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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
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PROJECT PROPOSALS: BRAZIL

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

Foam

- Conversion to CFC-free technology in the manufcture of polurethane foam at Bruzze — UNDP
- Conversion to CFC-free technology in the manufacture of polyurethane foam at CMZ Poliuretanos — UNDP
- Conversion to CFC-free technology in the manufacture of polyurethane foam at Espumatec — UNDP
- Conversion to CFC-free technology in the manufacture of polyurethane foam at FJ Polymers — UNDP
- Conversion to CFC-free technology in the manufacture of polyurethane foam at Kalf Calcados — UNDP
- Conversion to CFC-free technology in the manufacture of polyurethane foam at Mikawa & Cia — UNDP
- Conversion to CFC-free technlogy in the manufacture of polyurethane foam at Plasmold — UNDP
- Conversion to CFC-free technology in the manufacture of polyurethane foam at Bernini — UNDP

• Conversion to CFC-free technology in the manufacture of polurethane foam at Bulltrade	UNDP
• Conversion to CFC-free technology in the manufacture of polyurethane foam at Fast Frio	UNDP
• Conversion to CFC-free technology in the manufacture of polyurethane foam at Polistecom	UNDP
• Conversion to CFC-free technology in the manufacture of polyurethane foam at Zenimont	UNDP

Refrigeration

• Conversion to CFC-free technology in the manufacture of polyurethane foam at Artico	UNDP
• Conversion to CFC-free technology in the manufacture of polyurethane foam at Friar	UNDP
• Elimination of CFCs in the manufacture of refrigerated trucks and trailers at Increal Ltda.	UNDP
• Conversion to CFC-free technology in the manufacture of polyurethane foam at Mais Frio	UNDP
• Elimination of CFCs in the manufacture of refrigerated trucks and trailers at Niju Ind. Com Implem Rodov Ltda.	UNDP
• Phasing out of CFC-12 by HFC-134a and CFC-11 by cyclopentane in the production of commercial refrigeration equipment at Refrigeracao Rubra	UNIDO

PROJECT EVALUATION SHEET
BRAZIL

SECTOR: FOAM ODS use in sector (1993): 1950 ODP tonnes

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

Project Title. Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam at:
(a) BRUZZE (b) CMZ Poliuretanos (c) ESPUMATEC (d) FJ POLYMERS
(e) KALF CALCADOS (f) MIKAWA & CIA (g) PLASMOLD

Project Data	**Integral Skin**						
	BRUZZE	CMZ	ESPUMATEC	FJ Polymers	Kalf Calcados	MIKAWA	PLASMOLD
ODS (CFC-11) phase out (ODP tonnes)	16.5	5.5	64.6	8.2	15	7.5	11
Proposed project duration (months)	24	24	24	24	24	24	24
Incremental capital cost (US$)	572,000	115,000	450,000	126,500	38,500	104,500	198,000
- including contingency (%)	10	10	10	10	10	10	10
Incremental operational cost (US$)	70,300	17,900	86,000	7,000	62,600	14,600	46,000
Total project cost (US$)	642,300	132,900	536,000	133,500	101,100	119,100	244,000
Local ownership (%)	100	100	100	100	100	100	100
Export component (%)							
Amount requested (US$) {Original} {Revised}	278,190	92,750	536,000	133,500	101,100	119,100	185,500
Cost effectiveness (US$/kg.)	16.86	16.86	8.30	16.28	6.74	15.88	16.86
National Coordinating Agency	Brazilian Industry and Trade Ministry						
Implementing Agency	UNDP						
Technical review completed?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Secretariat's Recommendations							
Amount recommended (US $)	Pending	Pending	Pending	Pending	101,100	Pending	Pending
Project Impact (ODP tonnes)					15		
Cost effectiveness (US $/kg)					6.74		
Implementing Agency support cost (US$)					13,143		
Total cost to Multilateral Fund					114,243		

PROJECT DESCRIPTION

Foam Sector Profile

Sector ODS consumption (1993) reported in country programme	1950 tonnes ODP
Most recent consumption data	not available
ODS to be phased out in approved projects (as at July 1997)	1036 tonnes ODP
ODS phased out (as at July 1997)	0
ODS to be phased out in current proposed projects	280 tonnes ODP
Latest (1995) CFC-11 consumption reported according to Art.7	4070 tonnes ODP

(a) BRUZZE - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam

1. Bruzze will phaseout the use of CFC-11 in the manufacture of rigid integral skin molded foam for automotive applications. The company currently has: two low pressure Transtecnica dispensers (1997, model T-30/2) and one low pressure Policel dispenser (1985) both with maximum output 30 kg/min at 1:1 ratio, one premixer, one mold oven, two aluminum molds, and 28 epoxy molds. The company uses systems formulated by BASF.

2. The manufacturing operations are to be converted to water blown formulations with the possibility of intermediate use of HCFC-141b. The capital costs include: the replacement of one low pressure machine by a 40 kg/min high pressure dispenser (US $90,000), the introduction of 20 new model aluminum molds based on the wear of the existing epoxy molds (US $400,000). Trials, technology transfer and training amount to US $30,000. Contingency costs of US $52,000 are also included. The other two Transtecnica low pressure machines are retrofits, however the costs are not eligible for coverage since these machines were purchased in 1997. Incremental operating costs of US $70,300 are expected based on the use of the following chemicals: 16.5 tonnes CFC-11; 25 tonnes MDI.

3. Calculation of incremental operational costs of the Brazil projects are based on the following prices: CFC-11: US $2.40; MDI: US $3.20; HCFC-141b: US $3.50; Methylene chloride: US $1.00/kg.

Justification for the Use of HCFCs

4. In the event introduction of all the water blown system is delayed, the company will use HCFC-141b as an intermediate step until the technical challenges related to the use of water blown systems are resolved.

Equipment or Components to be Destroyed or Rendered Unusable

5. The existing Policel low pressure machine will be destroyed, however the method of destruction of this machine as well as the replaced molds is not mentioned.

(b) CMZ Poliurethanos - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam

1. The company CMZ Poliuretanos will convert from the use of CFC-11 in the manufacture of polyurethane rigid and flexible integral skin molded foam for less-critical automotive applications. This is a low quality application where the skin is not so important. CMZ operates two low pressure machines: Sulpol (1991) and Transtecnica (1992), with outputs of 40 kg/min and 30 kg/min, respectively, at variable ratio. One low pressure machine is unaccounted for according to annex B which lists two LP Sulpol dispensers. The company uses systems formulated by Bayer.

2. CMZ is substituting water blown formulations for CFC-11 as an auxiliary blowing agent. The capital cost of conversion involves the replacement of one Sulpol low pressure dispenser by a high pressure dispenser of output 40 kg/min (US $90,000), for use in the rigid integral skin foam application. The Transtecnica low pressure equipment will not require replacement. The capital cost associated with trials, technology transfer and training is US $15,000, while the cost of contingency is US $10,000. Incremental operating costs of US $17,900 are expected on the basis of the use of the following chemicals: 5.5 tonnes CFC-11 and 15.7 tonnes Methylene Chloride; 9.8 tonnes MDI and 7.8 tonnes Methylene Chloride.

Justification for the Use of HCFCs

3. Polymers has chosen to utilize HCFC-141b as an interim step until an all water blown system as a final solution can be applied in both the flexible and rigid integral skin foam applications.

Equipment or Components to be Destroyed or Rendered Unusable

4. One low pressure Sulpol machine.

(c) ESPUMATEC - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam

1. Espumatec will phaseout the use of CFC-11 in the manufacture of both flexible molded foam and integral skin foam for the furniture and automotive industries. The company currently has one Hennecke high pressure machine (1995), and five low pressure machines: three Transtecnica (1989) with a maximum output of 15 kg/min at 2:1 ratio,

and two Sulpol (1992, C-15 and C-30) with maximum outputs of 15 kg/min and 30 kg/min, respectively, at 2:1 ratio. The company uses systems formulated by Bayer, BASF and Dow.

2. The manufacturing operations are to be converted to water blown formulations with a possible use of HCFC-141b as an interim step in the case of integral skin foam production. The capital costs include the replacement of the four low pressure dispensers with lower maximum output by four high pressure dispensers, each with maximum ouputs of 20 kg/min (US $360,000). Trials, technology transfer and training amount to US $50,000. Capital costs also include contingency (US $40,000). Incremental operating costs of US $86,000 are expected based on the use of the following chemicals: 68.5 tonnes CFC-11; 32.4 tonnes MDI and 35.3 tonnes HCFC-141b.

Justification for the Use of HCFCs

3. The use of HCFC-141b as an interim solution is justified on the grounds that the suppliers have not yet introduced the water based system for integral skin foam by the time the equipment is introduced.

Equipment or Components to be Destroyed or Rendered Unusable

4. The four low pressure machines to be replaced will be destroyed, however the method of destruction is not mentioned.

(d) FJ POLYMERS - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam

1. F J Polymers will phaseout the use of CFC-11 in the manufacture of integral skin molded foam for automotive and other applications, as well as in rigid foam systems themselves and some small customers. The company currently has one Sulpol low pressure machine (1994), with a maximum output of 7 kg/min at 2:1 ratio.

2. The production is to be converted to HCFC-141b for an interim period, while allowing the enterprise time to introduce water blown formulations. The capital costs include the replacement of the low pressure machine for Polymers by one high pressure dispenser with maximum output 15 kg/min (US $80,000). Trials, technology transfer and training amount to US $35,000. Capital costs also include contingency (US $11,500). Incremental operating costs of US $7,000 are expected based on the use of the following chemicals: 9 tonnes CFC-11; 8 tonnes of HCFC-141b.

Justification for the Use of HCFCs

3. Polymers has chosen to utilize HCFC-141b as an interim step until an all water blown system as a final solution can be applied in both the flexible and rigid integral skin foam applications.

Equipment or Components to be Destroyed or Rendered Unusable

4. The low pressure machine to be replaced will be destroyed, however the method of destruction is not mentioned.

(e) KALF CALCADOS - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam

1. Kalf Calcados will phaseout the use of CFC-11 in the manufacture of integral skin molded foam for bicycle saddles. The company currently has one Barmag low pressure machine (early 1995), with a maximum output of 95 kg/min at 1:1 ratio.

2. The production is to be converted to water blown formulations. The capital costs include retrofit of the low pressure Barmag machine to adjust the ratio (US $15,000). Trials, technology transfer and training amount to US $20,000. Capital costs also include contingency (US $3,500). Incremental operating costs of US $62,600 are expected based on the use of the following chemicals: 15 tonnes CFC-11; 22 tonnes of MDI.

(f) MIKAWA & CIA - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam

1. The company Mikawa & Cia will convert from the use of CFC-11 in the manufacture of flexible and integral skin molded foam for office furniture. Mikawa & Cia operates two low pressure machines: Transtecnica (1991) with output of 30 kg/min. The company uses systems formulated by Sintenor.

2. Mikawa & Cia is substituting water blown formulations for CFC-11 as an auxiliary blowing agent. The capital cost of conversion involves the replacement of one low pressure dispenser by a high pressure dispenser of output 20 kg/min (US $80,000). The second low pressure dispenser will continue to be used for the flexible molded operation. The capital cost associated with trials, technology transfer and training is US $15,000, while the cost of contingency is US $9,500. Incremental operating costs of US $14,600 are expected on the basis of the use of the following chemicals: 3.5 tonnes CFC-11; 5.25 tonnes MDI.

Equipment or Components to be Destroyed or Rendered Unusable

3. The low pressure machine to be replaced will be destroyed, however the method of destruction is not mentioned.

(g) PLASMOLD - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam

1. PLASMOLD will phaseout the use of CFC-11 in the manufacture of integral skin molded foam for automotive and other applications. The company currently has: one low pressure Transtecnica dispenser (1988) and one low pressure Sintenor dispenser (1988) both with maximum output 15 kg/min at variable ratio.

2. The manufacturing operations are to be converted to water blown formulations. The capital costs include the replacement of both low pressure machines by two 15 kg/min high pressure dispensers (US $160,000). Trials, technology transfer and training amount to US $20,000. Contingency costs of US $18,000 are also included. Incremental operating costs of US $46,000 are expected based on the use of the following chemicals: 11 tonnes CFC-11; 16.5 tonnes MDI.

Equipment or Components to be Destroyed or Rendered Unusable

3. The two existing low pressure machines will be destroyed, however the method of destruction is not mentioned.

Impact of Project on 1999 Freeze

4. While these projects will contribute to Brazil meeting its 19999 freeze requirements, significant additional efforts will have to be made to enable it to comply with the 1999 freeze and further ODS decreases as required by the Montreal Protocol.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Integral Skin/Flexible Molded Foams

1. Based on expert advice to the Secretariat the following cost items are still being discussed with the Implementing Agencies.

- change of molds following conversion
- provision of heating ovens
- replacement of low pressure with high pressure machines.

2. Agreed costs of the affected projects will be communicated to the Sub-Committee on Project Review.

3. The affected projects are:

- Bruzze
- CMZ
- Espumatec
- F.J. Polymers
- Mikawa
- Plamold

4. The project cost of Kalf Calcados was agreed.

RECOMMENDATION(S)

1. The Fund Secretariat recommends blanket approval of the Kalf Calcados project with associated support costs at the funding level shown in the table below:

Project Title	Project Cost US $	Support Cost US $	Implementing Agency
(a) BRUZZE - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam	Pending		UNDP
(b) CMZ Poliurethanos - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam	Pending		UNDP
(c) ESPUMATEC - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam	Pending		UNDP
(d) FJ POLYMERS - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam	Pending		UNDP
(e) KALF CALCADOS - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam	101,100	13,143	UNDP
(f) MIKAWA & CIA - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam	Pending		UNDP
(g) PLASMOLD - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam	Pending		UNDP

PROJECT EVALUATION SHEET
BRAZIL

SECTOR: FOAMS ODS use in sector (1993): 1950 ODP tonnes

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

Project Titles:
(a) BERNINI - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam
(b) BULLTRADE - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam
(c) FAST FRIO - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam
(d) POLISTECOM - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam
(e) ZENIMONT - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam

Project Data	**Rigid**				
	Bernini	**Bulltrade**	**Fast Frio**	**Polistecom**	**Zenimont**
ODS phase-out (ODP tonnes)	22.9	30.8	14.5	42.6	38.1
Proposed project duration (months)	24	24	24	24	24
Incremental capital cost (US $)	121,000	154,000	231,000	264,000	396,000
- including contingency (%)	10	10	10	10	10
Incremental operational cost (US $)	41,650	69,000	8,900	39,000	18,800
Total project cost (US $)	162,650	223,000	239,900	303,000	414,800
Local ownership (%)	100	100	30	100	100
Export component (%)					
Amount requested (US $) {Original}	162,650	223,000	72,000	303,000	298,300
{Revised}					
Cost effectiveness (US $/kg)	7.10	7.24	4.96	7.11	7.83
National Coordinating Agency	Brazilian Industry and Trade Ministry				
Implementing Agency	UNDP				
Technical review completed?	Yes	Yes	Yes	Yes	Yes

Secretariat's Recommendations:					
Amount recommended (US $)	Pending	Pending	Pending	Pending	Pending
Project impact (ODP tonnes)					
Cost effectiveness (US $/kg)					
Implementing Agency support cost (US $)					
Total cost to Multilateral Fund (US $)					

PROJECT DESCRIPTION

Foam Sector Profile

Sector ODS consumption (1993) reported in country programme	1950 tonnes ODP
Most recent consumption data	not available
ODS to be phased out in approved projects (as at July 1997)	1036 tonnes ODP
ODS phased out (as at July 1997)	0 tonnes ODP
ODS to be phased out in current proposed projects	280 tonnes ODP
Latest (1995) CFC-11 consumption reported according to Art.7	4070 tonnes ODP

(a) BERNINI - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam

1. Bernini will phaseout the use of CFC-11 in the manufacture of rigid polyurethane foam for construction applications (roofing panels). The enterprise currently has a Hennecke HK 245 (1970) with output 20 kg/min, connected to a Hennecke premixer.

2. The manufacturing operations are to be converted to HCFC-141b/HCFC-22 blend as an interim step to a final solution. It is indicated that the use of a combination of HCFC-141b and HCFC-22 is to overcome the possible "densification" in the middle of the panel. The capital costs include: retrofit of the high pressure dispenser (US $15,000), and a three component premixer (US $70,000). Trials, technology transfer and training amount to US $25,000. Contingency costs of US $11,000 are also included. Incremental operating costs of US $41,650 are expected based on the use of the following chemicals: 25 tonnes CFC-11; 21.25 tonnes HCFC-141b/HCFC-22.

3. Incremental operations costs of all the projects are based on the following prices: CFC-11: US $2.40, HCFC-141b: US $3.20; HCFC-141b/HCFC-22: US $3.95

(b) BULLTRADE - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam

1. The company Bulltrade will convert from the use of CFC-11 in the manufacture of rigid polyurethane foam for sprayfoam insulation applications. Bulltrade operates two low pressure dispensers from Aistec (1994), with two different capacities: 8 kg/min and 3 kg/min. The company purchases formulated systems from Alkanos and Plastiquim.

2. The production is to be converted to HCFC-141 as an interim step to a final solution. The capital cost of conversion involves the replacement of the low pressure dispenser by a high pressure dispenser of output 160 kg/min (US $65,000), and two high pressure sprayfoam dispensers (US $60,000). The capital cost associated with trials, technology transfer and training is US $15,000, while the cost of contingency is US $14,000. Incremental

operating costs of US $69,000 are expected on the basis of the use of the following chemicals: 34 tonnes CFC-11; 28.92 tonnes HCFC-141b.

(c) FAST FRIO - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam

1. Fast Frio will phaseout the use of CFC-11 in the manufacture of rigid polyurethane foam for display cabinets and cold rooms for supermarkets. The company currently has one low pressure Cannon/Transtecnica ER2 (year unknown) and one low pressure Transtecnica T30/2 (1991), both with outputs 30 kg/min at 1:1 ratio.

2. The manufacturing operations are to be converted to HCFC-141b as an interim solution, followed by water or HFC. The capital costs include the replacement of the two existing dispensers by two high pressure ones with output 30 kg/min (US $180,000). Trials, technology transfer and training amount to US $30,000. Capital costs also include contingency (US $21,000). Incremental operating costs of US $8,900 are expected based on the use of the following chemicals: 16 tonnes CFC-11; 13.6 tonnes HCFC-141b.

(d) POLISTECOM - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam

1. Polistecom will phaseout the use of CFC-11 in the manufacture of rigid polyurethane foam panels for insulation in construction. The company has: one low pressure dispenser OMS SM-3- (1993) and another low pressure Transtecnica C30 (1993), both with output 30 kg/min at 1:1 ratio, one Gusmer FF1600 with GX& gun, and three presses.

2. The chosen interim replacement is HCFC-141b, until full conversion to water blown systems. The capital costs include the replacement of both low pressure dispensers by two high pressure dispensers with 30/60 kg/min (US $200,000), and the retrofit of the Gusmer FF1600 (US $5,000). Trials, technology transfer and training amount to US $25,000. Capital costs also include contingency (US $24,000). Incremental operating costs of US $39,000 are expected based on the use of the following chemicals: 47 tonnes CFC-11; 40 tonnes HCFC-141b.

(e) ZENIMONT - Conversion to CFC-free Technology in the Manufacture of Polyurethane Foam

1. Zenimont will phaseout the use of CFC-11 in the manufacture of rigid polyurethane foam for roof panels and rigid foam blocks. The company uses two low pressure, fixed ratio foam dispensers (1986 and 1991) from Transtecnica. Ratio is 1:1, with output 6-30 kg/min. Zenimont also uses three presses and five molds.

2. The chosen interim replacement is HCFC-141b, until full conversion to water blown systems. The capital costs include one high pressure dispenser 20-30 kg (US $70,000),

local works (25,000), one 200 kg/min high pressure dispenser (US $165,000), and one premixer (US $60,000). Trials, technology transfer and training amount to US $40,000. Capital costs also include contingency (US $36,000). Incremental operating costs of US $18,800 are expected based on the use of the following chemicals: 41 tonnes CFC-11; 26 tonnes HCFC-141b.

All Projects

Justification for the Use of HCFCs

1. The above enterprises have chosen interim use of HCFC-141b until a suitable final solution is available commercially in Brazil.

Equipment or Components to be Destroyed or Rendered Unusable

2. For all the above projects, the fate of the replaced equipment is not indicated.

Impact of Project on 1999 Freeze

3. These projects will contribute to Brazil meeting its 1999 freeze requirements, significant additional efforts will have to be made to enable it to comply with the 1999 freeze and further ODS decreases as required by the Montreal Protocol.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Fund Secretariat and the Implementing Agency are still discussing the projects. The outcome of the discussions will be communicated to the Sub-Committee on Project Review.

PROJECT EVALUATION SHEET
BRAZIL

SECTOR: REFRIGERATION ODS use in sector (1993): 900 ODP tonnes

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

Project Titles:

(a) Conversion to CFC-free technology in the manufacture of polyurethane foam at ARTICO
(b) Conversion to CFC-free technology in the manufacture of polyurethane foam at FRIAR
(c) Elimination in the use of CFCs in the manufacture of refrigerated trucks and trailers at Increal Ltda.
(d) Conversion to CFC-free technology in the manufacture of polyurethane foam at MAIS FRIO
(e) Conversion to CFC-free technology in the manufacture of polyurethane foam at NIJU
(f) Phasing out of CFC-12 by HFC-134a and CFC-11 by cyclopentane in the production of commercial refrigeration equipment at REFRIGERACAO RUBRA

Project Data	**Commercial Refrigeration**					
	Artico	Friar	Increal	Mais Frio	Niju	Rubra
ODS phase-out (ODP tonnes)	14.8	25.1	36	10.15	9	21.8
Proposed project duration (months)	24	24	24	24	24	24
Incremental capital cost (US $)	260,000	313,500	428,000	86,000	146,000	437,624
- including contingency (%)	10	10	10	10	10	10
Incremental operational cost (US $)	112,830	(35,700)	66,000	89,280	17,000	not requested
Total project cost (US $)	372,830	277,800	494,000	175,280	163,000	437,624
Local ownership (%)	100	100		100		100
Export component (%)						
Amount requested (US $) {Original}	225,100	277,800	502,000	154,400	126,500	437,624
{Revised}			494,000		128,500	
Cost effectiveness (US $/kg)	15.21	11.07	14.97	15.21	15.21	20.08
National Coordinating Agency	Brazilian Industry and Trade Ministry/Interministerial Ozone Tech. Group					
Implementing Agency	UNDP					UNIDO
Technical review completed?	Yes					

Secretariat's Recommendations:						
Amount recommended (US $)	Pending	Pending	Pending	154,400	Pending	320,540
Project impact (ODP tonnes)				10.15		21.8
Cost effectiveness (US $/kg)				15.21		14.70
Implementing Agency support cost (US $)				20,072		41,670
Total cost to Multilateral Fund (US $)				174,472		362,210

PROJECT DESCRIPTION

Background Information

The sector description in the project document contains the following information:

1. ODS consumption in the commercial refrigeration sector is estimated at 900 ODS tonnes (1993). Sector growth is not available, but is estimated to be high. The Executive Committee approved eight commercial refrigeration projects, phasing out 459.7 ODP tonnes.

2. The projects will contribute to reach the 1999 freeze requirements for Brazil.

(a) Conversion to CFC-free technology in the manufacture of polyurethane foam at ARTICO

1. Artico manufactures commercial refrigerators and display cabinets. The implementation of this project will result in the phasing out of 14.8 tonnes ODP.

2. The company will convert from CFC-11 to HCFC-141b as an interim solution. Subsequent conversion to a zero-ODP alternative will be undertaken at the company's own expense. Two low-pressure dispensers (one is from the year 1973) will be replaced with high-pressure, variable ratio dispensers. The existing dispensers will be destroyed.

Justification for HCFC-141b use

3. The investment costs to convert to pentane are prohibitive, based on the relatively small level of production. HFC or water-based systems will be used when they become commercially available. Subsequent conversion to a zero-ODS alternative in the foam manufacturing will be undertaken at company expense.

4. This project selected HFC-134a to replace CFC-12 use as a refrigerant. Redesign of the existing freezer and cooler models is required. The charging system and production facilities need to be modified. Vacuum pumps with vacuum control and leak detectors are required. As the company does not use charging boards, leak detection equipment or vacuum pumps as baseline equipment, they will be responsible for 50% of the requested cost.

5. The incremental operating costs are for chemical and component costs including compressors, for a two year duration.

(b) Conversion to CFC-free technology in the manufacture of polyurethane foam at FRIAR

1. Friar manufactures cold rooms and display cabinets for large supermarkets. CFC-11 is used in the production rigid polyurethane foam for insulation (13.5 MT/year) The company produce molded integral skin foam for decorative uses and as bumpers around the cabinets (3.0 MT/year).

2. The refrigerating system is based on HCFC-22 refrigerant. No ODP phase out activities are proposed in respect of the refrigerant. CFC-12 is used in service operations, and is not being addressed in this project.

3. The company uses CFC-11 for flushing the cooling system. About 9 MT of CFC-11 is being used for cleaning purposes. The CFC-11 flushing of the refrigeration system will be replaced with a nitrogen blowing operation. The costs will be paid by the company.

4. The baseline for the rigid foam includes a low pressure dispenser with four mixhead connection in a loop. The company will convert from CFC-11 to HCFC-141b as an interim solution for rigid insulation foam blowing phasing out 13.5 ODP tonnes. Final solution for the rigid foam , to be undertaken at the company's own expense, is expected to be either water blowing or HFCs. The conversion involves purchasing a new high pressure machine with the rail system for the mixing head. The requested costs at US $120,000 include trials, training and technology transfer.

5. In integral skin, two locally made low pressure dispensers (age unknown, old) are used due to two different ISF systems(one black and one colorless). The CFC phase out technology chosen is water blown formulation for the integral skin foam application. The implementation of the project will lead to phasing out of 3.0 ODP tonnes. One new high pressure machine with a color unit (to provide for different colors), a carrousel and a heating unit, trial, training and technology transfer are requested at US $165,000.

6. The replaced equipment will be destroyed.

Justification for HCFC-141b use

7. HCFC-141b is commercially available and is reasonably priced. It will be used for rigid foam blowing until the technical challenges related to final solutions of rigid foam in Brazil have been overcome. Subsequent conversion to a zero-ODS alternative in the foam manufacturing will be undertaken at company expense.

8. The incremental operating costs are for chemicals, for a two year duration calculated as an aggregate for rigid insulation form and integral skin foam. These costs are more than offset by savings accruing from the discontinuation of the use of CFC-11 in flushing the cooling system. The project will realize net operating benefits.

(d) Conversion to CFC-free technology in the manufacture of polyurethane foam at MAIS FRIO

1. Mais Frio manufactures commercial refrigerators and display cabinets. The implementation of this project will result in the phasing out of 10.15 tonnes ODP.

2. The company will convert from CFC-11 to HCFC-141b as an interim solution. The investment costs to convert to pentane are prohibitive, based on the relatively small level of production. HFC or water-based systems will be used when they become commercially available.

3. Subsequent conversion to a zero-ODP alternative will be undertaken at the company's own expense. The existing high-pressure dispenser will be retrofitted for HCFC-141b use.

4. This project selected HFC 134a to replace CFC-12 use as a refrigerant. Redesign of the existing freezer and cooler models is required. The charging system and production facilities must be modified. Vacuum pumps with vacuum control and leak detectors are required. As the company does not have leak detection equipment, a modest budget is presented. Vacuum pumps with vacuum control are required. HFC-134a compressors are required. There is no disposal plan for the vacuum pumps.

5. The incremental operating costs are for chemical and component costs, for a two year duration.

(c) Elimination in the use of CFCs in the manufacture of refrigerated trucks and trailers at Increal Ltda.

1. Increal Ltda manufactures refrigerated trucks and trailers. The implementation of this project will result in the phasing out of 36 tonnes ODP.

2. The company will convert from CFC-11 to HCFC-141b as an interim solution. Four low-pressure dispensers will be replaced by two high-pressure variable ratio dispensers. One additional dispenser is requested, with 50% of the cost contributed by the enterprise. The existing dispensers will be destroyed.

Justification for HCFC-141b use

3. HCFC-141b systems are technically mature and commercially viable. They provide relatively the most acceptable insulation value and energy efficiency, and the lowest investment and operating costs. No major changes in auxiliary equipment are needed. HFC or water-based systems will be used when they become commercially available. Subsequent conversion to a zero-ODS alternative in the foam manufacturing will be undertaken at company expense.

4. This project selected HFC 134a to replace CFC-12 use as a refrigerant. New compressors are required. The existing evacuation and charging system will have to be replaced. The design of the refrigeration system will be modified. Leak detectors are required. The replaced equipment will be destroyed.

5. The incremental operating costs are for chemicals and components, for a two year duration.

(e) Conversion to ODS-free technology in the manufacture of polyurethane foam at NIJU

1. Niju Ind Com Implem Rodov Ltda manufactures refrigerated trucks and trailers. The project states that implementation of this project will result in the phasing out of 9 tonnes ODP.

2. The company will convert from CFC-11 to HCFC-141b as an interim solution. A low-pressure dispenser will be replaced by a high-pressure variable ratio dispenser. The existing dispenser will be destroyed.

3. HCFC-141b systems are technically mature and commercially viable. They provide relatively the most acceptable insulation value and energy efficiency, and the lowest investment and operating costs. No major changes in auxiliary equipment are needed. HFC or water-based systems will be used when they become commercially available. Subsequent conversion to a zero-ODP alternative will be undertaken at company expense.

4. This project selected HFC-134a to replace CFC-12 use as a refrigerant. New refrigeration units will be procured. The existing evacuation and charging system will have to be replaced. Leak detectors are required. The company will dispose of any equipment that has been replaced under this project.

5. The incremental operating costs are for chemicals, for a two year duration.

(f) Phasing out of CFC-12 by HFC-134a and CFC-11 by cyclopentane in the production of commercial refrigeration equipment at REFRIGERACAO RUBRA

1. This project is a large size enterprise that manufactures commercial refrigeration equipment (25,000 units). The implementation of the project will result in the phasing out of 21.798 MT ODP.

2. Refrigeration components are bought, then assembled at the plant. Refrigerant is then charged into the equipment.

3. The company will convert from CFC-11 to cyclopentane as a blowing agent. This technology requires equipment modification as well as safety measures to handle hydrocarbons. Two low pressure foaming machines (1993 & 1996 made) are to be replaced with a new high pressure foaming machine. A premixing station, storage tank, sensors, safety equipment, ventilation system and other hydrocarbon related modifications are also requested.

4. CFC-12 will be replaced with HFC-134a use as a refrigerant. Equipment needed for conversion include charging board, vacuum pumps and leak detectors. Two vacuum pumps were commissioned in 1995 and 1997.

5. Two foaming machines, three CFC-12 leak detectors and refrigerant charging stations are listed as to be made unusable following conversion.

6. No incremental operating costs are requested.

7. According to UNIDO, the project will contribute to reach the 1999 freeze target in Brazil.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

(a) Conversion to CFC-free technology in the manufacture of polyurethane foam at ARTICO

1. UNDP requested US $90,000 for one low pressure dispenser which is 1973 year vintage. The Secretariat proposed funding at lower level to reflect the technological upgrade. The Secretariat and UNDP are still discussing the level of funding for this project. The results of discussion on this issue with UNDP will be reported to the Sub-Committee for Project Review.

(b) Conversion to CFC-free technology in the manufacture of polyurethane foam at FRIAR

1. The Secretariat informed UNDP that incremental costs for foaming blowing operations should be calculated separately for rigid insulation and integral skin foams using the respective cost-effectiveness threshold values. CFC-11 consumption used for cleaning of the cooling system cannot be included in the calculation of eligible incremental costs in the foam part of the project. The Secretariat and UNDP are still discussing the method of calculation of incremental costs in foam operations of the enterprise and the eligible level of funding for this project. The results of the discussion will be reported to the Sub-Committee for Project Review.

(d) Conversion to CFC-free technology in the manufacture of polyurethane foam at MAIS FRIO

1. The Secretariat and UNDP discussed the incremental costs requested for the new mixing head and new leak detectors. The costs of the new mixing head was recognized as ineligible. The requested cost of leak detectors was reduced to reflect the baseline of the company. The budget was adjusted accordingly.

(c) Elimination in the use of CFCs in the manufacture of refrigerated trucks and trailers at Increal Ltda.

(e) Conversion to ODS-free technology in the manufacture of polyurethane foam at NIJU

1. The Secretariat and UNDP are still discussing the bases for calculation of CFC consumption and related eligible incremental costs for these two companies. The results of the discussion will be reported to the Sub-Committee for Project Review.

(f) Phasing out of CFC-12 by HFC-134a and CFC-11 by cyclopentane in the production of commercial refrigeration equipment at REFRIGERACAO RUBRA

1. Some of the baseline equipment was acquired after July 1995 for use with CFC (one foaming machine, vacuum pumps, leak detectors) and is therefore not eligible for funding.

2. The Secretariat and UNIDO discussed the level of funding for the modification of other capital equipment. Project cost was revised accordingly.

RECOMMENDATION(S)

1. The Fund Secretariat recommends blanket approval of the Mais Frio and Rubra projects at the funding levels listed below:

Project Title	Project Cost US $	Support Cost US $	Implementing Agency
(a) Conversion to CFC-free technology in the manufacture of polyurethane foam at ARTICO	Pending		UNDP
(b) Conversion to CFC-free technology in the manufacture of polyurethane foam at FRIAR	Pending		UNDP
(c) Elimination in the use of CFCs in the manufacture of refrigerated trucks and trailers at Increal Ltda.	Pending		UNDP
d) Conversion to CFC-free technology in the manufacture of polyurethane foam at MAIS FRIO	154,400	20,072	UNDP
(e) Conversion to CFC-free technology in the manufacture of polyurethane foam at NIJU	Pending		UNDP
(f) Phasing out of CFC-12 by HFC-134a and CFC-11 by cyclopentane in the production of commercial refrigeration equipment at REFRIGERACAO RUBRA	320,540	41,670	UNIDO