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

Twenty-first Meeting
Montreal, 18-20 February 1997

PROJECT PROPOSALS: THAILAND

This document includes the comments from the Fund Secretariat on the following projects:

Refrigeration

• Elimination of ODS used in the production of household refrigerators at A.P. National Co., Ltd.	World Bank
• Elimination of ODS used in the production of household refrigerators at Kang Yong Electric Public Co., Ltd. (Phase II)	World Bank
• Elimination of ODS used in the production of household refrigerators at Sanyo Universal Electric Public Co., Ltd. (Phase II)	World Bank
• Elimination of ODS used in the production of household refrigerators at Thai Toshiba Electric Industries Co., Ltd. (Phase II)	World Bank

PROJECT EVALUATION SHEET
THAILAND

SECTOR: Refrigeration ODS use in sector (1992): 1,080 ODP tonnes

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

Project Titles:

Elimination of ODS used in the production of household refrigerators at A.P. National Co., Ltd.

Project Data	Domestic Refrigeration
	A.P. National
ODS phase-out (ODP tonnes)	54
Proposed project duration (Yrs)	1
Incremental capital cost (US$)	1,114,726
Contingency (%)	0
Incremental operational cost (US$)	451,675
Total project cost (US$)	1,566,401
Local ownership (%)	55
Export component (%)	0
Amount requested (US$) {Original	742,040
{Revised	
Cost effectiveness (US$/kg)	13.76
National Coordinating Agency	DIW
Implementing Agency	World Bank
Technical review completed?	Yes

Secretariat's Recommendations	
Amount recommended (US $)	311,150
Project impact (ODP tonnes)	54
Cost effectiveness (US $/kg)	5.76
Implementing Agency support cost (US$)	40,450
Total cost to Multilateral Fund	351,600

PROJECT DESCRIPTION

Elimination of ODS used in the production of household refrigerators at A.P. National Co., Ltd.

1. ODS consumption in the domestic refrigeration sector in Thailand was 1,080 MT in 1992. However, the production of household refrigerators and freezers in Thailand has increased significantly in recent years, from about 560,000 units in 1989 to approximately 2 million units in 1995. Presently, there are eight major manufacturers of household appliances.

2. A.P. National will convert to HFC-134a as a refrigerant and HCFC-141b as a foam blowing agent. 54 ODP tonnes will be eliminated after the project is implemented.

3. Conversion to HFC-134a involves replacement of charging equipment and leak detectors retrofitting of vacuum pumps, model redesign through assistance provided by the parent company, and procurement of testing equipment and training.

4. Conversion to HCFC-141b involves testing, technology transfer and training provided by the parent company.

5. A.P. National requests incremental operating costs associated with higher cost of component and chemical material for 6 month duration.

Justification for the use of HCFC-141b

6. In response to the Thai government's decision to ban the use of CFC-11 in the production of household refrigerators starting from 1 January 1997 A.P. National has decided to use HCFC-141b as a transitional substance for two years before switching to cyclopentane or other alternatives. The selection of this technology was recommended to them by their parent companies in Japan which currently use HCFC-141b as a blowing agent. HCFC-141b has a thermal conductivity comparable with CFC-11 resulting in similar insulation performance.

7. The company has provided a written statement whereby it acknowledged not to seek any further assistance from the Fund for conversion to non-ODP technologies.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The chosen technologies are proven. The choice of an interim HCFC-141b based technology is explained and justified.

2. The Secretariat discussed with the World Bank the eligibility and the incrementality of all cost items.

3. Allocations requested for model development and testing equipment have been reduced to account for enhanced testing capability of the company. Cost of technology transfer and training have been reduced to be in line with standard cost for this type of activities. Cost of a new high pressure machine has been recognized as ineligible incremental cost since the existing high pressure equipment is capable of handling HCFC-141b formulation. Operating costs have been reduced to reflect the prevailing density of the foam system and prices of materials and components. Capital and operating costs in the project budget have been adjusted accordingly.

RECOMMENDATION

1. 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
Elimination of ODS used in the production of household refrigerators at A.P. National Co., Ltd.	311,150	40,450	World Bank

PROJECT EVALUATION SHEET
THAILAND

SECTOR: Refrigeration ODS use in sector (1992): 1,080 ODP tonnes

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

Project Titles:

(a) Elimination of ODS used in the production of household refrigerators at Kang Yong Electric Public Co., Ltd. (Phase II)

(b) Elimination of ODS used in the production of household refrigerators at Sanyo Universal Electric Public Co., Ltd. (Phase II)

(c) Elimination of ODS used in the production of household refrigerators at Thai Toshiba Electric Industries Co., Ltd. (Phase II)

Project Data	Domestic Refrigeration		
	Kang Yong	Sanyo	Thai Toshiba
ODS phase-out (ODP tonnes)	101	436	89
Proposed project duration (Yrs)	6 months	6 months	1
Incremental capital cost (US$)	1,059,280	2,308,444	343,345
Contingency (%)	0	0	0
Incremental operational cost (US$)	403,467	2,193,500	736,303
Total project cost (US$)	1,462,747	4,501,944	1,079,648
Local ownership (%)	60	65	54.5
Export component (%)	0	0	0
Amount requested (US$) {Original	250,000	2,926,263	401,640
{Revised	250,000		
Cost effectiveness (US$/kg) (Phase I & Phase II)	13.76	11.46	13.76
National Coordinating Agency		DIW	
Implementing Agency		World Bank	
Technical review completed?	Yes	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			

PROJECT DESCRIPTION

(a) Elimination of ODS used in the production of household refrigerators at Kang Yong Electric Public Co., Ltd. (Phase II)
(b) Elimination of ODS used in the production of household refrigerators at Sanyo Universal Electric Public Co., Ltd. (Phase II)
(c) Elimination of ODS used in the production of household refrigerators at Thai Toshiba Electric Industries Co., Ltd. (Phase II)

1. ODS consumption in the domestic refrigeration sector in Thailand was 1,080 MT in 1992. However, the production of household refrigerators and freezers in Thailand has increased significantly in recent years, from about 560,000 units in 1989 to approximately 2 million units in 1995. Presently, there are eight major manufacturers of household appliances.

2. Projects from the three enterprises were approved at the 10th Meeting of the Executive Committee (1993) on the basis of two phases: Phase I was to provide for engineering, assistance, training, and testing, and Phase II would allow for the elimination of CFC-11 and CFC-12 through installation of new equipment necessary for mass production of CFC-free appliances.

3. Funds for Phase I were allocated as follows: $1,140,000 for Kang Yong, $1,864,000 for Sanyo and $823,000 for Thai Toshiba.

4. Phase II was to provide each enterprise with the necessary equipment for mass production of CFC free appliances.

5. The World Bank has submitted project proposals for Phase II to this meeting for the three enterprises.

6. The Phase II proposals state that the enterprises undertook the following activities, which were endorsed by the World Bank, while implementing Phase I:

- Installation of new test rooms and acquisition systems and modification of existing ones
- Purchase of quality control equipment
- Purchase of leak detectors, charging machines, vacuum pumps
- Technical assistance from parent companies
- Testing of refrigerators
- Other equipment for mass production.

7. Thus, the three enterprises have installed equipment compatible with the use of HFC-134a as a replacement for CFC-12 and HCFC-141b as a transitional replacement for CFC-11 in the refrigerant and foam components of the conversion, respectively.

8. The three enterprises have increased the production of CFC-based appliances since the approval of Phase I due to vertical and/or horizontal increase in capacity.

9. Phase II proposals request additional funding to procure additional equipment and to compensate for incremental operating costs for 6 months duration.

10. The World Bank calculated the level of grant as the sum of capital cost for Phase II and six months of operating costs, discounted by the percentage of foreign ownership and offset by the amount approved at the 10th Meeting (Phase I). In order to keep the project costs within the cost-effective threshold of the sector, Kang Yong and Thai Toshiba enterprises are requesting funds up to those allowed by the threshold value.

Justification for HCFC-141b technology

11. Kang Yong, Sanyo Universal and Thai Toshiba companies have selected HCFC-141b as a blowing agent understanding that it is a transitional technology. In response to the Thai government's decision to ban the use of CFC-11 in the production of household refrigerators starting from 1 January 1997 Sanyo Universal and Thai Toshiba have decided to use HCFC-141b as a transitional substance for two years before switching to cyclopentane or other alternatives. The selection of this technology was recommended to them by their parent companies in Japan which currently use HCFC-141b as a blowing agent. HCFC-141b has a thermal conductivity comparable with CFC-11 resulting in similar insulation performance.

12. Companies have provided a written statement where they have acknowledged not to seek any further assistance from the Fund for conversion to ultimate non-ODP technologies.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The chosen technologies are proven. The choice of an interim HCFC-141b based technology is explained and justified.

2. The Secretariat discussed with the World Bank and agreed on the eligibility and cost of equipment needed for conversion.

3. Costs of new high pressure machines requested for Kang Yong and Sanyo Universal have been recognized as ineligible incremental costs since the existing high pressure machines are capable of handling HCFC-141b formulation. It was agreed that cost of modification of existing foaming machines in Sanyo Universal will be eligible incremental cost. Cost of leak detectors, charging machines and vacuum pumps has been reduced to reflect the standard cost for this equipment. Cost of new extruder and welding machines was not recognized as eligible incremental cost.

Operating Cost

4. Operating cost have been discussed with the World Bank and agreement was reached on incremental cost per unit. Cost per unit has been reduced to reflect the prevailing density of the foam system and prices of materials and components.

5. Sanyo Universal and Thai Toshiba have increased significantly their production levels of CFC-based appliances in 1995, versus production figures reported in 1993 Phase I projects. An additional production line was added at Sanyo enterprise in 1994 for the production of CFC-based appliances. The issue of production level is presented in the overview paper (UNEP/OzL.Pro/ExCom/21/13). The 1993 figures will yield US $983,840 for Sanyo, and US $172,056 for Thai Toshiba versus US $1,260,545 and US $251,012, respectively, for 1995. The eligible operating costs for Sanyo Universal and Thai Toshiba will be subject to a recommendation by the Sub-Committee on Project Review.

6. Phase I of each of the three projects was implemented at lower cost than that approved at the 10th Meeting. At this stage, the balance of Phase I is not known for any of these projects.

7. The World Bank has indicated that it does not seek funding of Phase II projects at this meeting.

RECOMMENDATIONS

1. The Fund Secretariat recommends as follows:

   (i) The eligible incremental cost of Kang Yong Electric Public Co., Ltd. is US $222,182;

   (ii) The eligible incremental capital cost of Sanyo is US $329,490;

   (iii) The eligible incremental capital cost of Thai Toshiba is US $65,945;

   (iv) The eligible incremental operating cost of Sanyo and Thai Toshiba are pending a decision of the Executive Committee;

   (v) The Executive Committee may wish to consider the costs indicated for the three enterprises as eligible. However, it should defer funding pending a report from the World Bank on the balance available from the implementation of Phase I of these enterprises; and

   (vi) The Executive Committee may wish to request the World Bank that similar projects to be submitted at future meetings should include detailed funding information on the implementation of Phase I.