UNITED
NATIONS

EP

United Nations
Environment
Programme

Distr.
LIMITED

UNEP/OzL.Pro/ExCom/20/35
23 September 1996

ORIGINAL: ENGLISH

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

Twentieth Meeting
Montreal, 16-18 October 1996

PROJECT PROPOSALS: THAILAND

This document includes the Comments and Recommendations from the Fund Secretariat on the following projects:

Foam

- Conversion to CFC-free technology in the manufacture of rigid polyurethane foam at Dacron Trade Co. — UNDP
- Conversion to CFC-free technology in the manufacture of rigid polyurethane foam at Siam Matee — UNDP

Refrigeration

- Conversion of compressor manufacture from CFC-12 to HFC-134a designs at Sanyo Universal Electric Co., Ltd. — World Bank
- Conversion of compressor manufacture from CFC-12 to HFC-134a, Phase 2 at Kulthorn Kirbi Public Company Limited — World Bank

PROJECT EVALUATION SHEET
THAILAND

SECTOR: FOAM ODS use in sector (1991): 1,510 ODP tonnes

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

Project Titles:
(a) Conversion to CFC-free technology in the manufacture of rigid polyurethane foam at Dacron Trade Co.
(b) Conversion to CFC-free technology in the manufacture of rigid polyurethane foam at Siam Matee

Project Data	**Rigid**	
	Dacron Trade Co.	**Siam Matee**
ODS phase-out (ODP tonnes)	52	37
Proposed project duration (Yrs)	1.5	1.5
Incremental capital cost (US$)	342,650	104,500
Contingency (%)	10	10
Incremental operational cost (US$)	153,059	230,343
Total project cost (US$)	495,709	334,843
Local ownership (%)	100	100
Export component (%)	0	0
Amount requested (US$) {Original	495,709	289,710
{Revised	277,800	198,000
Cost effectiveness (US$/kg)	6.15[1]	7.83
National Coordinating Agency	DIW	DIW
Implementing Agency	UNDP	UNDP
Technical review completed?	Yes	Yes

Secretariat's Recommendations		
Amount recommended (US $)	277,800	198,000
Project impact (ODP tonnes)	47.6	33.92
Cost effectiveness (US $/kg)	5.84	5.83
Implementing Agency support cost (US$)	36,114	25,740
Total cost to Multilateral Fund	313,914	223,740

[1] Based on requested grant less 35.5% taken from the project cost as safety-related cost. The cost-effectiveness based on total project cost is US $9.53.

PROJECT DESCRIPTION

(a) Conversion to CFC-free technology in the manufacture of rigid polyurethane foam at Dacron Trade Co.

(b) Conversion to CFC-free technology in the manufacture of rigid polyurethane foam at Siam Matee

1. Dacron Trade manufactures polyurethane foam insulated containers (cold boxes) and polyurethane spray foam for fishing boat insulation. It has one production unit for manufacturing nine different models of insulated cold boxes ranging from 40 litres to 750 litres in volume using a refurbished low pressure dispenser and another unit for fishing boat insulation.

2. Siam Matee manufactures a range of thermoware products including items such as " beverageware", 'foodware" and 'householdware" as well as cold boxes. It operates a double speed low pressure foam injection machine with variable capacity of 1-15 kg/min and 6-35 kg/min.

3. Both companies will phase out the use of CFC-11 by the use of water-blown systems with interim use of HCFC-141b. The capital cost for Dacron Trade includes the cost of provision of two high pressure foam machines (one for cold box manufacturing (US $90,000) and the other for spray foam (US $30,000)), one pre-mixer (US $60,000), trials and technology transfer (US $28,000). The total capital cost amounts to US $217,800. The project will incur incremental operational cost of US $60,000, the total project cost amounts to US $277,800. The capital cost of the Siam Matee project includes the cost of one new high pressure dispenser (US $80,000), trials and technology transfer (US $15,000). The total capital cost amounts to US $104,000. There will be incremental operational costs of US $93,500. Thus, the total project cost will be US $198,000.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Dacron Trade

1. UNDP originally submitted for Dacron Trade a project which was based on the use of n-pentane as blowing agent. The costs of the project were: capital cost US $342,650, incremental operational cost US $153,059 for a total US $495,709. The cost-effectiveness of the project was determined to be US $6.15/kg (instead of US $9.53) after setting aside 35.5% of the project cost as safety-related cost. Following discussions between the Fund Secretariat and UNDP concerning the company's background and baseline conditions, and the current approaches to the conversion of thermoware production in the Asia region in general and Thailand in particular, which focuses on the use of water-blown technology as the final phase out technology with interim use of HCFC-141b, the project was revised and resubmitted by UNDP after consultations with the recipient enterprise.

2. The costs of various items of the revised project are indicated in paragraph 3 of the Project Description above. Following further discussion, the cost of the high pressure dispenser was revised from US $90,000 to US $80,000 in line with the cost of this item as budgeted in similar projects.

Siam Matee

3. It became necessary to review and recalculate the incremental operational cost after it was realized that the method used in the project differed from that used in similar projects. Recalculation of the incremental operational cost resulted in the amount of US $93,500. Hence, the total project cost became US $198,000 (US $104,000 + US $93,500).

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the projects with associated costs at the funding level shown in the table below:

		Project Cost US $	Support Cost US $	Implementing Agency
(a)	Conversion to CFC-free technology in the manufacture of rigid polyurethane foam at Dacron Trade Co.	277,800	36,114	UNDP
(b)	Conversion to CFC-free technology in the manufacture of rigid polyurethane foam at Siam Matee	198,000	25,740	UNDP

PROJECT EVALUATION SHEET
THAILAND

SECTOR: MAC & COMPRESSOR ODS use in sector N/A ODP tonnes

Sub-sector cost-effectiveness thresholds: N/A

Project Titles:

(a) Conversion of compressor manufacture from CFC-12 to HFC-134a designs at Sanyo Universal Electric Co., Ltd.

(b) Conversion of compressor manufacture from CFC-12 to HFC-134a, Phase 2 at Kulthorn Kirby Public Company Limited.

Project Data	**Compressor**	
	Sanyo	**Kirby**
ODS phase-out (ODP tonnes)	N/A	N/A
Proposed project duration (Yrs)	0.5	1
Incremental capital cost (US$)	1,840,000	2,177,000
Contingency (%)	15	15
Incremental operational cost (US$)	339,500	1,200,000
Total project cost (US$)	2,179,500	3,377,000
Local ownership (%)	65	70
Export component (%)	0	25
Amount requested (US$) {Original	1,417,000	2,010,000
{Revised		
Cost effectiveness (US$/kg)	N/A	N/A
National Coordinating Agency	Department of Industrial Work	Department of Industrial Work
Implementing Agency	World Bank	World Bank
Technical review completed?	Yes	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	Pending	Pending

PROJECT DESCRIPTION

(a) Conversion of compressor manufacture from CFC-12 to HFC-134a designs at Sanyo Universal Electric Co., Ltd.

(b) Conversion of compressor manufacture from CFC-12 to HFC-134a, Phase 2 at Kulthorn Kirby Public Company Limited.

1. The production of household refrigerators and freezers in Thailand was approximately 1.1 million units in 1991. The Executive Committee approved 11 projects on conversion of four enterprises to HFC-134a refrigerant with the total production of 830,000 units per year. Most refrigerators produced for the domestic market are equipped with compressors manufactured in Thailand by Sanyo and Kulthorn Kirby. These two companies license their technology from Sanyo, Japan and Tecumseh, USA respectively. The total output of these two companies was about 2.9 million units in 1995.

2. Both Sanyo and Kirby are planning to convert their production to HFC-134a refrigerant. The submitted projects represent Phase II of the conversion, covering replacement of production equipment not suitable for HFC-134a based technology, purchasing testing equipment and retooling of assembly lines.

3. Allocations for Phase I conversion has been approved at the 10th Executive Committee Meeting at US $989,000 for Sanyo and at US $686,000 for Kirby. Phase I included acquisition of technology, procurement and installation of testing facilities, pilot production and testing, and feasibility study of Phase II.

4. The Kulthorn Kirby company has requested sophisticated and very expensive water treatment system at US $167,360 based on the reverse osmosis process. No water treatment equipment is requested in the project for Sanyo company. This system will be used together with a water based cleaning system. Less expensive water demineralization plant at about US $20,000 has been considered but not applied due to higher operating and maintenance cost.

5. Kulthorn Kirby has requested machining equipment at US $357,174 to meet higher standards of Thai refrigeration companies owned by Japanese transnational companies. These higher standards are not applied by the original HFC-134a technology supplier Tecumseh, U.S.A.

6. Cost of equipment to control the humidity conditions in the assembly room was requested by Kulthorn Kirby company at US $87,000, which was not part of similar conversions approved by the Executive Committee.

7. Sanyo company has requested cost of a new stamping press at US $245,900 and the replacement of manual soldering process, with a new projection welding machine at US $240,000, which was not part of similar conversions considered by the Executive Committee.

8. High capacity oil purification and charging equipment is requested by the Sanyo company at US $176,000 although the output of compressor charged with the lubricant is only 1% of the total production.

9. Both companies have requested operating costs due to higher cost of components and materials for a six month duration. The Government of Thailand has proposed funding operating costs associated with HFC-134a compressors to be provided to compressor manufacturing companies. Refrigerator manufacturing companies in Thailand will not claim operating costs for new HFC-134a compressors.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The chosen technology is proven.

2. The Secretariat discussed with the World Bank the eligibility and incrementality of cost items. The Secretariat raised several issues related to eligibility of costs associated with purchasing a new stamping press, new processing machinery, equipment for upgrading environmental conditions on the assembly lines. The Secretariat recommended reductions on costs associated with laboratory equipment, projection welding machine and oil purification equipment to reflect technological upgrade. Reductions in cost of water processing equipment has also been recommended by the Secretariat.

3. It is to be noted that the costs associated with the two phases for each enterprise, without discounting for foreign ownership, are US $3,290,000 for Sanyo and US $4,209,000 for Kirby. These costs are much higher than ever approved for similar projects.

4. Incremental operating cost related to new HFC-134a compressors are usually requested by refrigerator companies. Incremental operating cost related to production of compressors based on non-ODS technology have never been approved for compressor manufacturing companies in order to avoid double counting. It is difficult to estimate the share of production of Kirby and Sanyo used by Thai end-users in the absence of a national strategy in the refrigeration sector. Therefore, operating costs claimed by the compressor manufacturers are not recommended for approval. It would be more prudent to consider operating costs associated with the HFC-134a compressors while reviewing individual domestic refrigeration projects.

5. The Secretariat is still discussing with the World Bank issues mentioned above.

RECOMMENDATIONS

Pending.