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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Twenty-eighth Meeting
Montreal, 14-16 July 1999

PROJECT PROPOSALS: BRAZIL

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

Foam

• Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of rigid at Moldepol	UNDP
• Phaseout of CFC-11 by conv. to water-blown technology in flexible molded foam,to water and methylene chloride blown technology in semi-rigid packaging foam,and to HCFC-141b in the manufacture of flexible integral skin foams at Espuma Oeste	UNDP
• Conversion from CFC-11 to HCFC 141b and water based technology in the manufacture of rigid polyurethane foam and integral skin foam at JNP Group	UNDP
• Phase-out of CFC-12 by conversion to n-butane as a blowing agent in the manufacture of extruded polyethylene foams for thermal insulation and food packaging purposes at Epex Co.	UNIDO
• Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Ananda	UNDP
• Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane sprayfoam at Isotherm.	UNDP
• Conversion from CFC-11 to HCFC-141b and water based technology in the manufacture of rigid polyurethane foam at Polsul Group	UNDP
• Phaseout of CFC-11 by conversion to HCFC-141b technology in rigid polyurethane foam (spray and pour in place) at SIFC	UNDP

Fumigant

• Phasing out methyl bromide in the entire Tobacco Sector	UNIDO

Refrigeration

• Conversion from CFC-11 to HCFC-141b, and from CFC-12 to HFC-134a and from R-502 to R-402a in the manufacture of commercial refrigeration products at General Icy	UNDP
• Phaseout of CFC-11, CFC-12 and R-502 by conversion to HCFC-141b technology (foam) and HFC-134a and R-404a technology (refrigerant) in the manufacture of milk coolers and display cabinets at Incomar	UNDP
• Phasing out CFC-12 with HFC-134a and CFC-11 with HFC-141b at five commercial refrigeration companies (umbrella project)	UNIDO
• Phase-out of CFC-11 & CFC-12 in the manufacture of domestic refrigerators & freezers by conversion to cyclo-pentane & HCF 134a at Metalurgica Venan Ltda.	UNDP

PROJECT EVALUATION SHEET
BRAZIL

SECTOR: Foam ODS use in sector (1997): 5,100 ODP tonnes

Sub-sector cost-effectiveness thresholds: Integral Skin US $16.86/kg
Polystyrene/Polyethylene US $8.22/kg

Project Titles:

(a) Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of rigid at Moldepol
(b) Phaseout of CFC-11 by conv. to water-blown technology in flexible molded foam,to water and methylene chloride blown technology in semi-rigid packaging foam,and to HCFC-141b in the manufacture of flexible integral skin foams at Espuma Oeste
(c) Conversion from CFC-11 to HCFC 141b and water based technology in the manufacture of rigid polyurethane foam and integral skin foam at JNP Group
(d) Phase-out of CFC-12 by conversion to n-butane as a blowing agent in the manufacture of extruded polyethylene foams for thermal insulation and food packaging purposes at Epex Co.

Project Data	**Integral skin**	**Multiple-subsectors**	**Multiple-subsectors**	**Polystyrene/polyethylene**
	Moldepol	**Espuma Oeste**	**JNP Group**	**Epex**
Enterprise consumption (ODP tonnes)	34.80	17.50	88.00	135.00
Project impact (ODP tonnes)	34.80	16.90	80.30	135.00
Project duration (months)	30	30	30	24
Initial amount requested (US $)	421,444	198,116	996,444	830,484
Final project cost (US $):				
Incremental capital cost (a)	50,000	130,000	980,000	744,860
Contingency cost (b)	5,000	11,500	85,775	69,386
Incremental operating cost (c)	366,444	61,770	352,454	-181,855
Total project cost (a+b+c)	421,444	203,270	1,418,229	632,391
Local ownership (%)	100%	100%	100%	100%
Export component (%)	0%	0%	0%	25%
Amount requested (US $)	421,444	181,616	823,867	632,391
Cost effectiveness (US $/kg.)	12.11	12.04	8.41	4.68
Counterpart funding confirmed?	Yes	Yes		Yes
National coordinating agency	PROZON	PROZON	PROZON	Ministry of the Environment and Amazon
Implementing agency	UNDP	UNDP	UNDP	UNIDO

Secretariat's Recommendations				
Amount recommended (US $)	421,444	181,616	823,867	632,391
Project impact (ODP tonnes)	34.80	16.90	80.30	135.00
Cost effectiveness (US $/kg)	12.11	9.94	10.37	4.68
Implementing agency support cost (US $)	54,788	23,610	100,625	79,563
Total cost to Multilateral Fund (US $)	476,232	205,226	924,492	711,954

1. Espuma Oeste: Cost-effectiveness of US $9.94 represents the composite threshold (limit US $12.35 /kg). The cost-effectiveness of the rigid foam and integral skin foam components is US $7.83 /kg and US $12.04 /kg respectively.
2. JNP Group: The cost due to JNP's system house operation (US $148,000) is not included in the calculation of the cost-effectiveness. US $10.37/kg represents composite cost-effectiveness of the rigid and integral skin foam sub-projects.

PROJECT EVALUATION SHEET
BRAZIL

SECTOR: Foam ODS use in sector (1997): 5,100 ODP tonnes

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

Project Titles:

(e) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Ananda
(f) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane sprayfoam at Isotherm.
(g) Conversion from CFC-11 to HCFC-141b and water based technology in the manufacture of rigid polyurethane foam at Polsul Group
(h) Phaseout of CFC-11 by conversion to HCFC-141b technology in rigid polyurethane foam (spray and pour in place) at SIFC

Project Data	**Rigid**	**Rigid**	**Rigid**	**Rigid**
	Ananda	**Isotherm**	**Polsul**	**SIFC**
Enterprise consumption (ODP tonnes)	18.00	29.00	59.00	10.50
Project impact (ODP tonnes)	16.00	26.30	55.00	9.50
Project duration (months)	30	30	30	30
Initial amount requested (US $)	37,380	193,737	655,885	73,600
Final project cost (US $):				
Incremental capital cost (a)	15,000	45,000	658,000	79,000
Contingency cost (b)	1,500	4,500	53,350	7,900
Incremental operating cost (c)	20,880	67,268	275,564	36,766
Total project cost (a+b+c)	37,380	116,768	986,914	123,666
Local ownership (%)	100%	10000%	100%	100%
Export component (%)	0%	0%	0%	0%
Amount requested (US $)	37,380	116,768	536,892	74,385
Cost effectiveness (US $/kg.)	2.33	4.44	7.36	7.83
Counterpart funding confirmed?	Yes	Yes		Yes
National coordinating agency	PROZON	PROZON	PROZON	PROZON
Implementing agency	UNDP	UNDP	UNDP	UNDP

Secretariat's Recommendations				
Amount recommended (US $)	37,380	116,768	536,892	74,385
Project impact (ODP tonnes)	16.00	26.30	55.00	9.50
Cost effectiveness (US $/kg)	2.33	4.44	7.36	7.83
Implementing agency support cost (US $)	4,859	15,180	69,058	9,670
Total cost to Multilateral Fund (US $)	42,239	131,948	605,950	84,055

1. Polsul: The cost due to Polsul systems house operation (US $132,000) is not included in the calculation of the cost-effectiveness.

PROJECT DESCRIPTION

(a) Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of rigid and flexible integral skin foams at Moldepol.

(b) Phaseout of CFC-11 by conversion to water-blown technology in flexible molded foam, to water and methylene chloride blown technology in semi-rigid packaging foam, and to HCFC-141b in the manufacture of flexible integral skin foams at Espuma Oeste.

(c) Conversion from CFC-11 to HCFC-141b and Water based Technology in the manufacture of rigid polyurethane foam and integral Skin Foam at JNP Group Project.

(d) Phaseout of CFC-12 by conversion to n-butane as a blowing agent in the manufacture of extruded polyethylene foams for thermal insulation and food packaging purposes at Epex Co.

(e) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Ananda.

(f) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane sprayfoam at Isotherm.

(g) Conversion from CFC-11 to HCFC-141b and water based technology in the manufacture of rigid polyurethane foam at Polsul Group Project.

(h) Phaseout of CFC-11 by conversion to HCFC-141b technology in rigid polyurethane foam (spray and pour-in-place) at SIFC.

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 reported	
- Baseline consumption of CFCs in foam sector		Not reported	
- 1998 consumption of CFCs in foam sector		Not reported	
- Funds approved for investment projects in foam sector as of March 1999 (27th Meeting)	US $	12,696,189	
- Quantity of CFC to be phased out in foam sector as of March 1999 (27th Meeting)		1,696.7	ODP tonnes
- Quantity of CFC phased out in foam sector as of March 1999 (27th Meeting)		332	ODP tonnes

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

Other relevant information:

1. Brazil has prepared an update of its country programme which was used by UNDP to provide sector background information. The number of enterprises in the foam sector is reported to have increased from 200 in 1993 to an estimated 500-650 currently. However, the number of these enterprises established after 25 July 1995 is not stated. Also the baseline Annex A Group I

substances consumption reported in the project document (10,499 ODP tonnes) is not consistent with the data published by the Ozone Secretariat (11,051 ODP tonnes).

2. Eight projects are being submitted to the 28th Executive Committee Meeting in the foam sector. When approved and implemented 391.8 ODP tonnes of CFCs (256.8 ODP tonnes CFC-11 and 135 ODP tonnes CFC-12) will be phased out.

Impact of the Projects

3. The 391.8 ODP tonnes to be phased out constitutes 3.5 per cent of Brazil's baseline consumption of Annex A Group I substances. There will be a residual ODP of 18 ODP tonnes due to the use of HCFC-141b as substitute blowing agent.

Justification for the Use of HCFC-141b

4. In seven of the projects, namely Ananda, Espuma Oeste, Isotherm, JNP Group Project, Polsul Group Project and SIFC, HCFC-141b will be used as interim technology. Justification of the use of the HCFC-141b based on comparative technological and economic analysis of the available options has been provided in each project. The Government letter provided in fulfilment of Decision 27/13 on the use of HCFCs has been attached as an annex to this evaluation.

(a) Phase out of CFC-11 by Conversion to Water-blown Technology in the Manufacture of rigid and flexible integral skin foams at Moldepol.

5. Moldepol used 34.8 tonnes/year of CFC-11 (average 1995-97) in the manufacture of rigid and flexible integral skin foam for decorative exterior building components. Production is to be converted to water blown foam. The two existing low pressure dispensers will be retrofit for adequate temperature control (US $20,000), although the enterprise would prefer to apply the funds toward the purchase of new dispensers. Other costs include trials (US $20,000), technology transfer and training (US $10,000) and incremental operating costs (US $366,444), as well as 10% contingency (US $5,000).

(b) Phase out of CFC-11 by Conversion to water-blown Technology in flexible molded foam, to water and methylene chloride blown technology in semi-rigid packaging foam, and to HCFC-141b in the manufacture of flexible integral skin foams at Espuma Oeste.

6. Espuma Oeste used 17.5 tons of CFC-11 in 1998 in the manufacture of rigid and semi-rigid foam (packaging and thermoware), flexible molded foam (cushions) and flexible integral skin foam. Production is to be converted to water blown foam for the flexible molded foam, to water and methylene chloride for the rigid and semi-rigid foam, and to HCFC-141b for the integral skin foam. The two existing low pressure dispensers are budgeted for retrofit with variable ratio, thermal control and HCFC-141b compatibility (US $60,000). In addition, a batch blender is foreseen (US $40,000). Other costs include trials (US $15,000), technology transfer and training (US $15,000) and incremental operating costs (US $61,770).

(c) Conversion from CFC-11 to HCFC-141b and Water based Technology in the Manufacture of Rigid Polyurethane Foam and integral Skin Foam at JNP Group Project.

7. JNP, a Brazilian polyurethane systems house, will convert its systems to CFC-free systems along with twenty-five (25) of its customers. These enterprises used 88 tonnes of CFC-11 in 1998 to manufacture rigid foam for insulation purposes, as well as integral skin and HR flexible molded. The production is to be converted to HCFC-141b as an interim step for the rigid foam and integral skin foam applications, with a likely permanent solution being water based or liquid HFC formulations. For the flexible molded foam, water based formulations are to be developed. The enterprises will replace existing low pressure dispensers by high pressure dispensers for the rigid foam applications (21 dispensers = US $630,000). For the ISF applications, four low pressure dispensers will be retrofit for use with HCFC-141b (US $40,000) and one new dispenser will be procured (US $35,000). For the flexible molded foam customers, one low pressure dispenser will be procured (US $30,000). The enterprises in the JNP group of customers and the project costs are provided in Table 1 attached to this evaluation. JNP will install a multi-component blending tank (US $85,000) and two staging tanks (US $30,000), and procure one prototype dispenser (US $30,000) and a field K-factor tester (US $5,000). Other costs include trials (US $85,000) and technology transfer (US $60,000) and incremental operating costs (US $501,900).

(d) Phase out of CFC-12 by conversion to n-butane as a blowing agent in the manufacture of extruded polyethylene foams for thermal insulation and food packaging purposes at Epex Co.

8. Epex Co. was established in March 1995. It consumed an average of 135 tonnes of CFC-12 to manufacture extruded polyethylene foams for thermal insulation, sealing and food packaging purposes. It will phase out the CFC-12 from the production of extruded polyethylene foams by converting to n-butane technology. The company operates three remodelled extruders commissioned in March 1995. The extruders will be retrofitted at a total cost of US $581,400. Other costs include carrying out of necessary civil works, installation of butane storage and pumping facility, building of a technological storage facility, installation of a safety system (US $187,460), services, safety certification, consultancy, commissioning and training including safety training (US $51,000). The total capital cost of the project is US $973,632, while the incremental operational savings is calculated to be US $66,262.

(e) Conversion from CFC-11 to HCFC-141b Technology in the Manufacture of Rigid Polyurethane Foam at Ananda.

9. Ananda used 18 tonnes of CFC-11 in 1998 in the manufacture of roof panels and insulated door jambs. The production is to be converted to HCFC-141b as an interim step, with a likely final step being either water blown or liquid HFCs. The project includes retrofit of the existing low pressure dispenser for use with HCFC-141b (US $5,000). Other costs include trials (US $5,000), training and technology transfer (US $10,000) and contingency (US $1,500). The project also includes incremental operating costs for two years (US $20,880).

(f) Conversion from CFC-11 to HCFC-141b Technology in the Manufacture of Rigid Polyurethane Sprayfoam at Isotherm.

10. Isotherm used 29 tonnes of CFC-11 in the manufacture of rigid polyurethane foam for sprayfoam applications in 1997. The production is to be converted to HCFC-141b as an interim step, with a likely permanent solution being water based formulations. The project includes replacement of a low pressure Pumer S-100 dispenser by a high pressure spray/pour foam dispenser ($30,000). Other costs include trials (US $5,000), training and technology transfer (US $10,000) and contingency (US $4,500). The project also includes incremental operating costs for two years (US $144,273).

(g) Conversion from CFC-11 to HCFC-141b and Water based Technology in the Manufacture of Rigid Polyurethane Foam at Polsul Group Project.

11. Polsul, a Brazilian polyurethane systems house, will convert its systems to CFC-free systems along with fourteen (14) of its customers. These enterprises used 59 tonnes of CFC-11 in 1998 to manufacture rigid foam for insulation purposes, as well as structural foam applications. The production is to be converted to HCFC-141b as an interim step for the insulation application, with a likely permanent solution being water based or liquid HFC formulations; and directly to water based formulations for the structural applications. The enterprises will replace existing low pressure dispensers by high pressure dispensers for the insulating applications (US $450,000). Polsul will install a multi-component blending tank (US $85,000) and two staging tanks (US $30,000), and procure one prototype dispenser (US $30,000) and a field K-factor tester (US $5,000). Other costs include trials (US $52,000) and technology transfer (US $50,000) and incremental operating costs (US $221,850). Grant requested is calculated individually per enterprise applying the applicable category threshold. The enterprises in the Polsul group and their project costs are shown in Table 2 attached to this evaluation.

(h) Phase out of CFC-11 by conversion to HCFC-141b technology in Rigid Polyurethane Foam (Spray and Pour in Place) at SIFC.

12. SIFC will eliminate the use of 9.4 tonnes out of 10.5 tonnes/year of CFC-11 in its sprayfoam and pour-in-place applications of polyurethane foam insulation. The production is to be converted to HCFC-141b technology as an interim replacement, with likely permanent solutions being either water based of HFC based formulations. The project includes replacement of the existing low pressure dispensers by high pressure dispensers of equivalent capacity (US $64,000). Other costs include trials (US $5,000), training and technology transfer (US $10,000) and contingency (US $8,400). The project also includes incremental operating costs for two years (US $45,675). The grant is based on the maximum allowable grant for the category and ODP eliminated.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Rigid and Integral Skin Foam

Ananda, Espuma Oeste, Isotherm, Moldepol and SIFC

1. The Fund Secretariat and UNDP discussed the projects and agreed on the costs. With regard to Espuma Oeste, the cost of the batch blender was agreed as US $25,000 instead of US $40,000 in view of the technological upgrade involved in its provision. The rigid foam and integral skin component were calculated separately to ensure compliance with the respective cost-effectiveness thresholds. Consequently the project cost amounted to US $181,616 made up of:

Component	Project Impact ODP tonnes	Project Cost US $	Cost-effectiveness US $/kg
Rigid foam	5.2	40,716	7.83
Integral skin	11.69	140,900	12.04
TOTAL	**16.89**	**181,616**	**9.94** (composite threshold)

2. The agreed project costs of the other projects are as indicated in the Secretariat's recommendations in the Project Evaluation Sheet.

JNP and Polsul Group Projects

3. The two projects, JNP Group project and Polsul Group project will cover 39 SMEs with CFC-11 consumption ranging from 0.9 ODP tonnes to 6.4 ODP tonnes. The total CFC-11 to be covered by the two projects is 147 ODP tonnes. During the discussion of the project UNDP stressed the importance of the role played by indigenous systems suppliers in facilitating access of SMEs in the foam sector to new foam systems to promote their conversion to non-CFC systems. While UNDP indicated that most of the estimated 500-650 foam producing companies are SMEs and hinted at submitting in future similar projects grouped around indigenous systems houses, no information was provided on the scope of the SME sector.

4. The approval of the two projects will bring the number of such projects approved for Brazil to three. However it is not certain what impact they will have on the SME foam sub-sector. Consequently, the Executive Committee may wish to request Brazil to provide a clearer picture of the foam sector SMEs prior to submission of any future projects for enterprises in the sub-sector.

JNP and Polsul Systems Houses

5. The Fund Secretariat and UNDP discussed the two projects in relation to the systems suppliers (JNP, Polsul) and the downstream customers. In view of possible technological or capacity upgrade resulting from provision of the new premixers it was agreed to cover

US $50,000 of the cost of the premixers for JNP and Polsul. Also one instead of two staging tanks should be provided for Polsul. Technology transfer cost was reduced from US $20,000 to US $10,000. Thus the capital cost for the two systems house projects are:

JNP: US $148,500 (including US $13,500 contingency)
Polsul: US $132,000 (including US $12,000 contingency)

The projects do not include incremental operational cost, since the systems houses do not by themselves phase out ODS.

Downstream Customers

6. The costs of the projects for the downstream customers were agreed. The calculation of the incremental capital cost included appropriate discounts for lack of equipment in the baseline and/or old age of equipment.

7. The following project costs were agreed for the two groups.

	JNP Group	Polsul Group
Incremental capital cost	US $ 917,275	US $ 579,350
Incremental operational cost	US$ 352,454	US $ 275 564
Total project cost:	US $1,269,729	US $854,914
Eligible Grant	US $675,367	US $404,892
Counterpart Funding Required	US $594,362	US $450,022

8. Only two of the 34 rigid foam producers in the two projects met the cost-effectiveness threshold of US $ 7.83/kg and three of the five integral skin foam producers met the threshold of 16.86/kg. The incremental operational cost constituted about 30% of the cost of the projects. Should the systems houses be able to reduce the level of the difference in the prices of the new and old systems, the commitment of the enterprises to provide counterpart funding could be reduced and the value added to the project by the involvement of the systems houses increased.

9. UNDP has not obtained the commitment of the enterprises regarding the counterpart funding. It has indicated that the counterpart funding will be addressed during the implementation of the projects. In view of the levels of counterpart funding the Executive Committee may wish to consider the projects within the context of Decision 22/63 on counterpart funding and approve the projects provisionally. However, in so doing, the Executive Committee may also wish to urge UNDP in cooperation with the systems houses (JNP and Polsul) to expedite the process of obtaining the enterprises' commitments.

10. Since the systems houses do not phase out CFC by themselves the costs of the systems house component of the project were not subjected to calculation of cost-effectiveness. The project costs were considered separately and not included in the cost of the projects for the downstream customers. When the cost of the systems house component and the customers component are considered together, the total cost to the Multilateral Fund of the two group projects (excluding implementing agency support costs) will be:

JNP Group: US $823,867
Polsul Group: US $536,892

Epex

11. The Fund Secretariat and UNIDO discussed the project. UNIDO shared with the Secretariat documentation from the company which confirmed that the company started using CFC-12 before the 25 July 1995 cut-off date. All the costs associated with safety and fire protection were agreed as proposed in the project except automatic carbon dioxide system over die which was funded at the level of about 55% of the proposed cost, due to the high level of safety already provided in the project. The costs of some items of extruder retrofits were not considered incremental considering the type, baseline, age and condition of the extruders. These included extrusion head with adjustable gap (at US $30,000 per extruder for a total of US $90,000), die head conditioning unit (at US $18,000 per extruder for a total of US $54,000) and homogenizer (at US $27,500 each for a total of US $82,500).

12. The incremental operational savings were also recalculated to correct errors of calculation and assumptions. The project costs became:

Incremental capital cost	US $814,246
Incremental operational savings	US $181,855
Project cost	US $632,391

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the Moldepol, Espuma Oeste, Epex, Ananda, Isotherm, and SIFC projects with the level of funding and associated support costs indicated in the table below.

Project Title	Project Cost US $	Support Cost US $	Implementing Agency
Phaseout of CFC-11 by conversion to water-blown technology in the manufacture of rigid and flexible integral skin foams at Moldepol	421,444	54,788	UNDP
Phaseout of CFC-11 by conversion to water-blown technology in flexible molded foam, to water and methylene chloride blown technology in semi-rigid packaging foam, and to HCFC-141b in the manufacture of flexible integral skin foams at Espuma Oeste.	181,616	23,610	UNDP
Phaseout of CFC-12 by conversion to n-butane as a blowing agent in the manufacture of extruded polyethylene foams for thermal insulation and food packaging purposes at Epex Co.	632,391	79,563	UNIDO
Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam at Ananda.	37,380	4,859	UNDP

Project Title	Project Cost US $	Support Cost US $	Implementing Agency
Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane sprayfoam at Isotherm.	116,768	15,180	UNDP
Phaseout of CFC-11 by conversion to HCFC-141b technology in rigid polyurethane foam (spray and pour-in-place) at SIFC.	74,385	9,670	UNDP

2.

(a) To provisionally approve the JNP and Polsul group projects subject to Executive Committee Decision 22/63 paragraphs (c) and (d) on counterpart funding with the level of funding and associated support costs as follows:

Project Title	Project Cost US $	Support Cost US $	Implementing Agency
Conversion from CFC-11 to HCFC-141b and Water based Technology in the Manufacture of Rigid Polyurethane Foam and integral Skin Foam at JNP Group Project.	823,867	100,625	UNDP
Conversion from CFC-11 to HCFC-141b and Water based Technology in the Manufacture of Rigid Polyurethane Foam at Polsul Group Project.	536,892	69,058	UNDP

(b) To request UNDP, in cooperation with the beneficiary systems houses (JNP and Polsul) and relevant Government authorities, to obtain the relevant commitments as soon as possible in order that the projects could proceed with minimum delay.

3. To decide that further approval of projects to phase out the foam sector SMEs in Brazil will be subject to the submission by the Government of Brazil of a strategy paper or a plan for phasing out the use of ODS by eligible enterprises in the sub-sector.

Table 1: List of Enterprises in the JNP Group and Project Costs

COMPANY	Technology	Category Threshold	SYSTEM (t/y)	ODP eliminated (t/y)	ICC	IOC	Deductions*	Eligible project costs	Grant requested	Grant Effectiveness
GROUP I – RIGID FOAM CUSTOMERS										
APLITERM	141b	7.83	20	2.7	25,960	11,925	0	37,885	21,141	7.83
ATAKIS	141b	7.83	25	2.7	80,960	11,925	0	92,885	21,141	7.83
BAURU	141b	7.83	6	0.9	36,960	3,975	7,500	33,435	7,047	7.83
FIBRAL	141b	7.83	48	6.4	36,960	28,267	0	65,227	50,112	7.83
FURGOES LONDRINA	141b	7.83	48	6.4	36,960	28,267	7,500	57,727	50,112	7.83
GENCO	141b	7.83	6	0.9	36,960	3,975	0	40,935	7,047	7.83
GL	141b	7.83	20	2.7	36,960	11,925	0	48,885	21,141	7.83
HELIOTEK	141b	7.83	25	3.6	36,960	15,900	7,500	45,360	28,188	7.83
HIDROPLAS	141b	7.83	30	4.5	36,960	19,875	27,000	29,835	29,835	6.63
INTERFRIO	141b	7.83	24	3.6	36,960	15,900	0	52,860	28,188	7.83
ISOMAC	141b	7.83	36	5.4	36,960	23,850	7,500	53,310	42,282	7.83
ISOMONT	141b	7.83	8	0.9	36,960	3,975	7,500	33,435	7,047	7.83
ISOTERMICA	141b	7.83	36	5.4	36,960	23,850	7,500	53,310	42,282	7.83
JGM	141b	7.83	6	0.9	36,960	3,975	0	40,935	7,047	7.83
MADEPINHO	141b	7.83	36	5.4	36,960	23,850	7,500	53,310	42,282	7.83
MAQFRIO	141b	7.83	36	5.4	36,960	23,850	7,500	53,310	42,282	7.83
SER-THERM	141b	7.83	15	1.8	36,960	7,950	9,000	35,910	14,094	7.83
SINTEC	141b	7.83	24	3.6	36,960	15,900	0	52,860	28,188	7.83
TACAFRIO	141b	7.83	18	2.7	36,960	11,925	7,500	41,385	21,141	7.83
TERMOSOL	141b	7.83	24	3.6	69,960	15,900	0	85,860	28,188	7.83
GROUP II – FMF/ISF CUSTOMERS										
MARIA CECILIA	Water	16.86	36	4	47,960	17,667	10,000	55,357	55,357	13.84
NICHIBRAS	141b	16.86	18	1.8	14,960	7,950	0	22,910	22,910	12.73
PPU	141b	16.86	10	0.9	14,960	3,975	0	18,935	15,174	16.86
PROCAR	Water	16.86	50	2	3,960	8,833	0	12,793	12,793	6.40
PURFLEX	141b	16.86	36	1.8	42,460	7,950	8,750	41,660	30,348	16.86
			641	**80**	**929,500**	**353,334**	**122,250**	**1,160,314**	**675,367**	

*Deductions for equipment to replace hand mixing or for age of old low pressure replaced by new high pressure dispenser.

Table 2: List of Enterprises in the Polsul Group and Project Costs

COMPANY	Technology	SYSTEM (t/y)	ODP eliminated (t/y)	ICC	IOC	Deductions	Eligible project costs	Grant requested	Grant Effectiveness
AVIPAL	141b	50	6.4	4,557	26,688	0	31,245	31,245	4.88
DELFINO	141b	20	2.7	37,557	11,259	7,500	41,316	21,141	7.83
FRIGOSUL	141b	40	5.4	37,557	22,518	0	60,075	42,282	7.83
MARE	Water	30	4	37,557	28,232	7,500	58,289	31,320	7.83
MICHELON	141b	30	3.6	37,557	15,012	12,000	40,569	28,188	7.83
ZAAR	141b	30	3.6	103,557	15,012	36,000	82,569	28,188	7.83
PIPILINE	Water	30	4	37,557	28,232	7,500	58,289	31,320	7.83
PLASTITALIA	Water	30	4	37,557	28,232	12,000	53,789	31,320	7.83
PNS	Water	30	4	37,557	28,232	9,000	56,789	31,320	7.83
FLORESTA	141b	20	2.7	4,557	11,259	0	15,816	15,816	5.86
RODOSSINOS	141b	30	3.6	37,557	15,012	7,500	45,069	28,188	7.83
TIL	141b	30	3.6	103,557	15,012	18,000	86,569	28,188	7.83
COPEL	141b	20	2.7	37,557	11,259	7,500	41,316	21,141	7.83
MEBRAFE	141b	35	4.5	37,557	18,765	0	56,322	35,235	7.83
		425	**54.8**	**591,798**	**274,724**	**124,500**	**728,022**	**404,892**	

*Deductions for equipment to replace hand mixing or for age of old low pressure replaced by new high pressure dispenser.

PROJECT EVALUATION SHEET
BRAZIL

SECTOR: Fumigant ODS use in sector (1998): 421.8 ODP tonnes

Sub-sector cost-effectiveness thresholds: n/a US $/kg

Project Title:

(a) Phasing out methylbromide in the entire Tobacco Sector

Project Data	**Methyl bromide**
	Tobacco
Enterprise consumption (ODP tonnes)	421.80
Project impact (ODP tonnes)	421.80
Project duration (months) l	48
Initial amount requested (US $)	11,722,205
Final project cost (US $):	
Incremental capital cost (a)	38,867,741
Contingency cost (b)	0
Incremental operating cost (c)	-21,130,536
Total project cost (a+b+c)	17,737,205
Local ownership (%)	100%
Export component (%)	0%
Amount requested (US $)	11,722,205
Cost effectiveness (US $/kg.)	27.79
Counterpart funding confirmed?	
National coordinating agency	
Implementing agency	UNIDO

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

PROJECT DESCRIPTION

Phasing out methyl bromide in the entire Tobacco Sector

1. UNIDO is submitting a project proposal for the phase out of the consumption of methyl bromide in soil fumigation in tobacco seedbeds in Brazil. Due to the high cost of the project and implementation modality proposed, the Fund Secretariat is attaching the project document to the Project Evaluation Sheet.

Tobacco sector in Brazil

2. Brazil is the fourth largest tobacco producer in the world, with a total production of 500,000 tonnes cultivated by nearly 209,000 producers on 310,000 hectares of land; a significant portion of the production is exported (58 per cent in 1997). The main production areas are: the Southern states of Rio Grande do Sul, Santa Catarina and Paraná (90 per cent of total production), and the Northeastern states of Bahia and Alagoas (10 per cent).

3. The average size of the family-run farm is 20 hectares, of which only 2 hectares is used for tobacco production. The remainder of the property is used for annual and perennial crops and forestry. Almost all farmers in the Southern States are members of AFUBRA, the largest tobacco growers' association in Brazil; it *inter alia,* provides insurance and other services (credit for replacement of tobacco curing stoves, analysis of production costs, agro-commercial purchases and farmers' education).

4. The counterpart of the farmers is the tobacco industrial sector whose members are represented by SINDIFUMO (Sindicato da Industria do Fumo). The entire sector is based on the "Integrated Production System", through which the varieties of tobacco to be cultivated, the total area to be covered and the total production expected are established by the enterprises at the beginning of the growing season. Technical assistance to farmers by 1,500 agronomists and agricultural technicians, is also provided regularly. The seed, fertilizer and pesticide are sold only to a fixed number of farmers in order to obtain the required production. The industry commits itself to buying all the tobacco produced by the associate farmers.

5. The tobacco produced in the South is light flue-cured ("Virginia" 75 per cent and "Amarelinho" 2 per cent) and air-cured ("Burley" 20 per cent and "Comum" 2 per cent), mainly used in the manufacture of cigarettes.

6. In the State of Alagoas, 7,000 producers cultivate 30,000 hectares to obtain three different kinds of tobacco: "Capa" (used to protect and contain cigars), "Hoja" (used for cigarettes) and "Corda" (manufactured as a 4-centimeter diameter rope, it is smoked in hand-made cigarettes). "Capa" and "Hoja" are destined for export while "Corda" is for internal consumption.

7. The tobacco sector in the northeaster states is not as organized as in the South. Technical assistance is provided only for the production of "Capa"; neither official prices for tobacco nor quality standards are issued. Practically, there is no significant consumption of methyl bromide in the Northeast region.

8. In the traditional system, when the soil is well prepared, the seedbeds are treated with methyl bromide prior to sowing of seeds in May or July, depending on the region. Transplanting occurs from August 15 to September 20 or from September 15 to October 20 depending on the climatic zone. Tobacco is harvested from November to February.

Project description

9. The Executive Committee approved, at its 22nd Meeting (May 1997) a demonstration project on three alternatives technologies to the use of methyl bromide in tobacco seedbeds, namely non-soil cultivation, solarization, and low-dose chemicals (under UNIDO implementation). Confirming the results obtained in the demonstration project, Brazilian producers have elected the soilless floating tray system in micro tunnels as the most appropriate for organizational and technical reasons. This technology has also been tested by AFUBRA and SINDIFUMO in a considerable number of farms.

10. The objective of this project is to eliminate the use of 703 metric tonnes of methyl bromide (equivalent to 421.8 ODP tonnes considering an ODP value of 0.6 or 281.2 ODP tonnes considering the revised ODP value of 0.4), in the production of transplants using the traditional tobacco seedbed technology. This amount represents the entire consumption of the tobacco sub-sector in Brazil. The project proposes to install small micro-tunnels (25 m^2) composed of 18 corrosion-protected arches, covered by UV protected plastic sheets. In the interior of the tunnel a small pool made with ceramic holders and black polyethylene film is filled with water to a depth of 6 cm. Expanded polystyrene trays filled with substrate float on the surface of the pool. The equipment set includes manual seeders, substrate compactors for sowing, elastic bidders, clipping devices and polystyrene trays.

11. The number of micro-tunnels required is 240,218, at a total cost of US $34.97 million. Of this cost, US $23.3 million is related to polystyrene trays and US $7.53 million is for polyethylene sheets. Operating savings for four years (NPV) associated with use of raw materials (fertilizer, pesticides, seed and substrate), and labour costs are estimated at US $21.13 million. In addition, a four-year subcontract for transferring the technology to 143,700 farmers, has been estimated at US $3.77 million to be funded by SINDIFUMO.

12. The project states that the process of transferring a new technology to a large number of farmers is a difficult task, which cannot simply be accelerated by adding more inputs. The recipients need time to absorb the technology and to correct unavoidable mistakes. Therefore, the project will be implemented over four years.

13. The project will be implemented by UNIDO, under national co-ordination of the Ozone Unit. UNIDO will work closely with AFUBRA and SINDIFUMO. Both associations are co-financing the project. The contracts for equipment will be awarded on the basis of competitive bidding. The final terms of reference for the subcontracts will be drawn up after the project is approved. The contractors appointed by UNIDO through a subcontract will be responsible for the supply and delivery of all necessary equipment to SINDIFUMO. The Government of Brazil will be responsible to ensure that the new technology complies with established national standards.

National policies and regulations

14. The Government of Brazil has agreed to issue and implement the following policies: (i) at the completion of the project, the Government will issue a regulation banning the use of methyl bromide in the tobacco sector; (ii) the Government will establish in 1999, a register of importers of methyl bromide and re-sellers/distributors; (iii) effective 1999, methyl bromide will be included in the system to control trading of imports and exports (SISCOMEX) which requires previous administrative authorization for importing into Brazil; (iv) from January 2000, the Government of Brazil has agreed on a 20 per cent reduction annually on methyl bromide consumption and only essential and critical uses will be allowed beyond January 2005.

SECRETARIAT'S COMMENTS

1. This is the second investment project for phasing out methyl bromide in tobacco seedbeds submitted for consideration by the Executive Committee. The Secretariat reviewed the project on the basis of the existing guidelines and in the light of the report submitted by UNIDO on the progress of implementation of the demonstration project in Brazil. The Secretariat also sought outside expert opinion.

Selection of technology

2. The floating tray system in micro-tunnels was selected since it is the most cost-effective, reliable and sustainable technology, which is being used by the majority of tobacco growers in developed countries. The results of the demonstration project indicated that in the floating system the number of seedlings produced per square meter was the highest among other alternative technologies, the incidence of weeds and nematodes was the lowest, the number of replants was also the lowest and, seedlings produced have good diameter and the highest weight of roots. The farmer's association AFUBRA has already chosen and successfully tested this technology in about 10,000 hectares involving 5,000 farmers. The Government of Brazil has also endorsed the choice of the floating tray system as the alternative technology.

3. The Secretariat and UNIDO discussed issues associated with the floating tray system, such as diseases in the trays, the availability of only a few registered pesticides for use in float systems, the higher level of management required; and the detrimental effects of temperature and humidity that could severely affect the quality of the tobacco. UNIDO indicated that during the demonstration project no diseases were noticed during the trials undertaken by 5,000 farmers in 1998; the pesticides and fertilizers required for the floating system are already registered in Brazil; and the higher level of management required will be provided through the training programme included.

Implementation modalities

4. The transfer of tobacco transplant production from a soil bed to a float bed system is a lengthy process; experience in the United States over the last 8-10 years shown that no single set of transplant production systems works for all growers (different float bed systems evolved over time to suit the needs of individual growers as they learned the system). A more cost-effective

and viable approach was suggested by which fewer number of growers learn the system and grow transplants for a larger number of other growers; then, larger growers grow transplants for themselves and for several smaller growers (numerous growers are now specializing in this approach). However, after discussing with the farmers, this approach was not selected for the following reasons:

(a) More expensive approach: The use of large tunnels is only justified when the planting season is long enough to allow two cycles of seedlings production per campaign. If not, the investment cost per thousand seedlings is US$16.2 for large tunnels and US$ 8.3 for small tunnels

(b) Higher risks: Concentrating seedlings production into fewer facilities will increase the risk of a failure which would affect a much larger number of farmers.

(c) Logistical arrangements: Transport of seedlings trays from the new seedlings production facilities to the farmers site will require to establish new transport networks and would require special boxes to protect the seedlings

Capital costs

5. The Secretariat and UNIDO discussed the capital cost of the project. The Secretariat pointed out that the cost for the trays requested was over US $23.3 million, which are too expensive based on prices in the United States. Considerably lower costs can be obtained based on larger quantities to be purchased. UNIDO indicated that in order to reduce costs, trays need to be produced close to the area of utilization. During project preparation, five large potential producers of trays in Brazil were identified in the area of Sao Paulo (about 1,000 km from the tobacco production region). The cost of US $0.97 was thus proposed based on the best offer received. This price is very similar to prices in Europe.

Operational costs

6. The calculation of the operational costs were based on firm quantities of pesticides and detailed labour costs. The quantities and inputs given in the project document have been based on a statistical sampling made separately by SINDIFUMO and AFUBRA. UNIDO has counter-checked the data with the data from the demonstration projects. UNIDO has also checked the prices of the inputs and found that some of them were not in line with international prices. After lengthy negotiations, AFUBRA and SINDIFUMO agreed to take international prices increased by the corresponding transport costs. Nonetheless, the Secretariat pointed out that this methodology was very sensitive to changes (any small changes in the amounts of fertilizers used or their costs will result in major changes in the overall calculation).

Other uses of the land and micro-tunnels

7. The project proposal stated that the cost associated with the land that would no longer be used for the production of seedbeds (equivalent 2,399 hectares) has not been considered in the calculation of the eligible costs of the project for the following reasons: the average tobacco farmer in Brazil owns an area of 17.3 hectares of which only 2.3 are dedicated to tobacco production and 3.5 hectares to natural forest; the potential output increase due to the availability

of an extra 0.02 hectares would be negligible; farmers are already using the traditional seedbeds to plant food crops after the regular 3 month seedling production; there is no demand in the market for renting very small parcels of land for just three months per year.

8. The Secretariat also mentioned that the micro-tunnels, once the production of seedbeds ceases, could be used for production of other crops, and thus, would have to be taken into consideration in the overall project cost. UNIDO indicated that other horticultural products could be produced only if the tunnels would be available during the coldest months of the year; which corresponds with the production of seedbeds.

Export component

9. The Secretariat pointed out that the export component has not been taken into consideration in the project, as indicated in the current strategy and guidelines on methyl bromide projects ("the size of the eligible grant could be reduced depending on the degree of export to non-Article 5 countries of the finished product or the participation of multinational corporations"). UNIDO indicated that the farmers themselves do not export tobacco.

10. The Fund Secretariat and UNIDO are still discussing issues associated with the incremental costs of the project. The results of the discussions will be communicated to the Executive Committee accordingly.

PROJECT EVALUATION SHEET
BRAZIL

SECTOR: Refrigeration ODS use in sector (1997): 5,190 ODP tonnes

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

Project Titles:

(a) Conversion from CFC-11 to HCFC-141b, and from CFC-12 to HFC-134a and from R-502 to R-402a in the manufacture of commercial refrigeration products at General Icy
(b) Phaseout of CFC-11, CFC-12 and R-502 by conversion to HCFC-141b technology (foam) and HFC-134a and R-404a technology (refrigerant) in the manufacture of milk coolers and display cabinets at Incomar
(c) Phasing out CFC-12 with HFC-134a and CFC-11 with HFC-141b at five commercial refrigeration companies (umbrella project)
(d) Phase-out of CFC-11 & CFC-12 in the manufacture of domestic refrigerators & freezers by conversion to cyclo-pentane & HCF 134a at Metalurgica Venan Ltda.

Project Data	**Commercial**	**Commercial**	**Commercial**	**Domestic**
	General Icy	**Incomar**	**Umbrella**	**Venan**
Enterprise consumption (ODP tonnes)	31.23	5.30	32.40	36.05
Project impact (ODP tonnes)	27.90	4.90	32.00	36.05
Project duration (months)	30	30	24	30
Initial amount requested (US $)	424,360	74,529	485,916	757,130
Final project cost (US $):				
Incremental capital cost (a)	235,300	102,000	374,916	678,350
Contingency cost (b)	23,530	10,200		67,800
Incremental operating cost (c)	152,309	7,056	111,000	163,362
Total project cost (a+b+c)	411,139	119,256	485,916	909,512
Local ownership (%)	100%	100%	100%	100%
Export component (%)	0%	0%	3%	0%
Amount requested (US $)	411,139	74,529	485,916	757,130
Cost effectiveness (US $/kg.)	14.74	15.21	15.18	13.76
Counterpart funding confirmed?	Yes	Yes		Yes
National coordinating agency	PROZON	PROZON	Ministry of Environment	PROZON
Implementing agency	UNDP	UNDP	UNIDO	UNDP

Secretariat's Recommendations				
Amount recommended (US $)	411,139	74,529	485,916	757,130
Project impact (ODP tonnes)	27.90	4.90	32.00	36.05
Cost effectiveness (US $/kg)	14.74	15.21	15.18	13.76
Implementing agency support cost (US $)	53,448	9,689	63,169	93,284
Total cost to Multilateral Fund (US $)	464,587	84,218	549,085	850,414

PROJECT DESCRIPTION

(a) Conversion from CFC-11 to HCFC-141b, and from CFC-12 to HFC-134a and from R-502 to R-402a in the manufacture of commercial refrigeration products at General Icy

(b) Phase out of CFC-11, CFC-12 and R-502 by conversion to HCFC-141b technology (foam) and HFC-134a and R-404a technology (refrigerant) in the manufacture of milk coolers and display cabinets at Incomar

(c) Phasing out CFC-12 with HFC-134a and CFC-11 with HFC-141b at five commercial refrigeration companies (umbrella project)

(d) Phase-out of CFC-11 & CFC-12 in the manufacture of domestic refrigerators & freezers by conversion to cyclo-pentane & HCF 134a at Metalurgica Venan Ltda.

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 reported
– Baseline consumption of CFCs in refrigeration sector	Not reported
– 1998 consumption of CFCs in refrigeration sector	Not reported
– Funds approved for investment projects in refrigeration sector **as of March 1999**	US $14,003,653
– Quantity of CFC to be phased out in refrigeration sector **as of March 1999**	2,454 ODP tonnes
– Quantity of CFC phased out in refrigeration sector **as of March 1999**	454 ODP tonnes

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

Sector Information

1. The UNDP projected unconstrained consumption of CF-11 and CF-12 by end users in commercial and domestic refrigeration segments of foam sector, based on a growth rate of 5%, will reach 4,080 MT by year 2000, 5,555 MT by year 2005, and 7,530 MT by 2010. The UNDP projected unconstrained consumption of CF-12 in refrigeration and air conditioning, excluding domestic refrigeration, based on the same growth rate, will reach 5,720 MT by year 2000, 7,300 MT by 2005, and 9300 MT by 2010.

2. About 60 companies having annual CFC consumption of more than 2 MT have been identified in Brazil by consultants of the implementing agencies. This information served as a basis for the 1999 update of the Country Programme of Brazil. Companies on the list, with the consumption higher than 10 ODP tonnes per year, have either already converted, or have projects in execution, or under formulation. Companies with less than 10 MT/year of CFC consumption,

for which formulation of individual projects is not feasible or cost-effective, are identified and grouped by UNIDO to form various umbrella projects.

3. The Executive Committee has approved about US$ 14.0 million for twenty-two projects to phase out 2,454 OPD tonnes of CFC in the refrigeration sector.

4. The approval of the four proposed projects will help Brazil to phase out a total of 101.25 ODP tonnes. The project duration for projects (a), (b), and (c), is 2.5 years and for project (d) is 2 years; thus, the expected ODP phase out would not impact on the 1999 freeze target of the country. Nevertheless, it will assist the country to meet the country's obligations under the Montreal Protocol.

(a) Conversion from CFC-11 to HCFC-141b, and from CFC-12 to HFC-134a and from R-502 to R-402a in the manufacture of commercial refrigeration products at General Icy

5. This project will phase out 27.9 ODP tonnes in the manufacture of commercial refrigeration systems at General Icy. It will be achieved by converting CFC-11 to HCFC-141b as the foam blowing agent, CFC-12 and R-502 to HFC-134a and R-402b, respectively, as the refrigerants. The enterprise operates two low pressure foam dispensers (15 and 7 kg/min). There are also three vacuum pumps, and one leak detector. The two low pressure dispensers and leak detector will be replaced and scrapped while the three vacuum pumps will be retrofitted. The project will include incremental capital costs covering two high pressure dispensers (US $180,000), a semi-automatic charging board (US $5,000), one vacuum pump (US $3,300), retrofit of two vacuum pumps (US $1,000), one leak detector (US $1,000), foam trials (US $5,000), prototyping (US $15,000), training and technology transfer (US $15,000). The total incremental operating costs amount to US $175,400 based on 2 years duration.

(b) Phase out of CFC-11, CFC-12 and R-502 by conversion to HCFC-141b technology (foam) and HFC-134a and R-404a technology (refrigerant) in the manufacture of milk coolers and display cabinets at Incomar

6. This project will phase out 4.9 ODP tonnes in the manufacture of milk coolers and display cases at Incomar. It will be achieved by converting foam production to HCFC-141b technology, refrigeration components from CFC-12 and R-502 to HFC-134a and R-404a, respectively. The enterprise will replace two low pressure dispensers with two medium output high pressure dispensers (US $60,000). The project will also include incremental capital costs covering two filling/evacuation station (one each for HFC-134a and R-404a) (US $10,000), one halogen leak detector (US $1,000), trials (US $11,000), and technology transfer and training (US $20,000). The total incremental operating costs amount to $7,056 based on 2 years duration.

(c) Phasing out CFC-12 with HFC-134a and CFC-11 with HFC-141b at five commercial refrigeration companies (umbrella project)

7. This umbrella project comprises five companies (Arpama, Begel, Belliere, Genarex and Katz Refrigeracao) and will phase out 32.4 ODP tonnes (100% of the total use of CFC-11 and CFC-12 in the commercial refrigeration equipment in these companies). It will be achieved by

converting CFC-11 to HCFC-141b as the foam blowing agent, CFC-12 to HFC-134a as the refrigerant. Part of the CFC-11 will be substituted by ODS-free extruded polystyrene.

8. The project will include incremental capital costs covering high pressure foaming machines (US $72,000), modification to existing foaming equipment (US $5,000), a curing oven (US $20,000), tooling for EPS moulding (US $37,600), various charging units, leak detection and evacuation equipment (US $129,000), redesign/trial production (US $7,000 level), and training (US $16,000). The incremental operating cost is requested for less than six months at US $111,000 because of the limitations of the cost-effectiveness threshold values.

Justification for the Use of HCFC-141b

9. The two companies have selected HCFC-141b technology to replace CFC-11 in foam blowing operations. The justifications for the use of HCFC have been provided for each individual company. The Government's concurrence of the use of HCFC technology has been also received by the Secretariat in accordance with Executive Committee decision 27/13 and is attached to this evaluation.

(d) Phase-out of CFC-11 & CFC-12 in the manufacture of domestic refrigerators & freezers by conversion to cyclo-pentane & HCF 134a at Metalurgica Venan Ltda.

10. This project will phase out 36.05 ODP tonnes in the manufacture of domestic refrigeration equipment at Metalurgica Venan Ltda. It will be achieved by converting CFC-11 to cyclopentane technology, and CFC-12 to HFC-134a technology. The enterprise operates one low pressure foam dispenser (15 kg/min). There are also two R12 charging stations, twelve vacuum pumps, and three R12 leak detector. The pressure dispenser and two charging stations will be replaced and scrapped while the twelve vacuum pumps and three leak detectors will be either destroyed or retrofitted.

11. The project will include incremental capital costs covering two high pressure dispensers, including a premixer, and chiller for handling of c-pentane (US $268,000). Funds associated with the c-pentane technology also cover c-pentane detection system (US $35,000), safety extract ventilation for two foaming areas (US $45,000), modification of six foaming jigs (US $30,000), encapsulation of foaming areas (US $30,000), anti-static floor coating (US $5,000), fire protection sprinkler system (US $25,000), pipe-work installation for foam dispenser (US $10,000), 5M3 cyclo-pentane storage tank (US$ 15,000), pump, valves, pipe-work installation (US $10,000), nitrogen ring main for the foam dispenser, and c-pentane storage tank (US $10,000), emergency power generator (US $12,000), safety inspections (US $25,000), training (US $8,000), trials (US $10,000), and technology transfer/technical assistance (US $10,000).

12. Funds associated with the use of HFC-134a as refrigerants include the replacement of charging stations (US $50,000), a vacuum pump (US $3,500), three HFC-134a leak detectors (US $18,000), training (US $5,000), redesign, prototyping, testing, pilot scale production, and reliability test trials (US $20,000), and technology transfer/technical assistance (US $10,000).

13. The incremental operating cost is calculated for 6 months. The Implementing Agency has requested only US $10,980, which will provide the enterprise with the maximum level of

funding allowable within the cost-effectiveness threshold. The cost-effectiveness of the project is calculated discounting for the cost of the equipment related to safety.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Secretariat has requested UNDP to recalculate incremental operating costs in General Icy and Incomar Projects taking into account the boundary between commercial and domestic refrigeration. The relevant adjustments have been made in the project cost.

2. The Secretariat discussed with UNDP costs associated with upgrading electrical systems in the foaming area and cost of five protection systems in Venan project. The relevant adjustments have been made in the budget for capital cost.

3. The Secretariat discussed with UNIDO the umbrella project for five commercial refrigeration enterprises regarding the issue of classification of part of production in the domestic refrigeration sector. UNIDO provided additional information justifying classification of these enterprises in the commercial refrigeration sector.

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the three projects submitted by UNDP and the project submitted by UNIDO with the funding level and associated support cost as indicated below.

	Project Title	Project Cost (US$)	Support Cost (US$)	Implementing Agency
(a)	Conversion from CFC-11 to HCFC-141b, and from CFC-12 to HFC-134a and from R-502 to R-402a in the manufacture of commercial refrigeration products at General Icy	411,139	53,448	UNDP
(b)	Phaseout of CFC-11, CFC-12 and R-502 by conversion to HCFC-141b technology (foam) and HFC-134a and R-404a technology (refrigerant) in the manufacture of milk coolers and display cabinets at Incomar	74,529	9,689	UNDP
(c)	Phasing out CFC-12 with HFC-134a and CFC-11 with HFC-141b at five commercial refrigeration companies (umbrella project)	485,916	63,169	UNIDO
(d)	Phase-out of CFC-11 & CFC-12 in the manufacture of domestic refrigerators & freezers by conversion to cyclo-pentane & HCF 134a at Metalurgica Venan Ltda.	757,130	93,284	UNDP