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Executive Committee of
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Implementation of the Montreal Protocol

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PROJECT PROPOSALS: BRAZIL

This document includes the Comments and Recommendations from the Fund Secretariat.

PROJECT EVALUATION SHEET

COUNTRY OR REGION: Brazil

PROJECT TITLE: See attached Table

BUDGET (4 projects): See attached Table

INCREMENTAL COSTS (4 projects): US \$1,034,900¹

ODS PHASE-OUT: 100 MT

COST EFFECTIVENESS²: (See attached Table)

PROJECT DURATION: 1.5 years

IMPLEMENTING AGENCY: UNDP

NATIONAL COORDINATING AGENCY: Brazilian Industry and Trade Ministry

TECHNICAL REVIEW COMPLETED: YES X NO

SECRETARIAT'S COMMENTS

I. This evaluation sheet describes four projects for phasing out CFC-11 in the manufacture of molded and/or integral skin polyurethane foam products. The four projects will phase out 100 tonnes ODP of CFC-11.

II. For the conversion of the molded foam production away from CFC-11, the companies will adopt full water blown technology. However, for the integral skin foam conversion, the companies (Macform, MBR, Nacra and Plascar) will use HCFC-141b technology for a limited transition period which is not defined, before moving on to full water blown technology. This approach is adopted to allow for the development and commercial introduction of formulations for the water blown technology.

III. The capital costs of conversion at all the enterprises is due to the cost of replacement of low pressure machines with high pressure ones. Other cost items are relatively minimal. The calculation of the incremental operational cost is based on the ultimate technology rather than the transitional technology using HCFC-141b.

¹ Including a 10 per cent contingency fee.

² Determined as the ratio of incremental costs to the estimated annual savings of ODP (\$/ODP kg).
For CFC-11, ODS=ODP.

IV. The recommended amounts reflect project costs agreed to after discussion of the cost components with UNDP.

V. The cost effectiveness of all the projects meet the threshold for integral skin and molded foams (US \$16.86/kg/yr.)

SECRETARIAT'S RECOMMENDATIONS

6. The Fund Secretariat recommends approval of the four projects at the level of funding indicated in the Table namely:

	US \$	Support Cost US \$ for UNDP
Macform	243,500	31,650
MBR	338,500	44,000
NACRA	254,500	33,100
Plascar	119,400	15,500

LIST OF BRAZIL FOAM PROJECTS (UNDP)

Project Title	Total Budget ³	Incremental Capital Cost US\$	Incremental Operational Cost/Savings US\$	ODP Phase out Tonnes ODP	Cost-Effect. \$/kg./yr.	Amount Recommended	Revised Cost-Effect.	Support Cost
Macform - Conversion to CFC-free technology in the manufacture of polyurethane foam	254,000	225,000	29,000	25	10.16	243,500	9.74	31,650
MBR - Conversion to CFC-free technology in the manufacture of polyurethane foam	367,000	320,000	47,000	40	9.18	338,500	8.46	44,000
NACRA - Conversion to CFC-free technology in the manufacture of polyurethane foam	286,500	263,333	23,500	20	14.33	254,500	12.72	33,100
PLASCAR - Conversion to CFC-free technology in the manufacture of integral skin polyurethane foam for steering wheels	127,400	85,000	42,400	15	8.49	119,400	7.96	15,500

³ Including a 10 per cent contingency fee and Financial Agent Fee (where applicable)

PROJECT EVALUATION SHEET

COUNTRY OR REGION:	Brazil
PROJECT TITLE:	Investment Project for Phasing out of ODS at FRISOKAR Equipamentos Plasticos Ltda.
BUDGET:	Capital costs: US \$730,825 Operating costs: (US \$133,876)
INCREMENTAL COSTS:	US \$596,949
ODS PHASE-OUT:	42 MT
COST EFFECTIVENESS ⁴ :	US \$16.06 per kg. ODP saved
PROJECT DURATION:	18 months
IMPLEMENTING AGENCY:	UNIDO
NATIONAL COORDINATING AGENCY:	Brazilian Ministry of Industry of Trade and Tourism
TECHNICAL REVIEW COMPLETED:	YES <u>X</u> NO <u> </u>

SECRETARIAT'S COMMENTS

1. The project proposes to phase out the consumption of 42 tonnes ODP of CFC-11 in the production of integral skin (IS) at FRISOKAR.
2. The replacement agent is n-pentane.
3. Incremental capital costs are requested for the purchase of two high pressure foaming machines, n-pentane storage and delivery system, safety equipment, and for training and consultancy services.
4. Incremental operating savings resulting from the use of the less expensive n-pentane will be realized.

⁴ Determined as the ratio of incremental costs to the estimated annual saving of ODP (\$/ODP kg).
For CFC-11, ODS=ODP.

5. The Secretariat discussed with UNIDO the incrementality and eligibility of all cost components provided in the project document.

6. On the account of the old age of the existing low pressure foaming machines, UNIDO agreed that only the difference in costs of low and high pressure machines is requested. Similarly the cost of the polyol/pentane premix stations was recalculated on the same basis. Training of technicians as well as trial production was removed from the operating cost and included under capital costs after the necessary adjustments. Maintenance cost was recalculated on the basis of the revised costs of the capital equipment only. Operating savings were revised to US \$169,302, the net present value of the four years of operating savings.

7. The revised project budget of US \$437,250 for capital costs and US \$169,302 for operating savings amount to US \$267,948 in eligible incremental costs. The revised cost effectiveness value is US \$6.38/kg ODP.

SECRETARIAT'S RECOMMENDATION

8. The Secretariat recommends approval of the project and approval of US \$267,948 in incremental costs and US \$34,833 in support costs for UNIDO.

PROJECT EVALUATION SHEET

COUNTRY OR REGION:	Brazil
PROJECT TITLE:	Elimination of CFC's in the manufacture of domestic chest freezers at Multibras S.A. Eletrodomesticos
BUDGET:	Capital Costs: US \$412,200 ⁵ Operational Costs: US \$976,972
INCREMENTAL COSTS:	US \$866,844 ⁶
ODS PHASE-OUT:	166 MT
COST EFFECTIVENESS⁷:	US \$3.93 per kg. ODP saved (Based on 62.4 national ownership)
PROJECT DURATION:	1.5 years
IMPLEMENTING AGENCY:	UNDP
NATIONAL COORDINATING AGENCY:	Grupo Tecnico e Ozonio (GTO)
TECHNICAL REVIEW COMPLETED:	YES <u> X </u> NO <u> </u>

SECRETARIAT'S COMMENTS

1. The project covers conversion of one chest freezer manufacturing line at Joinville plant of Multibras company with output of about 150,000 units per year. The total annual output of Multibras company is 2,653,000 freezers, refrigerators and air-conditioning units. Multibras has chosen a phase-out strategy in several steps. The first one is the present project. Thereafter, other production lines will be converted on line-by-line basis, based on the experience gained from this project.

2. This project proposes to replace the CFC-11 used as a blowing agent in the production of insulation foam with HCFC-141b and the CFC-12 used as a refrigerant with HFC-134a.

⁵ Including a 10 per cent contingency fee.

⁶ Taking into account 62.4 per cent national ownership.

⁷ Determined as the ratio of incremental costs to the estimated annual savings of ODP (\$/ODP kg.). For CFC-11 and CFC-12, ODS=ODP.

3. The proposal includes: modification of existing equipment where applicable; procurement and installation of new equipment or machinery and iso-butane; modification of assembly lines; testing; and a training programme.
4. The incremental operating costs include the additional costs of raw materials and HFC-134a compressors for a six-month duration.
5. A technical review was provided by UNDP.
6. Implementation of this project will result in the phase-out of 166 ODP tonnes of CFCs.
7. The Secretariat reviewed the project proposal to assess the eligibility and costs of the requested equipment for the conversion to HCFC-141b foaming and HFC-134a refrigerant technologies, in the light of similar projects approved by the Executive Committee. The Secretariat discussed with UNDP the incrementality of all cost components and their amounts.
8. It was agreed that replacement of capital equipment will be eliminated where retrofitting was possible. Cost of several items have been reduced on the basis of lower prices for the equipment available on the market. Technological upgrades have been identified and the relevant costs have been deducted from the budget. Operating costs have been reviewed and reduced.
9. Consequently, it was agreed that the new project budget should be recommended for approval.
10. The cost-effectiveness of this project is US \$5.77/kg. ODP phased out, which is calculated without regard to the percentage of local ownership. The cost-effectiveness is below the threshold value established by the 16th Meeting of the Executive Committee.

SECRETARIAT'S RECOMMENDATIONS

11. The Fund Secretariat recommends approval of US \$598,499 for the implementation of the project at Multibras S.A. Eletrodomesticos, and recommends US \$77,805 in support costs for UNDP.
12. The Secretariat further recommends that future approval of projects in the domestic refrigeration sector of Brazil should be based on a national strategy for the phase-out of this large sector.

PROJECT EVALUATION SHEET

COUNTRY OR REGION:	Brazil
PROJECT TITLE:	Conversion of the assembly of refrigeration compressors to phase out CFC-12 and CFC/HCFC-502 by using HFC-134a and R-404A at ELGIN MAQUINAS S.A. in Mogi des Cruzes
BUDGET:	Capital Costs: US \$614,580 Operational Costs: US \$474,000
INCREMENTAL COSTS:	US \$1,197,433 ⁸
ODS PHASE-OUT:	89 MT
COST EFFECTIVENESS ⁹ :	US \$13.45 per kg. ODP saved
PROJECT DURATION:	Four years
IMPLEMENTING AGENCY:	UNIDO
NATIONAL COORDINATING AGENCY:	Grupo Tecnico e Ozonio (GTO)
TECHNICAL REVIEW COMPLETED:	YES <u>X</u> NO <u> </u>

SECRETARIAT'S COMMENTS

1. The project covers the conversion of a production of CFC-12 and CFC/HCFC-502 compressors to HFC-134a and R-404 refrigerants at ELGIN company. The annual output of the company is 180,000 compressors.
2. The proposal includes: redesign, prototyping and testing; modification of existing equipment where applicable; procurement and installation of new equipment or machinery; modification of assembly lines; and training.
3. A technical review was provided by UNIDO.
4. The Secretariat reviewed the project proposal to assess the eligibility and costs of the requested equipment and other project components for the conversion to HFC-134a and R-404a

⁸ Including a 10 per cent contingency fee.

⁹ Determined as the ratio of incremental costs to the estimated annual saving of ODP by end-users of ELGIN's compressors (indirect impact) (\$/ODP kg.). For CFC-12, ODS=ODP.

refrigerant technologies, in the light of similar projects approved by the Executive Committee. The Secretariat discussed with UNIDO the incrementality of all cost components and their amounts.

5. It was agreed that replacement of capital equipment will be eliminated where retrofitting was possible. Thus, only retrofit cost of existing calorimeter is recommended. Technological upgrades were identified and the relevant costs have been deducted from the budget.

6. Operating costs have been calculated and requested. It was agreed that operating costs will be not claimed.

7. Consequently, it was agreed that the new project budget should be recommended for approval.

8. It was also agreed that cost-effectiveness cannot be meaningfully calculated for compressor manufacturer conversion project. The Executive Committee might wish to use conversion cost per unit as an indicator to compare relative cost-effectiveness of this type of projects. The conversion cost per unit in ELGIN project is US \$2.56 per unit.

SECRETARIAT'S RECOMMENDATIONS

9. The Fund Secretariat recommends approval of US \$460,339 for the implementation of the project at ELGIN MAQUINAS S.A., and recommends US \$59,844 in support costs for UNIDO.

10. The Fund Secretariat recommends also to transfer the approved allocations to UNIDO from the amount of US \$8,900,000 reserved by the Executive Committee for funding of projects in mobile air-conditioner and compressor sub-sector in 1995.