility to manage the local funds administration for the 3R and Investment Components. A Project Administration Agreement (subject to Bank review) will be established between the CB and the MERP. For each Sub-Project a Sub-Grant Agreement between the CB and each of the Participating Enterprises will be prepared. The Sub-Grant Agreement will include reporting provisions, annexes on disbursement, and provisions related to environmental protection and worker safety. Standard Bank disbursement procedures will be followed, with established limits on initial deposit and replenishment levels, statements of expenditures, and Bank review levels.

30. To ensure smooth disbursement, early involvement of the Corvin Bank in supervision will be required. The emphasis in selection of the CB by the NBH was based on its ability to disburse and administrate project funds. 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, such as the Terms-of-Reference for the Financial Intermediary. In addition, a one week training course on project implementation and management was held in Budapest in mid-January 1995.

31. **Environmental Aspects.** Each project sub-component was subject to local environmental regulations and Bank project environmental review procedure. The Project consists 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. For each sub-project, an annex on environmental and safety procedures was attached to the sub-project document which was reviewed by the technical reviewers.

32. Although the overall project objective is protection of the environment by reducing the emission of ODS, the change to non-ODS technologies or substitution of ODS with other chemicals may involve other environmental risks. Sub-Projects may employ flammable substitutes or, in the case of solvent Sub-Projects, increase wastewater. Sponsoring enterprises will be responsible for providing an environmental impact assessment (EIA) as required by Hungarian law. In addition, the MERP will ensure that information on international safety standards and procedures will be requested from the suppliers, and that these standards and procedures will be applied to the use of new substances by all Participating Enterprises.

33. **Timing of Preparatory Activity.** The following steps are planned for project processing:

FEPS Review Meeting	May 1995
Project Appraisal	May 1995
Yellow Cover Review Meeting	June 1995
Negotiations	July 1995
Board Approval	August 1995
Signature of Grant Agreement	September 1995

Table 1
Hungary ODS Phaseout - Summary of Sub-Project Data and Costs

Sub-Project	Sector	Types of ODS Used	Annual ODS Use (Tons of ODS)	Annual ODS Use (Tons of ODP) ¹	Annual ODP Phaseout ¹	Incremental Capital Cost ²	Incremental Operating Cost ²	Eligible Project Cost	Requested GEF Grant
Project Implementation Unit	Institutional	-	-	-	-	\$167,090	\$77,410	\$273,000	\$244,500
Refrigeration Association	Refrigeration	CFC-11/12 CFC-502	450.00	450.00	450.00	\$2,042,670	\$0	\$2,042,670	\$1,415,495
Frigolux	Refrigeration and Foam	CFC-11/12 CFC-502	15.65	15.00	13.15	\$572,864	\$0	\$572,864	\$476,064
Hajdusagi Iparmuevek Company	Foam	CFC-11	63.00	63.00	63.00	\$1,071,000	\$335,000	\$1,406,000	\$1,051,000
Metalucon	Foam	CFC-11	45.60	45.60	45.60	\$698,562	\$186,046	\$884,608	\$724,319
Metisol	Foam	CFC-11	80.00	80.00	79.00	\$441,207	\$0	\$441,207	\$346,022
Mediroll	Aerosol-Propellant	CFC-12	107.00	107.00	107.00	\$15,379	\$42,874	\$58,253	\$53,399
-mobil	Aerosol-Propellant	CFC-11 TCE	92.00 47.60	96.76	96.76	\$69,901	\$13,611	\$83,512	\$83,512
MMG-AM	Solvent	TCE CFC-113	87.00 3.50	12.20	12.20	\$1,506,100	(\$272,921)	\$1,233,179	\$1,220,000
Hitelap	Solvent	TCE	32.00	3.20	3.20	\$193,940	(\$14,151)	\$179,789	\$179,789
Tisza Shoe	Solvent	CFC-11 TCE	3.70 19.86	5.69	5.69	\$211,390	(\$35,432)	\$175,958	\$175,958
Finommechanikai	Solvent	CFC-113	1.45	1.16	1.16	\$33,570	\$0	\$33,570	\$33,570
BRG Radiotechnikai	Solvent	CFC-113	1.50	1.20	1.20	\$0	\$22,845	\$22,845	\$22,845
Rutitex	Solvent	CFC-11 CFC-113	7.61 0.33	6.42	6.42	\$355,120	(\$14,720)	\$340,400	\$340,400
Fire Protection Association	Fire Extinguisher	H-1211 H-1301	85.13 1.43	269.70	269.70	\$417,700	\$0	\$417,700	\$321,000
Financial Intermediary ³									
Contingency ³									
Total			1,144.36	1,156.93	1154.08	\$7,796,493	\$340,562	\$8,165,555³	\$6,687,873³

^{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 Multilateral Fund of the Montreal Protocol.

^{3/} Financial Intermediary Fee (expected to be 2-3%) and Contingency (expected to be 5-10%) to be determined during Appraisal to ensure that total project cost does not exceed \$9.4 million and GEF Grant does not exceed \$6.9 million. It is expected that the amount to be included under Contingencies (5-10%) will be offset by an equivalent reduction in project financing which will be attributable to excluding non-GEF countries from eligibility for GEF financing under the Project. This reduction due to the exclusion of exports has not yet been calculated and included/reflected in the table above.

ANNEX A: PROJECT DESCRIPTION AND COSTS**HUNGARY: PROJECT FOR THE PHASEOUT
OF OZONE DEPLETING SUBSTANCES**

1. 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 fourteen 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.

2. **Sub-Project 1 -- Project Implementation Unit.** The MERP will set up an ODS Phaseout Project Management unit (PIU) to be supported by a Technical Advisory Group (TAG) of Hungarian 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 producers and consumers of ODS. Finally, the PIU will be responsible for calling meetings of the TAG, which will be responsible for providing technical support to ODS consumers and producers in the implementation of investment Sub-Projects aimed at ODS Phaseout. Funding for this Sub-Project amounts to US\$244,500 to cover salaries, office equipment and the cost of hiring international consultants for supervision and review during implementation of the Sub-Projects.

3. **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. These substances are used and discharged during the maintenance and repairs of domestic, commercial, and industrial refrigerators, and air conditioners. The Sub-Project establishes a national network to remove these ozone depleting substances from refrigerators and to collect and regenerate 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 learn 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.

4. **Sub-Project 3 -- Phaseout of ozone depleting substances in the manufacturing of refrigerators and freezers at Frigolux Ltd.** The objective of the Sub-Project is to phaseout 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 displaced with the implementation and use of low ozone-depleting R-141 blowing agent and

the R-22 and R-134a cooling material. The choice of alternate technologies and materials is based on several criteria, including costs and the experience of the enterprise and the foreign technology partner with the chosen alternatives. For these changes new filling equipments, 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 will continue. 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.

5. **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/CO₂ as propellant. During the first ten months (January-October 1994), the high pressure foaming machine using water/CO₂ 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. The total cost of the Sub-Project is estimated at \$1,406,000. Hajdusagi Iparmuvek Company will cover US\$355,000 of the total incremental cost of the Sub-Project from its own sources, while the remaining incremental costs of the Sub-Project (US\$1,051,000) are to be financed by the GEF grant.

6. **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 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.

7. **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. 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.

8. **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 and the obligatory sterilizing tests. 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. Metalucon 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.

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

10. **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 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. The realization of the Sub-Project should take six 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 \$1,506,100, of which \$1,233,179 will be financed by the GEF Grant.

11. **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, by developing products in water based solutions, and washing with water. The Sub-Project will substitute for the old developer and washer by procuring and putting into service modern equipment. A new sewage cleaning plant is to be installed to make it possible to treat the sewage water. The execution of the Sub-Project will take ten 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 \$193,940, of which \$179,789 will be financed by the GEF Grant.

12. **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 sewage 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-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-September 30, 1995). In the final phase, the new technologies are to be installed and checked (October 1- December 31, 1995). The total cost of the Sub-Project is estimated at \$211,390 of which \$175,958 will be financed by the GEF Grant.

13. **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 perchloroethylene system based on 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.

14. **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 iron 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 to be financed by the GEF grant.

15. **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 eight months. The total cost of the Sub-Project is estimated at \$355,120, of which \$340,400 will be financed by the GEF Grant.

16. **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 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.). 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 Sub-Project will include the following items: (i) procurement of thirteen personal computers and printers; (ii) organization of the computers and printers into a geographic information system (GIS); and (iii) putting into service and testing of the system. The total cost of the Sub-Project is estimated at \$417,700, of which the amount of \$321,000 will be financed by the GEF Grant.

**SUMMARY AND RECOMMENDATIONS
OF THE TECHNICAL REVIEW**

**HUNGARY: PROJECT FOR THE PHASEOUT
OF OZONE DEPLETING SUBSTANCES**

1. The technical review for the Hungary Ozone-Depleting Substances (ODS) Phase-Out Project, as for all ODS projects, consists of two parts: (a) the overall analysis of project and program integrity, priority of subprojects, and consistency with other ODS projects financed by the Multilateral Fund for the Implementation of the Montreal Protocol; and (b) technical analysis of individual subprojects, undertaken by the Ozone Operations Resource Group (OORG). The OORG was established by the World Bank to undertake the analysis of proposed subprojects for funding under the Multilateral Fund. It uses standard criteria against which it judges the technical viability and cost-effectiveness of a given subproject. These criteria include appropriateness of the technology, environmental impact, project costs, implementation time frame, lessons from past experience, safety issues and final recommendations.
2. The STAP technical reviewer felt the project as a whole is well planned, and with the revisions suggested, it should be funded. The overall project will lead to a reduction of about 50% in Hungary's ODS consumption. Although the recycling-reclamation-recovery component will reduce ODS by only a modest amount, this component is deemed important to establish operational procedures for long-term ODS savings.
3. At the time of this technical review, the OORG had reviewed the 15 subprojects at least once, and the six subprojects still needing revisions were in the process of resubmitting proposals to incorporate the design modifications recommended by OORG. The issues raised by OORG related to technology transfer guarantees from the supplier and use of HFCs (refrigeration sector), use of undesirable substances (solvents sector), and capital and operating costs (halon sector). These 6 subprojects have subsequently been revised and approved by OORG.
4. The reviewer questioned the costs of the institutional strengthening and monitoring components, given the short life of the project, and recommended that the life and budget of the Project Implementation Unit (PIU) be reduced to appropriately lower levels. Likewise, the data control and information system and the monitoring office would not have time to contribute meaningfully to the project, so the reviewer recommended that some of these functions be taken on by the PIU. The institutional network strengthening activities are very important, but their budget could be reduced and tasks more clearly defined. A long-term UV-B monitoring component should be added to the project to follow future changes in UV-B. At present, no country in Eastern Europe is monitoring UV-B.

