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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Twenty-ninth Meeting
Beijing, 24-26 November 1999

PROJECT PROPOSALS: BRAZIL

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

Foam

- | | |
|---|------|
| • Phase-out of CFC-11 by conversion to water-blown technology in the manufacture of rigid integral skin foam at Durothan | UNDP |
| • Phase-out of CFC-11 by conversion to water-blown technology in the manufacture of integral skin foams at ELV TEC | UNDP |
| • Phase-out of CFC-11 by conversion to water-based technology in the manufacture of integral skin foams at Nicos do Brasil | UNDP |
| • Phase-out of CFC-11 by conversion to water-based technology in the manufacture of integral skin and flexible molded foams at Purtec | UNDP |
| • Phase-out of CFC-11 by conversion to water-based technology in the manufacture of rigid integral skin foam at Spray | UNDP |
| • Conversion from CFC-11 to water-based technology in the manufacture of rigid polyurethane foam at ACS | UNDP |
| • Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Brasfoam | UNDP |
| • Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Brasinj | UNDP |
| • Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane boxfoam and sprayfoam at Calorisol | UNDP |
| • Conversion from CFC-11 to HCFC-141b technology in the manufacture | UNDP |

- of rigid polyurethane foam at Fibrart
- Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane boxfoam at Fibrasil UNDP
- Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Intertelhas UNDP
- Conversion from CFC-11 to water-based technology in the manufacture of rigid polyurethane foam at Plastwork UNDP
- Conversion from CFC-11 to HCFC-141b in the manufacture of rigid polyurethane foam for display cabinets at Vacuum Systems UNDP
- Conversion from CFC-11 to water-based technology in the manufacture of rigid polyurethane foam for packaging, and to HCFC-141b technology for insulation applications at Worldpack UNDP

**PROJECT EVALUATION SHEET
BRAZIL**

SECTOR: Foam ODS use in sector (1998): 2,286 ODP tonnes

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

Project Titles:

- (a) Phase-out of CFC-11 by conversion to water-blown technology in the manufacture of rigid integral skin foam at Durothan
- (b) Phase-out of CFC-11 by conversion to water-blown technology in the manufacture of integral skin foams at ELV TEC
- (c) Phase-out of CFC-11 by conversion to water-based technology in the manufacture of integral skin foams at Nicos do Brasil
- (d) Phase-out of CFC-11 by conversion to water-based technology in the manufacture of integral skin and flexible molded foams at Purtec
- (e) Phase-out of CFC-11 by conversion to water-based technology in the manufacture of rigid integral skin foam at Spray

Project Data	Integral skin				
	Durothan	ELV TEC	Nicos do Brasil	Purtec	Spray
Enterprise consumption (ODP tonnes)	30.00	14.00	16.50	18.90	31.80
Project impact (ODP tonnes)	30.00	14.00	16.50	18.90	31.80
Project duration (months)	36	36	36	36	36
Initial amount requested (US \$)	275,925	159,900	160,000	210,069	216,580
Final project cost (US \$):					
Incremental capital cost (a)	107,000	75,000	90,000	65,000	85,000
Contingency cost (b)	10,700	7,500	9,000	6,500	8,500
Incremental operating cost (c)	110,925	51,765	61,000	69,269	117,580
Total project cost (a+b+c)	228,625	134,265	160,000	140,769	211,080
Local ownership (%)	100%	100%	100%	100%	100%
Export component (%)	0%	0%	0%	0%	0%
Amount requested (US \$)	228,625	134,265	160,000	140,769	211,080
Cost effectiveness (US \$/kg.)	7.62	9.59	9.70	7.45	6.64
Counterpart funding confirmed?			Yes	Yes	Yes
National coordinating agency		Ministry of Environment - PROZON			
Implementing agency	UNDP	UNDP	UNDP	UNDP	UNDP

Secretariat's Recommendations					
Amount recommended (US \$)	228,625	134,265	160,000	140,769	211,080
Project impact (ODP tonnes)	30.00	14.00	16.50	18.90	31.80
Cost effectiveness (US \$/kg)	7.62	9.59	9.70	7.45	6.64
Implementing agency support cost (US \$)	29,721	17,454	20,800	18,300	27,440
Total cost to Multilateral Fund (US \$)	258,346	151,719	180,800	159,069	238,520

**PROJECT EVALUATION SHEET
BRAZIL**

SECTOR: Foam ODS use in sector (1998): 2,286 ODP tonnes

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

Project Titles:

- (f) Conversion from CFC-11 to water-based technology in the manufacture of rigid polyurethane foam at ACS
- (g) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Brasfoam
- (h) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Brasinj
- (i) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane boxfoam and sprayfoam at Calorisol
- (j) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Fibrart

Project Data	Rigid				
	ACS	Brasfoam	Brasinj	Calorisol	Fibrart
Enterprise consumption (ODP tonnes)	17.40	68.00	10.00	21.00	33.00
Project impact (ODP tonnes)	17.40	61.60	9.10	19.00	29.90
Project duration (months)	36	36	36	36	36
Initial amount requested (US \$)	119,336	297,500	69,687	91,477	111,838
Final project cost (US \$):					
Incremental capital cost (a)	50,000	55,000	105,000	70,000	80,000
Contingency cost (b)	5,000	5,500	10,500	7,000	8,000
Incremental operating cost (c)	64,336	49,700	36,590	14,477	23,838
Total project cost (a+b+c)	119,336	110,200	152,090	91,477	111,838
Local ownership (%)	100%	100%	100%	100%	100%
Export component (%)	0%	0%	0%	0%	0%
Amount requested (US \$)	119,336	110,200	71,253	91,477	111,838
Cost effectiveness (US \$/kg.)	6.86	1.79	7.83	4.81	3.74
Counterpart funding confirmed?			Yes	Yes	Yes
National coordinating agency	Ministry of Environment – PROZON				
Implementing agency	UNDP	UNDP	UNDP	UNDP	UNDP

Secretariat's Recommendations					
Amount recommended (US \$)	119,336	110,200		91,477	111,838
Project impact (ODP tonnes)	17.40	61.60		19.00	29.90
Cost effectiveness (US \$/kg)	6.86	1.79		4.81	3.74
Implementing agency support cost (US \$)	15,514	14,326		11,892	14,539
Total cost to Multilateral Fund (US \$)	134,850	124,526		103,369	126,377

**PROJECT EVALUATION SHEET
BRAZIL**

SECTOR: Foam ODS use in sector (1998): 2,286 ODP tonnes

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

Project Titles:

- (k) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane boxfoam at Fibrasil
- (l) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Intertelhas
- (m) Conversion from CFC-11 to water-based technology in the manufacture of rigid polyurethane foam at Plastwork
- (n) Conversion from CFC-11 to HCFC-141b in the manufacture of rigid polyurethane foam for display cabinets at Vacuum Systems
- (o) Conversion from CFC-11 to water-based technology in the manufacture of rigid polyurethane foam for packaging, and to HCFC-141b technology for insulation applications at Worldpack

Project Data	Rigid				
	Fibrasil	Intertelhas	Plastwork	Vacuum Systems	Worldpack
Enterprise consumption (ODP tonnes)	16.50	54.00	18.50	16.50	90.00
Project impact (ODP tonnes)	15.00	48.90	18.50	15.00	86.60
Project duration (months)	36	36	36	36	36
Initial amount requested (US \$)	115,100	376,623	144,855	115,100	405,610
Final project cost (US \$):					
Incremental capital cost (a)	71,250	20,000	100,000	70,000	160,000
Contingency cost (b)	7,125	2,000	10,000	7,000	16,000
Incremental operating cost (c)	15,050	148,074	68,887	45,700	229,610
Total project cost (a+b+c)	93,425	170,074	178,887	122,700	405,610
Local ownership (%)	100%	100%	100%	100%	100%
Export component (%)	0%	0%	0%	0%	0%
Amount requested (US \$)	93,425	170,074	144,855	117,450	405,610
Cost effectiveness (US \$/kg.)	6.23	3.48	7.83	7.83	4.98
Counterpart funding confirmed?			Yes	Yes	
National coordinating agency	Ministry of Environment - PROZON				
Implementing agency	UNDP	UNDP	UNDP	UNDP	UNDP

Secretariat's Recommendations					
Amount recommended (US \$)			144,855		405,610
Project impact (ODP tonnes)			18.50		86.60
Cost effectiveness (US \$/kg)			7.83		4.98
Implementing agency support cost (US \$)			18,831		52,729
Total cost to Multilateral Fund (US \$)			163,686		458,339

PROJECT DESCRIPTION

Sector Background

- Latest available total ODS consumption (1997)	10,314.9	ODP tonnes
- Baseline consumption* of Annex A Group I substances (CFCs)	11,050.9	ODP tonnes
- 1998 consumption of Annex A Group I substances	Not available	
- Baseline consumption of CFCs in foam sector	Not available	
- 1998 consumption of CFCs in foam sector	2,286.0	
- Funds approved for investment projects in foam sector as of end of 1998	US \$ 12,024,372	
- Quantity of CFC to be phased out in foam sector as of end of 1998	1,614.6	ODP tonnes
- Quantity of CFC phased out in foam sector as of end of 1998	490.0	ODP tonnes
- Quantity of CFCs to be phased out in foam projects approved in 1999 (27 th and 28 th Meetings)	463.8	ODP tonnes
- Funds approved for investment projects in the foam sector in 1999 (27 th and 28 th Meetings).	US \$ 3,496,560	

*Baseline consumption of Annex A controlled substances refers to average of the consumption for the years 1995-1997 inclusive.

INTEGRAL SKIN FOAM PROJECTS

Durothan, ELV TEC, Nicos do Brasil, Purtec and Spray

1. These five companies used between 14 and 31.8 ODP tonnes of CFC per year with a total consumption of 110.9 ODP tonnes. Durothan and Nicos do Brasil manufacture rigid integral skin mirror frames, table components and ATM consoles and bed head boards. ELV TEC manufactures rigid integral skin foam computer housing and cabinets. Spray manufactures rigid integral skin dental office equipment, while Purtec manufactures both flexible molded bicycle seats and integral skin spoilers.

2. The companies use both low and high pressure machines of various outputs and age, ranging from 11 years to 28 years. One of the companies (Spray) has two 11 year old low pressure machines which are not operational.

3. All the companies will convert their operation to the use of water-blown technology. The incremental capital cost of the projects include retrofit of the existing low and high pressure dispensers except in the case of Durothan where the existing 23 year old 48 l/min high pressure dispenser is replaced at the cost of US \$95,000 with company contribution of US \$50,000, as the more cost-effective approach (the retrofit cost is higher than the agreed company contribution). The retrofit costs of the low pressure dispensers ranged from US \$22,000 to US \$35,000 while

that of the high pressure machines ranged from US \$45,000-US \$75,000 depending on their baseline characteristics and operational requirements. Other costs included barrier coat and mold release sprayers at US \$2,500 each, trials (US \$5,000) and technology transfer and training (US \$10,000). There are incremental operational costs due to the higher use of MDI.

RIGID FOAM PROJECTS

ACS, Brasfoam, Brasinj, Calorisol, Fibrart, Fribrasil, Intertelhas, Plastwork, Vacuum Systems and Worldpack

4. These ten rigid foam companies consumed a total of 278.9 tonnes of CFC-11 annually (1998). Their consumption ranges from 10 to 68 ODP tonnes. Three of the companies (ACS, Fibrart and Fribrasil) produce spray foam and panels mainly for truck trailers; two (Brasinj and Vacuum Systems) produce foam for commercial refrigeration display cabinets and doors; two (Plastwork and Worldpack) produce packaging foam for the electronic industry while the others produce rigid foam products such as flotation cubes and roofing panels.

5. The companies producing packaging foam, and flotation cubes which do not require critical insulation properties will convert to water-blown technology. For all other insulation products the companies will convert to HCFC-141b. The companies use low pressure dispensers as well as sprayfoam dispensers.

6. For the companies converting to water-blown technology the existing low pressure machines will be retrofitted for higher output, variable ratio and thermal control as necessary (US \$20,000), while small machines (such as Olin and Instapack) will be replaced with low output high pressure pour-in-place dispensers (at US \$25,000 each). For companies converting to HCFC-141b existing low pressure machines will be replaced by high pressure machines including sprayfoam machines at US \$20,000. Other incremental capital costs are trials (US \$5,000 - US \$10,000 depending on the product lines), technology transfer and training US \$10,000 per project. For Plastwork and Worldpack the cost also includes the cost of temperature controlled room at US \$10,000 each. The projects include incremental operational cost ranging from about US \$14,500 to about US \$390,000. For four of the enterprises (Brasinj, Fribrasil, Intertelhas and Vacuum Systems) the incremental operational cost includes the cost associated with 5-7.5% increase in foam density.

Project Implementation Time Frame

7. All 15 (both integral skin and rigid) foam projects have an implementation duration of three years.

Justification for use HCFC-141b

8. A letter advising of the Government decision to use HCFC technology has been received by the Secretariat in accordance with Executive Committee decision 27/13 and is attached to this evaluation together with the information and commitments from the enterprises.

Impact of the Projects

9. A total of 432.2 ODP tonnes of CFC-11 will be eliminated from the 15 projects when implemented, including 111.2 ODP tonnes from the integral skin foam projects and 321 ODP tonnes from the rigid foam projects. The total amount eliminated represents 3.9% of Brazil's baseline consumption of Annex A Group I substances. There will be residual ODP of 25.9 ODP tonnes resulting from the use of HCFC-141b.

10. When the 15 projects are approved the total amount of CFCs to be phased out in projects approved in 1999 for the foam sector in Brazil will be 896 ODP tonnes, representing 8.1% of the baseline consumption of Annex A Group I controlled substances.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Integral Skin Foam Projects

1. The Fund Secretariat and UNDP discussed the projects and agreed on their costs taking into account the ages of the machines where applicable in determining the eligible incremental costs of the projects.

Rigid Foam Projects

2. The Fund Secretariat and UNDP discussed the projects and agreed on the costs of the following projects: ACS, Brasfoam, Calorisol, Fibrart, Plastwork and World Pack.

3. In four projects (Brasinj, Fibrasil, Intertelhas, Vacuum Systems) involving the production of foam for commercial refrigeration display cabinets and doors, roofing panel and insulation panels for truck trailers costs attributed to 5-7.5% increase in density have been factored into the incremental operational cost calculations. The operational costs of these projects as calculated with the increased density are, Brasinj: US \$36,590, Fibrasil: US \$15,050, Intertelhas: US \$148,074 and Vacuum Systems: US \$45,700. This results in 73% - 80% increase in the operational cost based on the differences in chemical prices before and after conversion. The issue is under discussion and therefore the incremental operational costs of the projects as well as the eligible grant have not been determined. The outcome of the discussion will be communicated to the Sub-Committee on Project Review.

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the integral skin foam projects, namely, Durothan, ELV TEC, Nicos do Brasil, Purtec and Spray with the funding level and associated support costs as indicated in the table below. The Fund Secretariat also recommends blanket approval for six rigid foam projects, namely, ACS, Brasfoam, Calorisol, Fibrart, Plastwork and Worldpack with the funding level and associated support costs as indicated in the table below.

2. The projects of Brasinj, Fribrasil, Intertelhas and Vacuum Systems are being submitted for individual consideration on account of the issues relating to increased densities.

	Project Title	Project Funding (US\$)	Support Cost (US\$)	Implementing Agency
(a)	Phase-out of CFC-11 by conversion to water-blown technology in the manufacture of rigid integral skin foam at Durothan	228,625	29,721	UNDP
(b)	Phase-out of CFC-11 by conversion to water-blown technology in the manufacture of integral skin foams at ELV TEC	134,265	17,454	UNDP
(c)	Phase-out of CFC-11 by conversion to water-based technology in the manufacture of integral skin foams at Nicos do Brasil	160,000	20,800	UNDP
(d)	Phase-out of CFC-11 by conversion to water-based technology in the manufacture of integral skin and flexible molded foams at Purtec	140,769	18,300	UNDP
(e)	Phase-out of CFC-11 by conversion to water-based technology in the manufacture of rigid integral skin foam at Spray	211,080	27,440	UNDP
(f)	Conversion from CFC-11 to water-based technology in the manufacture of rigid polyurethane foam at ACS	119,336	15,514	UNDP
(g)	Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Brasfoam	110,200	14,326	UNDP
(i)	Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane boxfoam and sprayfoam at Calorisol	91,477	11,892	UNDP
(j)	Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Fibrart	111,838	14,539	UNDP
(m)	Conversion from CFC-11 to water-based technology in the manufacture of rigid polyurethane foam at Plastwork	144,855	18,831	UNDP
(o)	Conversion from CFC-11 to water-based technology in the manufacture of rigid polyurethane foam for packaging, and to HCFC-141b technology for insulation applications at Worldpack	405,610	52,729	UNDP