UNITED NATIONS

EP

United Nations Environment Programme

Distr.
Limited

UNEP/OzL.Pro/ExCom/28/43
17 June 1999

ORIGINAL: ENGLISH

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

PROJECT PROPOSALS: THAILAND

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

Foam

- Conversion from CFC-11 to low index additive (LIA) technology in the manufacture of flexible polyurethane foam at P.T. Foam Chiengmai L.P. — UNDP
- Conversion from CFC-11 to HCFC-141b technology in the manufacture of commercial refrigeration equipment at Arco Industry Co., Ltd — IBRD
- Conversion to HCFC-141b technology in the manufacture of commercial refrigerator and display cabinets at Makassan Metal Works — IBRD
- Conversion from CFC-11 to water-based technology in the manufacture of rigid polyurethane foam at Thai Steel Door L.P. — UNDP

Refrigeration

- Umbrella Project to Convert CFC-12 Commercial Refrigeration to HFC-134a, and CFC-11 to HCFC-141b as the Blowing Agent for Foam Insulation at 224 Small-and-Medium-Sized Enterprises — IBRD

PROJECT EVALUATION SHEET
THAILAND

SECTOR: Foam ODS use in sector (Baseline): 2,116.7 ODP tonnes

Sub-sector cost-effectiveness thresholds: Flexible Slabstock US $6.23/kg
Rigid US $7.83/kg

Project Titles:

(a) Conversion from CFC-11 to low index additive (LIA) technology in the manufacture of flexible polyurethane foam at P.T. Foam Chiengmai L.P.
(b) Conversion from CFC-11 to HCFC-141b technology in the manufacture of commercial refrigeration equipment at Arco Industry Co., Ltd
(c) Conversion to HCFC-141b technology in the manufacture of commercial refrigerator and display cabinets at Makassan Metal Works
(d) Conversion from CFC-11 to water-based technology in the manufacture of rigid polyurethane foam at Thai Steel Door L.P.

Project Data	**Flexible Slabstock**	**Rigid**	**Rigid**	**Rigid**
	Chiengmai	**Arco**	**Makassan**	**Steel Door**
Enterprise consumption (ODP tonnes)	12.70	18.00	10.30	10.00
Project impact (ODP tonnes)	12.70	16.80	9.30	10.00
Project duration (months)	30	30	30	30
Initial amount requested (US $)	79,120	131,544	72,819	78,300
Final project cost (US $):				
Incremental capital cost (a)	110,000	125,000	105,000	45,000
Contingency cost (b)	11,000	12,500	10,500	4,500
Incremental operating cost (c)	44,300	59,682	26,022	53,000
Total project cost (a+b+c)	165,300	197,182	141,522	102,500
Local ownership (%)	100%	100%	100%	100%
Export component (%)	0%	0%	0%	0%
Amount requested (US $)	79,120	131,544	72,819	78,300
Cost effectiveness (US $/kg.)	6.23	7.83	7.83	7.83
Counterpart funding confirmed?			Yes	
National coordinating agency	Department of Industrial Works			
Implementing agency	UNDP	IBRD	IBRD	UNDP

Secretariat's Recommendations				
Amount recommended (US $)	79,120	131,544	72,819	78,300
Project impact (ODP tonnes)	12.70	16.80	9.30	10.00
Cost effectiveness (US $/kg)	6.23	7.83	7.83	7.83
Implementing agency support cost (US $)	10,286	17,101	9,466	10,179
Total cost to Multilateral Fund (US $)	89,406	148,645	82,285	88,479

PROJECT DESCRIPTION

(a) Conversion from CFC-11 to low index additive (LIA) technology in the manufacture of flexible polyurethane foam at P.T. Foam Chiengmai L.P.

(b) Conversion from CFC-11 to HCFC-141b technology in the manufacture of commercial refrigeration equipment at Arco Industry Co., Ltd

(c) Conversion to HCFC-141b technology in the manufacture of commercial refrigerator and display cabinets at Makassan Metal Works

(d) Conversion from CFC-11 to water-based technology in the manufacture of rigid polyurethane foam at Thai Steel Door L.P.

Sector Background

- Latest available total ODS consumption (1997)		5,304.4	ODP tonnes
- Baseline consumption* of Annex A Group I substances (CFCs)		6,082.1	ODP tonnes
- 1998 consumption of Annex A Group I substances		Not reported	
- Baseline consumption of CFCs in foam sector		2,116.7	ODP tonnes
- 1998 consumption of CFCs in foam sector		1,279	ODP tonnes
- Funds approved for investment projects in foam sector as of March 1999 (27th Meeting)	US $	10,456,859	
- Quantity of CFC to be phased out in foam sector as of March 1999 (27th Meeting)		2,051.3	ODP tonnes
- Quantity of CFC phased out in foam sector as of March 1999 (27th Meeting)		365	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. Four projects are being submitted to the 28th Executive Committee Meeting in the foam sector. When approved and implemented 48.8 ODP tonnes of CFC-11 will be phased out.

Impact of the Projects

2. The 48.8 ODP tonnes to be phased out constitutes 0.8 per cent of Thailand's baseline consumption of Annex A Group I substances and 2.3 per cent of its baseline foam sector consumption. There will be a residual ODP of 2.2 ODP tonnes due to the use of HCFC-141b as substitute blowing agent.

Justification for the Use of HCFC-141b

3. HCFC-141b will be used as substitute blowing agent by Arco Industry Co. and Makassan Metal Works. Justification for the use of the HCFC-141b has been provided in the project document, including technical and economic analysis of the use of other alternative technologies in comparison with HCFC technology. The Government's concurrence of the use of HCFC

technology has been provided in accordance with Executive Committee Decision 27/13 and is attached as Annex I to this evaluation.

(a) Conversion from CFC-11 to low index additive (LIA) technology in the manufacture of flexible polyurethane foam at P.T. Foam Chiengmai L.P.

4. P.T. Foam Chiengmai L.P. used 12.7 tonnes of CFC-11 (average 1995-97) in the manufacture of flexible foam for furniture. The production is to be converted to low index additive (LIA) technology or alternatively to maximize the use of methylene chloride and use glycerin additive, as the enterprise has already maximized use of methylene chloride on its own. The project includes replacement of the existing boxfoam dispenser by a semi-automatic boxfoam unit with exhaust and metering of the hazardous/critical components (US $95,000). Other costs include trials (US $5,000), training and technology transfer (US $10,000) and contingency (US $11,000). The project also includes incremental operating costs for four years (US $44,300).

(b) Conversion from CFC-11 to HCFC-141b technology in the manufacture of commercial refrigeration equipment at Arco Industry Co., Ltd

5. Arco uses 18 tonnes/year of CFC-11 in the manufacture of rigid polyurethane foam for commercial refrigeration equipment. The foam production is to be converted to HCFC-141b as an interim step, with a likely permanent solution being water-based formulations or HFC's. The project includes replacement of the 10 kg/min low pressure foam dispenser by a high pressure dispenser (US $110,000). Other costs include trials (US $10,000), training and technology transfer (US $10,000) and contingency (US $13,000). The project also includes incremental operating costs for two years (US $59,682).

(c) Conversion to HCFC-141b technology in the manufacture of commercial refrigerator and display cabinets at Makassan Metal Works

6. Makassan Metal Works L.P. uses 10.3 tonnes/year of CFC-11 in the manufacture of rigid foam for commercial refrigerators and display cabinets. The project is treated as a rigid foam project, since there is only a negligible refrigeration component, mostly related to servicing that will be handled directly by the enterprise itself. 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 the low pressure dispenser by a 40 kg/min high pressure foam dispenser of equivalent output (US $90,000). Other costs include foam trials (US $5,000), technology transfer and training (US $10,000) and contingency (US $10,050). The project also includes incremental operating costs for two years (US $26,022).

(d) Conversion from CFC-11 to water-based technology in the manufacture of rigid polyurethane foam at Thai Steel Door L.P.

7. Thai Steel Door L.P. used 10 tonnes of CFC-11 (average 1996-98) in the manufacture of insulated steel doors. The production is to be converted to a water based system. The project includes purchase of a high pressure pour-in-place dispenser at US $40,000 with enterprise contribution of US $10,000 and a batch premixer (US $15,000). Other costs include trials (US $5,000), training and technology transfer (US $10,000) and contingency (US $6,000).

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The costs of the four projects were agreed between the Fund Secretariat and the implementing agencies, namely UNDP (Chiengmai and Steel Door) and the World Bank (Arco and Makassan).

2. In the case of Arco the premixer cost of US $42,804 (2 years NPV) was not considered an eligible incremental cost, while in the Makassan project the cost of the 40 kg/min high pressure dispenser at US $90,000 was considered to be high. However the revision in the costs of these items would not affect the projects' eligible grants as the project costs exceeded the threshold funding level.

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the four projects (Chiengmai, Arco, Makassan and Steel Door) with the level of funding and associated support costs indicated in the table below.

	Project Title	Project Cost (US$)	Support Cost (US$)	Implementing Agency
(a)	Conversion from CFC-11 to low index additive (LIA) technology in the manufacture of flexible polyurethane foam at P.T. Foam Chiengmai L.P.	79,120	10,286	UNDP
(b)	Conversion from CFC-11 to HCFC-141b technology in the manufacture of commercial refrigeration equipment at Arco Industry Co., Ltd	131,544	17,101	IBRD
(c)	Conversion to HCFC-141b technology in the manufacture of commercial refrigerator and display cabinets at Makassan Metal Works	72,819	9,466	IBRD
(d)	Conversion from CFC-11 to water-based technology in the manufacture of rigid polyurethane foam at Thai Steel Door L.P.	78,300	10,179	UNDP

PROJECT EVALUATION SHEET
THAILAND

SECTOR: REFRIGERATION ODS use in sector (1997): 750 ODP tonnes

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

Project Titles:
(a) Umbrella Project to Convert CFC-12 Commercial Refrigeration to HFC-134a, and CFC-11 to HCFC-141b as the Blowing Agent for Foam Insulation at 224 Small-and-Medium-Sized Enterprises

Project Data	**Commercial**
	Umbrella
ODP phase-out (ODP tonnes)	207
Proposed project duration (Mths)	24
Maximum funding level approved (US $)	2,631,486
The first tranche disbursed (US $)	750,000
Amount requested for the second tranche (US $)	1,000,000
Balance	881,486
Cost effectiveness (US $/kg)	15.21
National Coordinating Agency	Dept. of Industrial Works, Ministry of Industry
Implementing Agency	The World Bank
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 $)	

PROJECT DESCRIPTION

(a) Umbrella Project to Convert CFC-12 Commercial Refrigeration to HFC-134a, and CFC-11 to HCFC-141b as the Blowing Agent for Foam Insulation at 224 Small-and-Medium-Sized Enterprises.

2. This project was approved by the Executive Committee at its 25th Meeting. Decision 25/42 was taken as follows : "Having taken note of the comments and recommendations of the Sub-Committee on Project Review (UNEP/OzL.Pro/ExCom/25/17, paragraphs 75 and 76), the Executive Committee decided to approve the above project at a maximum funding of US $2,631,486, on the understanding:

(a) That the amount be released in tranches;
(b) That an initial distribution of a tranche of US $750,000 be made to allow the project to move foward;
(c) That it be understood that no further tranches would be forthcoming until specific data were provided to the Executive Committee; and
(d) That if the specific data provided demonstrated that the project, through the non-service-related foam and refrigerant components, would achieve less than the 173 ODP-tonne reduction anticipated, the amount approved for the project would be reduced proportionally".

3. The World Bank has now requested release of a second tranche of US $1,000,000. In support of its request, the World Bank has provided the following information on implementation of the project:

"Under the initial funding, the grant agreement was signed and the Umbrella Project is making progress in accordance with the plans. The World Bank has obtained detailed information from more than half of the 200 commercial refrigeration enterprises to be covered under the terminal Umbrella Project. More than 100 commercial refrigeration companies have been visited by consultants as part of the implementation of the project and ODP data has been collected and verified. The non-service-related ODP consumption data from those 100 companies amount to 169.73 MT ODP".

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Secretariat has examined the information on the ODP consumption provided by the World Bank for 109 enterprises. The information contains data on the total number of units of refrigeration equipment produced by individual enterprises and data on both the purchase and total consumption of CFC-11 and CFC-12 per enterprise.

2. However, it is still not possible to corroborate the consumption used in manufacturing as opposed to servicing, without the information about the quantities of ODS used in the equipment produced, because the numbers of each different product produced by each enterprise are not

known. Different products can contain substantially different quantities of ODS. For instance, a water cooler may contain less than a hundred grams of refrigerant, while a cold room may contain several tens of kilograms. Therefore, the Secretariat has requested additional information from the World Bank on the number of each type of individual product produced by respective enterprises, i.e. the numbers of water coolers, the number of cold rooms etc. This information will assist in verifying the per unit consumption of CFC-11 and CFC-12 by each enterprise, and thus the enterprise's total eligible consumption, through comparison with industrial norms for the CFC-12 refrigerant charge per product and the CFC-11 used per product for foam insulation.

3. The Secretariat has not yet received the requested information.

4. The Sub-Committee on Project Review will be informed about the results of the proposed verification of the data by the Secretariat once the data is made available to it.

5. The project is submitted for individual consideration by the Sub-Committee.