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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Thirty-fourth Meeting
Montreal, 18-20 July 2001

PROJECT PROPOSALS: BRAZIL

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

Foam:

- Phaseout of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid and flexible integral skin foam at Air Micro UNDP
- Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of rigid integral skin foam at Beneplast UNDP
- Phaseout of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid integral skin foam at Injetec UNDP
- Phaseout of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid integral skin foam at Juntafacil UNDP
- Phaseout of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid integral skin foam at Ornati-Luce UNDP
- Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of flexible molded foam at Paranoa UNDP
- Conversion from CFC-11 to water-based technology in the manufacture of flexible molded foam and to HCFC-41b for flexible integral skin foam at Rosil UNDP
- Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of flexible integral skin foam, flexible molded foam at Royal Rubber UNDP

- Phaseout of CFC-11 by conversion to water-based and HCFC-141b technology in the manufacture of rigid and flexible integral skin foam at VM UNDP
- Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of rigid integral skin foam, rigid foam and HR flexible molded foam at Carolinas UNDP
- Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of rigid and flexible microcellular foam at Hidroplas UNDP
- Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of flexible molded foam and rigid integral skin foam, and to HCFC-141b for rigid, flexible integral skin and phenolic foam at J Dal Ponte UNDP
- Conversion from CFC-11 to water-blown technology in the manufacture of rigid polyurethane foam and rigid integral skin foam at Piatex UNDP
- Conversion from CFC-11 to HCFC-141b in the manufacture of rigid foam for cold room panels, as well as freezers and coolers at Central Equipment UNDP
- Conversion from CFC-11 to HFC-141b in the manufacture of rigid polyurethane foam at Danko UNDP
- Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam for ice cream makers and coolers at three enterprises UNDP
- Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam for truck bodies and panels at nine enterprises UNDP
- Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Grupo ACO UNDP
- Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Isar UNDP
- Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Isoeste UNDP
- Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Isoprice UNDP
- Conversion from CFC-11 to water-blown technology in the manufacture of rigid polyurethane foam for surfboards at Jedda UNDP
- Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Korta Calhas UNDP
- Conversion from CFC-11 to water-blown technology in the manufacture of rigid polyurethane foam for electrical resistance floats at Taurus UNDP
- Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Thermoblock UNDP
- Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Transen UNDP

- Phase-out of CFC-11 consumption by conversion to HCFC-141b technology at Danica Co. in the manufacture of rigid polyurethane foam for insulating purposes UNIDO

Refrigeration:

- Umbrella project for five enterprises converting from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a at EZ Industria, Hidraumatic, Menoncin, Unifrio and from CFC-12 to HFC-134a at Croydon UNIDO

**PROJECT EVALUATION SHEET
BRAZIL**

SECTOR: Foam ODS use in sector (1999): 1,920 ODP tonnes

Sub-sector cost-effectiveness thresholds: Integral Skin US \$16.86/kg

Project Titles:

- (a) Phaseout of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid and flexible integral skin foam at Air Micro
- (b) Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of rigid integral skin foam at Beneplast
- (c) Phaseout of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid integral skin foam at Injetec
- (d) Phaseout of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid integral skin foam at Juntafacil
- (e) Phaseout of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid integral skin foam at Ornati-Luce
- (f) Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of flexible molded foam at Paranoa

Project Data	Integral skin					
	Air Micro	Beneplast	Injetec	Juntafacil	Ornati-Luce	Paranoa
Enterprise consumption (ODP tonnes)	19.20	11.70	13.00	13.50	15.60	13.00
Project impact (ODP tonnes)	17.30	11.70	11.70	12.20	14.10	13.00
Project duration (months)	33	33	33	33	33	33
Initial amount requested (US \$)	61,990	131,876	43,334	55,204	46,292	85,760
Final project cost (US \$):						
Incremental capital cost (a)	30,000	90,500	25,000	35,000	25,000	39,000
Contingency cost (b)	3,000	9,050	2,500	3,500	2,500	3,900
Incremental operating cost (c)	23,490	35,626	15,834	16,704	18,792	41,760
Total project cost (a+b+c)	56,490	135,176	43,334	55,204	46,292	84,660
Local ownership (%)	100%	100%	100%	100%	100%	100%
Export component (%)	0%	0%	0%	0%	0%	0%
Amount requested (US \$)	56,490	135,176	43,334	55,204	46,292	84,660
Cost effectiveness (US \$/kg.)	3.26	11.55	3.70	4.52	3.28	6.51
Counterpart funding confirmed?	Yes	Yes	Yes	Yes	Yes	Yes
National coordinating agency			PROZON			
Implementing agency			UNDP			

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 EVALUATION SHEET BRAZIL

SECTOR: Foam ODS use in sector (1999): 1,920 ODP tonnes

Sub-sector cost-effectiveness thresholds: Integral Skin US \$16.86/kg

Project Titles:

- (g) Conversion from CFC-11 to water-based technology in the manufacture of flexible molded foam and to HCFC-141b for flexible integral skin foam at Rosil
- (h) Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of flexible integral skin foam, flexible molded foam at Royal Rubber
- (i) Phaseout of CFC-11 by conversion to water-based and HCFC-141b technology in the manufacture of rigid and flexible integral skin foam at VM
- (j) Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of rigid integral skin foam, rigid foam and HR flexible molded foam at Carolinas
- (k) Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of rigid and flexible microcellular foam at Hidroplas
- (l) Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of flexible molded foam and rigid integral skin foam, and to HCFC-141b for rigid, flexible integral skin and phenolic foam at J Dal Ponte

Project Data	Integral skin			Multiple-subsectors		
	Rosil	Royal Rubber	VM	Carolinas	Hidroplas	J Dal Ponte
Enterprise consumption (ODP tonnes)	5.40	15.25	13.90	49.70	33.00	102.00
Project impact (ODP tonnes)	5.20	15.25	13.70	49.70	33.00	97.60
Project duration (months)	33	33	33	36	33	36
Initial amount requested (US \$)	87,672	121,895	89,402	237,597	173,911	395,134
Final project cost (US \$):						
Incremental capital cost (a)	96,000	67,500	41,000	80,000	59,750	145,000
Contingency cost (b)	9,600	6,750	4,100	8,000	5,975	14,500
Incremental operating cost (c)	12,267	46,545	38,802	149,597	100,486	224,634
Total project cost (a+b+c)	117,867	120,795	83,902	237,597	166,211	384,134
Local ownership (%)	100%	100%	100%	100%	100%	100%
Export component (%)	0%	0%	0%	0%	0%	0%
Amount requested (US \$)	87,672	120,795	83,902	237,597	166,211	384,134
Cost effectiveness (US \$/kg.)	16.86	7.92	6.12	5.20*	5.12*	3.85*
Counterpart funding confirmed?	Yes	Yes	Yes	Yes	Yes	Yes
National coordinating agency	PROZON					
Implementing agency	UNDP					

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 \$)						

* Represents composite cost-effectiveness of the projects. Composite cost-effectiveness threshold of the projects was calculated to be US \$12.35/kg. The components of the projects are within the applicable sub-sector cost-effectiveness threshold.

**PROJECT EVALUATION SHEET
BRAZIL**

SECTOR: Foam ODS use in sector (1999): 1,920 ODP tonnes

Sub-sector cost-effectiveness thresholds: Rigid US \$7.83/kg

Project Titles:

- (m) Conversion from CFC-11 to water-blown technology in the manufacture of rigid polyurethane foam and rigid integral skin foam at Piatex
- (n) Conversion from CFC-11 to HCFC-141b in the manufacture of rigid foam for cold room panels, as well as freezers and coolers at Central Equipment
- (o) Conversion from CFC-11 to HFC-141b in the manufacture of rigid polyurethane foam at Danko
- (p) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam for ice cream makers and coolers at three enterprises
- (q) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam for truck bodies and panels at nine enterprises
- (r) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Grupo ACO

Project Data	Rigid					
	Multiple-subsectors Piatex	Central Equipment	Danko	Group 3 enterprises	Group 9 enterprises	Grupo ACO
Enterprise consumption (ODP tonnes)	15.00	16.80	45.90	28.30	79.80	26.25
Project impact (ODP tonnes)	15.00	15.10	41.40	25.50	72.10	22.24
Project duration (months)	36	30	30	36	36	30
Initial amount requested (US \$)	84,175	118,233	196,384	163,940	450,479	158,950
Final project cost (US \$):						
Incremental capital cost (a)	34,000	87,500	83,000	52,900	267,200	123,000
Contingency cost (b)	3,400	8,750	8,300	5,290	26,720	12,300
Incremental operating cost (c)	45,675	33,485	108,384	77,155	156,559	39,656
Total project cost (a+b+c)	83,075	129,735	199,684	135,345	450,479	174,956
Local ownership (%)	100%	100%	100%	100%	100%	100%
Export component (%)	0%	0%	0%	0%	0%	0%
Amount requested (US \$)	83,075	118,233	199,684	135,345	450,479	174,139
Cost effectiveness (US \$/kg.)	5.78*	7.83	4.82	5.31	6.25	7.83
Counterpart funding confirmed?	Yes	Yes	Yes	Yes	Yes	Yes
National coordinating agency				PROZON		
Implementing agency				UNDP		

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 \$)						

* Represents composite cost-effectiveness of the projects. Composite cost-effectiveness threshold of the projects was calculated to be US \$12.35/kg. The components of the projects are within the applicable sub-sector cost-effectiveness threshold.

**PROJECT EVALUATION SHEET
BRAZIL**

SECTOR: Foam ODS use in sector (1999): 1,920 ODP tonnes

Sub-sector cost-effectiveness thresholds: Rigid US \$7.83/kg

Project Titles:

- (s) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Isar
- (t) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Isoeste
- (u) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Isoprice
- (v) Conversion from CFC-11 to water-blown technology in the manufacture of rigid polyurethane foam for surfboards at Jedda
- (w) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Korta Calhas
- (x) Conversion from CFC-11 to water-blown technology in the manufacture of rigid polyurethane foam for electrical resistance floats at Taurus

Project Data	Rigid					
	Isar	Isoeste	Isoprice	Jedda	Korta Calhas	Taurus
Enterprise consumption (ODP tonnes)	25.50	72.00	18.00	54.00	84.00	12.00
Project impact (ODP tonnes)	23.00	64.90	16.20	54.00	75.70	12.00
Project duration (months)	30	30	30	30	30	30
Initial amount requested (US \$)	180,090	291,539	126,846	161,362	146,312	88,075
Final project cost (US \$):						
Incremental capital cost (a)	130,000	136,000	135,500	75,000	45,000	46,850
Contingency cost (b)	13,000	13,600	13,550	7,500	4,500	4,685
Incremental operating cost (c)	31,320	87,696	37,204	65,772	102,312	36,540
Total project cost (a+b+c)	174,320	237,296	186,254	148,272	151,812	88,075
Local ownership (%)	100%	100%	100%	100%	100%	100%
Export component (%)	0%	0%	0%	0%	0%	0%
Amount requested (US \$)	174,320	237,296	126,846	148,272	151,812	88,075
Cost effectiveness (US \$/kg.)	7.58	3.66	7.83	2.74	2.00	7.34
Counterpart funding confirmed?	Yes	Yes	Yes	Yes	Yes	Yes
National coordinating agency				PROZON		
Implementing agency				UNDP		

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 EVALUATION SHEET
BRAZIL**

SECTOR: Foam ODS use in sector (1999): 1,920 ODP tonnes

Sub-sector cost-effectiveness thresholds: Rigid US \$7.83/kg

Project Titles:

- (y) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Thermoblock
 (z) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Transen
 (aa) Phase-out of CFC-11 consumption by conversion to HCFC-141b technology at Danica Co. in the manufacture of rigid polyurethane foam for insulating purposes

Project Data	Rigid		
	Thermoblock	Transen	Danica
Enterprise consumption (ODP tonnes)	45.60	21.00	160.80
Project impact (ODP tonnes)	41.10	18.90	146.60
Project duration (months)	30	30	30
Initial amount requested (US \$)	260,592	58,640	716,697
Final project cost (US \$):			
Incremental capital cost (a)	154,000	18,000	255,000
Contingency cost (b)	15,400	1,800	25,500
Incremental operating cost (c)	91,192	42,140	336,125
Total project cost (a+b+c)	260,592	61,940	616,625
Local ownership (%)	100%	100%	100%
Export component (%)	0%	0%	0%
Amount requested (US \$)	260,592	61,940	616,625
Cost effectiveness (US \$/kg.)	6.34	3.28	4.21
Counterpart funding confirmed?	Yes	Yes	Yes
National coordinating agency	PROZON		Ministry of Environment
Implementing agency	UNDP		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 \$)			

PROJECT DESCRIPTION

Sector background

- Latest available total ODS consumption (2000*)	11,109.55 ODP tonnes
- Baseline consumption of Annex A Group I substances (CFCs)	10,525.80 ODP tonnes
- Consumption of Annex A Group I substances for the year 1999	9,333.00 ODP tonnes
- Baseline consumption of CFCs in foam sector	Not Available
- Consumption of CFCs in foam sector in 2000	2,004.00 ODP tonnes
- Funds approved for investment projects in foam sector as of end of 2000	US \$22,993,685.00
- Quantity of CFC to be phased out in investment projects in the foam sector as of end of 2000	3,436.97 ODP tonnes
- Quantity of CFC phased out from approved investment project in the foam sector as of end of 2000	1,487.30 ODP tonnes
- Quantity of CFCs in approved investment projects in the foam sector not yet completed as of end of 2000	1,831.40 ODP tonnes
- Quantity of CFCs remaining to be phased out in the foam sector as of end of 2000	172.60 ODP tonnes

* Based on data submitted to the Fund Secretariat by the Government of Brazil on 1 May 2001.

1. Twenty-seven projects with total ODS consumption of 1,010.2 ODP tonnes have been submitted for the foam sector in Brazil. When account is taken of projects approved and still under implementation the amount of CFC left to be phased out in the foam sector will be only 173 tonnes. Thus about 837 ODP tonnes of CFC proposed in the 27 projects remain unaccounted for.

2. The UNDP 2001 business plan provides for preparation of 27 foam sector projects to phase out 1,200 ODP tonnes at the cost of US \$8.64 million while UNIDO's 2001 business plan also provides for preparation of four foam sector projects accounting for 70 ODP tonnes of CFC-11 at the cost of US \$500,000. The summary of projects proposed in the Business Plan and those presented to the 34th Meeting by the two implementing agencies is as follows:

	No. of Projects		Consumption		Cost in Million US \$	
	Business Plan (BP)	34 th Meeting Projects	Business Plan	34 th Meeting Projects	Business Plan	34 th Meeting Projects
UNDP						
Integral skin (including flexible molded)	15	8	400.00	121.00	5.2	0.72
Rigid (incl. 2 umbrella projects for 12 enterprises)	6	14	400.00	530.00	2.24	2.40
Multiple sub-sector (including integral skin and rigid foams)	Not in BP	4	Not in BP	200.00	Not in BP	0.89
Flexible foam	8	--	400.00	--	1.2	--
UNIDO						
Integral skin	2	--	20.00	--	0.2	
Rigid	2	1	50.00	161.00	0.3	0.71

Flexible Molded/Integral Skin Foam

Air Micro, Beneplast, Injetec, Juntafacil, Ornati-Luce, Paranoa, Rosil, Royal Rubber, VM Tecnologia em Pecas Ltda (VM)

3. Eight of the nine companies were founded between 1969 and 1995. The VM Tecnologia em Pecas Ltda company was founded in 1997 as a spin-off of VM Modelacas Ltda which was founded in 1992. The nine companies consumed a total of 120.55 tonnes of CFC-11 in 2000 in the production of integral skin foam for various applications such as moldings, foam seats, office furniture, medical equipment, ATM machines, floor mats, totes for automotive packaging, and hand tools for the construction industry. Current consumption and other relevant data for each company are listed in Table 1 below. Four of the companies producing flexible integral skin foam will convert their production to HCFC-141b technology as an interim solution with a likely final step of HFC based technology, in order to meet the standards of skin quality. Beneplast, Paranoa, and Royal Rubber will convert to water-blown technology as a permanent solution. Rosil, and VM will convert to HCFC-141b as an interim solution for their production of flexible integral skin foam only. Rosil will convert its flexible molded foam production to water-based systems. VM will also convert its production of rigid integral skin foam to water-based formulations.

4. All the companies currently use low-pressure dispensers (except Paranoa which uses two medium pressure dispensers) of which some are without variable ratio and/or temperature conditioning capability. Some of the production lines are also without mold heating facility. The baseline equipment of the companies is listed in Table 1 below.

5. The companies are requesting to retrofit the existing dispensers at a cost of US \$5,000 - US \$20,000 depending on the capabilities of the existing dispensers and install ventilation systems at US \$10,000 each. Other requests include mold heaters (US \$10,000), a multi-component heated blender (US \$45,000), and an industrial hot air blower (US \$1,000). In addition, each company has expenses for training and technical assistance (US \$10,000 - US \$25,000). Please refer to Table 1 for a detailed profile of the individual flexible molded/integral skin foam producing companies.

6. Implementation of the projects will result in a residual ODS of 6.4 ODP tonnes per year as a result of conversion to HCFC-141b technology. Thus the net impact of the project will be the elimination of 114.15 ODP tonnes.

Multiple Sub-Sector

Carolinas, Hidroplas, J Dal Ponte, Piatex

7. UNDP reported that the companies were established between 1969 and 1980. They consumed 199.7 ODP tonnes of CFC-11 in 2000 in the production of flexible molded, integral skin, and, rigid foam. Current consumption and other relevant data for each company are listed in Table 1. Manufactured products include dental office furniture, packaging foam, automotive parts, thermal and sound insulation panels for commercial trucks and farm tractors, mattresses,

and cushions. CFC-11 will be phased out through the use of water-blown technology for the flexible molded, rigid integral skin and non-insulation rigid foam production and through HCFC-141b technology for the rigid insulation foam and flexible integral skin production.

8. The baseline equipment for each company is listed in Table 1. The companies have requested conversion equipment such as dispensers (US \$25,000 – US \$50,000 per unit), retrofitting (US \$10,000 – US \$30,000), ventilation and monitoring (US \$10,000), and mold ovens (US \$5,000 each). The total cost of trials, training and technical assistance will vary between US \$25,000 and US \$45,000 depending upon the company.

9. Implementation of the projects will result in a residual ODS consumption of 4.4 ODP tonnes as a result of conversion to HCFC-141b. Thus the net impact of the project will be the elimination of 195.3 ODP tonnes.

Rigid Foam

Central Equipment, Danica Co., Danko, Grupo Aco, Isar, Isoeste, Isoprice, Jedda, Korta Calhas, Taurus, Thermoblock, Transen

10. The companies were founded between 1958 and 1998. Grupo Aco was established in 1998 as the successor of the company Grupo Telha which was established in April 1995. Similarly, Isoprice was established in 1997 as the successor of the 1989 company Therm-All Ind. Com. Ltda. The twelve companies consumed a total of 581.85 tonnes of CFC-11 in 2000 in the manufacture of rigid polyurethane foam products. Current consumption and other relevant data of each company are listed in Table 1. Ten of the companies manufacture rigid insulation foam spray, panels and blocks for various applications, including freezers and coolers, roof structures, pipe insulation, building construction, hot water boilers, and solar panels. The other two companies (Jedda and Taurus) manufacture rigid polyurethane foam for surfboard blanks and electrical resistance floats respectively. The ten companies manufacturing insulation foams will convert their production to HCFC-141b as interim technology with suggested permanent solutions of water-based and HFC-based formulations. The other two companies will convert to water-based formulations as a permanent technology.

11. All the companies, except for three, currently use low-pressure dispensers of various makes and outputs and other home-made equipment. Central Equipment, Jedda, and Taurus have no equipment but use hand-mixing techniques. The baseline equipment of the companies is listed in Table 1.

12. There are requests for new high-pressure dispensers to replace existing low-pressure dispensers at a unit cost of US \$18,000 to US \$95,000. Semi-automatic block foaming machines are also requested to replace hand-mix boxfoam operations at a cost of US \$75,000, except in the case of Danica Co which is requesting US \$150,000. The unit cost of technology transfer, and training ranges from US \$10,000 to US \$40,000. Please refer to Table 1 for a detailed profile of the rigid foam producing companies.

13. Implementation of the twelve projects will result in a residual ODS consumption of 50.71 ODP tonnes as a result of conversion to HCFC-141b. Thus the net impact of the project will be the elimination of 531.14 ODP tonnes.

Group project - 3 Enterprises: A.V. Bertollo, Citrocar, Systherm

14. A.V. Bertollo, Citrocar, and Systherm were founded in 1986, 1993, and 2000 respectively. Systherm was originally founded in 1993 under the name Systherm Ind. Trefrigeracao Ltda, but was renamed Systherm Ind. Com. Refrigeracao Sao Carlos Ltda in 2000 when the company relocated. These three small companies consumed a total of 28.3 tonnes of CFC-11 in 2000 in the manufacture of rigid polyurethane foam insulation for ice cream makers and coolers. The companies will phase out their use of CFC-11 by converting to HCFC-141b interim technology for 1-2 years. The likely permanent solution will be conversion to HFC formulations. Please refer to Table 2 (below) for an individual profile of these companies.

15. Presently, all three companies produce rigid foam through a hand-mix process. They are each requesting to purchase a high-pressure dispenser at a cost of US \$18,000 – US \$25,000. Other costs include trials, technology transfer, and training (US \$6,000 each) amounting to an incremental capital cost of US \$58,190 (including 10% contingency). The incremental operating cost is US \$77,155 and the total project cost amounts to US \$135,345.

16. Implementation of the projects will result in a residual ODS consumption of 2.8 ODP tonnes as a result of conversion to HCFC-141b. Thus the net impact of the project will be the elimination of 25.5 ODP tonnes.

Group project - 9 Enterprises: ABC Furgoes, Fricam Refri, Junges, Rafaeli, Refri Santos, Rondofrio, Tresmaense, Trevosul Refrig, Verde Lago Furgoes

17. UNDP reported that all of the companies were established and in commercial production prior to 25 July 1995. The predecessor of ABC Furgoes (founded in 1998) was established in 1991 under the name Furgoes Forte. Refri Santos was established in 1999 as the successor of Vida Frio which was founded in 1992. Rondofrio (established in December 1995) was previously known as Multifrigo which was founded in 1978. These nine small companies consumed a total of 79.8 ODP tonnes of CFC-11 in the year 2000 producing trucks, refrigerated trucks, freezers, and coolers. All the companies will phase out CFC-11 by converting to HCFC-141b interim technology for a period of 1-2 years with a likely subsequent conversion to HFC formulations. Please refer to Table 2 for an individual profile of the companies.

18. Seven of the nine companies hand-mix their operations to produce rigid foam. Rafaeli and Verde Lago Furgoes own low-pressure dispensers purchased in 1994 with capacities of 15 kg/min and 7 kg/min respectively. All of the companies are requesting to purchase small high-pressure dispensers costing US \$18,000 – US \$70,000 each. Training and technical assistance is estimated to cost US \$11,300 per company. The total incremental capital cost with contingency is US \$293,920 and the incremental operating cost is US \$156,559. The total project cost amounts to US \$450,479.

19. Implementation of the projects will result in a residual ODS consumption of 7.7 ODP tonnes as a result of conversion to HCFC-141b. Thus the net impact of the project will be the elimination of 72.1 ODP tonnes.

Justification for conversion to HCFC-141b technology

20. The following justification is provided for the use of HCFC-141b by those companies which will convert to HCFC-141b technology.

21. The use of pentane was rejected as a feasible option because preblended systems are not readily available in Brazil and the cost for the company to blend it itself would be too high. Water-based technology was found to be too expensive and would require significant developmental effort. The use of liquid HFCs was also rejected because they are currently not available. HCFC-141b technology was the preferred option because it is readily available and can be implemented immediately to allow a major reduction in the ODS use at the companies.

22. The Secretariat has received a letter from the Government of Brazil endorsing the use of HCFC-141b by the companies as required by Executive Committee Decision 27/13.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

23. The Fund Secretariat and UNDP have discussed and agreed on the eligible grants of the projects as listed below. However the projects are being submitted for individual consideration on account of the issue of ODS consumption described in paragraphs 24 and 25 below.

Project	Grant Amount US \$	Project	Grant Amount US \$
Air Micro	56,490	Danko	199,684
Injetec	43,334	Group 3 enterprises	135,345
Juntafacil	55,204	Group 9 enterprises	450,479
Ornati-Luce	46,292	Grupo ACO	174,139
Paranoa	84,660	Isar	174,320
Rosil	87,672	Isoeste	237,296
Royal Rubber	120,795	Isoprice	126,846
VM	83,902	Jedda	148,272
Carolinas	237,597	Korta Calhas	151,812
Hidroplas	166,211	Taurus	88,075
J Dal Ponte	384,134	Thermoblock	260,592
Piatex	83,075	Transen	61,940
Beneplast	135,176	Danica	616,625
Central Equipment	118,233		

ODS consumption

24. The analysis of the foam sector consumption data based on the latest data reported by Brazil to the Fund Secretariat and the data on approved projects shows an excess of about 837 tonnes of CFC which cannot be accounted for. UNDP and UNIDO have proposed in their 2001 business plans to prepare a total of 33 projects (29 by UNDP and 4 by UNIDO) to phase out a total of 1,270 tonnes in Brazil. The two agencies have submitted 27 projects to phase out 1,010.2 tonnes in their first submissions of the year 2001. It is therefore expected that the amount of consumption unaccounted for in Brazil's consumption data for the sector will increase as more projects are submitted to future meetings. The Secretariat has requested both UNDP and UNIDO to provide clarification of this phenomenon and if possible provide documentary evidence that the enterprises were established before July 1995 and/or have been using CFC-11.

25. There are also several companies established recently which are reported to have been spin-offs from existing companies or taken over production from existing companies. UNDP which submitted the projects has also been requested to provide documentary evidence that these companies were using CFC-11 prior to the change in ownership status and continued to use CFCs thereafter.

Action on relevant sections of Decision 33/2

26. UNDP informed the Secretariat that it had not received validation of the CFC consumption to be phased out in the projects and/or commitment of the Government of Brazil as required under Decision 33/2(c) of the Executive Committee. It indicated that the Government had expressed concerns about some of the requirements of the decision as well as the format proposed by the Secretariat for their implementation. UNDP also added that in view of the volume of the portfolio of projects from Brazil it was not feasible within the time available before the 34th Meeting to address the issues relating to the commitments of individual enterprises.

Project duration

27. Following discussion with UNDP consistent with Decision 33/2 (b), UNDP proposed a reduction of the duration of the rigid foam projects (except group projects) and flexible molded/integral skin foam projects from 36 months to 30 months and 33 months respectively. The group projects and multiple sub-sector foam projects will remain as 36 months.

Technology transfer costs

28. The Secretariat raised the issue of technical assistance and technology transfer costs with UNDP. UNDP indicated that technical assistance is key to successful implementation of its foam projects and proposed a formula which reduced the technology transfer costs of projects in countries for which more than five projects have been approved within a given business plan year by US \$1,000 - US \$2,000. The changes are reflected in the costs of UNDP foam projects to the 34th Meeting, where necessary.

Table 1. Profile of the Individual Foam Producing Companies by Sub-Sector

Company and Year Established	ODS Use (2000) ODP tonnes	Baseline Equipment/Year of Installation	Action Proposed/Cost US \$	Other/Cost US \$	Trial, Tech Transfer & Training US \$
FLEXIBLE MOLDED/INTEGRAL SKIN FOAM					
Air Micro 1995	19.2	1994 15 kg/min LPD	Retrofit for HCFC-141b US \$5,000	Ventilation and monitor US \$10,000	20,000
Beneplast 1984	11.7	1993 15 kg/min LPD	Retrofit for variable ratio and cooling US \$20,000	Two mold ovens Total: US \$10,000 Closed-top, multi- component, heated blender US \$45,000	12,500
Injetec 1995	13.0	1994 30 kg/min LPD	Retrofit for HCFC-141b US \$5,000	Ventilation and monitor US \$10,000	10,000
Juntafacil 1991	13.5	1994 15 kg/min LPD	Retrofit for HCFC-141b US \$5,000	Ventilation and monitor US \$10,000 Mold heaters US \$10,000	10,000
Ornati-Luce 1994	15.6	1995 7 kg/min LPD	Retrofit for HCFC-141b US \$5,000	Ventilation and monitor US \$10,000	10,000
Paranoa 1963	13.0	1980 60 kg/min MPD (x 2)	Replace two MDI pumps Total: US \$20,000	None	20,000
Rosil 1995	5.4	None (hand-mix operations)	Purchase four LPDs Total: US \$100,000	Ventilation and monitoring Total: US \$20,000	15,000
Royal Rubber 1983	15.25	1994 7 kg/min LPD	Retrofit for thermal control US \$10,000 Purchase two LPDs Total: US \$50,000	None	25,000
VM 1992 & 1997	13.9	1994 15 kg/min LPD 1990 30 kg/min LPD	Retrofit for HCFC-141b US \$5,000 Retrofit for variable ratio US \$10,000	Ventilation and monitor US \$10,000 Industrial hot air blower US \$1,000	20,000
RIGID FOAM					
Central Equipment 1992	16.8	None (hand-mix operations)	Purchase a 60 kg/min HPD with two mixheads US \$95,000	Overhead mix head rail US \$25,000	15,000

Company and Year Established	ODS Use (2000) ODP tonnes	Baseline Equipment/Year of Installation	Action Proposed/Cost US \$	Other/Cost US \$	Trial, Tech Transfer & Training US \$
Danica Co. 1976	160.8	1990 40 kg/minLPD (x 2) 1990 Home-made 120 kg/min mechanical mixing unit 1999 200 kg/min HPD 1989 mould for roof panels 1992 moulds for blocks (x 13)	Replace with two 40 kg/min HPD US Total: \$160,000 Replace with 120 kg/min LPD US \$150,000 Retrofit 14 molds Total: US 5,000		17,000
Danko 1970	45.9 (avg. 1998-2000)	1993 30 kg/min LPD 1996 15 kg/min LPD	Replace with 30 kg/min HPD US \$70,000 Retain		10,000
Grupo Aco 1995 & 1998	26.25	April 1995 30 kg/min LPD April 1995 Home-built preblender	Replace with 30 kg/min HPD US \$75,000 Replace with closed-top preblender US \$20,000	Sled and Rails US \$10,000	\$15,000
Isar 1977	25.5	1993 Home-made 7 kg/min LPD (x 3)	Replace with three 7.5 kg/min HPD Total: US \$54,000	60 kg semi-automatic boxfoam unit US \$75,000 Ventilation for boxfoam unit US \$10,000	20,000
Isoeste 1983	72	1994 7 kg/min LPD (x 2) 1992 Home-made Boxfoam dispenser	Replace with two 7.5 kg/min HPD Total: \$US 36,000 Replace with 60 kg semi-automatic boxfoam unit US \$75,000	Two 18 m heated hoses for dispenser Total: US \$10,000 Ventilation for boxfoam unit US \$10,000	15,000
Isoprice 1989 & 1997	18	(rented) 7 kg/min LP spray dispenser Home-built boxfoam dispenser	Replace with 7.5 kg/min HPD US \$18,000 Replace with 60 kg semi-automatic boxfoam unit \$US 75,000	Closed-top preblender \$US 20,000 Ventilation US \$10,000	20,000
Jedda 1985	54.0	None (hand-mix operations)	Purchase 30 kg/min HPD US \$70,000	Mixhead rail system US \$20,000	20,000
Korta Calhas 1992	84.0	1998, 2000 Box foam dispensers (x 2)	Add ventilation US \$10,000	Closed-top preblender US \$20,000	10,000
Taurus 1958	12	None (hand-mix operations)	Purchase 3 kg/min HPD US \$55,000	None	10,000

Company and Year Established	ODS Use (2000) ODP tonnes	Baseline Equipment/Year of Installation	Action Proposed/Cost US \$	Other/Cost US \$	Trial, Tech Transfer & Training US \$
Thermoblock 1993	45.6	1993 15 kg/min LPD 1987 15 kg/min LPD 1994 Locally-made 7 kg/min LP spray dispenser	Replace with 15 kg/min HPD US \$25,000 Replace with portable 15 kg/min HPD US \$25,000 Replace with 7 kg/min portable HPD US \$18,000	Semi-automatic boxfoam dispenser US \$75,000	40,000
Transen 1987	21	1998 50 l/min LPD	None	None	15,000
MULTIPLE SUB-SECTORS					
Carolinas 1973	49.7	1994 7.5 kg/min LPD 1994 15 kg/min LPD 1992 7.5 kg/min pressure transfer dispenser	Retrofit for cooling US \$10,000 Retrofit for cooling US \$10,000 Replace with 7-10 kg/min LPD with thermal control and static mixer US \$25,000	Two mold ovens Total: US \$10,000	25,000
Hidroplas 1974	33	1990 15 kg/min LPD	Retrofit for heating, cooling, variable ratio US \$20,000 Purchase 7.5 kg/min LPD US \$25,000	None	30,000
J Dal Ponte 1980	102	1981 35 kg/min HPD 1993 15 kg/min LPD 1994 sprayfoam dispenser	None Retrofit for thermal control Total: US \$30,000 None Purchase three LPDs 60 kg/min US \$40,000 15 kg/min US \$30,000 100 kg/min US \$50,000	Nones	45,000
Piatex 1969	15	15 kg/min LPD	Retrofit for cooling US \$10,000	None	25,000

Table 2. Profile of Brazil's Umbrella Companies

Company and Date Established	CFC Used	Impact ODP Eliminated (t/y)*	ICC** US \$	Contingency	IOC*** US \$	Total Project Cost US \$	Amount Requested US \$	Cost Effectiveness US \$/kg
GROUP PROJECT 3 COMPANIES								
A.V. Bertollo 1986	6.3	5.7	24,300	1,530	22,562	39,392	39,392	6.91
Citrocar 1993	10	9.0	31,300	1,880	40,376	61,056	61,056	6.78
Systherm 2000	12	10.8	31,300	1,880	42,812	63,492	63,492	5.88
<i>SUB-TOTAL</i>	<i>28.3</i>	<i>25.5</i>	<i>86,900</i>	<i>5,290</i>	<i>105,750</i>	<i>163,940</i>	<i>163,940</i>	<i>6.43</i>
GROUP PROJECT 9 COMPANIES								
ABC Furgoes 1998	5.4	4.9	29,300	2,030	11,110	33,440	33,440	6.82
Fricam Refri 1995	5.4	4.9	36,300	2,380	11,110	37,290	37,290	7.61
Junges 1961	7.2	6.5	29,300	2,030	14,640	36,970	36,970	5.69
Rafaeli 1995	13.5	12.2	36,300	3,630	25,427	65,357	65,357	5.36
Refri Santos 1999	14.4	13.0	61,300	3,630	27,714	67,644	67,644	5.20
Rondofrio 1995	7.5	6.8	36,300	2,380	15,141	41,321	41,321	6.08
Tresmaense 1991	12.0	10.8	81,300	4,630	24,226	75,156	75,156	6.95
Trevosul Refrig 1990	5.4	4.9	36,300	2,380	11,110	37,290	37,290	7.61
Verde Lago Furgoes 1987	9.0	8.1	36,300	3,630	16,081	56,011	56,011	6.91
<i>SUB-TOTAL</i>	<i>79.8</i>	<i>72.1</i>	<i>382,700</i>	<i>26,720</i>	<i>156,559</i>	<i>450,479</i>	<i>450,479</i>	<i>6.25</i>

* tonnes per year **incremental capital cost ***incremental operating cost

**PROJECT EVALUATION SHEET
BRAZIL**

SECTOR: Refrigeration ODS use in sector (2000): 7,272 ODP tonnes

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

Project Titles:

- (a) Umbrella project for five enterprises converting from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a at EZ Industria, Hidraumatic, Menoncin, Unifrio and from CFC-12 to HFC-134a at Croydon

Project Data	Commercial
	Five companies
Enterprise consumption (ODP tonnes)	34.01
Project impact (ODP tonnes)	33.07
Project duration (months)	28
Initial amount requested (US \$)	503,537
Final project cost (US \$):	
Incremental capital cost (a)	324,150
Contingency cost (b)	19,370
Incremental operating cost (c)	125,932
Total project cost (a+b+c)	469,452
Local ownership (%)	100%
Export component (%)	0%
Amount requested (US \$)	469,452
Cost effectiveness (US \$/kg.)	14.47
Counterpart funding confirmed?	Yes
National coordinating agency	PROZON
Implementing agency	UNIDO

Secretariat's Recommendations	
Amount recommended (US \$)	469,452
Project impact (ODP tonnes)	33.07
Cost effectiveness (US \$/kg)	14.47
Implementing agency support cost (US \$)	61,029
Total cost to Multilateral Fund (US \$)	530,481

PROJECT DESCRIPTION

Sector Background

Latest available total ODS consumption (1999)	13,135.50 ODP tonnes
Baseline consumption of Annex A Group I substances (CFCs)	10,525.80 ODP tonnes
Consumption of Annex A Group I substances for the year 2000	9,333.00 ODP tonnes
Baseline consumption of CFCs in refrigeration sector	Not Available ODP tonnes
Consumption of CFCs in refrigeration sector in 2000	7,272.00 ODP tonnes
Funds approved for investment projects in refrigeration sector as of end of 2000	US \$19,422,305.00
Quantity of CFC to be phased out in investment projects in refrigeration sector as of end of 2000	2,604.94 ODP tonnes

29. The total consumption of CFCs in the refrigeration sector for the year 2000, according to information from the Government of Brazil, was 7,272 ODP tonnes, including 812 ODP tonnes utilised for manufacturing of new refrigeration equipment and 6,460 ODP tonnes used for servicing.

30. The Executive Committee has approved about US \$19,422,305 for 49 projects to phase out 2,604.94 ODP tonnes of CFC for enterprises manufacturing refrigeration equipment in the refrigeration sector. The conversion of domestic refrigeration manufacturers in Brazil is in its final stage. No more projects will be submitted in this sub-sector. In accordance with legislation adopted by the Government of Brazil, the conversion of this sub-sector to non-ODS technologies would have to be finalized by the end of 2000.

Project description

31. The current project will phase-out 43.36 ODP tonnes of CFC-11 and 13.34 ODP tonnes of CFC-12 in the manufacture of commercial refrigeration equipment at five small- and medium-sized enterprises in Brazil (Croydon, EZ Industria, Unifrio, Hidraumatic and Menoncin). This will be achieved by converting from CFC-11 to HCFC-141b as the foam blowing agent and from CFC-12 to HFC-134a as the refrigerant. The enterprises are involved in the manufacture of various models of bottle coolers, water dispensers, freezers and display cabinets. Croydon manufactures commercial juice coolers using CFC-12 as a refrigerant, no foam operations are involved. The enterprises employ low-pressure foam dispensers for foaming operations in the baseline with the exception of Hidraumatic which uses manual foaming for its product. In addition, all the enterprises operate CFC-12 charging, evacuation and detection equipment in the baseline.

32. The project includes incremental capital costs for the five enterprises, covering the cost of a high-pressure foam dispenser at EZ Industria, and low-pressure dispensers at Unifrio, Menoncin and Hidraumatic. For the refrigeration operations, EZ Industria and Unifrio are requesting automatic charging stations and Menoncin two portable charging units. All five

enterprises are requesting hand-held leak detection equipment. Incremental operating costs cover the higher cost of chemicals and components, and an increase in foam density.

Justification for the use of HCFC-141b

33. Justification for the use of HCFC-141b by companies has been provided in each project and is available in the Secretariat. The Government of Brazil has also provided letters endorsing the use of HCFC-141b by enterprises.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

34. The Secretariat discussed with UNIDO the implications of Decision 31/45 on the new sector for installation, assembly and servicing for Unifrio. It was proposed to treat the production of insulation panels for refrigerated cells according to rules and policies for the rigid foam sector. Menoncin and Unifrio are utilising compressors manufactured by Elgin, which received assistance from the Fund. IOC associated with these compressors have been recognised as ineligible in accordance with decision 26/36. The levels of grant for Unifrio and Menoncin have been recalculated accordingly.

RECOMMENDATIONS

35. The Fund Secretariat recommends blanket approval of the commercial refrigeration projects from UNIDO with the level of funding and associated support costs as indicated below.

	Project Title	Project Funding (US\$)	Support Cost (US\$)	Implementing Agency
(a)	Umbrella project for five enterprises converting from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a at EZ Industria, Hidraumatic, Menoncin, Unifrio and from CFC-12 to HFC-134a at Croydon	469,452	61,029	UNIDO
