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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Forty-first Meeting
Montreal, 17 - 19 December 2003

PROJECT PROPOSALS: PAKISTAN

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

- An overview of CFC phase out projects submitted to the 41st Meeting of the Executive Committee

Foam

- Phaseout of the use of CFCs in remaining foam enterprises: Pakistan Insulation, Simpson Wire, HEPCO, Indus Plastic, Workman and Thermocraft Engineering — World Bank

Halon

- Plan for the phase-out of import and net consumption of halons in the fire fighting sector — UNIDO

Refrigeration

- Implementation of the refrigerant management plan (institutional framework, customs empowerment, training service technicians, recovery and recycling) (first tranche) — UNIDO
- Phaseout of the use of CFC-11 and CFC-12 in the manufacture of refrigeration equipment at Dawlance, United Refrigeration, Ice Age and at 29 small enterprises — World Bank

Solvent

- Sector phase out of CTC — UNIDO

AN OVERVIEW OF CFC PHASE OUT PROJECTS SUBMITTED TO THE 41ST MEETING OF THE EXECUTIVE COMMITTEE

Remaining consumption eligible for funding

1. According to Decision 35/57 of the Executive Committee, the remaining consumption eligible for funding for Pakistan was 487.1 ODP tonnes of CFCs as per Option 1 (Montreal Protocol baseline) or 250.9 ODP tonnes as per Option 2 (very recent consumption), (document UNEP/OzL.Pro/ExCom/35/61).

2. Since the 35th Meeting, the Executive Committee has approved a total of 14.2 ODP tonnes of CFCs in Pakistan. Therefore, the maximum remaining CFC consumption eligible for funding is 472.9 ODP tonnes.

Project proposals submitted to the 41st Meeting

3. The Government of Pakistan submitted, to the 41st Meeting of the Executive Committee, the following three project proposals to phase out 1,063.6 ODP tonnes of CFCs:

(a) Phase out of the use of CFCs in the remaining foam enterprises: Pakistan Insulation, Simpson Wire, HEPCO, Indus Plastic, Workman and Thermocraft Engineering (World Bank), with a total CFC phase out of 104.8 ODP tonnes;

(b) Phase out of the use of CFC-11 and CFC-12 in the manufacture of refrigeration equipment at Dawlance, United Refrigeration, Ice Age and at 29 small enterprises (World Bank), with a total CFC phase out of 344.8 ODP tonnes;

(c) Implementation of the refrigerant management plan (RMP), (UNIDO), for a total phase out of 614 ODP tonnes of CFCs used in the refrigeration servicing sector.

4. The total CFC phase out of the three project proposals excluded the remaining consumption eligible for funding by 590 ODP tonnes. Subsequently, the World Bank's letter of submission of the Pakistan country programme update stated that:

(a) "…with the Government's endorsement, we have received instructions on how Pakistan would like to proceed in regards to Dec. 35/57. Pakistan has chosen Option 1, with an understanding that the remaining consumption for funding is 503.14 ODP MT. This includes the consumption of the cancelled refrigeration project (PAK/REF/26/INV/31). Although the enterprise was liquidated, the production capacity has remained and is now being used by a group of four partners since the end of 2002. This group has been operating with a reduced number of the old employees to produce this year.

(b) In addition, in the final CPU, the Government of Pakistan has indicated that it plans on prioritizing CFC phase out by targeting all remaining manufacturing enterprises at once (288 ODP MT total eligible consumption), while commencing activities in the servicing sector to permit sufficient lead time for putting the RMP

into place (184.79 MT to 214.99 MT remaining eligible consumption, depending on the decision on the cancelled project above). This relates, of course, to the issue of the amount of CFC that may be funded at the upcoming Executive Committee meeting.

(c) Rather than reducing the issue to only a matter of ODP tons that may be funded according to the model at the 41st Executive Committee meeting, the Bank would like to call to the Secretariat's attention that there is a remaining "unfunded" consumption of over 1000 ODP MT. With the implementation of the proposed projects, the phase out achieved will be higher than the limited amount that may be funded. The refrigeration proposal for example, will phase out 369.4 MT although only 181.3 MT can be compensated. Implementation of this phase out must commence immediately, however, to ensure all of the phase out occurs as scheduled in the next few years".

5. Regarding consumption of the cancelled refrigeration project (PAK/REF/26/INV/31), the World Bank submitted a letter from the new proprietors which confirmed that the enterprise is viable (albeit under a different name) and are currently producing CFC-based refrigerators.

6. On the basis of the sectoral distribution of the remaining CFC consumption eligible for funding, the Secretariat reviewed the three project proposals above mentioned.

PROJECT EVALUATION SHEET
PAKISTAN

SECTOR:	Foam	ODS use in sector (2002):	260.77 ODP tonnes
Sub-sector cost-effectiveness thresholds:		Integral skin	US $16.86/kg
		Polystyrene/Polyethylene	US $8.22/kg
		Rigid	US $7.83/kg

Project Titles:

(a) Phaseout of the use of CFCs in remaining foam enterprises: Pakistan Insulation, Simpson Wire, HEPCO, Indus Plastic, Workman and Thermocraft Engineering

Project Data	**Multiple**
	6 Enterprises
Enterprise consumption (ODP tonnes)	106.9
Project impact (ODP tonnes)	104.8
Project duration (months)	25
Initial amount requested (US $)	948,353
Final project cost (US $):	
Incremental capital cost (a)	870,503
Contingency cost (b)	77,850
Incremental operating cost (c)	
Total project cost (a+b+c)	948,353
Local ownership (%)	100
Export component (%)	0
Amount requested (US $)	658,973
Cost effectiveness (US $/kg.)	6.29
Counterpart funding confirmed?	
National coordinating agency	Ministry of Environment (MoE)
Implementing agency	World Bank

Secretariat's Recommendations	
Amount recommended (US $)	658,973
Project impact (ODP tonnes)	104.8
Cost effectiveness (US $/kg)	6.29
Implementing agency support cost (US $)	49,423
Total cost to Multilateral Fund (US $)	708,396

PROJECT DESCRIPTION

7. The World Bank has submitted to the 41st Meeting on behalf of the Government of Pakistan, an umbrella project to phase-out the remaining CFC consumption in the foam sector stated to be 106.9 ODP tonnes at the total cost of US $948,353.

8. The project covers six enterprises producing rigid, integral skin and flexible molded polyurethane foam, extruded polystyrene foam and polyvinyl chloride (PVC) foam. The enterprises covered by the project are listed below.

Enterprise	CFC consumption ODP tonnes	Foam Sub-sector	Project Cost	Cost-effectiveness	Products/application
Pakistan Insulation	28.0	Rigid	165,660	6.23	Sprayfoam (roof insulation), pipe insulation, rigid foam blocks
Thermocraft	5.5	Rigid	57,160	10.99	Rigid foam for truck bodies
Simpson Wire	10.5	Rigid, flexible molded	114,008	11.29	Cold storage and pipe insulation, bicycle seats and gloves
Workman	2.9	Flexible molded, integral skin	37,010	12.76	Furniture applications
Hepco	15.0	Extruded polystyrene	201,703	13.45	Food packaging
Indus Plastic	45.0	Not available	372,812	8.28	Polyvinyl chloride sandals/shoes
Total	106.9		948,353		

Rigid foam

9. Pakistan Insulation operates a number of Gusmer sprayfoam dispensers and produces foam blocks by hand mixing, while Simpson Wire and Thermocraft operate low pressure machines. The production of rigid polyurethane foam will be converted to the use of HCFC-141b. Where the enterprises currently operate low pressure dispensers they will be replaced with high pressure dispensers and where there is no equipment in the baseline, a high pressure dispenser with the required counterpart funding has been proposed. High pressure sprayfoam dispensers will be retrofitted or replaced as necessary.

Justification for the Use of HCFC-141b

10. A letter of transmittal from the Government of Pakistan endorsing the use of HCFC-141b by the companies has not yet been received by the Secretariat.

Integral skin foam

11. Simpson Wire uses Cannon low pressure machines to produce its flexible molded foams while Workman uses an Elastogran high pressure dispenser. The flexible molded foam and integral skin foam production will be converted to water-blown technology with retrofit of the

baseline dispenser at Workman with temperature control. The baseline dispenser at Simpson is said to be suitable for the conversion without any retrofits.

Extruded polystyrene foam

12. The extruded polystyrene foam production will be converted to the use of butane. This would require the retrofit of the existing extruder and installation of ventilation, exhaust, alarm systems and other fire protection facilities.

PVC Foam

13. The company (Indus Plastics) is reported to be producing PVC shoes (mostly sandals) on 9 extruders using butyl acetate in summer and CFC-11 in winter as blowing agents. Likewise the sandals are dip-painted in a butyl acetate bath in summer and a CFC-11 bath in winter. The company's CFC-11 consumption in the PVC foam production and the solvent application was reported to be 30 tonnes and 15 tonnes respectively. The company's production of shoes/sandals on the extruders and their painting are to be converted to the use of butyl acetate all year round. For this, the World Bank has proposed heating and providing exhaust for the extrusion areas (five rooms) at US $48,000 per room for a total amount of US $240,000 and the paint area at US $60,000. With trials and technology transfer, the total incremental capital cost amounts to US $325,000, while the incremental operating cost (difference in price between butyl acetate and CFC-11 prices as well as additional cost of heating) amounts to US $15,312. The total cost of the project is US $372,812 with an assumed cost-effectiveness of US $8.28/kg.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Incremental cost calculation

14. The Secretariat identified a number of technical issues and issues relating to the calculation of incremental costs of the projects. Following discussion of the issues between the Secretariat and the World Bank, the incremental costs of the affected projects were recalculated. It was also agreed to provide technical assistance to Indus Plastics to assist it to eliminate the use of CFC-11 in its foaming and painting operations, given the fact that the company's poor baseline conditions are the primary factor in its inability to use the standard technology for producing PVC foam in winter.

15. Consequently, the following were agreed as the eligible grants of the projects.

Enterprise		Project impact	Eligible grant US $	Cost-effectiveness US $/kg
Pakistan Insulation	28.0	26.6	157,410	5.92
Hepco	15.0	15.0	123,300	8.22
Workman	2.9	2.9	37,010	12.76
Thermocraft	5.5	5.2	55,593	10.69
Simpson Wire	10.5	10.1	110,660	10.96
Indus Plastic	45.0	45.0	175,000	3.89
Total	**106.9**	**104.8**	**658,973**	**6.29**

16. Thus the project cost for the group would be US $658,973 with cost-effectiveness of US $6.29.

RECOMMENDATIONS

17. The Fund Secretariat recommends blanket approval of the Pakistan project for phase-out of the use of CFCs in remaining foam enterprises at the level of funding and associated support cost indicated in the table below.

	Project Title	Project Funding (US$)	Support Cost (US$)	Implementing Agency
(a)	Phaseout of the use of CFCs in remaining foam enterprises: Pakistan Insulation, Simpson Wire, HEPCO, Indus Plastic, Workman and Thermocraft Engineering	658,973	49,423	World Bank

PROJECT EVALUATION SHEET
PAKISTAN

SECTOR: Halon ODS use in sector (2001): 28.8 ODP tonnes

Sub-sector cost-effectiveness thresholds: n/a

Project Titles:

(a) Plan for the phase-out of import and net consumption of halons in the fire fighting sector

Project Data	**Banking**
Enterprise consumption (ODP tonnes)	n/a
Project impact (ODP tonnes)	24.2
Project duration (months)	36
Initial amount requested (US $)	473,500
Final project cost (US $):	
Incremental capital cost (a)	174,000
Contingency cost (b)	12,400
Incremental operating cost (c)	23,000
Total project cost (a+b+c)	209,400
Local ownership (%)	100%
Export component (%)	0%
Amount requested (US $)	
Cost effectiveness (US $/kg.)	8.65
Counterpart funding confirmed?	
National coordinating agency	Ozone Cell
Implementing agency	UNIDO

Secretariat's Recommendations	
Amount recommended (US $)	209,400
Project impact (ODP tonnes)	24.2
Cost effectiveness (US $/kg)	8.65
Implementing agency support cost (US $)	18,846
Total cost to Multilateral Fund (US $)	228,246

PROJECT DESCRIPTION

18. The project aims at establishing and implementing the national halon management programme which will support Pakistan in meeting its obligations under the Montreal Protocol.

19. Pakistan is requesting US $209,400 plus support costs of US $18,846 to undertake the following activities:

- Establishment of the national halon recycling and banking facility;
- Establishment of halon users database, installed halon inventory and critical halon needs predictions;
- Establishment of a halon management advisory panel/steering committee;
- Development and implementation of technical training on halon management, halon alternative fire fighting technologies and environmentally safe halon equipment maintenance for fire protection industries, main end users and fire protection authorities;
- Development and implementation of technical training for the halon reclamation and banking facility equipment operators;
- Providing technical assistance and consultancy services to main halon end-users and regulatory authorities; and
- Development and implementation of public awareness and education activities.

20. In Pakistan, halon 1211 is used in portable fire extinguishers and halon 1301 is used in fixed fire fighting systems protecting installations and valuable property in various sectors of national economy including defence, power generation, civil aviation and banking.

21. Pakistan does not produce halons and fully depends on the import from other countries. Halon 1211 is imported in bulk quantities, and then refilled into portable fire extinguishers by local fire fighting equipment manufacturers and distributors. Portable halon 1211 extinguishers are also imported. Halon 1301 is imported in the fixed fire fighting systems and in bulk quantities for refilling. Small quantities of halon 2402 are installed in imported planes.

22. The proposal indicated that Pakistan has an established fire protection industry with a significant market for fire fighting equipment. There are several manufacturers, importers, distributors and servicing companies involve in supply, installation and service of mainly imported fire fighting equipment.

23. The installed capacity is estimated at 399 MT for halon 1211, 62 MT for halon 1301, and 0.6 MT for halon 2042. Pakistan's latest halon consumption as reported pursuant to Article 7 was 28.8 ODP tonnes in 2001.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

24. Pakistan qualifies as a country with a medium-level of installed capacity pursuant to Decision 18/22. Capital, operating, and start-up costs are consistent with approved projects for countries with this level of installed capacity.

25. The project was designed in the light of the halon evaluation results presented to the 40th Meeting of the Executive Committee. UNIDO indicated that the halon banking facility will be established at an enterprise in the fire protection industry based on the recommendation of the halon advisory panel taking into account the company's expertise, contacts with clients, and the company's commitments to provide sufficient facilities for the installation and staff for its operation. The Government will directly monitor all project activities to ensure that the monopoly situation of the halon banking operator will not adversely impact the needed supply of the industry. According to the proposal, the operator will sustain operations as a small part of its normal operations and through cost-recovery for the halon recovered and banked through the programme.

26. UNIDO also indicated that representatives of the Government, fire protection industry and critical sector end-users will be directly involved in the establishment of the halon bank through a Management Advisory Panel. If the above cost recovery mechanism is found to be insufficient for sustaining the halon bank operation, cost sharing will be sought from the Government and the critical end-users. Pursuant to paragraph 5 of the proposed agreements, the Government is committed to provide the necessary level of resources as may be required for the implementation of the ODS phase-out plan and for achieving the consumption limits indicated in the respective table.

27. The proposal indicates that a ban on import of the virgin halon will come into effect shortly after the start of the halon banking operations. It also indicated that the compliance with the halon control measures would be achieved through the respective reduction of halon import quota in 1994.

RECOMMENDATIONS

28. The project is recommended for blanket approval at the level of funding, including agency support costs of 9 percent, indicated in the table below.

	Project Title	Project Funding (US$)	Support Cost (US$)	Implementing Agency
(a)	Plan for the phase-out of import and net consumption of halons in the fire fighting sector	209,400	18,846	UNIDO

PROJECT EVALUATION SHEET
PAKISTAN

SECTOR: Refrigeration servicing sector ODS use in sector (2001): 563 ODP tonnes

Sub-sector cost-effectiveness thresholds: n/a

Project Title:

(a) Implementation of the refrigerant management plan (first tranche)

Project Data	**Refrigeration management plan**
Enterprise consumption (ODP tonnes)	
Project impact (ODP tonnes)	215.0*
Project duration (months)	
Initial amount requested (US $)	2,942,200
Final project cost (US $):	
Incremental capital cost (a)	
Contingency cost (b)	
Incremental operating cost (c)	
Total project cost (a+b+c)	1,139,500**
Local ownership (%)	100%
Export component (%)	0%
Amount requested (US $)	191,500
Cost effectiveness (US $/kg.)	5.3***
Counterpart funding confirmed?	
National coordinating agency	Ministry of Environment, Local Government and Rural Development
Implementing agency	UNIDO

Secretariat's Recommendations	
Amount recommended (US $)	191,000
Project impact (ODP tonnes)	36.0
Cost effectiveness (US $/kg)	5.3
Implementing agency support cost (US $)	14,325
Total cost to Multilateral Fund (US $)	205,325

* Total impact of the project. The impact of the tranche is 36 ODP tonnes.

* * Total cost of the project.

*** Cost effectiveness of the revised project proposal

PROJECT DESCRIPTION

The refrigeration servicing sector

29. For the preparation of the RMP, an extensive survey was conducted in Pakistan the second half of 2001, covering more than 6,500 workshops. Based on the survey, in 2000 CFC consumption used for servicing refrigeration equipment was calculated at 770 ODP tonnes, used for servicing about 1.53 million of domestic refrigerators (460 ODP tonnes), 26,000 industrial and commercial refrigeration equipment (122 ODP tonnes) and 143,000 MAC units in passenger cars, trucks and buses (188 ODP tonnes).

30. At the 41st Meeting of the Executive Committee, the Government of Pakistan submitted the Pakistan country programme update (UNEP/OzL.Pro/ExCom/41/75). According to this document, the CFC consumption in the refrigeration-servicing sector was 614 ODP tonnes in 2002.

31. Based on the survey conducted in 2001, it is estimated that there are 10,000 servicing workshops in the country (8,000 of them located in Punjab and Sindh). The majority of workshops are small, with an average of 3 to 4 people. The distribution of the services provided by size of workshop and refrigeration equipment serviced is presented in the following table:

Workshops		**Numbers of shops (per cent)**			**Annual CFC-12 usage (per cent)**		
Category	R-12 use (kg/yr)	MAC	Domestic	Split system	MAC	Domestic	Split system
Tiny	< 10 kg	1.1	15.2	2.8	0.2	2.6	0.8
Small	10 – 100 kg	7.9	31.5	15.4	9.2	30.7	16.8
Medium	100 kg – 1 MT	1.8	16.4	1.2	12.7	13.1	8.2
Large	More than 1 MT	0.1	0.01	0.01	2.8	1.9	0.7
No report		0.5	2.2	0.8	N/a		
Total		11.4	65.3	23.3	25.2	48.3	26.5

32. There are more than 100 technical and vocational institutions in Pakistan. Some automobile and refrigerator manufacturers have their own training schemes for their contracted service shops and workers.

33. Currently, there is no public system to certify and license refrigeration service technicians in Pakistan.

Policy measures

34. The National Ozone Depleting Substance Phase Out Policy was approved in November 2000 by the Cabinet. It includes provisos related to higher tariffs on ODSs and components for ODS-based products, and restrictions on production of CFC products with effect from 31 December 2003.

35. On 7 September 2001 the Central Board of Revenue issued a regulation removing concessionary duties on components and raw material for CFC refrigerators and freezers. It is expected that import duties on components and raw material for production and service of CFC equipment may be increased from 10 –25 per cent to 35 per cent.

36. Import quotas of CFCs used for manufacturing and servicing refrigeration equipment were approved and agreed by the Ministry for Industry and Production and the Ministry for Environment as follows: 10 per cent in 2002 – 2003; 15 per cent in 2003 – 2004; 25 per cent in 2004 – 2005; and 50 per cent by 1st January 2005.

Need identified in the servicing sector

37. The following activities have been proposed for reducing CFC consumption in the refrigeration servicing sector:

(a) Enforcement of the legal and regulatory framework (US $277,000): training 200 customs officers, provision of 30 ODS identification kits for customs officers; development of a licensing system; and an awareness programme;

(b) Improvement of service practices for refrigeration technicians (US $532,000): training material and equipment for 20 training institutes, including a mobile training unit for technicians in remote areas; training and certification of 3,000 service technicians (the rest of the technicians will be trained by those trained by the RMP or through the national training system to be established by the project);

(c) Establishment of a recovery and recycling network (US $2,152,500): provision of 2,000 recovery machines (designed and manufactured locally), 1,000 recovery bags and 3,000 vacuum pumps and ancillary equipment to service workshops and establishment of 4 recycling centres; and

(d) Co-ordination and monitoring of the sub-projects contained in the RMP: setting up of regional function for co-ordination of the activities in provinces or regions.

Implementation modalities

38. The Ministries of the Federal Government of Pakistan will be responsible for the national co-ordination of the project, while the Ozone Unit will be the core institution for co-ordination. Four executive teams (one for each major region in the country) constituted by representatives from the provincial governments (environmental departments and industry departments), customs offices, education and training institutions and industries, will lead project implementation at the regional level.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

39. The Government of Pakistan submitted the RMP project proposal to the 37th and 40th Meetings of the Executive Committee. However, due to outstanding issues related to the remaining CFC consumption eligible for funding, UNIDO requested that the project proposal be withdrawn at each Meeting.

40. The Secretariat and UNIDO discussed issues regarding the sustainability of the RMP project considering the large number of CFC-based refrigeration equipment still being manufactured in the country (300,000 units), the high price differential between CFCs (US $3-US $4 per kg) and HFC-134a (US $8.40-US $9.30 per kg). The Secretariat and UNIDO also discussed issues related to the number of recovery machines and cost related-issues (e.g., cost of some of the equipment items requested in the proposal which were higher than the price of the same equipment in similar projects so far approved).

41. Subsequently, consistent with the information regarding Pakistan's decision on allocation of the maximum eligible consumption in Pakistan, UNIDO revised the RMP proposal. The funding level of the revised proposal is based on a consumption level of 215 ODP tonnes. The incremental cost of the revised proposal is US $1,139,500. The level of incremental cost is based on a pro rata application of the cost-effectiveness figure of US $5.30/kg previously agreed between the Secretariat and UNIDO after review of the project proposal originally submitted to the 37th and 40th Meetings. The remaining consumption in the refrigeration servicing sector will be phased out by the Government of Pakistan without further assistance from the Multilateral Fund.

RECOMMENDATIONS

42. The Fund Secretariat recommends approval of the projects with associated support costs at the funding level shown in the table below:

	Project Title	Project Funding (US$)	Support Cost (US$)	Implementing Agency
(a)	Implementation of the refrigerant management plan (first tranche)	191,000	14,325	UNIDO

PROJECT EVALUATION SHEET
PAKISTAN

SECTOR: Refrigeration ODS use in sector (2002): 702.7 ODP tonnes

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

Project Titles:

(a) Phaseout of the use of CFC-11 and CFC-12 in the manufacture of refrigeration equipment at Dawlance, United Refrigeration, Ice Age and at 29 small enterprises

Project Data	**Commercial/Domestic**
	Dawlance, United, Ice Age and 29 small
Enterprise consumption (ODP tonnes)	369.40
Project impact (ODP tonnes)	181.25
Project duration (months)	36
Initial amount requested (US $)	1,798,680
Final project cost (US $):	
Incremental capital cost (a)	2,184,850
Contingency cost (b)	89,935
Incremental operating cost (c)	
Total project cost (a+b+c)	2,274,785
Local ownership (%)	100
Export component (%)	0
Amount requested (US $)	1,798,680
Cost effectiveness (US $/kg.)	9.92
Counterpart funding confirmed?	
National coordinating agency	Ministry of Environment (MoE)
Implementing agency	World Bank

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

43. The objective of this project is to phase-out CFCs in the manufacturing refrigeration and air-conditioning sub-sector in Pakistan thus contributing to achieving the compliance of Pakistan with CFC reduction targets in 2005 and 2007. The plan consists of management activities (non-investment component) as well as individual and group ODS phase-out projects (investment component).

44. All major refrigeration enterprises in Pakistan have received project funding from the Multilateral Fund (a total of fourteen). Seven of these had originally been identified in the country programme. Four companies representing a consumption of about 171 ODP tonnes cancelled their projects before implementation commenced because they were either not satisfied with the terms and conditions of their phase-out projects or were closing their plants. One enterprise was liquidated, Refrigerators Manufacturing Co., and its manufacturing capacity remained idle until recently. It was purchased at the end of 2002 and the new owners re-hired some of the former employees to restart production. Two of the other enterprises that cancelled their projects quickly regained a large portion of the CFC-based domestic and commercial refrigeration market, when Refrigerators Manufacturing Co. and DAL left the market. This influenced the speed of and incentive for conversion of Multilateral Fund beneficiaries who feared for their competitiveness if they proceeded immediately with conversion. Imports of HFC-134a and HCFC-141b have gradually been increasing and the price differential with CFCs is becoming less pronounced. Consequently, project implementation in the refrigeration sector is accelerating, and the enterprises now wish to proceed with conversion projects.

45. The actual consumption of the enterprises covered by this project and the distribution of the remaining eligible consumption is indicated in the table below.

Remaining non-funded refrigeration enterprises

Enterprise	Sub-sector	CFC use in 2002 ODP tonnes	CFC-11	CFC-12	Eligible CFC phase-out*
29 Small-sized enterprises (Mobile air-conditioners, electric water coolers, Ice Cone machines)	Commercial	10,585	9.65	9.65	9.65
Dawlance	Commercial	64.58	53.02	11.56	37.9
United Refrigeration	Domestic	251.33	203.07	48.26	96
Ice Age	Commercial	43.83	37.28	6.55	37.7
Total		**369.39**	**293.37**	**76.02**	**181.25**

* Eligible consumption taken as the amounts from the previously submitted projects for United, Dawlance and Ice Age, and the actual reported amounts for the small manufacturers.

46. The strategy to eliminate remaining CFC consumption in the manufacturing refrigeration and air-conditioning sub-sector will consist of the introduction of the following sequential and sometimes simultaneous actions:

(a) Provide resources required for management of overall phase-out in the refrigeration manufacturing sector and provide support to a group project coordinator for the small enterprises;

(b) Provide technical and financial assistance to refrigeration and air-conditioning manufacturers to phase-out remaining CFC use.

47. The project foresees the phase-out of the use of CFCs through individual sub-projects at each of the three companies, and through one group project covering 29 enterprises. The phase-out efforts for the group project will be coordinated through a local expert who will oversee project implementation, and work closely with the Ministry of Environment and the World Bank. The proposed costs of the subprojects are as indicated in below.

48. The following Table contains information on the assistance to be provided to the refrigeration and air conditioning enterprises:

Enterprise	CFC use (ODP tonnes)	Number of Enterprises	Project Cost (US$)	Grant Request (US$)
Dawlance	64.58	1	635,736	477,894
United Refrigeration	251,33	1	776,078	457,815
Ice Age	43.83	1	551,879	551,879
Umbrella Project for 29 SMEs	9.65	29	236,092	236,092
Management cost				75,000
TOTAL	369.4	32	2,199,785	1,798,680

49. Dawlance, United Refrigeration and all SMEs selected HCFC-141b technology in foam operations. Cyclopentane technology was considered but not accepted based on safety considerations. Ice Age selected cyclopentane-based technology. The technology of choice is HFC-134a for all enterprises in refrigeration operations.

50. The World Bank indicated that the choice of HCFC-141b as an interim technology was made by the enterprises following a discussion with them on available alternatives and relevant decisions of the Executive Committee regarding the use of HCFC-141b as interim substitute foam blowing agent. The justification for the use of transitional technologies is attached as Annex 8 to the proposal. A letter of transmittal from the Government of Pakistan endorsing the use of HCFC-141b by the companies has not yet been received by the Secretariat.

51. Total requested grant is US $1,798,680. Overall cost effectiveness is estimated at US $9.92/kg ODP.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

52. The proposal for the refrigeration manufacturing sub-sector includes two companies that with previously approved but cancelled investment projects. Dawlance received US $477,894 at the 26th Meeting in November 1997 and United Refrigeration received US $457,817 at the 27th Meeting in March 1998. The projects were cancelled by mutual agreement without disbursement of funds. According to Decision 29/8, reapplication from enterprises with cancelled projects can be considered after period of two years has elapsed. This is the case for Dawlance and United Refrigeration.

53. The Secretariat has reviewed the requested capital and incremental costs in the proposal. The Secretariat indicated to the World Bank that the additional production lines installed at Dawlance and United Refrigeration in 1996 were not eligible for funding. Incremental operating costs (IOC) associated with chemicals and parts used for production in these additional lines also appear not to be eligible for funding. Operating costs for Dawlance were requested for two years. However, given the fact that this company uses compressors of lower than 250 watt capacity it must be considered as a domestic refrigeration enterprise. Therefore, the incremental operating costs are only eligible for a six month period. The incremental costs requested in Dawlance United Refrigeration projects for the replacement compressors also exceed the established norms agreed between the Secretariat and the Implementing Agencies. The World Bank was requested to recalculate the amount of the requested grant accordingly.

54. The level of incremental cost eligible for funding is being discussed between the World Bank and the Secretariat. Advice on the outcomes of these discussions will be provided prior to the meeting of the Sub-Committee on Project Review as appropriate.

RECOMMENDATIONS

55. Pending.

PROJECT EVALUATION SHEET
PAKISTAN

SECTOR: Solvent ODS use in sector (2002): 660 ODP tonnes

Sub-sector cost-effectiveness thresholds: n/a

Project Title:

(a) Sector phase out of CTC

Project Data	**Solvent**
	Phase out
Enterprise consumption (ODP tonnes)	
Project impact (ODP tonnes)	413.7*
Project duration (months)	48
Initial amount requested (US $)	3,609,122
Final project cost (US $):	
Incremental capital cost (a)	
Contingency cost (b)	
Incremental operating cost (c)	
Total project cost (a+b+c)	3,609,122
Local ownership (%)	100%
Export component (%)	0%
Amount requested for first tranche (US $)	1,199,848
Cost effectiveness (US $/kg.)	8.70
Counterpart funding confirmed?	n/a
National coordinating agency	Ministry of Environment, Local Government and Rural Development
Implementing agency	UNIDO

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 $)	

* Impact of the first tranche is 116.0 ODP tonnes.

PROJECT DESCRIPTION

56. The Government of Pakistan has submitted a national phase out plan for ODS solvents (mainly CTC) (solvent plan) for consideration by the Executive Committee at its 41st Meeting.

ODS solvent consumption

57. The 1997-2002 TCA and CTC consumption reported under Article 7 by the Government of Pakistan is presented in the table below. The CTC baseline for compliance is 412.9 ODP tonnes.

ODS	Consumption (ODP tonnes)					
	1997	**1998**	**1999**	**2000**	**2001**	**2002**
TCA	2.9	2	2.5	2.5	3.5	0.0
CTC	734.8	110	564.3	564.3	655.6	636.9
CFC-113	65.6	0	0	0	32	0

Project approvals and remaining consumption

58. The Executive Committee has approved projects in the solvent sector in Pakistan that will phase out 60.9 ODP tonnes of CFC-113, 158.3 ODP tonnes of CTC (of which 80 ODP tonnes are used as a process agent) and 1.1 ODP tonnes of TCA. As of December 2002, 59.6 ODP tonnes of CFC-113 have been phased out. On the basis of the consumption reported in 2002, no additional phase-out is required for TCA and CFC-113 and a maximum consumption of 478.6 ODP tonnes of CTC remains to be addressed.

59. The Government of Pakistan also submitted to the 41st Meeting of the Executive Committee a country programme update (UNEP/OzL.Pro/ExCom/41/75). For the preparation of the country programme update, associations and enterprises were contacted to obtain detailed data on CTC consumption levels and patterns for all known applications.

60. It has been indicated in the country programme update that of the total reported CTC consumption (636.9 ODP tonnes), only 46.4 ODP tonnes could be identified and verified (e.g., about 7 per cent of the total consumption).

61. In the project document, it is indicated that a total of 67.1 ODP tonnes of CTC has been identified as the consumption in eight specific enterprises. A further 346.5 ODP tonnes has been identified as being eligible consumption through a survey conducted by UNIDO's national consultant during preparation of the solvent sector plan. The 346.5 ODP tonnes is indicated as being consumed by 921 enterprises in the informal sector that process stainless steel (from the Gujranwala and Wazirabad regions and in Sialkot, Lahore, Karachi and Hyderabad). UNIDO indicated that additional consumption of 64.9 ODP tonnes from other small enterprises was determined to be ineligible for funding. In total these amounts are equal to the CTC consumption remaining to be addressed as indicated in paragraph 58 above.

Action proposed by the Government

62. The Government of Pakistan proposes to implement a strict quota system to reduce CTC imports by 89 per cent in one year. In order to facilitate the CTC phase out, the solvent plan will target the direct phase out of 413.7 ODP tonnes of CTC in eligible enterprises and additional phase out of 64.85 ODP tonnes in the informal sector. The solvent plan will be implemented through a combination of policy and management support, technical assistance and investment for some enterprises that have been identified and verified (PEL, Dawood Herculis and Pakistan Steel). The conversion of these enterprises and any other SMEs to non CTC-solvents must take place before the end of 2004. Some 90 ODP tonnes of CTC will also be phased out in 2004 from ongoing projects. Priority will be placed on ensuring ongoing projects are completed on time.

63. Since 346.5 ODP tonnes of eligible consumption are used in the informal sector, emphasis will also be placed on awareness raising activities, policies and technical assistance.

Alternative technologies and incremental costs

64. The total cost of the solvent plan, as submitted, was estimated at US $3,519,015 (US $9.92/kg).

65. The eight identified enterprises will be addressed through investment sub-projects. Given the small size of the remaining enterprises, with limited technical capabilities, costs associated with plant and process changes and technical assistance, trials and training, have been requested. ODS phase-out in ineligible enterprises will not be funded under the sector phase-out plan and is expected to take place through the control exercised by the Government using policy and regulatory actions.

66. The main sub-project components of the solvent plan are:

(a) Phase out of 46.0 ODP tonnes of CTC at PEL Co., through the installation of a new vacuum cleaning and degreasing machine, a chiller and a compressor and ancillary equipment, trials and testing. Operating costs for two years are requested;

(b) Phase out of 20.9 ODP tonnes of CTC at seven identified and verified enterprises through enhanced ventilation and extraction systems, installation of a chiller and ancillary equipment, trials and testing. Operating costs for two years are requested;

(c) Phase out of 346.5 ODP tonnes of CTC at 921 SMEs through retrofitting of existing equipment, improved ventilation and a 5-year technical assistance programme calculated on the basis of US $560/year and enterprise; and

(d) Training of national experts, technicians at workshops and customs officers (twice a year for 5 years).

67. Technical assistance will be provided for preparing specifications for equipment, start-up of production with new equipment, addressing technical issues with the phase-in of the new equipment and trials.

68. A policy development and enforcement programme covering various legislative, regulatory, incentives/disincentives and punitive actions will be established to enable the Government of Pakistan to acquire and exercise the required mandates in order to ensure compliance with the phase-out obligations. The solvent plan also includes an awareness programme and regulation monitoring and verification of ODS phase-out of completed sub-projects within the solvent plan.

Management

69. The solvent plan will be managed by the Ozone Unit through a dedicated management unit supported by representatives and experts from UNIDO.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

Issues related to CTC consumption

70. UNIDO's survey indicated a consumption of 572 ODP tonnes of CTC compared to the reported Article 7 data of 636.9 ODP tonnes. The Secretariat indicated that a proportion of the surveyed consumption would be expected not to be eligible, for instance because the enterprises were new. Subsequently, UNIDO indicated that the survey had identified only eligible consumption and that the difference of 65 ODP tonnes between the survey data and the total CTC consumption remaining to be addressed corresponded to the ineligible consumption.

CTC phase out at PEL Co.

71. The largest single enterprise in the solvent plan is PEL Co. A project proposal for the phase out of ODS solvents at PEL was forwarded to the Secretariat for the 37th, 38th, and 39th Meetings but could not be submitted for the consideration by the Executive Committee because of data discrepancies (e.g., TCA consumption in the project and TCA data reported by the Government under Article 7). During the review of the project, the level of incremental cost was agreed between the Fund Secretariat and UNIDO.

72. The Secretariat noted that as originally presented the sector plan proposed to include costs for phase-out of TCA used at PEL even though the reported national consumption was zero. UNIDO agreed to remove the TCA part of the project. However UNIDO also revised the design and costing of the project so that the cost remaining for the CTC part was comparable to the original cost of the whole project. The Secretariat suggested that the cost should be based on the already agreed incremental costs reduced proportionately for the quantity of TCA not eligible for funding.

CTC phase out at SMEs

73. The Secretariat pointed out that sectoral plans do not always identify all of the consumption in detail, especially the consumption used in SMEs which is typically a small percentage of the overall sector consumption (e.g., less than 10 percent). However, in the solvent plan originally presented, the only consumption identified and verified at the enterprise level is 59.5 ODP tonnes (equivalent to 14.4 per cent of the total CTC covered under the solvent plan) used by eight enterprises. The only information provided in the solvent plan for the remaining 920 enterprises, with a consumption of 346.5 ODP tonnes, is the name of the company and the contact person. In this regard, the Secretariat was concerned about the basis used for calculation of consumption and the incremental cost of the solvent plan. The Secretariat requested additional information from UNIDO on, *inter alia*, the number of enterprises visited during the survey; equipment baselines and eligibility of production capacity and date of establishment, and the measures taken to verify the accuracy and relevance of the information gained.

74. In this regard, UNIDO indicated that its consultant visited 59 of the 921 eligible enterprises (6.5 per cent of the total) and UNIDO's own staff visited 9 small companies operating in the stainless steel processing sector. UNIDO indicated that all of the eligible companies were established before 15 July 1995. UNIDO also noted that as a part of the survey 177 companies with a total CTC consumption of 64.9 ODP tonnes were found to be ineligible for funding. UNIDO also reported that the total CTC consumption was estimated based on an average consumption per unit that was extrapolated based on the number of consumers. UNIDO found that all the enterprises visited, used similar equipment and procedures (either open cleaning machines or manual cleaning in tanks).

75. The solvent plan calculated the incremental costs for the small enterprises on the basis of providing new cleaning machines or retrofits to all enterprises, including incremental operating costs. In this regard, the Secretariat pointed out that such an approach may be eligible for enterprises where it can be established that baseline conditions exist to justify cleaning machines. Typical sector consumption profiles would also be expected to include significant consumption by solvent blenders who will change to other non-ODS formulations and very small users who will be provided with technical support, which will not include cleaning machines or incremental operating costs. These elements were not seen the plan. Subsequently, UNIDO agreed to modify the project proposal so that aside from the 8 principal companies, the remaining 921 companies would receive a total of US $350 for modest equipment and ventilation modifications, and would also receive a voucher for technical assistance and consultancy at US $2,800 per enterprise: in total US $2.9 million. No basis was provided for determination of the suggested level of technical assistance via the vouchers. The overall requested cost of the project was revised from US $3,519,015 to US $3,615,340.

Project implementation

76. The Secretariat noted that little detail was provided in the original project proposal concerning the methodology and practical means of implementing the solvent sector plan, particularly in regard to the major part of the consumption in small enterprises, and on measuring

and verifying consumption limits and phase-out. UNIDO agreed to provide a section on performance targets of the solvent out plan.

77. The Secretariat and UNIDO are still discussing outstanding issues, in particular issues related with the limited information available on the baseline conditions of the 921 SMEs enterprises, the limited sample of enterprises surveyed on which the incremental cost of the solvent sector has been based and the basis for the proposed incremental costs for the voucher system for 921 small enterprises. The outcome of the discussions will be advised to the Sub-Committee on Project Review.

RECOMMENDATION

78. Pending.

- - -

PROJECT COVER SHEET

COUNTRY	:	**PAKISTAN**	
IMPLEMENTING AGENCY	:	UNIDO	
PROJECT TITLE	:	Sector phase out plan of CTC	
PROJECT IN CURRENT BUSINESS PLAN	:	Yes	
SECTOR	:	CTC	
CTC USE IN SOLVENT SECTOR (2002) :	:	636.9	ODP Tonnes
PROJECT IMPACT	:	413.7	ODP Tonnes
PROJECT DURATION	:	2003 - 2007	
PROJECT COST	:		
LOCAL OWNERSHIP	:	100%	
EXPORT COMPONENT	:	0	
REQUESTED GRANT	:	3,609,122	US$
COST-EFFECTIVENESS	:	8.7	US$
IMPLEMENTING AGENCY SUPPORT COST	:	270,684	US$
TOTAL COST OF PROJECT TO MULTILATERAL FUND	:	3,879,806	US$

FINANCING ARRANGEMENT	:	**Project cost**	**Grant with support cost**
2003 tranche	:	1,199,848	1,289,837
2004 tranche	:	1,170,141	1,257,902
2005 tranche	:	900,193	967,707
2006 tranche	:	236,340	254,066
2007 tranche	:	102,600	110,295

STATUS OF COUNTERPART FUNDING	:	N/A
PROJECT MONITORING MILESTONES INCLUDED	:	Yes
NATIONAL COORDINATING AGENCY	:	Ministry of Environment

Project Summary

This Sector Phase-out Plan will phase-out all the remaining ODS consumption in the Solvent Sector in Pakistan. The Phase-out Plan will be implemented over the period of 2004 - 2007 and upon completion, will result in the complete phase-out of ODS in the Solvent Sector in Pakistan. The Sector Phase-out Plan will cover the technology conversions in the eligible enterprises in the Solvent Sector and ensure timely, sustainable and cost-effective phase-out through a combination of investment, technical support and policy/management support components. The total eligible incremental costs and the requested grant for the Solvent Sector Phase-out Plan in Pakistan amount to US$ 3,609,122.

Impact of the project on the country's Montreal Protocol obligations

The approval of this project will assist Pakistan to meet its Montreal Protocol obligations, in the reductions of ODS consumption according to the agreed schedules.

PREPARED BY: UNIDO (in consultation with NOU and the World Bank) DATE September 2003
REVIEWED BY: Dr. Clinton Norris DATE September 2003

1. PROJECT OBJECTIVES

The objectives of this project are:

a) To ensure timely, sustainable and cost-effective ODS phase-out in the Solvent Sector, through development, implementation of investment/ technical and policy/management support components.
b) To enable Pakistan to meet its obligations of phased ODS reductions according to the Control Schedule of the Montreal Protocol.
c) To achieve entire phase-out of ODS in the Solvent Sector in Pakistan by end of 2007.

2. INSTITUTIONAL FRAMEWORK

Pakistan ratified the Vienna Convention, the Montreal Protocol and the London Amendment in 1992. The Copenhagen Amendment was signed by the Government of Pakistan in 1995. The Country Programme was - approved at the 20th Meeting of the Executive Committee in October 1996. The project for the Country Programme Update was approved at the 36th Executive Committee Meeting in 2002. The Country Programme is being updated to conduct the survey of sectors consuming ODS other than Annex A Group I substances (CFCs), i.e. solvents and halons as well as methyl bromide. The Country Programme, proposed measures and actions to be taken/considered by both government and industry, such as institutional and regulatory measures, awareness and information dissemination, technical assistance, training and investments for technology conversions, to facilitate the phase-out of ODS in the various ODS consuming industry sectors and to assist them to comply with the country's commitments and priorities.

The Country Programme Update was initiated in 2002 - with the assistance of the World Bank - to renew and reinforce Pakistan's commitment, strategy and action plan in order to eliminate the entire consumption of ODS. Considering the needs of the industry, the availability of ODS in the industrial sub-sectors, the economy in Pakistan , the new strategic planning frameworks and the adjusted funding policies adopted by the Multilateral Fund, a total elimination of ODS in the solvent sector is now targeted by end 2007.

The activities related to ozone layer protection and implementation of the Montreal Protocol, are managed and coordinated through the National Ozone Unit (Ozone Cell), which is under the Ministry of Environment (Local Government and Rural Development).

Table 1. Action Plan as stated in the Pakistan Country Programme

Item	***Action***		
	1996-2000	*2001-2005*	*2006-2010*
1. Country Programme	Complete elaboration and commence to implement.	Reassess and adjust, then continue.	Reassess, continue and complete.
2. Legal System	Establish legal system for ODS management and implement.	Improve related regulations and system, and continue.	Continue
3. Bans	Ban on new enterprises producing refrigerators, air conditioning equipment, and foam material using ODS. Ban on import of products using or containing ODS (special cases in halon extinguishers excluded).	Ban on creating or enlarging cleaning lines using ODS. Ban on uncontrolled release of ODS during servicing.	Ban on import of ODS or products using or containing ODS.

4. Investment Control	Ban on investment in building new plants using ODS. Strict control of investments in new, enlarged, or technically reformed enterprises consuming ODS.	Continue	Continue
5. Financial incentives	Reduction of import tariffs on equipment and materials required for implementation of ODS phase out projects.	Continue	Continue
6. Taxation	Feasibility study on related tariff and tax policies, practice inclined tax policies on ODS.	Inclined policies on the sale of ODS and their substitutes, ODS products and their substitutes.	Continue
7. Awareness, education and technical information exchange	Carry out awareness and education on ozone layer protection through public media, such as newspapers, broadcasting, and TV programs, so as to upgrade the environmental awareness of the public. Communicate key points of national ozone policy to the public. Issue special bulletins on the harmful effects of ozone layer depletion.	Continue awareness and education, hold technical workshops and public meetings. Announce new policies in advance of their introduction. Inform consumers about the premature obsolescence of refrigerators and refrigerant and air conditioning equipment based on ODS.	Continue
8. Exclusive sales and quotas of ODS.	Investigate thoroughly ODS consumption status and their input channels, monitor and control ODS sales networks, and establish exclusive ODS sales systems.	Define consumption quotas to users, control the quotas and supplies according to the quotas.	Continue
9. Recycle/ recovery of ODS	Establish networks and sites for recycle/recovery and operate them.	Continue activity from the previous period. Establish networks and sites for halons recovery and storage, recover halons in fire extinguishing devices in non-essential cases and use them in the essential devices.	Continue activity from the previous period.
10. Monitoring	Develop a monitoring system for ODS imports	Continue activity from the previous period.	Continue activity from the previous period.

	within the general administration of Customs. Define and divide responsibilities for supervision and management of technical substitution projects among environmental protection agencies and various sectors and industries, and commence monitoring activities. Determine the phase out plan, start a reward and punishment strategy. Report regularly on the progress of ODS phase out.		

3. SECTOR BACKGROUND

3.1 Background of the Solvent Sector

The amendment of the Country Programme indicates the use of three solvents in the Solvent Sector, namely carbon tetrachloride (CTC), trichloroethane (TCA) and CFC-113 where CTC represents 99,6 % of total actual ODP consumption in the sector. The balance of 0.4 % represents the consumption of TCA and CFC-113 of already approved not yet implemented projects as indicated in Tab. 4 and 5 under paragraph 3.4.

Most frequent applications of the above-mentioned solvents have been found in metal cleaning, degreasing and removing of impurities.

3.2. Formal structure of the solvent sector

In Pakistan solvents are used as cleaning, process and formulation agents structured in the sub-sectors as follows:

Cleaning Agent

Generally, it is understood that the metal processing and precision instruments industries are the main users of solvents.

- Cleaning of Heat Exchangers
- Automobile Manufacturing
- Refrigeration
- Arms and Ammunition Manufacturing
- Surgical instruments, stainless cutlery
- Textile

Process Agent

- Pharmaceutical intermediates

Of all ozone depleting substances used in solvent sector, carbon tetrachloride (CTC) was found most extensively utilized for cleaning and degreasing operations in above-mentioned applications.

In the metal cleaning sub-sector, there are several medium-sized manufacturers, which have already converted or are in the process of conversion to non-ODS technology with the assistance of MLF.

Metal cleaning sub-sector comprises of a large number of predominantly small and medium-sized enterprises, which are clustered or scattered in industrial regions of Lahore, Sialkot, Gujranwala, Hyderabad and Karachi. These companies do not have sufficient access to more sophisticated technology and know-how. In general, the knowledge of the latest technologies is limited in the enterprises. Although general awareness about quality assurance, training, environment and safety-related issues exists, it does not receive much emphasis in practice. They are characterized by low levels of investments in plant and machinery, and resulting labour-intensive operation, due to the pressures on profitability.

Several companies declared certain volume of export of their products to various countries including non-Article 5 ones. It is estimated that such export component could represent 5 percent of the total. However, it should be noted, that no ODS could be re-exported to those countries, since solvents are only used for cleaning operations and no residuals could be retained at the surface nor inside the products.

3.3 History of ODS phase-out in the solvent sector

The overall ODS consumption in solvent sector, as per Dataform97 reports provided by the Government of Pakistan is shown below:

Table-2

		1997		1998		1999		2000		2001		2002	
Solvent	ODP	Metric tonnes	ODP tonnes	Metric tonnes	ODP tonnes	Metric tonnes	ODP tonnes	Metric tonnes	ODP tonnes	Metric tonnes	ODP tonnes	Metric tonnes	ODP tonnes
CTC	1.1	668.0	734.8	100.0	110.0	512.7	564.3	512.7	564.3	596.0	655.6	579.0	636.9
TCA	0.1	29.0	2.9	20.0	2.0	25.0	2.5	25.0	2.5	35.0	3.5	0.0	0.0
CFC 113	0.8	82.0	65.6	0.0	0.0	0.0	0.0	0.0	0.0	40.0	32.0	0.0	0.0
Total			**803.3**		**112.0**		**566.8**		**566.8**		**691.1**		**636.9**

As mentioned in the Country Programme Update (Chapter 2.4.2) the methodology utilized for Art. 7 reporting has not been consistent year to year. There are several data variations when reviewing past Art. 7 data. Notable is, in this instance, a large dip in CTC consumption in 1998, despite of the fact that the boom in the manufacturing of stainless steel products was in progress at that time.

CTC consumption has steadily increased since 1995. The 1998 figure of 100 MT was based on what importers had reported as having been imported but not on CBR data. The Ozone Cell reported that the low amount is attributed to the fact that the licensing system was being put into place and importers temporarily stopped their imports until they knew if and how much CTC import levels would be regulated.

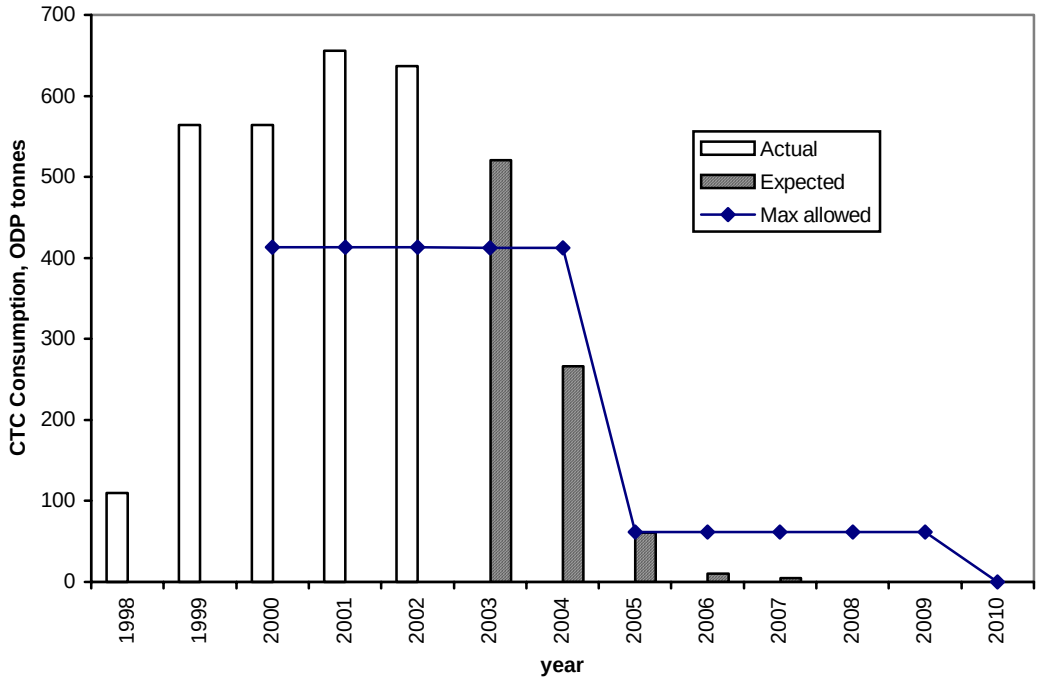
3.4 Assessment of the CTC consumption reduction schedule in the solvent sector

Table 3. ODS Consumption reduction schedule in the Solvent Sector, in ODP tonnes

Year	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
1. Max allowable total consumption of CFC	415.2	415.2	63.5	63.5	63.5	63.5	63.5	0
2. Reduction from ongoing projects	-	90.0	70.7	0	0	0	0	0

3. New reduction under the present plan	116.0	164.9	134.3	51.0	5	0	0	0
4. Total annual reduction of CFC	116.0	254.9	205.0	51.0	5	3	2	0
5. Expected total consumption of CFC	520.9	266.0	61	10	5	2	0	0
6.Compliance status	Non compliance	Compliance	Compliance	Compliance	Compliance	Compliance	Compliance	Compliance

Fig. 1. CTC consumption reduction schedule in Pakistan



3.4 Calculation of Remaining Eligible Consumption

Remaining eligible and fundable consumption has been calculated based on the findings of most recent survey in the sector conducted by In Consult Co. as mentioned hereafter in chapter 3.5.

Table-4: Recent ODS consumption data for the year 2002 according to the survey.

	2002	
Solvent	Metric tonnes	ODP tonnes
CTC	520.0	572.0
TCA	10.7	1.07
CFC 113	1.6	1.28
TOTAL ODP tonnes		**574.35**

Table-5: Approved projects in the solvent sector in Pakistan

			CFC 113	TCA	CTC	Total
Recent consumption according to the survey			1.28	1.07	572	**574.35**
Approved projects Already completed	Proj. No.					
	PAK/SOL/22/INV/13	Conversion of ODS coating processes form CFC-113 to trichloroethylene and IPA at Treet Corporation Ltd., Hyderabad	*18.9			18.9
	PAK/SOL/22/INV/14	Conversion of ODS coating processes form CFC-113 to trichloroethylene and IPA at Treet Corporation Ltd., Lahore	*40.7			40.7
Ongoing projects	PAK/PAG/35/INV/42	Conversion of carbon tetrachloride as process solvent to 1,2-dichloroethane at Himont Chemicals Ltd.			80	80
	PAK/SOL/37/INV/47	Conversion of cleaning installations from carbon tetrachloride (CTC) to tetrachloroethylene (PER) at Riaz Electric Ltd., Lahore			10	10
	PAK/SOL/40/INV/XX	Conversion of cleaning installations from carbon tetrachloride (CTC) and methyl chloroform (MCF) to tetrachlorethylene (PER) and water in combination with partial process modification at Hirra Frooq Ltd., Lahore		0.89	36.63	37.52
	PAK/SOL/40/INV/XX	Conversion of cleaning installations from carbon tetrachloride (CTC) methyl chloroform (MCF) and CFC 113 to tetrachloroethylene (PER) and water in combination with process modification at Breeze Frost Industries Ltd., Lahore	1.28	0.18	31.68	33.14
		Subtotal for approved individual projects	1.28	1.07	158.31	220.26
		Total remaining eligible consumption	0	0	413.69	**354.09**

* Consumption of 74.5 tones of CFC 113 had been reported before 22nd Ex Com meeting, i.e. at the time when those two projects for Treet factories in Lahore and Hyderabad have been formulated. This consumption of 59.6 ODP value has been phased out through the implementation of the above-mentioned projects. No additional consumption of CFC-113 was found in 2003.

** Individual projects approved by 40th ExCom

3.5 Data collection and validation

Survey on the ODS solvents has been conducted through the In Consult Co., local consulting company, in order to collect consumption data for the preparation of the Solvent Sector ODS Phase out Programme for Pakistan. In Consult Co. has been known as one of the most experienced consulting companies in the industrial sector of Pakistan. They used their specific methodology while searching for ODS-solvents consumers and collecting necessary data while collaborating with institutions and searching at companies and associations as listed below.

The results of the survey showed solid and satisfactory affirmation of the findings provided by the World Bank, who was responsible for the Country Programme Update. Data from two independent sources had been discussed among local consultant of the World Bank, the representatives of the Government, In Consult Co. and UNIDO. A very good consonance from different sources was found.

3.5.1 The institutions involved in collection and validation of the consumption data.

- Based on an established methodology for similar tasks, In Consult Co. approached:
- Federal Bureau of Statistics, Government of Pakistan to conduct a research following the Customs Tariff Guide to review the data on import statistics published by this Bureau.
- Registered importers of the solvents to the country, to study and analyse the data collected through the market survey to assess the inflow of the solvents through official as well as unofficial channels.
- Representatives and dealers of foreign manufactures of the solvents, to verify inflow quantities of the solvents.
- Associations of potential consumers of solvents, to verify the data in the production sub-sectors.
- Regional Offices of the Chamber of Commerce and Industries, to verify the consumption data in the production sub-sectors.
- Individual production units to check actual use of the solvents.

The complete list regarding the above-mentioned institutions, associations, chambers, producers as well as quantitative findings are available as relevant attachments to the Survey.

3.5.2. Sources of the data.

Authenticity of the sources of the data and the methodology used have been discussed with the National Ozone Unit, as well as with the national consultant of the World Bank, who was responsible for the preparation of the Country Programme Update. Appropriate approach and sufficient diversity of the sources has been declared.

3.5.3. Methodology of identification of final consumers

Since all potential consumers have been identified in metal cleaning sub sector, which consists of a large number of small companies, the associations and chambers of commerce and industry in main industrial regions of Lahore, Gujranwala, Sialkot, Karachi, Wazirabad and Hyderabad have been approached in order to obtain the detailed consumption data and to reconfirm the eligibility for funding under Sector Phase out Programme. UNIDO standard questionnaire for the solvent sector have been distributed to the clusters through the associations. Based on random selection, an on-site visits to certain companies and cleaning units took place to verify and ascertain eligibility for technical assistance under this ODS phase out programme.

3.5.4 Summary

Associations and enterprises were contacted to obtain detailed information on CTC consumption levels and patterns for all known applications. The total annual consumption level of CTC was verified to be 579 MT (636.9 ODP tonnes) through importers and customs data.

According to the survey conducted by In Consult, CTC consumption amounting to 520 MT (572 ODP tonnes) has been verified to be the consumption eligible for funding under MP criteria.

Totally 1,110 registered potential consumers of ODS-solvents have been identified through the Survey. The findings have been evaluated and classified according to relevant eligibility criteria. Only 929 companies from **metal cleaning sub sector** have been found fully in compliance with eligibility criteria and thus applicable to and subject for this programme technical assistance.

3.5.5 Companies eligible for funding

According to the results of the survey eligible companies were grouped as follows

a) Individual project for PEL Co.

Enterprise background
PEL Ltd. is the second largest manufacturer of refrigerators and the largest producer of air conditioners in Pakistan and was established in 1982. It is fully owned by Pakistanis and is a public share holding company with its main

offices in Lahore. The company is a conglomerate of various enterprises active in wide range of fields, including TV sets transformers, power switches etc. The Appliances Division incorporates a refrigerator plant in Lahore and a deep freezer and air-conditioning factory in Gadoon. The company's market share amounts to approximately 38% and does not export its products.

PEL's installed production capacity of heat exchangers for its deep freezers and air-conditioners is approximately 95,000 per annum using various processing oils.

The production is heavily influenced by the seasonal nature of the market and is concentrated in the first and second quarters and declines sharply in the third and fourth quarters.

Table-6: Dimensions of manufactured heat exchangers and the installed annual capacity

Installed capacity\Dimensions	Length (mm)	Heights (mm)	Depth (mm)	Ø (mm)
25,000	215	215	117	9.525
35,000	396	414	64	9.525
35,000	446	371	137	9.525
35,000	542	432	98	9.525
35,000	591	408	116	9.525

In 2001 PEL was producing mainly in one 8-hours shift per day, in peak periods however, there were two shifts per day. To fulfil the demands of the market PEL was manufacturing in average in one and a half shifts per day. The work-month was 25 days.

The annual production of heat exchangers and solvents consumption is given in Table-7.

Table-7: Heat exchangers production

Year	Heat Exchangers	CTC consumption in MTS
2000	65000	39.5
2001	66000	39.0
2002	67500	39.3

b) Group I

Table-8: Companies operating in metal cleaning sub-sector consuming 19 MT of CTC in total.

	Enterprise	Address	Annual production	No of employees	Products	Baseline equipment	CTC consumption in 2002 [MT]
1	Go Go Traders	S.I.E. Sialkot-4 Tel: 432 255924 Fax: 432 555109	800,000 Pcs	15	Surgical instruments	2 X open ultrasonic machines	4.18
2	G.T. Surgical (Pvt.) Ltd.	P.O. Box No. 19 Sialkot-4 Tel:432 554225 Fax:432553912	30 MT of finished goods	16	Scissors, forceps, needle holders, retractors	2 x ultrasonic machine (Branson)	3.6
3	M.J. Instruments Co.	S.I.E. Sialkot-4 Tel: 432 553695 Fax: 432 554428	650,000 Pcs	6	Surgical and dental instruments	One ultrasonic machine (ICI SSI)	2.6
4	Mohsan Surgical Industries	Defence Road, Fateh Garh Agency Chowk	600,000 approx	6	Surgical instruments	One ultrasonic machine	1.8

		Tel:432 561508 Fax: 432 268532					
5	Euromed Industries	Plot No.56-A Small industrial estate. Sialkot Tel: 432 555107 Fax: 432 555108	250,000 Pcs	6	Surgical and dental instruments	One open air ultrasonic machine	1.2
6	Gallant Pvt.Ltd.	Vazirabad road, Sialkot 51339 Tel: 432 283221 Fax: 432 283232	550,000 Pcs	7	Surgical instruments	Open air degreasing machine	3
7	Aemco Z.E. (Pvt.) Ltd	Vazirabad road, Sialkot 51338 Tel: 432 263221 Fax: 432 263232	650,000	6	Surgical instruments	One open air ultrasonic machine	2.62
						Total	19.0

c) Group II
Large group of 921 small companies consuming from 600 to 800 kg of CTC in various cleaning activities but predominantly in metal cleaning operations. Total consumption of those companies amounts to 321 MT of CTC.

Full lists of companies are attached as Annexes VI, VII andVIII.

4. Strategy plan of the solvent sector ODS phase out programme

The Montreal Protocol Programme in Pakistan has already addressed metal cleaning and process agent sub-sectors through individual projects. In addition to achieving the ODS phase-out targets, it has created a degree of awareness among the industry of the need for incorporating environmental objectives in their investment and operational decisions. The technical assistance and training inputs received through the projects have also enhanced to some extent, the capacity at the enterprise level to address technical and environmental issues. However, the source of the remaining consumption in the solvent sector is predominantly by small and medium-sized enterprises characterized by modest levels of investments, training, technical knowledge and awareness available to these enterprises.

4.1. Historical phase-out approach

All the projects which have been approved in this sector by now are individual projects. From experience in other similar developing countries, the group approach has been proven to be effective in terms of coverage, cost-effectiveness and ODS phase-out, though it has not necessarily been fully effective in mitigating the infrastructure barriers, such as technology awareness, technical assistance, training, etc. due to the relatively limited amounts of resources approved for these activities, which are considered to be crucial in sustaining the viability of the enterprises and the ODS phase-out. A sector-wide phase-out approach therefore needs to be selected to address the remaining CFC consumption in this sector, addressing these concerns and considering that solvent sector in Pakistan has not made desired progress in ODS phase-out and thus the country is not in compliance with the Montreal Protocol ODS phase out schedule as far as consumption of ozone depleting solvents is concerned.

4.2 Government strategy and plan of actions

The Government of Pakistan plans to address the remaining eligible consumption of 354.94 ODP tonnes in the solvent sector through the **Sector ODSs Phase-out Plan in the Solvent Sector** to be submitted for MLF approval in the 41st ExCom Meeting in December 2003. Any individual pipeline project in the solvent sector, which had been already prepared but not yet approved, will be implemented in frame of this sector phase out plan.

The Government strategy comprises:

- Timely implementation of approved not yet implemented individual projects
- Introduction of new and enforcement of existing institutional strengthening measures in line with action plan as stated in tab.1 above.

- Public awareness, technical assistance, process optimisation and rationalization, consultancy, training and technical services on the individual enterprise or enterprise clusters levels to be facilitated through the implementation of the programme.

Tabulated and graphical phase out schedule along with concise Plan of Actions based on the Country Strategy is attached as ANNEX V

5. PROJECT DESCRIPTION

The Sector Phase-out Plan for elimination of ODS in the solvent sector in Pakistan will be implemented through a combination of policy & management support, technical support and investment components including commissioning of new equipment technical consultancy services and training components.

5.1. Policy and Management

The implementation of the Sector Phase-out Plan will need to be closely aligned and coordinated with the various policy, regulatory, fiscal, awareness and capacity-building actions the Government of Pakistan is taking and will need to take in future, in order to ensure that the implementation of the Sector Phase-out Plan is consistent with the Government priorities, such as promotion of sustainable and eco-efficient production techniques. Further, in view of the annual performance-based targets needed to be achieved under the terms of the Sector Phase-out Plan, the implementation of the Plan would need to be closely and efficiently managed and will introduce additional coordinating, reporting and monitoring activities.

The Solvent Sector Phase-out Plan will be managed by the National Ozone Unit through a dedicated management unit, comprising of a coordinator-team leader to be designated by the Government and supported by representatives and experts from the implementing agency, consulting companies and the necessary support infrastructure. The Policy & Management Support component of the Sector Phase-out Plan will include the following activities pertaining to the solvent sector, for the duration of the Plan:

a) Management and coordination of the Plan implementation with the various Government policy actions pertaining to the Solvent Sector
b) Establishment of a policy development and enforcement program, covering various legislative, regulatory, incentive, disincentive and punitive actions to enable the Government to acquire and exercise the required mandates in order to ensure compliance by the industry with the phase-out obligations.
c) Development and implementation of training, awareness and capacity-building activities for key government departments, legislators, decision-makers and other institutional stakeholders, to ensure a high-level commitment to the Plan objectives and obligations.
d) Awareness creation of the Phase-out Plan and the Government initiatives in the Sector among consumers and public, through workshops, media publicity and other information dissemination measures.
e) Regular monitoring of the programme implementation according to the established schedule. Establishment and operation of a decentralized mechanism for monitoring and evaluation of Plan outputs, in association with provincial regulatory environmental bodies for ensuring sustainability.
f) Preparation of annual implementation plans including determining the sequence of enterprise participation in the planned sub-projects.
g) Assistance in the procurement of the equipment (custom clearance) and its commissioning.
h) Verification and certification of ODS phase-out in completed sub-projects within the Plan through plant visits and performance auditing.
i) Establishment and operation of a reporting system. Preparation and submission of annual reports on the achievement of the performance targets.
j) Liaise with the Government, UNIDO and industries. Coordinate of all activities linked with the implementation of the project.

It is proposed that a national execution and coordination team is established to carry out the programme in the most effective way. It is supposed that entire project will be implemented by UNIDO in close cooperation with the Government of Pakistan.

It is suggested that the team would consist of 5 members and composed as follows:

Two representatives of the Government:
Director of the National Ozone Unit – Coordinator-Team Leader
NOU member – executive secretary
One representative of the implementing agency located in the country:
Director of UNIDO Field Office

Two representatives of national consultancy and industrial community, who have been involved in the execution of surveys as well as in the preparation of the Country Programme Update.

5.2. Technical support and Investment

Companies eligible for funding under this programme are proposed to receive technical support along with the equipment.

The investment component of the plan will focus on enabling the participant enterprises to physically eliminate ODS from their production activities and would comprise of the following elements:

- Assessment of the technical requirements of conversion
- Determining the scope of international and local procurement
- Development of technical specifications and terms of reference for procurement
- Pre-qualification and short-listing of vendors
- International/local competitive bidding
- Techno-commercial evaluation of bids and vendor selection
- Procurement contracts
- Site preparation
- Customs clearance and delivery
- Installation and start-up
- Product and process trials
- Operator training
- Commissioning and phase-in of non-ODS production
- Destruction of baseline equipment

The approach for implementing the investment component in the remaining eligible and unfunded enterprises in the sector is proposed to be through a group sub-projects while applying for and stressing on industrial optimization and process rationalization.

This approach draws on previous implementation experience and has been designed based on the size, level of organization, location and customer base of enterprises concerned and also based on ease and convenience for execution and management. Given the generally small size of the remaining enterprises in the sector, with inadequate in-house technical capabilities, the need for adequate investments for plant and process changes, supported by investments on adequate technical assistance, trials and training, is critical and will involve proportionately larger inputs. It is foreseen that the durations for the sub-projects would be set in such a way as to ensure that the verifiable annual performance targets as may be required for the Sector Phase-out Plan, would be more conveniently quantifiable and achievable.

ODS phase-out in ineligible enterprises will not be funded under the sector phase-out plan and is expected to take place through the control, which the Government will imply through policy and regulatory actions.

Each eligible company is running a metal cleaning process. Usually very simple open equipment with immersing technique and ambient temperature solvent is used.

5.2.1. Plant and process investment

New chemicals suitable for the selected alternative technology will be required. These will be available from existing chemical suppliers. No specific investments are foreseen for handling of raw chemicals.
In most cases process improvement in combination with new solvent will be needed. Therefore, activities under 5.2.2 as below, will assist enterprises for safe handling of chemicals as well as they will help them to acquire new industrial techniques.

Both open and closed equipment will be needed, depending on circumstances such as high air flow in the operating area, or very small enclosures that are often encountered in SMEs, in order to allow vapour cleaning. Total prevention to release the solvent from the technological chain is necessary due to occupational safety measures. The use of closed or a new type of open equipment will ensure eco-efficient solution of the conversion technology.

Other equipment like cooling water generators (chillers) and air compressors will be necessary. Process improvement in the cleaning of larger heat exchangers will require a special technique to expand the tubes and thus the use of special pistols and bullets made of tungsten carbides.

Set of pipelines, fittings, valves, thermo-insulating materials and other installation materials has to be also funded.

5.2.2. Technical assistance

Technical assistance will be required to be provided through international and national experts to ensure a smooth transition to the new replacement technology. The experts would need to be process specialists and their functions will include overall technical supervision of conversion projects and technical coordination between equipment/chemical suppliers, recipient enterprises and the implementing and/or executing agency. Their specific responsibilities include:

a) Technical assistance for preparing specifications of equipment to be procured in the sub-project
b) Technical equipment bid evaluation from suppliers during the competitive bidding process
c) Technical guidance to the recipient enterprise during start-up with the new equipment and process
d) Resolving technical issues with the phase-in of the new equipment and processes
e) Technical evaluation of the results of production and product quality trials jointly with the recipient enterprise
f) Technical project commissioning including final technical inspection of equipment and process for establishing completion and compliance with project objectives such as the destruction of the baseline ODS-based equipment where applicable, verification of depletion of ODS stocks, and verifying that the non-ODS production process is in operation
g) Technical evaluation of enterprise reimbursement claims on equipment, raw materials, local works and other items and certification of the same
h) Technical clearance of project completion, so that the project assets can be handed over and the project closed.
i) Technical assistance for completion and other reporting requirements.

5.2.3. Process trial

Trials will be required to validate the new equipment as well as the cleaning process using the new technology, specifically to establish their performance and suitability for the conversion in accordance with specifications and project objectives. Trials will also be needed to evaluate and establish cleaning efficiency. Trial costs will cover the **extra** cost of chemicals, consumables and utilities required during site preparation and commissioning **that is the incremental costs due to conversion**.

5.2.4. Application safety and process training

Training will be needed to acquaint the operators at the enterprises with the new equipment and processes. Training will also be required to address industrial safety, industrial hygiene and occupational safety issues, such as

carcinogenity or toxicity, ventilation, and health hazards and to institute the required industrial practices as applicable to the replacement technology.

5.3 Technology options

The selection of the alternative technology for conversion would be governed by the following:

a) Proven and reasonably mature technology
b) Cost-effective conversion.
c) Availability of the systems at favourable pricing.
d) Critical properties that have to be obtained in the end product
e) Compliance with established (local and international) standards on safety and environment.

The technology selected would also need to be easily adaptable at the recipient enterprises. The selection of the technology would also need to be consistent with the priorities of the Government and industry and to ensure sustainability of the technology in the long-term.

Of all possible technology options in metal cleaning varying from conversion to non ODS solvent alternative through modification of the cleaning process and using volatile oils to non cleaning option, this programme will be based on the historical technology options which had been selected for individual projects already approved for Pakistan.

6. INCREMENTAL COSTS

6.1. Summary of incremental costs

The incremental costs for the Phase-out Plan are calculated based on the guidance provided by the various ExCom Decisions and precedents and agreements reached with MLF during recently approved similar projects in this sector. The basis for the Cost calculation is historical. Assumptions and methodology have been derived from already approved projects for this sector in Pakistan. Detailed project cost calculations are presented in Annex I and Annex II (IOC). The total costs are as follows

Total costs of SPP for solvent sector in Pakistan						
Activity	Total	2003	2004	2005	2006	2007
Non investment activities. Project management	305,100	112,900	82,050	65,050	28,000	17,100
Incremental capital costs	3,267,395	1,086,948	1,077,640	808,967	208,340	85,500
Incremental operating costs	36,627		10,451	26,176		
Total project cost	3,609,122	1,199,848	1,170,141	900,193	236,340	102,600
IA support cost	270,684	89,989	87,761	67,514	17,726	7,695
Total grant by MFMP	3,879,806	1,289,837	1,257,902	967,707	254,066	110,295
Business plan 2003 - 2005		1,290,000	1,398,000			
ODP to be phase out [MT]	413.7	370.9		266		
Cost effectiveness US$/kg ODP	8.72	6.39		4.66		

6.2 Economies

The incremental costs of the Plan are budgeted on the basis that the sector-wide phase-out approach will result in economies through adoption of cost-effective execution strategies and also through dynamics of the market forces, while providing the Government with the flexibility and the resources to align its policy and regulatory actions with the technical actions, for ensuring a timely, systematic and sustainable ODS phase-out process. Some of the salient provisions of the economies considered for calculating the incremental costs of the sector-wide approach as compared to the individual project-to-project approach are as below:

a) In the investment component, budgets for technical assistance, trials and training are reduced to reflect the savings in the group/sector-wide approach, based on prior agreements for similar projects.

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b) The proposals for replacing the baseline ODS-based equipment have been based on functionality rather than eligibility alone, resulting in savings in the overall costs of the replacement equipment, in accordance with prior agreements with MLF on similar projects.

c) Application of industrial rationalization and grouping of consumers in existing clusters was considered.

7. COST EFFECTIVENESS

The cost effectiveness (ratio of the total incremental costs to the net ODP phased out) of this project works out to US$ 8.72/kg/y. This has been calculated from the net incremental project costs of US$ 3,609,122 and the ODP value 413.7 MT, to be phased out upon completion.

It should be noted that there is a difference in the cost effectiveness between 2003 – 2004 and 2005 – 2007 implementation period, where quite high amount of ODP has to be phased out by 2005 in order to keep the country in compliance with the Montreal Protocol reduction schedule.

8. FINANCING

The total requested grant funding is **US$ 3,609,122** (without agency support cost)

9. IMPLEMENTATION

9.1 Management

The overall management of the Plan will be carried out as described in Section 5.1, by National Ozone Unit, Government of Pakistan. The implementation of the Plan will be carried out by National Ozone Unit through a dedicated management unit to be established and in close cooperation with UNIDO.

The Ozone Unit within the purview of the Federal Ministry of Environment will be responsible for monitoring and coordination of the implementation of the Sector Phase-out Plan. The Ozone Unit will be responsible for tracking promulgation and enforcement of policy/legislations and assist UNIDO with the preparation of annual implementation plans and progress reports to the Executive Committee of MLF. National Ozone Unit in collaboration with UNIDO would supervise Plan implementation activities and conduct an annual independent audit for verifying ODS consumption levels under this Plan, including spot checks and random inspection visits.

9.3. Funding Arrangements

Upon approval by MLF of the Phase-out Plan, the Government of Pakistan , through UNIDO , requests the Executive Committee to authorize disbursement of the funding of the Plan at the 41st Meeting of the Executive Committee.

10. RESULTS

This project will eliminate residual use of ODS in the Solvent Sector in Pakistan. After implementation of this programme no industrial use of ODS solvents will be permitted in Pakistan.

ANNEXES

Annex I: Incremental Costs

Cost breakdown of project components of solvent Sector Phase out Plan, Pakistan, in US$

Items	Description	Unit cost	Q'ty	Sub total	2003	2004	2005	2006	2007
Project management									
International consultant	Once per year 2004 - 2007	2,000	5	10,000	4,000	4,000	1,000	500	500
Training of national experts and custom officers	Seminars, workshops, twice per year	18,000	10	180,000	60,000	55,000	45,000	15,000	5,000
Awareness promotion		5,000	5	25,000	15,000	5,000	4,000	500	500
Coordination, policy development, monitoring, reporting									
	Coordinating office set up	12,000	1	12,000	12,000				
	Office equipment	4,500	1	4,500	4,500				
	Local services, e.g. Selection of service providers and recipients, distribution of equipment	12,000	5	60,000	14,000	15,000	12,000	10,000	9,000
	Local travel	200	40	8,000	2,000	2,000	2,000	1,000	1,000
	Reporting and sundries	700	8	5,600	1,400	1,050	1,050	1,000	1,100
Subtotal for non investment activities				**305,100**	112,900	82,050	65,050	28,000	17,100
Incremental costs for each group of companies									
PEL Co. Individual project under SPP									
Vacuum cleaning and degreasing machine		70,000	1	70000	60000	10000			
Chiller		8,000	1	8000	7000	1000			
Compressor		2,000	1	2000		2000			
Piping, insulation, fittings, valves and ancillary installation material		800		800		800			
Civil works		950		950		950			
Transportation, shipping, insurance		4,000		4000		4000			
Consultancy		6,000		6000		3000	3000		
Training of operators		1,000		1000		800	200		
Material testing, equipment test		800		800			800		
Contingency 10%		9,355		9355			9355		
Subtotal		102,905		102,905	67,000	22,550	13,355		

Incremental Operating Cost			24,274		4,274	20,000		
Sub-total for PEL Co.		1	**127,179**	67,000	26,824	33,355		
Group I								
Improved open cleaning and degreasing equipment	25,000	7	175,000	150,000	25,000			
Chiller	6,000	7	42,000	37,000	5,000			
Improvement of extraction, ventilation system	1,300	7	9,100			9,100		
Piping, insulation, fittings, ancillary material	500	7	3,500			3,500		
Consultancy	700	7	4,900		2,450	2,450		
Training of operators	400	7	2,800			2,800		
Material testing, equipment test	300	7	2,100			2,100		
Contingency 10%	3,420	7	23,940		11,940	12,000		
Subtotal	37,620		263,340	187,000	44,390	31,950		
Incremental Operating Cost	1,765	7	12,353		6,177	6,176		
Total number of companies		7						
Sub-total - Group I			**275,693**	187,000	50,567	38,126		
Group II								
Retrofitting of existing equipment	150	921	138,150	39,450	55,200	26,000	10,000	7,500
Improvement of ventilation	200	921	184,200	51,000	61,100	61,100	8,000	3,000
Voucher on technical assistance and consultancy (USD 560/year and compnay)	2,800	921	2,578,800	742,498	894,400	676,562	190,340	75,000
Incremental Operating Cost	0	921	0					
Total number of companies		921						
Sub-total - Group II	3,150		**2,901,150**	832,948	1,010,700	763,662	208,340	85,500
Total funding			**3,609,122**	**1,199,848**	**1,170,141**	**900,193**	**236,340**	**102,600**
IA support cost (7.5%)			270,684	89,989	87,761	67,514	17,726	7,695
Total grant by MFMP			**3,879,806**	1,289,837	1,257,902	967,707	254,066	110,295
Business Plan 2003 - 2005				1,290,000	1,398,000			

Annex II: Incremental Operating Costs

PEL Co. individual project

	Unit	Unit Cost [US$]	Q'ty	Pre-conversion	Post-conversion
Solvent					
CTC	kg	0.435	39,300	17,096	
Perchlorethylene	kg	0.910	3,000		2,730
Electricity	kWh	0.13	288000		37440
Nitrogen	Lump sum			1200	
Wast management	kg	0.8	6000	into environment	4800
Subtotal for one year operation				18,296	44,970
Difference					26,675
First year (*0.91)					24,274
Second year (*0.83)					0
IOC					24,274

Group I					
Solvent					
CTC	kg	0.435	19,000	8,265	
Perchlorethylene	kg	0.910	1,450		1,320
Electricity	kWh	0.13	144,000		18,720
Nitrogen	Lump sum			600	
Waste management	kg	0.8	3,000		2,400
Subtotal for one year operation				8,865	22,440
Difference					13,575
First year (*0.91)					12,353
Second year (*0.83)					0
One company portion					1,765
IOC					12,353
Group II					0
Total IOC					**36,627**

Annex III: Environmental Assessment

This project uses environmentally safe and acceptable technology

The enterprises participating in this project have obtained the necessary statutory environmental clearances for their present operations. Additional clearances if any, for implementing this project, will be obtained as and when required from the relevant competent authorities.

Annex IV: Draft Agreement

ANNEX V. Draft agreement between Pakistan and the Executive Committee of the Multilateral Fund for the phase-out of CTC.

1. This Agreement represents the understanding of Pakistan (the "Country") and the Executive Committee with respect to the complete phase-out of controlled use of the ozone-depleting substances in the sectors set out in Appendix 1-A (the Substances) prior to [date for final completion], compliance with Protocol schedules.

2. The Country agrees to phase out the controlled use of the Substances in all sectors in accordance with the annual phase-out targets set out in row I of Appendix 2-A (the "Targets") and this Agreement. The annual phase-out targets will, at a minimum, correspond to the reduction schedules mandated by the Montreal Protocol, except to the extent that the performance targets conform to the response by the Meeting of the Parties to Decision 37/20(a) of the Executive Committee. The Country accepts that, by its acceptance of this Agreement and performance by the Executive Committee of its funding obligations described in paragraph 3, it is precluded from applying for or receiving further funding from the Multilateral Fund in respect to the Substances.

3. Subject to compliance by the Country with its obligations set out in this Agreement, the Executive Committee agrees in principle to provide the funding set out in row 9 of Appendix 2-A (the "Funding") to the Country. The Executive Committee will, in principle, provide this funding at the Executive Committee meetings specified in Appendix 3-A (the "Funding Approval Schedule").

4. The Country will meet the consumption limits for each Substance as indicated in row 1 in Appendix 2-A. It will also accept independent verification by the relevant Implementing Agency of achievement of these consumption limits as described in paragraph 8 of this Agreement.

5. The Executive Committee will not provide the Funding in accordance with the Funding Disbursement Schedule unless the Country satisfies the following conditions at least [number] days prior to the applicable Executive Committee meeting set out in the Funding Disbursement Schedule:

(a) that the Country has met the Target for the applicable year;

(b) that the meeting of these Targets has been independently verified as described in paragraph 8; and

(c) that the Country has substantially completed all actions set out in the last Annual Implementation Programme;

(d) that the Country has submitted and received endorsement from the Executive W Committee for an annual implementation programme in the form of Appendix 4-A (the "Annual Implementation Programmes") in respect of the year for which funding is being requested.

6. The Country will ensure that it conducts accurate monitoring of its activities under this Agreement. The institutions set out in Appendix 5-A (the "Monitoring") will monitor and report on that monitoring in accordance with the roles and responsibilities set out in Appendix 5-A. This monitoring will also be subject to independent verification as described in paragraph 8.

7. While the Funding was determined on the basis of estimates of the needs of the Country to carry out its obligations under this Agreement, the Executive Committee agrees that the Country may have the flexibility to reallocate the approved funds, or part of the funds according to the evolving circumstances to achieve the goals prescribed under this Agreement. Reallocations which are considered as major changes should be accounted for in the verification report and reviewed by the Executive Committee.

8. The Country agrees to assume overall responsibility for the management and implementation of this Agreement and of all activities undertaken by it or on its behalf to fulfil the obligations under this Agreement. UNIDO (the "Lead IA") has agreed to be the lead implementing agency in respect of the Country's activities under this Agreement. The Lead IA will be responsible for carrying out the activities listed in Appendix 6-A, including but not limited to independent verification. The Country also agrees to periodic evaluations, which will be carried out under the monitoring and evaluation work programmes of the Multilateral Fund. The Executive Committee agrees, in principle, to provide the Lead IA with the fees set out in row 10 of Appendix 2-A.

9. Should the Country, for any reason, not meet the Targets for the elimination of the Substances or otherwise does not comply with this Agreement, then the Country agrees that it will not be entitled to the Funding in accordance with the Funding Disbursement Schedule. At the discretion of the Executive Committee, Funding will be reinstated according to a revised Funding Disbursement Schedule determined by the Executive Committee after the Country has demonstrated that it has satisfied all of its obligations that were due to be met prior to receipt of the next instalment of Funding under the Funding Disbursement Schedule. The Country acknowledges that the Executive Committee may reduce the amount of the Funding by the amounts set out in Appendix 7-A in respect of each ODP tonne of

reductions in consumption not achieved in any one year.

10. The Funding components of this Agreement will not be modified on the basis of any future Executive Committee decision that may affect the Funding of any other consumption/production sector projects or any other related activities in the Country.

11. The Country will comply with any reasonable request of the Executive Committee and the Lead IA to facilitate implementation of this Agreement. In particular, it will provide access by the Lead IA to information necessary to verify compliance with this Agreement.

12. All of the agreements set out in this Agreement are undertaken solely within the context of the Montreal Protocol and do not extend to obligations beyond this Protocol. All terms used in this Agreement have the meaning ascribed to them in the Protocol unless otherwise defined herein.

Appendix 1-A. The substances

1. The common names of the ODS to be phased out under the Agreement will be listed here.

Annex A	Group I	CFC-11,CFC—12,CFC—113,CFC-114 and CFC—115
	Group II	Halon 1211, Halon 1301, and Halon 2402
Annex B	Group I	CFC-13
	Group II	CT C
	Group III	TCA
Annex C	Group III	Bromochloromethane
Annex E		Methyl bromide

Appendix 2-A. The targets, and funding

Year	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Max allowable total consumption of CFC	415.2	415.2	63.5	63.5	63.5	63.5	63.5	0
Reduction from ongoing projects	-	90.0	70.7	0	0	0	0	0
New reduction under the present plan	116.0	164.9	134.3	51.0	5	0	0	0
Total annual reduction of CFC	116.0	254.9	205.0	51.0	5	3	2	0
UNIDO agreed funding	1,199,848	1,170,141	900,193	236,340	102,600			
UNIDO support cost	89,989	87,761	67,514	17,726	7,695			
Total grant	1,289,837	1,257,902	967,707	254,066	110,295			

Appendix 3-A. Funding approval schedule
Funding will be considered for approval at the last meeting of the year prior to the year of the annual plan.

Appendix 4-A. Form of annual implementation programme (see Annex I to the Guidelines)

Appendix 5-A. Monitoring institutions and roles (as developed in the project document)

Appendix 6-A. Role of the lead implementing agency

1. The Lead IA will be responsible for a range of activities to be specified in the project document along the lines of the following:

(a) Ensuring performance and financial verification in accordance with this Agreement and with its specific internal procedures and requirements as set out in the Country's phase-out plan;
(b) Providing verification to the Executive Committee that the Targets have been met and associated annual activities have been completed as indicated in the Annual Implementation Programme;
(c) assisting the Country in preparation of the Annual Implementation Programme;
(d) ensuring that achievements in previous Annual Implementation Programmes are reflected in future Annual Implementation Programmes;
(e) reporting on the implementation of the Annual Implementation Programme commencing with the Annual Implementation Programme for the [year] year to be prepared and submitted in [year];
(f) ensuring that technical reviews undertaken by the Lead IA are carried out by appropriate independent technical experts;
(g) carrying out required supervision missions;
(h) ensuring the presence of an operating mechanism to allow effective, transparent implementation of the Annual Implementation Programme and accurate data reporting;
(i) verification for the Executive Committee that consumption of the Substances has been eliminated in accordance with the Targets;
(j) co—ordinate the activities of the Coordinating lAs, if any;
(k) ensuring that disbursements made to the Country are based on the use of the Indicators; and
(l) providing assistance with policy, management and technical support when required.

Appendix 6-B. Role of co—operating Implementing Agencies (to be developed in the project document and included in this Appendix)

Appendix 7-A. Reductions in funding for failure to comply

1. In accordance with paragraph 9 of the Agreement, the amount of funding provided may be reduced by US$ 1,000 ODP tones of reductions in consumption not achieved in the year.

Annex V: PHASE-OUT SCHEDULE

Solvent sector phase out programme

Consumption data and country strategy to return to compliance according to the Decision XIV/21 of the Fourteenth meeting of the parties.

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Consumption [ODP tonnes]	803.3	112.0	566.8	566.8	691.1	636.9	520.9	266.0	61.0	10.0	5.0	0.0		
MP targets [ODP tonnes]					412.9				61.9					0

Plan of actions:

2003 Institutional strengthening measures imposed to reduce the consumption. Enforcement of implemented legislation.(116 ODP tonnes reduction)

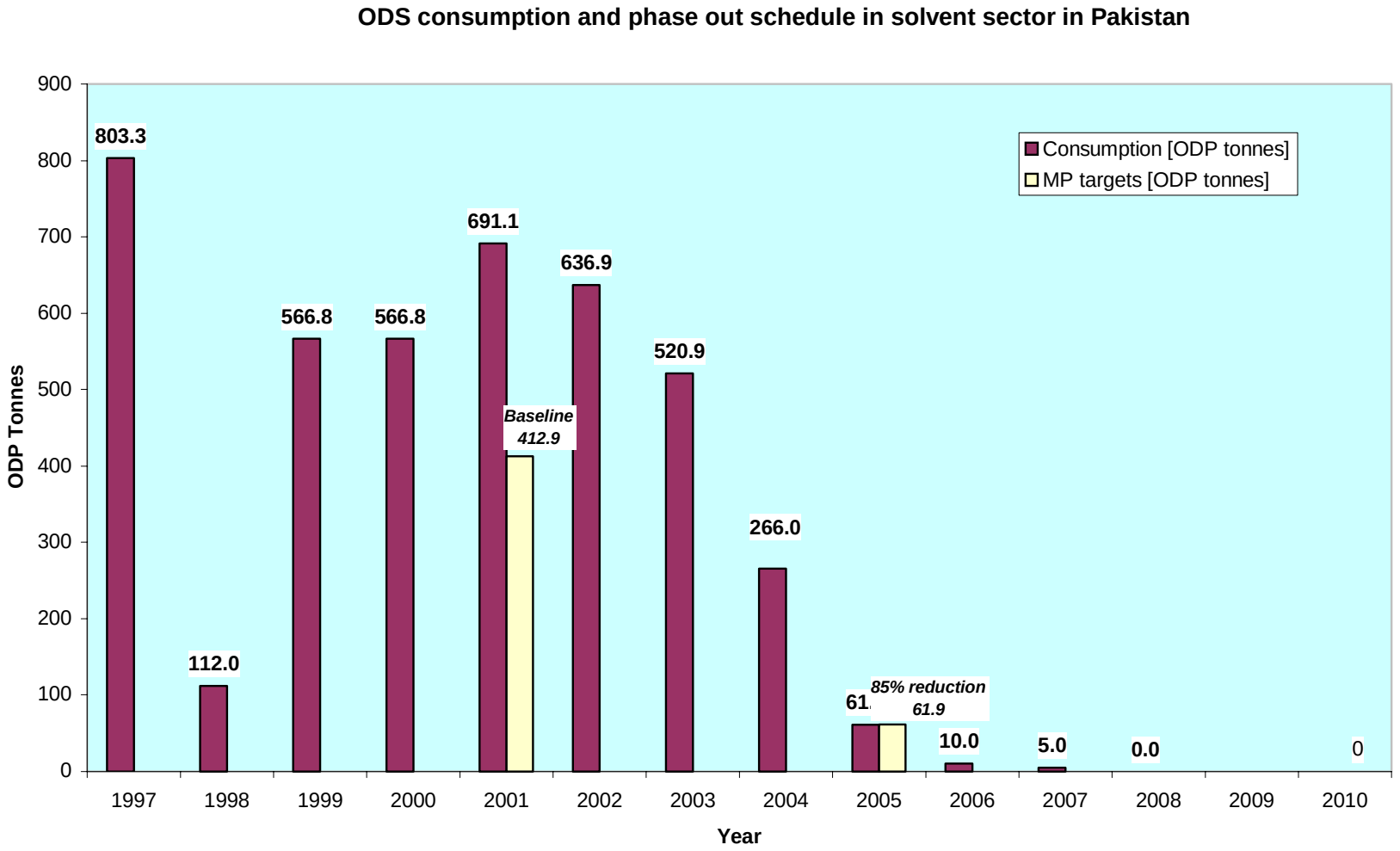
2004 Investment project for Himont Co. to be completed (80 ODP tonnes reduction)
Investment project for Riaz Electric Co. to be completed (10 ODP tonnes reduction)
Sector Phase out Programme commenced with initial straight effect of 54.9 ODP tonnes reduction
Non investment and institutional strenghtening activities as stipulated in Tab. 1 with total reduction effect of 110 ODP tonnes

2005 Investment project for Hirra Farooq and Breeze Frost Industries to be completed (70.7 ODP tonnes reduction)
Second year of sector ODS phase out schedule to be completed (134.3 ODP tonnes reduction)

2006 Third year of sector ODS phase out schedule to be completed (7.8 ODP tonnes reduction)
Individual investment project under SPP for PEL Appliances Co. to be completed (43.2 ODP tonnes reduction)

2007 Sectoral Phase out Programme to be accomplished (residual 10 tonnes to be phased out)
(Entire legislation of the country is envisged to be in compliance with the requirements of the Montreal Protocol. Ban on imports of ODS and ODS using equipment in function.)

Annex V:


ODS consumption and phase out schedule in solvent sector in Pakistan
ODP Tonnes
Year
Consumption [ODP tonnes]
MP targets [ODP tonnes]
803.3
112.0
566.8
566.8
691.1
636.9
520.9
266.0
61
10.0
5.0
0.0
0
Baseline 412.9
85% reduction 61.9
900
800
700
600
500
400
300
200
100
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010

Annex V:


Consuption and phase out schedule of ODS in solvent sector in Pakistan
ODP Tonnes
900
800
700
600
500
400
300
200
100
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Year