



**United Nations
Environment
Programme**



Distr.
LIMITED

UNEP/OzL.Pro/ExCom/27/24
23 February 1999

ORIGINAL: ENGLISH

EXECUTIVE COMMITTEE
OF THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Twenty-seventh Meeting
Montreal, 24-26 March 1999

PROJECT PROPOSALS: COSTA RICA

This document consists of the comments and recommendations of the Fund Secretariat on the following projects:

Fumigant:

- Alternatives to methyl bromide for soil fumigation on Costa Rican melons UNDP
- Alternatives to methyl bromide for soil fumigation on Costa Rican cut flowers UNDP

Refrigeration:

- Phaseout of CFC-11 and CFC-12 by conversion to HCFC-141b and HFC-134a respectively in the manufacture of commercial refrigeration equipment at Quena S.A. UNDP
- Phaseout of CFC-11 and CFC-12 by conversion to HCFC-141b and HFC-134a respectively in the manufacture of commercial refrigeration equipment at Refrigeracion Hermanos Gonzalez S.A. UNDP
- Phaseout of CFC-11 and CFC-12 by conversion to HCFC-141b and HFC-134a respectively in the manufacture of commercial refrigeration equipment at Refrigeracion Omega S.A. UNDP
- Phaseout of CFC-11 and CFC-12 by conversion to HCFC-141b and HFC-134a respectively in the manufacture of commercial refrigeration equipment at Refrigeracion Wimmer Hnos, S.A. UNDP

**PROJECT EVALUATION SHEET
COSTA RICA**

SECTOR: FUMIGANT

ODS use in sector (1997): 700 ODP tonnes

Sub-sector cost-effectiveness thresholds: n/a

Project Titles:

- (a) Alternatives to methyl bromide for soil-fumigation on melons
 (b) Alternatives to methyl bromide for soil-fumigation on cut flowers

Project Data	Methyl Bromide	
	Cut flowers	Melons
ODS phase-out (ODP tonnes)	N/A	
Proposed project duration (months)	18	18
Total incremental costs (US \$)	209,275	195,320
- including contingency (%)	10	10
Total project cost (US \$)	209,275	195,320
Local ownership (%)		
Export component (%)		
Amount requested (US \$) {Original}	209,275	195,320
{Revised}	193,500	180,500
Cost effectiveness (US \$/kg)	N/A	
National Coordinating Agency	Ozone Office, Environment Ministry (MINAE)	
Implementing Agency	UNDP	
Technical review completed?	Yes	

Secretariat s Recommendations:		
Amount recommended (US \$)	193,500	180,500
Project impact (ODP tonnes)	N/A	N/A
Cost effectiveness (US \$/kg)	N/A	N/A
Implementing Agency support cost (US \$)	25,155	23,465
Total cost to Multilateral Fund (US \$)	218,655	230,965

PROJECT DESCRIPTION

- (a) Alternatives to methyl bromide for soil fumigation on melons
- (b) Alternatives to methyl bromide for soil fumigation on cut flowers

1. According to a recent survey conducted by the Research Institute of Toxic Substances of the National University of Costa Rica, methyl bromide consumption increased from 449 metric tonnes in 1992 to 845 metric tonnes in 1997. About 71% of methyl bromide is used for soil fumigation of melon farms to control weeds, nematodes and pathogenic fungi, 15% for soil fumigation in cut flowers to control weeds, nematodes, fungi and bacteria, and the remaining 16% for fumigation of other crops, commodities and structures. The producing area for melons is located in the North and Central Pacific coast, while flower growers are located in the Central Valley (Highlands).

2. These projects are to demonstrate five alternative techniques to the use of methyl bromide as a soil fumigant in melon farms and cut flowers, namely, solarization; organic amendments; soil fumigants; other pesticides; cover crops (for melons) and steam pasteurization (cut flowers). All these techniques will be used as part of an Integrated Pest Management (IPM) system.

3. The project has been developed with the participation of scientific, commercial and educational institutions, NGOs, farmers and the Ozone Unit, including the Regional Institute of Toxic Substances Research of the National University of Costa Rica, the Agronomic Research Institute, the National Organic Agriculture Association, the Costa Rican Ecologist Association, the Melon Growers Chamber and cut flowers farmers, whose experiences served as the baseline to start the project.

4. An Integrated Pest Management (IPM) programme for crop protection utilizes a combination of cultural practices, including crop rotation, cover crops, fertilization and plant nutrition; physical methods, including steam, solarization, and heat, and use of chemical compounds. Soil solarization is most effective when implemented as a component of an IPM system.

5. The cut flowers project will be implemented in the Central Valley (medium lands) covering the main green leaf production areas. The proposed technologies will be tested in cultivated areas offered by the company Atlántica and at an experimental station of the National University of Costa Rica, which has an extension programme with farmers. The melon project will be implemented in the Pacific North Coast corresponding to the melon producing area of the country. The company "Melones de Costa Rica" has offered their fields for conducting demonstration techniques. Demonstrations will also be conducted at an experimental station of the National University of Costa Rica.

6. The expected results from project implementation are to demonstrate alternative technologies that can assist farmers to phase out the use of methyl bromide for the production of melons and cut flowers, develop technical and economic analysis of the proposed technologies, and to disseminate the results of the demonstration project. The total cost associated with the

demonstration of the alternative technologies (for both projects) is US \$170,000, the cost for key pest monitoring, including laboratory analysis and economic assessment of proposed technologies is US \$80,000; and the costs related to training of farmers, information dissemination and an international workshop is US \$90,000.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. Costa Rica ratified the Copenhagen Amendment on 11 November 1998.
2. The project proposal for soil fumigation for melons was first submitted to the 24th Meeting of the Executive Committee, at a cost of US \$484,973. During the project review process, UNDP and the Secretariat discussed the eligibility of several project components, including requests for weather monitoring, human health research and environmental impact evaluation. The Secretariat and UNDP further discussed issues associated with salaries of specialists in different fields and a project co-ordinator, and the cost associated with travel and material and supplies. Based on the discussions, UNDP agreed to defer the project.
3. The revised project proposal has incorporated the comments raised by the Fund Secretariat to the original proposal. Both project proposals follow the Committee's strategy and guidelines for projects in the methyl bromide sector (24th Meeting).
4. The Fund Secretariat and UNDP discussed the feasibility of combining the objectives of the two project proposals through a careful review of project design and implementation modalities (including selection of appropriate field tests), since similar alternative technologies will be demonstrated for each crop and the same team of people will be responsible for implementation of both projects. UNDP informed the Secretariat that the geographic locations of the production areas were different for each crop.
5. The Secretariat sought clarifications on the measures taken by UNDP when preparing the project to avoid any potential conflict of interest in the design and implementation of the projects, since it appeared that the consultant who prepared the proposals would also be the project coordinator responsible for their implementation. In this regard, UNDP stated that it had taken all necessary precautions in avoiding any potential conflict of interest in the design of the projects and in the mechanism for their implementation. The projects were formulated and designed by farmers, farmers' associations, agronomists, NGOs and other stakeholders. Also, UNDP adjusted the cost of the personnel accordingly.
6. The Secretariat and UNDP discussed cost issues regarding information dissemination, study tours and travel. Subsequently, the project costs were adjusted as indicated in the project evaluation sheet.

7. The project proposals state that the Government of Costa Rica will finance other unclaimed costs (US \$108,000). The Fund Secretariat has not reviewed these costs, some of which would not be eligible.

RECOMMENDATION

Taking into consideration the above comments, the Fund Secretariat recommends blanket approval of the projects with associated support costs at the funding level shown in the table below:

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
Alternatives to methyl bromide for soil –fumigation on melons	180,500	23,465	UNDP
Alternatives to methyl bromide for soil –fumigation on cut flowers	193,500	25,155	UNDP

**PROJECT EVALUATION SHEET
COSTA RICA**

SECTOR: REFRIGERATION ODS use in sector (1997-1998): 26.26 ODP tonnes

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

Project Titles:

- (a) Phase out of CFC and CFC-12 by conversion to HCFC-141b and HFC-134a respectively in the manufacture of commercial refrigeration equipment at Quena S.A.
- (b) Phase out of CFC and CFC-12 by conversion to HCFC-141b and HFC-134a respectively in the manufacture of commercial refrigeration equipment at Refrigeracion Hermanos Gonzalez S.A.
- (c) Phase out of CFC and CFC-12 by conversion to HCFC-141b and HFC-134a respectively in the manufacture of commercial refrigeration equipment at Refrigeracion Omega S.A.
- (d) Phase out of CFC and CFC-12 by conversion to HCFC-141b and HFC-134a respectively in the manufacture of commercial refrigeration equipment at Refrigeracion Wimmer Hermanos S.A.

Project Data	Commercial			
	Quena	Ref. Hermanos Gonzalez	Ref. Omega	Ref. Wimmer Hermanos
ODS phase-out (ODP tonnes)	9.88	4.43	4.33	4.64
Proposed project duration (months)	36	36	36	36
Incremental capital cost (US \$)	154,935	152,185	126,995	147,840
- including contingency (%)	10	10	10	10
Incremental operational cost (US \$)	64,495	32,983	32,888	38,377
Total project cost (US \$)	219,430	185,168	159,883	186,217
Local ownership (%)	100	100	100	100
Export component (%)	0	0	0	0
Amount requested (US \$) {Original}	226,045	188,433	174,188	191,727
{Revised}	219,430	185,168	159,883	186,217
Cost effectiveness (US \$/kg)	22.21	41.79	39.4	40.13
National Coordinating Agency	Comision Gubernamental del Ozono (COGO)			
Implementing Agency	UNDP			
Technical review completed?	yes			

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 \$)	Pending	Pending	Pending	Pending

PROJECT DESCRIPTION

- (a) **Phase out of CFC and CFC-12 by conversion to HCFC-141b and HFC-134a respectively in the manufacture of commercial refrigeration equipment at Quena S.A.**
- (b) **Phase out of CFC and CFC-12 by conversion to HCFC-141b and HFC-134a respectively in the manufacture of commercial refrigeration equipment at Refrigeracion Hermanos Gonzalez S.A.**
- (c) **Phase out of CFC and CFC-12 by conversion to HCFC-141b and HFC-134a respectively in the manufacture of commercial refrigeration equipment at Refrigeracion Omega S.A.**
- (d) **Phase out of CFC and CFC-12 by conversion to HCFC-141b and HFC-134a respectively in the manufacture of commercial refrigeration equipment at Refrigeracion Wimmer Hermanos S.A.**

1. The project proposal indicated consumption of CFCs in Costa Rica at 201.4 ODP tons in 1995, 232.7 ODP tons in 1996 and 204.2 ODP tons in 1997. With this umbrella project and other projects such as the National CFC-12 Recovery and Recycle project, and the Atlas Electrica project (completed in mid-1998, eliminating 40.39 tons of CFC-11 and 12.2 tons of CFC-12 based on 1997 consumption), Costa Rica states that it will have no difficulty meeting its obligations under the Montreal Protocol to freeze annual consumption of Annex A CFCs at the level of 212.37 ODP tons.

2. This umbrella project represents the collective reduction of over 95% of ODS consumption in the sub-sector (28.4 ODP tons), which is primarily used in the production of bottle coolers, chest freezers, refrigerated display cases, reach-in refrigerators, and walk-in cold rooms.

3. The companies propose to replace CFC-12 with HFC-134a as a refrigerant, CFC-11 with HCFC-141b blowing agent in a foam production process. The project proposal includes a section on selection and justification of the use of HCFC-141b technology. This section is attached in the Annex to the project evaluation. UNDP has also provided letters of commitment from the Governmental Ozone Commission and the management of individual enterprises relating to the selection of HCFC-141b technology.

4. All the four companies manufacture a range of unitary commercial refrigeration equipment. Three of them are also involved in installation of cold rooms.

5. In the foaming operations, all four companies have low pressure foaming machines as a baseline which will be replaced with high pressure dispensers. Funds are also requested for training, test trials, and technology transfer/technical assistance.

6. The changes to the refrigeration system involve the replacement of CFC-12 evacuation and charging stations with HFC-134a semi-automatic charging stations. The proposal requests funds for replacement of limited number of old vacuum pumps with new vacuum pumps and the cost of retrofitting other pumps. It is proposed also to replace CFC-12 leak detectors with new

HFC-134a equipment. Funds are requested for training, re-design, prototyping, testing, pilot scale production, and technology transfer/technical assistance.

7. Each project proposal contains a list of equipment to be destroyed. The replaced vacuum pumps and CFC-12 leak detectors are requested to be utilized for servicing of existing CFC-12 equipment. No funds will be requested for replacement of this equipment in future projects.

8. The incremental operating cost requested for two years associated with foam blowing chemicals, refrigerant, compressors, condensers, capillary tubes and filter dryers. The savings due to the elimination of methylene chloride used for cleaning mixing heads of low pressure machines are subtracted from IOC.

9. Each individual project document contains milestone for project monitoring.

10. The cost-effectiveness of four projects under the umbrella proposal ranges from US \$ 22.88 to US \$ 42.54 per kg of ODP phased out and exceed the cost-effectiveness threshold established in the commercial refrigeration sector (US \$ 15.21/kg ODP phased out). The requested grants include full capital cost, including contingencies and incremental operating costs calculated for two years. UNDP suggested that Costa Rica can be classified as a low volume consuming country on the basis of only CFC consumption in 1996 and 1997 which was below 360 MT. The project documents indicates that “ Costa Rica imports also HCFC-22, HCFC-124 and Methyl Bromide. The import data for these substances is not considered relevant to the LVC classification.”

SECRETARIAT S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The project proposal was submitted to the 26th Meeting of the Executive Committee. The proposal was reviewed by the Secretariat. Several issues were identified related to the eligibility of costs associated with replacement of certain production equipment, technical assistance and technology transfer, and incremental operating cost related to increased foam density. Due to lack of time, the proposal was withdrawn by UNDP and resubmitted to the 27th Meeting.

2. The cost-effectiveness of each of the four individual projects under the umbrella proposal exceeds the cost-effectiveness threshold established in the commercial refrigeration sector (US \$ 15.21/kg ODP phased out). UNDP suggested that Costa Rica can be classified as a low volume consuming country on the basis of calculated CFC consumption in 1995,1996 and 1997 which is considered to be below 360 MT. Full incremental capital and operating costs are included in the requested grant.

3. The data on ODP consumption in Costa Rica as reported by the Ozone Secretariat is as follows:

1995 ODP consumption – 489.1 ODP tons, including 158.5 ODP tons of CFCs and 330 ODP tons of Methyl Bromide;

1996 ODP consumption - 864.2 ODP tons, including 497 ODP tons of CFCs and 360 ODP tons of Methyl Bromide;
1997 ODP consumption - 636.4 ODP tons, including 94.8 ODP tons of CFCs and 507 ODP tons of Methyl Bromide.

4. The Multilateral Fund Secretariat received also data on 1998 consumption as part of Costa Rica institutional strengthening project. ODP consumption is reported to be 192.6 ODP tons of CFCs and 540 ODP tons of methyl bromide.

5. Costa Rica is submitting to this meeting two demonstration projects on Methyl Bromide alternatives. Costa Rica ratified the London and Copenhagen amendments in November 1998. Activities related to Methyl Bromide phase out are part of Costa Rica institutional strengthening project submitted to the 27th Executive Committee meeting. Since average ODP consumption for the last three years (1996, 1997 and 1998) exceeds 360 ODP tons, it appears that Costa Rica might not continue to be classified as a low volume consuming country.

6. UNDP provided justifications on the use of HCFC-141b technology.

7. The Secretariat discussed with UNDP the eligibility and incrementality of capital cost items. Subsequently, several budget items were adjusted to reflect the equivalent replacement and to account for technological upgrade. Costs requested for technical assistance, technology transfer and training were rationalized taking into account the implementation of the four projects as one group. The Secretariat discussed also ODS consumption by the companies and incremental operating cost associated with increased foam density. The higher density was recognized not to be justified in projects for three enterprises. ODS consumption figures were verified and corrected.

8. Three companies are involved in installation of refrigeration equipment in cold rooms. In accordance with Decision 25/14, the Secretariat is submitting to this meeting a paper on assembly, installation and service of transportation refrigeration and air-conditioning (UNEP/OzL.Pro/ExCom/27/37). The paper also addresses eligibility of incremental operating cost in installation of refrigeration units in cold rooms. The amount of eligible grant will be calculated pending a decision of the Executive Committee on this matter as well as on classification of Costa Rica as a non-low volume consuming country.

RECOMMENDATIONS

1. The Executive Committee may wish to consider the issue of classification of Costa Rica as a low volume consuming country and implications of discussions under agenda item 6 (e) (i) for eligibility of incremental operating cost.

Annex I

Selection of the Technology to Replace CFC-11 in Foam Operations

1. In their evaluation of the technology options to replace CFC-11, the enterprises in this terminal umbrella project the following criteria were considered:

- Environmental acceptability
- Physical properties
- Maturity of the technology
- Safety and applicability in the enterprise factory environment
- Price, product availability, and cost-effectiveness
- Energy efficiency impact
- CFC-11 replacement technology selected by competitors
- Multilateral Fund Executive Committee decisions relating to HCFC and hydrocarbon technologies

2. To assist the enterprises in the selection of a CFC-11 replacement technology, separate project budgets were prepared for the HCFC-141b as a first stage, interim, replacement for CFC-11. The decisions in favour of HCFC-141b were based on the better insulation value, lower investment and operational costs, and the fact that it is more appropriate to the existing skill levels of the work forces at these enterprises.

3. All the enterprises understand the implications of the selection of HCFC-141b technology, and the potential cost of subsequent replacement of HCFC-141b at an undetermined future date. They accept and commit to a future change from HCFC-141b to a zero-ODP technology, and that they will have to bear all of the associated costs.

4. Other factors also influenced the enterprise decisions in favour of HCFC-141b technology:

- (a) HCFC-141b is the technology adopted by most of their existing, or potential, competitors in Central America, the Caribbean, and most South American countries. With no local supplies, no other local demand, and their own very small requirements, the enterprises were concerned about both product availability, and the price of pentanes in Costa Rica.
- (b) Whilst the Multilateral Fund Executive Committee decisions relating to CFC-11 replacement technology selection may “presume” against the use of HCFC’s, such HCFC based technologies are not prohibited and may still be considered eligible for Multilateral Fund assistance. The Comision Gubernamental del Ozono (COGO) of the Ministerio del Ambiente y Energia, the responsible Costa Rica Government counterpart, supports the selection of HCFC-141b as an “interim” CFC replacement technology at these enterprises.

- (c) All enterprises expressed concerns regarding the longer term safety issues related to the introduction of a flammable blowing agent technology into their respective factory environments and their choice at the present time in a non-flammable CFC replacement.

5. Water blown foam formulations do not yet represent a commercially available option and technically this technology does not meet the enterprise's requirements on insulation value/energy efficiency for refrigerator insulation applications. At the present time, liquid HFC technology does not meet the criteria on maturity and commercial availability of the technology. However, liquid HFC technology is considered a likely zero-ODP candidate to replace HCFC-141b in the time frame of 2003-2005 subject to successful results from ongoing toxicological and environmental impact studies.

6. The selection of HCFC-141b technology by the enterprises in this project as the immediate replacement for CFC-11 is a realistic and sensible choice under the prevailing circumstances. The enterprises understand that HCFC-141b is an interim solution that will require a change to an appropriate zero-ODP technology at some future date. Based on the present status of non-flammable zero-ODP technologies, they expect to utilize HCFC-141b technology until approximately 2005.