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Executive Committee of
the Multilateral Fund for the
Implementation of the Montreal Protocol

Nineteenth Meeting
Montreal, 8-10 May 1996

Corrigendum

PROJECT PROPOSALS: BRAZIL

Refrigeration projects: **Replace** pages 6 to 9 **with** the attached pages.

PROJECT EVALUATION SHEET

BRAZIL

SECTOR: REFRIGERATION ODS use in sector (1994): 7,000 ODP tonnes

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

Project Titles:

- (a) Elimination of CFC-11 and CFC-12 in the manufacture of domestic refrigerators and freezers at Multibras s.a.
- (b) Elimination of CFC-11 and CFC-12 in the production of commercial refrigeration equipment at REUBLI.

Project Data	Domestic	Commercial
	Multibras	REUBLI
ODS phase-out (ODP tonnes)	1,234	89.9
Proposed project duration (Yrs)	3	1.5
Incremental capital cost (US\$)	4,107,300	560,296
Contingency (%)	10	10
Incremental operational cost (US\$)	9,159,862	488,569
Total project cost (US\$)	13,267,162	1,048,865
Local ownership (%)	59.79	100
Export component (%)	0	0
Amount requested (US\$) { Original	7,932,436	1,048,865
{ Revised	5,498,289	901,270
Cost effectiveness (US\$/kg)	6.42	11.66
National Coordinating Agency	PROZON	PROZON
Implementing Agency	UNDP	World Bank
Technical review completed?	Yes	Yes

<i>Secretariat's Recommendations</i>		
Amount recommended (US \$)	N/A	901,270
Project impact (ODP tonnes)	N/A	89.9
Cost effectiveness (US \$/kg)	N/A	10.02
Implementing Agency support cost (US\$)	N/A	117,165
Total cost to Multilateral Fund	N/A	1,018,4335

PROJECT DESCRIPTION

- (a) Elimination of CFC-11 and CFC-12 in the manufacture of domestic refrigerators and freezers at Multibras s.a.

1. Consumption of CFCs in the refrigeration sector in Brazil is estimated at 7,000 tonnes. ODS consumption in manufacturing and installation of domestic, commercial and air-conditioning equipment is about 2,205 tonnes ODP.

2. Six major enterprises are engaged in the manufacture of domestic refrigerators and freezers. Multibras is the largest manufacturer of domestic appliances in Brazil accounting for approximately 62% of total production of domestic refrigerators and freezers. Multibras manufactures domestic appliances in three separate factories with ten independent production lines. ODS consumption was 911 tonnes of CFC-11 and 423 tonnes of CFC-12 in 1995.

3. Initial plans made in 1994 were based on conversion of one chest freezer production line. Thereafter, other refrigerator and freezer production lines were to be converted to non-CFC technology on line-by-line basis, based on the experience gained from the conversion of the chest freezer line. A project for the conversion of this production line was approved at the 17th Meeting of the Executive Committee. After careful study by Multibras, a new integrated project covering total ODS phase-out was prepared by UNDP. Because of the scale of its operations Multibras adopted a phased strategy for ODS replacement. ODS consumption will be eliminated at three production lines by 1997. The next four lines will be converted in 1998. The remaining four production lines will be converted to non-CFC technology in 1999.

4. The company opted for HCFC-141b to replace CFC-11 blowing agent and HFC-134a as a substitution of the CFC-12 refrigerant. Whilst recognizing the environmental benefits of cyclopentane versus HCFC-141b, Multibras selected HCFC-141b as a first stage, interim, replacement of CFC-11 as it provides the best energy efficiency, and the lowest investment and operational costs. The energy efficiency factor is strongly emphasized in the Governmental policy in the refrigeration industry in Brazil. Cyclopentane and water blown foam formulation do not meet the Multibras standards on energy efficiency. Liquid HFC technologies do not meet the criteria on maturity of the technology and availability. The company stated that additional costs needed for the transition to non-ODS technologies in the future will be totally covered by the company itself.

5. For conversion to HFC-134a, Multibras is requesting replacement and retrofit of charging and evacuation equipment, and leak detectors. New brazing work stations are also requested for the conversion, to reduce the exposure of hydroscopic lubricant in the compressor to the humid environment. The company recognized that the introduction of new brazing equipment is associated with substantial technological upgrades. Therefore, only 10 per cent of the cost of new equipment is requested.

6. For conversion to HCFC-141b, Multibras is requesting new pre-mixing and foam injecting equipment.

7. The costs of trials, testing, technology transfer and training are included in the requested budget.

8. Operating costs are calculated for a 6 month period, and are determined on a plant-by-plant basis. UNIDO indicated that "the incremental operating costs will be requested one year after activities in the plant start".

9. As indicated in paragraph 3 above, Multibras will implement the project in stages. However, the company is requesting approval of the project at the 19th meeting. The approved funds could be paid on three installments, one each in 1996, 1997 and 1998. The first installment would be offset against the amount approved for Multibras at the 17th Meeting

(b) Elimination of CFC-11 and CFC-12 in the production of commercial refrigeration equipment at REUBLI.

10. REUBLI company operates in the Brazilian commercial refrigeration sector which accounts for about 400 small and medium enterprises. The Executive Committee approved at its 18th Meeting two projects phasing out about 35 MT of CFCs. This project will eliminate 89.9 MT of CFC-11 and CFC-12 in manufacturing commercial chest freezers and coolers.

11. The conversion to HFC-134a will involve replacing the existing charging boards and leak detectors with equipment suitable for HFC-134a, retrofitting vacuum pumps and prototype testing.

12. The two available low pressure machines will be replaced with one high pressure machine. Existing cabinet and door jigs will be rebuilt to accommodate new requirements in foaming operations.

13. This company recognizes the transitional nature of HCFC technology. There are limitations in adapting the existing equipment to a safe operation with cyclopentane due to the fact that the factory is located in a residential area. It is not possible to obtain approval for foam blowing operations with highly flammable chemicals in a growing urban area. REUBLI's management accepts that all future costs related to a subsequent transition to zero-ODP technology will be borne by the company itself.

14. The company requested incremental operating costs for six months duration.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

(a) Elimination of CFC-11 and CFC-12 in the manufacture of domestic refrigerators and freezers at Multibras s.a.

1. UNDP and the Fund Secretariat agreed on outstanding eligibility and incrementality issues under the project. As a result, eligible total incremental capital costs were determined as US \$1,571,300 and eligible incremental operational costs were determined as US \$7,624,702, compared to initial amounts of US \$4,107,300 and US \$9,159,862, respectively. The total eligible incremental cost was thus determined to be US \$9,196,002.

2. Taking into account the 59.79% local ownership share, the eligible grant total would be US \$5,498,289. Since US \$598,499 was approved for MULTIBRAS at the 17th Executive Committee, the amount remaining to be approved under the project (excluding project support costs) would be US \$4,899,790. The overall project cost-effectiveness would be 4.45.

3. The company confirms that the incremental operating costs do not include costs associated with the production of refrigerators which are more energy efficient than those produced with CFC technology. The company will also, following established procedures, implement the project as one integrated project to be completed over a 3-year period eliminating a total of 1,235 ODP tonnes.

4. Since inclusion of the total amount remaining to be approved would increase UNDP's programme to a value greater than the allocation agreed for submission to the 19th Meeting, UNDP will seek approval of the project at the 20th Meeting.

(b) Elimination of CFC-11 and CFC-12 in the production of commercial refrigeration equipment at REUBLI.

5. The Fund Secretariat has discussed with the World Bank the eligibility and incrementality of capital and operating costs associated with the foam and refrigerant components. The Secretariat raised several issues concerning the eligibility of vacuum control gauges and costs of charging, evacuation and foaming equipment. It was agreed to adjust capital costs accordingly.

RECOMMENDATIONS

The Fund Secretariat recommends as follows:

(a) To request UNDP to resubmit to the Twentieth Meeting of the Executive Committee, the project on Elimination of CFC-11 and CFC-12 in the manufacture of domestic refrigerators and freezers at Multibras s.a.; and

(b) To approve the Reubli project with associated support costs at the funding level shown in the table below:

	Project Cost US \$	Support Cost US \$	Implementing Agency
(b) Elimination of CFC-11 and CFC-12 in the production of commercial refrigeration equipment at REUBLI.	901,270	117,165	World Bank