



**United Nations
Environment
Programme**

Distr.
GENERAL

UNEP/OzL.Pro/ExCom/48/27
6 March 2006

ORIGINAL: ENGLISH



EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Forty-eighth Meeting
Montreal, 3-7 April 2006

PROJECT PROPOSALS: CHILE

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

Foam

- Terminal umbrella project for phase-out of the use of CFC-11 in the manufacture of polyurethane foam UNDP

Refrigeration

- Terminal umbrella project for phase-out of the use of CFC-11, CFC-12 and R-502 (CFC-115) in the manufacture of refrigeration equipment UNDP

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**PROJECT EVALUATION SHEET – NON-MULTI-YEAR PROJECTS
CHILE**

PROJECT TITLES **BILATERAL/IMPLEMENTING AGENCY**

(a)	Terminal umbrella project for phase-out of the use of CFC-11 in the manufacture of polyurethane foam	UNDP
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NATIONAL CO-ORDINATING AGENCY	CONAMA
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LATEST REPORTED CONSUMPTION DATA FOR ODS ADDRESSED IN PROJECT

A: ARTICLE-7 DATA (ODP TONNES, 2004, AS OF FEBRUARY 2006)

Annex A, Group I CFCs	230.78		
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B: COUNTRY PROGRAMME SECTORAL DATA (ODP TONNES, 2004, AS OF DECEMBER 2005)

ODS Name	Sub-sector/quantity	Sub-sector/quantity	Sub-sector/quantity	Sub-sector/quantity
CFC-11	Foam: 19.61	Ref. Manufacturing: 5.43		
CFC-12	Aerosol: 7.00	Ref. Manufacturing: 22.40	Ref. Servicing: 10.11	
CFC-115	Ref. Servicing: 10.11			

CFC consumption remaining eligible for funding (ODP tonnes)	579.0
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CURRENT YEAR BUSINESS PLAN ALLOCATIONS		Funding US	Phase-out ODP tonnes
	(a)	239,000	27.00

PROJECT TITLE:	(a)
ODS use at enterprise (ODP tonnes):	60.0*
ODS to be phased out (ODP tonnes):	51.4
ODS to be phased in (ODP tonnes):	2.3
Project duration (months):	42
Initial amount requested (US \$):	429,962
Final project cost:	
Incremental Capital Cost (US \$)	419,250
Contingency (10%) (US \$)	41,925
Incremental Operating Cost (US \$)	160,839
Total Project Cost (US \$)	620,014
Local ownership (%):	100
Export component (%):	0
Requested grant (US \$):	429,962**
Cost-effectiveness (US \$/kg):	7.83***
Implementing agency support cost (US \$):	32,247
Total cost of project to Multilateral Fund (US \$):	462,209
Status of counterpart funding (Y/N):	Y
Project monitoring milestones included (Y/N):	Y

SECRETARIAT'S RECOMMENDATION	Blanket approval at the costs indicated above
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* Includes 2.3 ODP tonnes CFC attributed to phase-out due to non-investment component (management activities).

** Includes US \$27,500 for management activities.

*** Based on the actual grant for investment project (US \$402,462).

PROJECT DESCRIPTION

1. UNDP has submitted to the 48th Meeting on behalf of the Government of Chile a terminal umbrella project to phase out 57.7 ODP tonnes of CFC-11 in the foam sector at a total cost of US \$429,962 plus US \$32,247 in support costs to UNDP. The umbrella project will address the residual consumption in the foam sector representing the enterprises that did not participate in the auction programme “Technology Conversion Financing Programme” (TECFIN) which was implemented by Chile through the World Bank to phase out CFC in the foam and refrigeration sectors.

2. A survey conducted in June 2005 identified 33 active generally small-scale foam producing enterprises 18 of which were found to be eligible for funding. Thus the project covers a total of seventeen small-scale foam producers with CFC consumption ranging from 0.5 -6.0 ODP tonnes/year and one medium-scale rigid polyurethane foam panel producer consuming 17 ODP tonnes/year.

3. The enterprises included in the project, their levels of CFC consumption and foam application are listed in Table 1 below:

Table 1: List of enterprises in the foam sector terminal umbrella project

Nº	Company name	Location	Application	Blowing agent consumption (ODP tonnes)
1	Refricentro	Santiago	Panels	17.0
SUB-TOTAL PANELS				17.0
2	Arrayán	Santiago	Spray	1.6
3	Fidel Valenzuela	Santiago	Spray	1.5
4	Flobra	Santiago	Spray	2.5
5	Ingepur	Santiago	Spray	4.8
6	Termo Chile	Santiago	Spray	3.7
7	Purteck	Santiago	Spray	6.0
8	Tulio Mosso	Concepción	Spray	3.7
9	Impermeabilizaciones Roofing	Santiago	Spray	0.5
10	Polares	Concepción	Spray/PIP	3.3
11	Purmar	Santiago	Spray/PIP	3.6
Sub-total spray/ Pour-in-place (PIP)				31.2
12	Soldaduras E Paz	Santiago	PIP	1.3
13	Astilleros Arica	Arica	PIP	0.6
14	Termosistema	Santiago	PIP	2.0
15	Maestranza Hernán Reyes Gonzalez	Santiago	PIP	0.6
16	Klubi	Santiago	PIP	2.2
17	Termoingeniería	Puerto Montt	PIP	2.8
Sub-total pour-in-place				9.5
GRAND TOTAL				57.7

4. All the foam production activities will be converted to the use of HCFC-141b. For the panel production which currently uses a low pressure dispenser and handmix an additional low pressure dispenser will be procured at the cost of US \$70,000 with the necessary deductions for technology upgrade.

5. Five of the sprayfoam producers use low pressure sprayfoam dispensers while the other five use high pressure dispensers. For the conversion to HCFC-141b the low pressure sprayfoam dispenser will be replaced with high pressure dispensers at the cost of US \$20,000 each, while the existing high pressure dispensers will be retrofitted at the cost of US \$5,000 each. There are six producers of pour-in-place applications all currently using handmix techniques with premixed systems purchased from various suppliers. The conversion will involve the procurement of low output low pressure foam dispensers at the cost of US \$20,000-US \$25,000 with deductions for technology upgrade.

6. Incremental operating costs have been calculated taking account of the increase in density on production costs.

7. The project costs are summarized in the table below.

Table 2: Summary of project costs

Production	No. of enterprises	CFC-11 consumption	Project impact (ODP tonnes)	Incremental capital cost (US \$)	Contingency (US \$)	Incremental operating cost (US \$)	Total (US \$)	Requested amount (US \$)	Cost-effectiveness (US \$/kg)
Panel	1	17	15.1	88,500	8,850	44,430	141,780	118,233	7.83
Spray/ Pour-in-place	10	31.2	27.8	195,000	195,00	89,050	303,550	217,674	7.83
Pour-in-place	7	9.5	8.5	135,750	13,575	27,359	176,684	66,555	7.83
Total	18	57.7	51.4*	419,250	41,925	160,839	620,014	402,462	7.83

* 6.3 ODP tonnes will be phased in as a result of the use of HCFC-141b

Management (non-investment) activities

8. As a strategy to ensure complete elimination of the use of CFC in the foam sector, the Government plans to undertake, together with the investment programme, non-investment activities which include the following:

- Awareness campaigns to ensure full participation and voluntary CFC phase-out by enterprises not benefiting from the investment project;
- Verification visits;
- Technical and financial assistance to eligible enterprises to phase out;
- Technical assistance to non-eligible enterprises.

The amount of US \$27,500 is being requested for the management activities.

Justification for the use of HCFC

9. The UNDP technical expert that pre-appraised the umbrella project had, prior to the preparation of the project document, discussions with government representatives about the choice of technology for replacing the existing CFC-based technology. The representatives were briefed in detail about the following:

- An overview of the available interim (low ODP) and permanent (zero ODP) replacement technologies based on technological and financial analysis of conversion;
- The “techno-economic impact” of each technology on the products manufactured, and the processes and practices employed;
- Possible implications of each technology, in terms of its known impact on environment, health and safety, such as ozone depleting potential, global warming potential, occupational health, etc;
- Import restrictions to non-article 5 countries of products made with HCFC-141b;
- HCFC technologies being interim technologies due to their ODP and therefore may continue to adversely affect the environment, although at a lower rate than CFCs;
- The use of the HCFC-141b needs to be phased out at a future date, and any investments required for the phase-out and for conversion to a permanent technology will have to be borne by the enterprises themselves.

10. This information would be communicated by the Government representatives to individual enterprises at the time of project implementation. The enterprises will indicate their agreement through commitment letters to be submitted as a condition for participation in the project prior to its implementation.

11. The main conclusions reached through technological and financial analysis, which were discussed with government representatives were:

- (a) For insulating rigid foam applications, which in this project consist of sprayfoam, panels and pour-in-place (PIP), currently no viable permanent technologies are available in the marketplace that are appropriate for the included enterprises;
- (b) Water-based technologies do not provide the insulation performance required by these applications;
- (c) Hydrocarbon technologies are only appropriate for implementation by large, relatively sophisticated enterprises, and not for the small enterprises covered under this project. The capital costs would be very high for any given enterprise, and the safety of the installation would be difficult to guarantee. Hydrocarbons are especially unsuitable for sprayfoam applications due to the mobile nature of the operations that have relatively uncontrolled application environments. Therefore, it has been determined that hydrocarbons are an inappropriate technology choice for this project;
- (d) HFC technologies are not commercially available in Chile and carry substantial cost penalties, especially for small foam producers such as the enterprises in the project;

- (e) HCFC-141b provides the insulation properties required for these applications, and is a relatively simple substitution for CFC-11 from a processing standpoint. It is available in the market, and is currently employed by many of these enterprise's competitors, as this technology has already been implemented through several previous Multilateral Fund funded projects.

12. In view of the above, the technology selected for thermal insulation foams is based on the use of HCFC-141b, until permanent technology (either water based or HFC-based systems) is available and can provide the required physical properties.

13. The Government of Chile submitted a letter of transmittal consistent with decision 33/2. The letter of transmittal indicated the agreement of the Government of Chile to the use of HCFC-141b in line with decision 27/13 and in recognition of Article 2F of the Montreal Protocol.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

14. The Fund Secretariat and UNDP discussed and agreed on the project's concepts as well as the costs. Given the consumption pattern of the sector it was agreed that the Government's request for US \$27,500 (about 7 per cent of the project cost) for funding the management activity be recommended for approval.

RECOMMENDATION

15. The Fund Secretariat recommends blanket approval of the terminal umbrella foam project at the level of funding and the agency support cost indicated in the table below.

	Project Title	Project Funding (US\$)	Support Cost (US\$)	Implementing Agency
(a)	Terminal umbrella project for phase-out of the use of CFC-11 in the manufacture of polyurethane foam	429,962	32,247	UNDP

**PROJECT EVALUATION SHEET – NON-MULTI-YEAR PROJECTS
CHILE**

PROJECT TITLES**BILATERAL/IMPLEMENTING AGENCY**

(a)	Terminal umbrella project for phase-out of the use of CFC-11, CFC-12 and R-502 (CFC-115) in the manufacture of refrigeration equipment	UNDP
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NATIONAL CO-ORDINATING AGENCY	CONAMA
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LATEST REPORTED CONSUMPTION DATA FOR ODS ADDRESSED IN PROJECT**A: ARTICLE-7 DATA (ODP TONNES, 2004, AS OF FEBRUARY 2006)**

Annex A, Group I CFCs	230.78		
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B: COUNTRY PROGRAMME SECTORAL DATA (ODP TONNES, 2004, AS OF DECEMBER 2005)

ODS Name	Sub-sector/quantity	Sub-sector/quantity	Sub-sector/quantity	Sub-sector/quantity
CFC-11	Foam: 19.61	Ref. Manufacturing: 5.43		
CFC-12	Aerosol: 7.00	Ref. Manufacturing: 22.40	Ref. Servicing: 10.11	
CFC-115	Ref. Servicing: 10.11			

CFC consumption remaining eligible for funding (ODP tonnes)	579.0
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CURRENT YEAR BUSINESS PLAN ALLOCATIONS		Funding US	Phase-out ODP tonnes
	(a)	211,700	11.00

PROJECT TITLE:	(a)
ODS use at enterprise (ODP tonnes):	21.7
ODS to be phased out (ODP tonnes):	21.7
ODS to be phased in (ODP tonnes):	
Project duration (months):	36
Initial amount requested (US \$):	426,057
Final project cost:	
Incremental Capital Cost (US \$)	438,100
Contingency (10%) (US \$)	44,450
Incremental Operating Cost (US \$)	0
Total Project Cost (US \$)	482,550
Local ownership (%):	100
Export component (%):	0
Requested grant (US \$):	426,057
Cost-effectiveness (US \$/kg):	19.6
Implementing agency support cost (US \$):	31,954
Total cost of project to Multilateral Fund (US \$):	458,011
Status of counterpart funding (Y/N):	Y
Project monitoring milestones included (Y/N):	Y

SECRETARIAT'S RECOMMENDATION	Pending
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PROJECT DESCRIPTION

16. UNDP has submitted to the 48th Meeting on behalf of the Government of Chile a terminal umbrella project to phase out 21.7 ODP tonnes of CFC-11 in the refrigeration manufacturing sector at a total cost of US \$426,057 plus US \$31,954 in support costs to UNDP. The umbrella project will address the residual consumption in the domestic and commercial refrigeration manufacturing sub-sectors. The domestic refrigeration sub-sector project is a project for one manufacturing company (Sindelen) while the commercial refrigeration project groups 31 very small CFC consuming enterprises.

Domestic refrigeration manufacturing (Sindelen)

17. The foam component of the Sindelen project was implemented as part of the innovative auction programme, the market-based Technology Conversion Financing Programme (TECFIN) implemented by the World Bank to fund CFC phase-out in Chile. Therefore funding is requested to phase out consumption of CFC-12 in the refrigerant component only.

18. The CFC used as the refrigerant by Sindelen is proposed to be phased out by conversion to hydrocarbon refrigerant (R-600a) estimated to cost a total of US \$325,600. This is mainly due to costs related to fire and explosion protection measures. The requested amount takes account of funds already released to Sindelen under TECFIN. The original cost of the refrigerant component of the project agreed under TECFIN was US \$60,833, apparently for conversion to HFC-134a.

Project costs and implementation

19. In a project document submitted by the World Bank to the 26th Meeting (UNEP/OzL.Pro/ExCom/26/27) requesting funding for the second phase of TECFIN (TECFIN II) it was indicated that Sindelen in November 1997 tendered two bids to CONAMA (the NOU and national executing agency for TECFIN) covering both the foam and refrigerant components of the project. The total amount of the bid was US \$137,802, made up of US \$86,058 and US \$51,744 for the foam and refrigerant components respectively. According to the report the bids were evaluated in December 1997 and awards were issued in January 1998. It appears from available information that the refrigerant component was based on HFC-134a technology.

20. However UNDP indicated that only the foam component has been implemented by the company for which it has received US \$67,683 (instead of the original bid of US \$86,058). It indicated that the company and CONAMA had not been able to agree on the conversion technology for the refrigerant component, therefore the component remained unimplemented.

Commercial refrigeration manufacturing

21. The project groups together 31 small-scale enterprises manufacturing display cabinets and cold chambers with a total CFC consumption of 10.9 ODP tonnes. The enterprises do not produce foam but purchase foam panels from outside for their production. All but five of the enterprises are located in Santiago. The enterprises participating in the project are shown in Table 3 below.

Table 3: Enterprises in the commercial refrigeration manufacturing terminal umbrella project

Nº	Company name	Location	Application
1	Booster	Santiago	Display cabinets, Cold chambers, Projects
2	Bozzo	Santiago	Display cabinets, Cold chambers, Projects
3	Climatermic	Santiago	Projects
4	Emasa	Santiago	Display cabinets, Cold chambers; Projects
5	Esutec	Santiago	Cold chambers
6	Frigomet	Santiago	Display cabinets, Cold chambers, Projects
7	Friosac	Santiago	Display cabinets, Cold chambers
8	Gastón Reyes	Santiago	Display cabinets
9	Ingefrio	Santiago	Projects
10	Intercal	Santiago	Cold chambers, Tunnels, Projects
11	Marloa	Santiago	Display cabinets
12	Novafrio	Santiago	Display cabinets, Projects
13	Soval	Santiago	Display cabinets
14	Todo Máquinas	Santiago	Display cabinets
15	Vicrolum	Santiago	Display cabinets
16	Viento Sur Ltda.	Santiago	Projects
17	Vifrical	Santiago	Display cabinets
18	Frio-Sergut	Santiago	Display cabinets
19	Frio-Lucy	Santiago	Display cabinets
20	Frigonor	Santiago	Display cabinets
21	J. Wuth	Santiago	Miscellaneous
22	Cryoservice	Santiago	Display cabinets, Cold chambers
23	Rimasa	Santiago	Display cabinets
24	Friosur	Concepción	Display cabinets
25	Mavic	Concepción	Display cabinets
26	Estrella del Sur	Concepción	Army projects
27	Cámaras Frigoríficas Jesaa	Santiago	Display cabinets, Cold chambers
28	Vesago	Chillan	Display cabinets
29	Ecomac	Concepcion	Display cabinets
30	Moya Refrigeracion	Coquimbo	Display cabinets
31	Cousiño Refrigeracion	Santiago	Display cabinets
	Friotrans	Villa Alemana	Display cabinets
	Imsa	Santiago	Panels

22. In view of the low level of CFC consumption and technical capacity of the enterprises the project is designed as a technical assistance programme. This will involve awareness promotion through workshops and hands-on training together with a modest tooling package that could

facilitate conversion. There will also be additional training in good practices which will be integrated with Chile's refrigerant management plan (RMP).

Project costs

23. The project costs relate to expert costs, training, technical support, and provision of tools. No incremental operating cost is requested. The summary of the costs are shown in the table below.

Table 4: Summary of project costs

	Item	Cost (US \$)
(a)	Project management activities:	
	Awareness, monitoring activities, visits	23,000
	Project management: technical expert/travel costs	31,500
(b)	Technical support - workshops	30,000
(c)	Tooling package	57,600
	Sub-total	142,100
	Contingency	14,850
	Total	156,950
	Total CFC consumption ODP tonnes	10.9
	Cost-effectiveness	US \$14.40/kg

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Domestic refrigeration manufacturing – Sindelen project

24. In view of the World Bank report mentioned in paragraph 20 above, the Secretariat drew UNDP's attention to the issue of potential double counting and issues arising from change of technology after project approval as well as decisions on multiphase projects.

25. Following discussions on the status of implementation at Sindelen, UNDP provided documentation which confirmed that the company received the stated amount in funding for the foam component in December 2003 and that Sindelen formalized its decision with CONAMA not to proceed with the refrigeration project as formulated, in May 2005.

26. It can therefore be concluded that the company has not received funding for the refrigerant component of the project and might be eligible for funding under the relevant rules of the Fund, subject to confirmation by UNDP that the unutilized project funds have been returned to the Fund by TECFIN and/or the World Bank. At the time of writing, this information had not yet been received.

27. The information provided by UNDP also indicated that the project was subject to the provisions under decisions 22/69 regarding change of technology after project approval. Consistent with decision 22/69 the level of funding for the entire project should not exceed the total project cost originally approved under TECFIN.

28. The Secretariat has calculated the costs of the project based on the TECFIN scenario, rather than a scenario based on a fresh design of the project, since it is evident that the project was formally approved under TECFIN. The costs are summarized in the table below.

Table 5: Project Costs of Sindelen Domestic Refrigeration Project

Project component	CFC consumption under TECFIN (ODP tonnes)	Cost-Effectiveness threshold (US\$/kg)	Maximum eligible funding (US\$)	Calculated project cost under TECFIN (US \$)	Amount approved under TECFIN (US \$)	Amount received under TECFIN (US\$)	Unutilized balance of approved project funds
Domestic refrigeration-foam part	12.29	13.76	169,110	131,925	86,058	67,683	64,242
Domestic refrigeration-refrigerant part	7.39	13.76	101,686	60,833	51,744	0	60,833
Total	19.68		270,797	192,758	137,802	67,683	125,075

Amount eligible for funding of second phase of Sindelen project: US \$125,075

Cost-effectiveness of original project: US \$9.79/kg

29. On this basis, as indicated in Table 5 above, the grant of the unimplemented component of the Sindelen project, if found to be eligible for funding, would be US \$125,075 as shown below.

Agreed project cost	US \$192,758
Amount received for foam component	<u>(US \$67,683)</u>
Unutilized balance of project cost	US \$125,075

Commercial refrigeration manufacturing umbrella project

30. The Secretariat and UNDP discussed and agreed the level of funding as US \$156,950 with cost-effectiveness of US \$14.40/kg as indicated in Table 4 above.

Total project cost of the refrigeration manufacturing terminal umbrella project

31. Based on the above comments, the total eligible grant for the terminal umbrella project for phase-out of the use of CFC-11, CFC-12 and CFC-115 in the manufacture of commercial and domestic refrigeration equipment in Chile would be a total of US \$282,025, with the following breakdown.

Domestic refrigeration component (Sindelen)	US \$125,075
Commercial refrigeration component (31 enterprises)	<u>US \$156,950</u>
Total	US \$282,025

32. The Secretariat is awaiting clarification from UNDP regarding the status of the unused funding for the Sindelen project to enable recommendation to be made on the necessary course of action. The relevant information from UNDP together with the necessary recommendation will be communicated to the Executive Committee in due course.

RECOMMENDATIONS

33. Pending
