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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
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PROJECT PROPOSALS: TURKEY

This document includes the comments and recommendations of the Fund Secretariat on the following project proposals:

Foam

- Phasing out of CFC-11 in manufacturing of flexible PU slabstock foam through the use of CO₂ blowing technology at Serra Sunger UNIDO

Fumigant

- Demonstration project: alternatives to the use of methyl bromide as soil fumigant in protected horticulture (tomatoes and cucumbers) and ornamental (carnations) crops UNIDO

Refrigeration

- Conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a for domestic refrigerators -incremental operating costs- at Peg Profilo Elektrikli Gereçler Sanayii A.Ş. World Bank
- Conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a for domestic refrigerators -incremental operating costs at Arcelik World Bank
- Conversion project from CFC-12 into HFC-134a and HFC-404a for commercial refrigeration at Safkar World Bank

- Conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a for commercial refrigerators -incremental operating costs at Klimasan Klima Sanayii ve Ticaret A.S. World Bank

Solvent

- Conversion of an electronic defluxing process from ODS-solvent cleaning to hydrocarbon/surfactant (semi-aqueous) cleaning at Aselsan A5 World Bank
- Umbrella project for 17 enterprises for phaseout of ODS used as solvents World Bank

SECTOR:	FOAM ODS use in sector (1993):	500 ODP tonnes
Sub-sector cost-effectiveness thresholds:	Flexible Slabstock	US \$/kg

(a) Phasing out of flexible PU slabstock foam through the use of CO₂ blowing technology at Serra Sunger.

Project Data	Flexible Slabstock
	Serra Sunger
ODS phase-out (ODP tonnes)	86
Proposed project duration (months)	18
Incremental capital cost (US \$)	671,500
- including contingency (%)	10
Incremental operational cost (US \$)	(217,142)
Total project cost (US \$)	454,358
Local ownership (%)	100
Export component (%)	0
Amount requested (US \$) {Original}	503,440
{Revised}	454,358
Cost effectiveness (US \$/kg)	5.28
National Coordinating Agency	Ministry of Environment, Ankara Turkey
Implementing Agency	UNIDO
Technical review completed?	Yes

Amount recommended (US \$)	454,358
Project impact (ODP tonnes)	86
Cost effectiveness (US \$/kg)	5.28
Implementing Agency support cost (US \$)	59,067
Total cost to Multilateral Fund (US \$)	513,425

PROJECT DESCRIPTION

- (a) Phasing out of CFC-11 in manufacturing of flexible PU slabstock foam through the use of CO₂ blowing technology at Serra Sunger.
 1. The bulk of the ODS consumption in Turkey is in the manufacturing of rigid and flexible polyurethane foams and in the use as refrigerants in compressors for domestic refrigerators, air conditioners and commercial cold storage.
 2. The flexible PU foam sub-sector in Turkey consists of about 8 major manufacturers and about 25 small manufacturers. The primary product produced, flexible polyurethane foam, is consumed mainly in the local market with very little export to neighbouring countries.
 3. Consumption of CFC-11 of the industries in the sub-sector producing slabstock foams by continuous process is between 70-130 tonnes per annum.
 4. In 1993 the total CFC consumption by the whole flexible foam sector, including small and medium size enterprises (block foams, cold cure moulding, shoe sole, etc.) was estimated to increase from 1,246 tonnes in 1989 to 1,645 tonnes in 1993, of which 500 tonnes of CFC-11 is used in flexible polyurethane foam sector. No current sectoral consumption data are available. The country's reported CFC consumption for 1995 was 3,789 ODP tonnes, while the 1996 consumption was 3,758 ODP tonnes.
 5. 17 projects have been approved since the 15th Meeting (December 1994) to phase out 1,783 ODP tonnes. These include five flexible slabstock foam projects for the phase out of 491 ODP tonnes. As of March 1998 no ODS phase out had been reported.
 6. UNIDO indicates that if the project is implemented as scheduled, CFC consumption eliminated from the foam sector which currently constitutes approximately 15% of the country's CFC consumption, will contribute to the country's 1999 CFC consumption freeze.
 7. Serra Sunger Ltd. is a 100% Turkish company, reported to be one of the large consumers of CFC-11 in flexible foam sector. The company was established in 1986 as a chemical distributor and polyurethane block foam manufacturer. It produces flexible foam for mattresses and furniture cushions. It installed a Laader Berg 300 kg/min maxfoam continuous production line in 1994. About 70% of the foam is currently blown with CFC-11. It produces average of 2,760 tonnes of foam annually, ranging in density between 15 and 36 kg/m³. The company will phase out the use of CFC-11 from the production of flexible PU slabstock foam through the use of liquefied carbon dioxide (LCD). The project will be implemented through modification of existing production facilities and installation of LCD system, supplementary equipment and instruments at a total cost of US \$495,000. Other costs include license fee (US \$50,000), training and consultancy services (US \$30,000, contingency US \$56,500. Incremental operational savings were calculated to be US \$217,142.

8. UNIDO indicates that the project's implementation modalities and conditions will be agreed upon between it and Serra Sunger after the project approval. Under this agreement certain commitments will be made by the company including provision of counterpart funding and agreement to destroy replaced equipment. A certificate on destruction of replaced equipment will be attached to the project completion report.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The project was discussed with UNIDO within the framework of Decision 24/58 (Guidelines for liquid Carbon Dioxide Projects). As a result of these discussions the incremental project costs were recalculated to reflect the eligible incremental costs. The Secretariat and UNIDO have agreed on the project costs.

RECOMMENDATION(S)

1. The Fund Secretariat recommends blanket approval of the project with the level of funding and associated support cost as indicated below.

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
Phasing out of flexible PU slabstock foam through the use of CO2 blowing technology at Serra Sunger.	454,358	59,067	UNIDO

PROJECT EVALUATION SHEET **TURKEY**

SECTOR: FUMIGANT ODS use in sector (1997): 841 ODP tonnes

Sub-sector cost-effectiveness thresholds: US \$/kg

Project Title:

Demonstration project - Alternatives to the use of methyl bromide as soil fumigant in protected horticulture (tomatoes and cucumbers) and ornamental (carnations) crops

Project Data	Methyl Bromide
ODS phase-out (ODP tonnes)	-
Proposed project duration (months)	24
Total incremental costs (US \$)	378,400
- including contingency (%)	10
Total project cost (US \$)	378,400
Local ownership (%)	100
Export component (%)	-
Amount requested (US \$) {Original}	378,400
{Revised}	
Cost effectiveness (US \$/kg)	-
National Coordinating Agency	Ministry of Environment
Implementing Agency	UNIDO
Technical review completed?	n/a

<i>Secretariat's Recommendations:</i>	
Amount recommended (US \$)	Pending decision of the Executive Committee
Project impact (ODP tonnes)	
Cost effectiveness (US \$/kg)	
Implementing Agency support cost (US \$)	
Total cost to Multilateral Fund (US \$)	

PROJECT DESCRIPTION

Demonstration project - Alternatives to the use of methyl bromide as soil fumigant in protected horticulture (tomatoes and cucumbers) and ornamental (carnations) crops

1. Methyl bromide is used in Turkey for quarantine, commodities and soil fumigation. Although in 1994 the Government of Turkey attempted to reduce consumption of methyl bromide in agriculture, over the last four years its consumption has increased, reaching 841 tonnes in 1997. UNIDO reported that based on discussions with Farmers Associations about 500 metric tonnes of this fumigant are used in horticultural products, 250 tonnes of which are used for fumigation of warehouses and the remaining for pre-shipment and quarantine measures. Methyl bromide consumption data reported to the Ozone Secretariat in 1996 was 578.4 tonnes.
2. More than 50% of methyl bromide is used in the province of Antalya (Mediterranean Region of Turkey), which is the most important area for cultivation of high value horticultural and ornamental crops. Over the last few years, the intensive cultivation of crops such as tomatoes, cucumbers and carnations, in the same soil under glass or plastic shelters has led to several phytosanitary problems (root-rot nematodes, *Fusarium* wilts and *Rhizoctonia solani*). Presently, pest control is achieved mainly using methyl bromide.
3. In April 1998, the framework for initiating a two-year demonstration project on alternative techniques to methyl bromide as soil fumigant in the Antalya province was discussed with the Directorate of Citrus and Greenhouse Crops Research Institute of Antalya (established under the Plant Protection and Research Department of the Ministry of Agriculture, Forestry and Rural Affairs of Turkey), and with several large scale producers of tomatoes, cucumbers and cut flowers.
4. This project is to demonstrate the technical and economical feasibility of five alternative methods to the use of methyl bromide in protected horticultural crops (tomatoes and cucumbers) and cut flowers (carnations), namely: soil-solarization, bio-fumigation, application of low doses of alternative chemicals according to strategies of low environmental impact, non-soil cultivation techniques and steam pasteurization as part of an integrated pest management (IPM) system.
5. Integrated Pest Management (IPM) programme for crop protection utilizes a combination of cultural practices, including crop rotation, cover crops, fertilization and plant nutrition; physical methods, including steam, solarization, and heat, and use of chemical compounds. A combination of soil pasteurization and IPM has proven to be an effective approach for the control of pests and diseases in horticulture (annual losses of only 1-2% due to bacterial and fungal diseases, as compared to much higher losses when relying on soil fumigation with methyl bromide only). Also, an IPM programme could improve the effectiveness of mixtures of certified pesticides, nematodes, herbicides and fungicides (the pesticide mix has to be prepared according to the ecology and climate of the area).
6. The project will be implemented in the Antalya province by the Directorate of Citrus and Greenhouse Crops Research Institute. During the first year, demonstration trials will be

undertaken in an area of at least 0.8 ha; and, during the second year in at least three different companies of the region producing tomatoes, cucumbers and carnations.

7. Soil preparation will be carried out using the same methodology the growers use. All tests will be carried out in duplicate using each of the alternative technologies to methyl bromide previously selected. During the first cultivation season, the alternate technologies will be tested on relatively small surfaces. The most promising technologies will be tested on a larger scale in the second year. Soil samples will be analyzed before and after the soil treatment and three days after planting has taken place (when possible). During cultivation, symptomatic plants will be detected, counted, recorded and eradicated. The control will take also into account the yield and quality data for the corresponding crop.

8. The Project will be co-ordinated by the Ministry of Environment (Ozone Office). It will be implemented by UNIDO in close co-operation with the Directorate of Citrus and Greenhouse Crops Research Institute in Antalya and the major producers of horticultural crops and cut flowers of the region.

9. The expected results from project implementation are: (i) a technical and economic analysis of utilization of proposed alternatives to methyl bromide, (ii) two agronomists and two technicians fully trained in the alternative technologies used; and (iii) dissemination of the results of the demonstration project within the Mediterranean Region of Turkey.

10. Two agronomists and two medium-level technicians from the Directorate of Citrus and Greenhouse Crops Research Institute will be recruited for managing and supervising the demonstration projects, including designing the tests, collecting and analyzing the data, supervising field activities and coordinating the services of project personnel. The total cost for human resources is US \$265,000 including a subcontract for field work (US \$172,000), and the cost of the equipment is US \$40,000. A cost breakdown is attached to the project evaluation sheet.

SECRETARIAT'S COMMENTS

COMMENTS

1. The project concept follows the Executive Committee's guidelines. Turkey ratified the Copenhagen Amendment on 10 November 1995.

2. UNIDO informed the Secretariat that, during project preparation, special emphasis has been put in working with the institutions, organizations, professionals and agro-industries which are transferring the technology to the farmers.

3. The Secretariat asked if UNIDO had contacted Article 2 countries with a view to recruiting government experts from those countries (as per Decision 24/18). In this regard, UNIDO indicated that "the use of external expertise is needed only when the local institutions

require advice in using state of the art techniques of which there is only a theoretical knowledge in Article 5 countries”.

4. Notwithstanding the emphasis placed by UNIDO on working with local institutions and on seeking to reduce salary costs, the concept and cost structure of this project is similar to projects initially approved by the Executive Committee. Taking this into consideration, the Executive Committee may consider whether it wishes to approve the project with associated support costs at the funding level shown in the table below:

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
Demonstration project - Alternatives to the use of methyl bromide as soil fumigant in protected horticulture (tomatoes and cucumbers) and ornamental (carnations) crops	378,400	49,192	UNIDO

ANNEX I

PRELIMINARY EQUIPMENT SPECIFICATIONS

Preliminary equipment specifications and breakdown of costs are as follows:

ITEM	DESCRIPTION	TOTAL COST (in US dollars)
1	One compact steam boiler, with a capacity of 1,200 kg/h of steam at 10 Bar, complete with fittings and a 500 l/h water softening system. One 10,000-liter, steel-plated tank, to store fuel. Two mobile platforms, one for the boiler and the other for the fuel tank and water softening system. 100 m of flexible pipe for steam, at 10 Bar, and 60 m of flexible diffusion pipes, plus fittings, connecting devices, filters, waterproof electrical connections, etc.	27,000
2	Expendables like artificial substrates, seedlings, selective wavelength plastic sheets, bassins, trays, etc.	11,000
3	Irrigation system for non-soil cultivation	2,000
	TOTAL	40,000

ANNEX II.

PROJECT BUDGET

Budget line	DESCRIPTION	w/m	US\$
11-01	International Expert IPM specialist	3.0	45,000
11-02	International Expert in Soilless cultivation	0.5	8,000
11-03	International Expert in Steam pasteurisation	0.5	8,000
11-04	International Expert in Bio-fumigation	0.5	8,000
17.01	National project coordinator		24,000
21-00	Subcontract for local trials, as per Annex III.		172,000
32-00	Study tour (<i>04 participants</i>)		19,000
35-00	Regional workshop		16,000
41-00	Equipment, as specifications in Annex I.		40,000
51-00	Publication costs		4,000
	SUB TOTAL		344,000
	Contingencies (<i>10%</i>)		34,400
51-01	TOTAL PROJECT COST		378,400
	OVERHEAD COSTS (<i>13%</i>)		49,192
	TOTAL PROJECT BUDGET		427,592

ANNEX III.

PRELIMINARY TERMS OF REFERENCE FOR THE SUBCONTRACT

The subcontract is expected to:

1. Provide the service of:

- two Agronomists (*total of 48 w/m*)
- two Agricultural Technicians (*total of 48 w/m*)

2. Provide transportation for the international experts, the two agronomists and the two technicians to the demonstration sites during the entire duration of the project.

3. Provide transportation to the project sites and installation of the supplies and equipment (steam boiler, etc.) purchased.

4. Make available an area of at least 0.85 hectares of covered land (glass and plastic-houses) at the experimental stations of the Directorate of Citrus and Greenhouse Crops Research Institute in Aksu and Kocayatak (Antalya province).

5. Provide the necessary preparatory work at each of the sites selected for the demonstration tests and trials: soil preparation, planting and implementation of alternative pest control technologies.

6. Provide service of all the necessary manual workers to implement the above and for the regular maintenance of the plots.

7. The first year, organise and perform the demonstration tests and trials, at small scale (60 m²), for *tomatoes*, *cucumbers* and *carnations*, using all the proposed technologies and in accordance to the timetable and methodology given by the international experts in close co-operation with the two local agronomists, as per Annex III/1.

8. The second year, organise and perform the demonstration trials of the most promising alternative technologies at full commercial scale (1.000-1.500 m²) in the greenhouses made available by the most important producers of horticultural products (*cucumbers* and *tomatoes*) and cut flowers (*carnations*) of Antalya province.

9. Compensate the farmers for the use of their own greenhouses and for the inputs provided.

10. Provide at least 6.000 liters of fuel-oil for the steam boiler used in the steam pasteurisation tests.

11. Prior to initiating any activity, provide the analytical protocols for monitoring, on a quantitative and qualitative basis, the populations of nematocides, fungi, bacteria and insects.

12. Provide the most suitable protocol to monitor the incidence of weeds.

13. At each project site, perform soil, water and biological analysis as specified in **Annex III/2**.

14. Collect, record, process, analyse and consolidate the field data of each trial in a daily report.

15. Prepare and submit every three months a progress report, in English, of the activities performed and the results obtained at each project site. The report should include a fact sheet with the results of each of the demonstration test performed

16. At the end of the first year, prepare and submit a consolidate report containing a technical and economical analysis of the results obtained.

17. Provide a fully-equipped office space, with e-mail and fax connection in working condition, and part-time secretarial service throughout the entire duration of the project.

18. Throughout the entire duration of the project activities, cover communications costs between the Directorate of Citrus and Greenhouse Crops Research Institute and UNIDO headquarters in Vienna (Austria) and between the Research Institute and the different project sites.
19. At the end of the second year, organise a regional workshop to present to the farmers and growers the project activities and the results obtained. This includes providing the venue and all facilities.
20. Prepare a paper back publication containing a description of the results obtained.
21. Prepare and submit a final report at the end of the contract.
22. Provide LPG for greenhouse heating, fumigants, fertilisers and pesticides, biological agents, all equipment and unforeseen material necessary for the implementation of the demonstration trials.

PROJECT EVALUATION SHEET **TURKEY**

SECTOR: REFRIGERATION ODS use in sector (1993): ODP tonnes

Sub-sector cost-effectiveness thresholds: Commercial US \$15.21/kg
Domestic US \$13.76/kg

Project Titles:

- (a) Conversion from CFC-12 into HFC-134a and HFC-404a for commercial refrigeration at Safkar.
- (b) Conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a for commercial refrigerators (incremental operating costs) at Klimasan (Incremental Operating costs).
- (c) Conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a for domestic refrigerators (incremental operating costs) at Arcelik (Incremental Operating Costs).
- (d) Conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a for domestic refrigerators (incremental operating costs) at Profilo (Incremental Operating Costs).

Project Data	Commercial		Domestic	
	Safkar	Klimasan	Arcelik	Profilo
ODS phase-out (ODP tonnes)	21.3	26.40	398	279.29
Proposed project duration (months)	24	12	12	12
Incremental capital cost (US \$)	157,795	921,206	5,271,596	2,191,713
- including contingency (%)	0	0	0	0
Incremental operational cost (US \$)	564,185	233,585	2,177,215	1,977,206
Total project cost (US \$)	721,980	1,154,791	7,448,811	4,168,919
Local ownership (%)	100			
Export component (%)	0			
Amount requested (US \$) {Original}	324,548	167,689	2,049,942	672,250
{Revised}				
Cost effectiveness (US \$/kg)	15.21	31.15	13.76	12.18
National Coordinating Agency	Technology Development Foundation of Turkey (TTGV)			
Implementing Agency	The World Bank			
Technical review completed?	Yes			

Secretariat's Recommendations:

Amount recommended (US \$)				
Project impact (ODP tonnes)				
Cost effectiveness (US \$/kg)				
Implementing Agency support cost (US \$)				
Total cost to Multilateral Fund (US \$)				

PROJECT DESCRIPTION

Background information on the refrigeration sector in Turkey

1. According to the 1993 Country Programme the sector of commercial and domestic refrigeration accounted for 714 MT of CFC-12 and 1,100 MT of CFC-11 in Turkey. The Executive Committee approved 3 and 5 projects in domestic and commercial refrigeration sub-sectors to phase out 945 ODP tonnes (772 ODP tonnes in domestic and 173 ODP tonnes in commercial sectors respectively).
 2. All the four proposals include the following statement:
"While the sub-project is not required to meet the 1999 freeze, it is part of the overall strategy supporting the accelerated phase out which Turkey has adopted, and is consistent with the country programme."
 3. Projects approved by the Executive Committee in the commercial refrigeration sector are for large and medium-size manufacturers. There is a large number of predominantly small manufacturers with an estimated annual consumption of 0.5 to 1 MT per company. It is estimated that between 1,500 and 2,000 such manufacturers exist in Turkey.
 4. Finally, there are five manufacturers of air-conditioning and refrigeration equipment for busses and trucks. The main producer is Safkar with a market share of about 70%.
- (a) Conversion from CFC-12 into HFC-134a and HFC-404a for commercial refrigeration at Safkar**
1. This project covers the replacement of CFC-12 used as refrigerant by HFC-134a and HFC-404a for installation of refrigeration units in trucks, installation of air-conditioning units in mini-busses, busses and vans, and servicing of installed refrigerating and air-conditioning equipment (large automotive AC and coolers) at Safkar. The project includes the retrofit of existing vacuum pumps, replacement of two charging stations and 4 sets of charging manifold/pressure gauges as well as equipment for servicing including charging units, leak detectors, and recovery/recycling units. Incremental operating costs for two years are included. As a possible MLF grant will not cover the full conversion, Safkar has to participate in financing conversion and has confirmed its willingness to do so.
- (b) Conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a for commercial refrigerators (incremental operating costs) at Klimasan.**
1. This project is requesting the incremental operating costs associated with the conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a used for production of commercial refrigerators at Klimasan. The Executive Committee approved in 1994 the capital cost for the conversion of production to the non-ODS technology. The conversion was completed by the end of 1996.

2. IOC is requested for 1 year of operation with cyclopentane and HFC-134a. The basis for the IOC calculation is the last year (1994) with full production with CFCs, and includes incremental costs for imported compressors, refrigerant, capillary tube, filter drier, foam blowing agent, polyol and isocyanate and nitrogen. However, costs associated with HFC-134a compressors and lubricant are excluded from the present request pending decision of the Executive Committee on the incremental operating costs for compressors.

(c) Conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a for domestic refrigerators (incremental operating costs) at Arcelik.

1. This project covers the incremental operating cost of the conversion from CFC-11 and CFC-12 to cyclopentane and HFC-134a used for production of domestic refrigerators at Arcelik. The project for conversion was approved by the Executive Committee in 1992 and was implemented in 1996.
2. IOC is requested for 1 year of operation with cyclopentane and HFC-134a. The basis for the IOC calculation is the last year (1993) with full production with CFCs, and includes incremental costs for imported compressors, lubricant for locally manufactured compressors, refrigerant, capillary tube, filter drier, foam blowing agent, polyol and isocyanate. The amount of IOC requested is calculated as the difference between the maximum amount allowed under the threshold value for the sub-sector (13.76 \$/kg) after discounting by 35% for safety cost and the amount approved for Arcelik at the 7th Meeting. However, costs associated with HFC-134a compressors and lubricant were excluded from the present request pending decision of the Executive Committee on the incremental operating costs for compressors.

(d) Conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a for domestic refrigerators (incremental operating costs) at Profilo.

1. This project covers the incremental operating cost of the conversion from CFC-11 and CFC-12 to cyclopentane and HFC-134a used for production of domestic refrigerators at Profilo. The conversion project was approved by the Executive Committee in 1994 and was implemented in 1996.
2. IOC is requested for 1 year of operation with cyclopentane and HFC-134a. The basis for the IOC calculation is the last year (1993) with full production with CFCs, and includes incremental costs for imported compressors, lubricant for locally manufactured compressors, refrigerant, capillary tube, filter drier, foam blowing agent, polyol and isocyanate. However, costs associated with HFC-134a compressors and lubricant were excluded from the present request pending decision of the Executive Committee on the incremental operating costs for compressors.

SECRETARIAT'S COMMENTS**COMMENTS****(a) Conversion from CFC-12 into HFC-134a and HFC-404a for commercial refrigeration at Safkar.**

1. The proposal indicates that the servicing component will assist the country in reducing CFC-12 consumption at the time "when the ban of ODS becomes effective". The implementation of the servicing components would result in phasing out of 1.94 MT of CFC-12 with very poor cost-effectiveness at US \$51.5/kg of ODP phased out. Each of 25 servicing shops would service about 10 vehicles a year recovering about 50 kg of CFC-12 annually. The servicing of refrigerated trucks and air-conditioned vehicles should be part of the Refrigeration Management Plan in Turkey encompassing all the necessary elements as decided by the Executive Committee. The Secretariat recommended to the World Bank to withdraw this component from the proposal. The World Bank did not accept the Secretariat's recommendation.

2. The Secretariat discussed with the World Bank the selection of R404A substitute refrigerant. It was noted that 404A was designed as a substitute for low temperature refrigerants such as R502 not for CFC-12. Capital costs were also discussed in relation to the cost of retrofitting of vacuum pumps, cost of material for performance tests, and technical assistance.

3. The requested operating costs cannot be recognized as eligible since Safkar provides what is essentially a servicing function in that the companies concerned only fill imported, assembled MACs. Installation and charging of refrigerant is usually done on site by the technicians of Safkar. This is the second time that a request for operating costs dealing with assembled MAC units is submitted. The first proposal was submitted by France to the 23rd Meeting as a bilateral project for four Iranian companies dealing with installation of refrigeration and air-conditioning units in vehicles and wagons. The proposal included operating costs. However, the project was approved by the 24th Executive Committee Meeting without incremental operating costs. The Secretariat recommended to the World Bank to withdraw the request for incremental operating costs on the basis of the precedent in the similar project for Iran. The World Bank did not accepted the Secretariat's proposal.

4. The Secretariat is seeking guidance from the Executive Committee on the issues of inclusion of the servicing component in the requested capital cost and on the requested operating costs.

(b) Conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a for commercial refrigerators (incremental operating costs) at Klimasan (Incremental Operating costs).**(c) Conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a for domestic refrigerators (incremental operating costs) at Arcelik (Incremental Operating Costs).**

- (d) Conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a for domestic refrigerators (incremental operating costs) at Profilo(Incremental Operating Costs).**

General

The following three projects have been implemented. The proposals are requesting compensation for incremental operating costs of one year duration. The proposals have been submitted on the basis of a decision of the Executive Committee taken at its 13th Meeting which provides that incremental costs could be approved for "one year's duration calculated on the basis of the costs prevailing following the start of operations" (UNEP/OzL.Pro/ExCom 13/47, page 43, paragraph 159). As a basis for calculating the incremental operating costs for the three enterprises which have already been converted to non ODS technology the World Bank used the number of ODS based units produced during the year in which the project was approved (Klimasan and Profilo), or the year following the project approval (Arcelik).

The Secretariat is seeking guidance from the Executive Committee as to whether the "one year's duration" is the year immediately preceding the year in which the project was submitted (CFC-based production), the year in which the project was approved (CFC-based production) or the year immediately following project implementation (non-ODS based production).

- (b) Conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a for commercial refrigerators (incremental operating costs) at Klimasan.**

1. The commercial refrigeration project for Klimasan was approved at the 15th Meeting of the Executive Committee at US \$ 690,903. The approval covered incremental capital cost of the conversion. The cost-effectiveness threshold for the commercial refrigeration sector was approved at the 16th Meeting of the Executive Committee at US \$ 15.21/ kg ODP phased out. The cost-effectiveness of the approved project was US \$ 25.4/kg ODP.

2. The World Bank proposal is for incremental operating costs at US \$ 167,689. The requested cost cannot be recommended for approval since the amount approved for Klimasan has already exceeded the eligible level of funding.

- (c) Conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a for domestic refrigerators (incremental operating costs) at Arcelik.**

1. The conversion project was approved in 1992 and was one of the first investment projects submitted prior to the establishment of many of policies by the Executive Committee regarding both incremental capital and operating costs. The project approved in 1992 did not contain any indications for future request for IOC. HFC-134a technology was selected to phase out CFC-12 refrigerant. The 1992 proposal did not refer to a specific choice of technology in the foam operation. The proposal included several very costly items such as X-Ray testing unit (US \$ 403,300), data acquisition system (US \$ 132,000), control ambient test cell (US \$ 303,000), engineering assistance and training (US \$ 621,875) which were never requested at such level of

funding or approved in subsequent project proposals. A review of more than 200 domestic refrigeration projects approved since the 7th Meeting proved that the above-mentioned items were not necessary for conversion of refrigeration enterprises to non-ODS technologies.

2. The overall cost-effectiveness of Arcelik project is calculated at US \$13.76/kg ODP. Arcelik is a large manufacturer of domestic appliances with annual production of 700,000 units and ODS consumption of 398 ODP tonnes. The Executive Committee has never approved any project with such poor overall cost-effectiveness, taking into account the capacity of the plant. Several projects have been approved for converting enterprises of comparable size to the same technology with cost-effectiveness values up to 2.5 times better than that of Arcelik. Analysis of all projects for conversion to hydrocarbon technology approved by the Executive Committee indicates that the cost-effectiveness of projects for enterprises with production rates exceeding 200,000 units a year ranges from US \$10/kg to US \$5/kg, with the trend downward as production volumes increase. This project would have been at a much lower range of cost-effectiveness if the eligibility and costs would have been properly assessed.

3. In the absence of the Executive Committee guidance on how to deal with proposals similar to the one from Arcelik, the Secretariat is submitting the project to the Executive Committee for its consideration.

(d) Conversion from CFC-11 and CFC-12 into cyclopentane and HFC-134a for domestic refrigerators (incremental operating costs) at Profilo

1. The local ownership of the company has changed from 80% at the time of approval of the conversion project (December 1994) to 34% (June 1998). To assess compliance with Decision 19/38 on change of ownership, the Secretariat requested the World Bank to provide full information on the change of the ownership and its date. The World Bank advised that the ownership of the enterprise changed in September 1995, (less than a year from approval) and that procurement of the equipment had been completed before the change of ownership. It should be noted that Profilo had procured some of the machinery and equipment prior to the approval of the conversion project. Information on this was included in the project document although there was no request for retroactive funding.

2. Incremental costs for imported compressors and the cost of lubricant for compressors manufactured by PEG are calculated at US \$ 4.52 and US \$ 3.27 respectively which is very high.

3. Requested costs have been reduced to reflect the export to non-Article 5 countries.

4. The Secretariat is seeking guidance from the Executive Committee on the issues raised above.

SECTOR:	Solvents	ODS use in sector (1995): (Electronics industrial cleaning)	275 ODP tonnes
Sub-sector cost-effectiveness thresholds:	CFC-113 TCA		US 19.73.4\$/kg US 38.50\$/kg

- Conversion of an electronic defluxing process from ODS-solvent cleaning to hydrocarbon/surfactant ('semi-aqueous') cleaning at Aselsan AS
- Umbrella project for 17 enterprises - phaseout of ODS used as solvents

Project Data	Solvents	
	Aselsan AS	17 Enterprises
ODS phase-out (ODP tonnes)	3.9	11.97
Proposed project duration (months)	12	12
Incremental capital cost (US \$)	97,902	495,699
- including contingency (%)	-	10.5
Incremental operational cost (US \$)	(29,290)	166,637
Total project cost (US \$)	68,612	662,336
Local ownership (%)	100	100
Export component (%)	12	7.2
Amount requested (US \$) {Original}	68,612	395,854
{Revised}	-	-
Cost effectiveness (US \$/kg)	17.59	33.07
National Coordinating Agency	Technology Foundation of Turkey	
Implementing Agency	World Bank	
Technical review completed?	Yes	

<i>Secretariat's Recommendations:</i>		
Amount recommended (US \$)	58,517	415,312
Project impact (ODP tonnes)	3.9	11.97
Cost effectiveness (US \$/kg)	15.00	34.7
Implementing Agency support cost (US \$)	7,607	53,991
Total cost to Multilateral Fund (US \$)	66,124	469,303

PROJECT DESCRIPTION

(a) Conversion of an electronic defluxing process from ODS-solvent cleaning to hydrocarbon/surfactant ('semi-aqueous') cleaning at Aselsan AS

1. The project document indicates that ODS consumption in the solvent sector in Turkey in 1995 was 275 ODP tonnes.
2. This project is retroactive. CFC-113 was used in the Communications Division for removing soldering flux from a wide variety of electronics assemblies. This has been replaced by a semi-aqueous process using a commercial hydrocarbon/surfactant (HCS) solvent. The Microelectronics, Guidance and Electro-optic Division of the company, which is a very small user of CFC-113, but a separate entity, is phasing out its CFC-113 use under its own financing, using a no-clean process.
3. The project uses freely-available commercial technology. Because the new process is more critical than the old one, process control instrumentation was seen as essential to ensure that the assemblies are correctly cleaned to the required specifications.
4. There is no specific reference to meeting the 1999 freeze. The phasing out of CFC-113 in this project is described as an important step towards achieving the aims of the country programme.
5. The main capital costs are US \$77,319 for a semi-aqueous cleaning machine and US \$9,257 for process control instrumentation. There are incremental operating savings of US \$38,190 mainly from reductions in solvent costs. Twelve percent of the company's products are exported to non-Article-5 countries, eligible costs have been adjusted accordingly.
6. The existing CFC-based cleaning equipment has been re-used by the enterprise for other non-critical cleaning tasks utilizing used non-ODS solvent and alcohol-based solvent. No costs were involved.

(b) Umbrella project for 17 enterprises - phaseout of ODS used as solvents

7. The phase-out of 2.4 ODP tonnes of CFC-113 (ODP of 0.8) and 8.425 tonnes of TCA (ODP of 0.1) is proposed in metal cleaning applications at 17 enterprises. The enterprises are engaged in a variety of activities including aircraft maintenance, and manufacture of household goods and metal products ranging from cutlery sets to medical prostheses. The present metal cleaning processes will be replaced with aqueous cleaning. This requires the supply and installation of new aqueous cleaning machines, the adaptation of waste-water treatment facilities, and the provision of training. The proposal indicates that operating costs will increase.

8. This is not a terminal umbrella project. The funding proposed for each of the 17 enterprises is limited by the relevant cost-effectiveness threshold. The enterprise contribution will cover IOCs, contingencies, and for some of the enterprises, a proportion of equipment, installation and training costs.
9. It is proposed to use the services of a local manufacturer of cleaning machines to supply all the new equipment, to remove the existing machines and to provide the technology transfer.
10. The existing ODS cleaning machines will be dismantled and non-CFC related components will be re-used.
11. The capital costs for the new machines and waste-water treatment (total US \$448,635 for 17 enterprises) are significantly lower than those seen in other projects for internationally sourced equipment. Capital costs have been offset by the scrap value of the ODS machines. Training and commissioning costs are low.
12. There are incremental operating costs, rather than savings, due largely to the quantities of aqueous cleaning additives (detergents, etc.) said to be needed. However, as all enterprise grants are limited by the cost-effectiveness threshold, this does not have a significant effect on the overall project costs.
13. Details of the activities of each of the 17 enterprises, their consumption and baseline situation, are included in the project proposal together with individual capital equipment cost and individual IOC calculations.
14. Some enterprises had non-Article 5 export components up to 30 per cent. However, the average for the project is 7.2 percent. Individual enterprise grants are correctly calculated with regard to the export component.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

- (a) Conversion of an electronic defluxing process from ODS-solvent cleaning to hydrocarbon/surfactant ('semi-aqueous') cleaning at Aselsan AS

1. The Secretariat resolved minor cost issues with the World Bank, in particular in relation to the cost of chemicals. The incremental operating savings were recalculated, with a consequent reduction in total project cost.

(b) Umbrella project for 17 enterprises - phaseout of ODS used as solvents

2. The project incorporates an innovative approach in the use of a single, local supplier to provide the required new metal cleaning equipment for 17 enterprises. Economies in equipment supply cost appear to have been achieved. Also, economies seem to have been achieved in the cost of providing the necessary training. However this may be the first occasion in which training costs have been based fully, or mainly, on the cost of local services.

3. The required information has been provided for each enterprise involved in the project. Capital costs are eligible. The eligibility of the level of incremental operating costs is less certain, however these costs are being borne by the 17 enterprises concerned.

4. The Secretariat discussed minor cost issues with the World Bank, in particular in relation to incremental operating costs. Costs were recalculated by the World Bank after discussions on the cost and quantities of chemicals. As a consequence, operating cost increased for two enterprises which were initially below the cost-effectiveness threshold, resulting in an increase in the overall project costs. Account was not originally taken of the export component but this was subsequently remedied.

5. The project appears well conceived and in principle was thoroughly documented. However, possible inaccuracies at the detailed level illustrate the need for care to be taken with umbrella projects to ensure that the information provided is accurately reported and is reliable.

RECOMMENDATION

1. The projects are recommended for blanket approval, together with 13 per cent agency support costs, at the level of funding indicated below:

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
a) Conversion of an electronic defluxing process from ODS-solvent cleaning to hydrocarbon/surfactant ('semi-aqueous') cleaning at Aselsan AS	58,517	7,607	World Bank
b) Umbrella project for 17 enterprises - phaseout of ODS used as solvents	415,312	53,991	World Bank