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

**PROJECT PROPOSAL: MALAYSIA**

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

Foam

- Replacement of CFC-11 foam blowing agent by HCFC-141b in the manufacture of insulation panels at Yong Tuck Refrigerators Trading Co.

UNIDO

**PROJECT EVALUATION SHEET  
MALAYSIA**

SECTOR: FOAM ODS use in sector (1993): 1,360 ODP tonnes

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

**Project Titles:**

The replacement of CFC-11 foam blowing agent by HCFC-141b in the manufacture of insulation panels at Yong Tuck Refrigerators Trading Co.

Project Data	Rigid
	Yong Tuck
ODS phase-out (ODP tonnes)	9
Proposed project duration (months)	18
Incremental capital cost (US \$)	44,000
- including contingency (%)	10
Incremental operational cost (US \$)	17,735
Total project cost (US \$)	61,735
Local ownership (%)	100
Export component (%)	0
Amount requested (US \$) {Original}	61,735
{Revised}	
Cost effectiveness (US \$/kg)	7.72
National Coordinating Agency	Ministry of Science, Technology and Environment
Implementing Agency	UNIDO
Technical review completed?	Yes

<b>Secretariat's Recommendations:</b>	
Amount recommended (US \$)	61,735
Project impact (ODP tonnes)	8
Cost effectiveness (US \$/kg)	7.72
Implementing Agency support cost (US \$)	8,026
Total cost to Multilateral Fund (US \$)	69,761

## PROJECT DESCRIPTION

### Sector Information

1. Malaysia's baseline consumption (average 1995-1997) of Annex A Group I controlled substances reported to the Ozone Secretariat: 3,271.1 ODP tonnes.
2. The inventory of approved projects shows that as of November 1998 US \$11.01 million had been approved for projects in the foam sector to phase out 1,578 ODP tonnes of CFC. US \$7.04 million had been disbursed and 1,021.9 ODP tonnes phased out.
3. The sector background information provided by UNIDO is based on data for 1993 and the information may no longer be accurate or relevant to the current situation. It provides a breakdown of consumption by sector, with the foam sector consuming about 35% of the total consumption. UNIDO indicates that the consumption of CFC-11 for foam making was expected to drop in 1995 due to Government regulations prohibiting the use of ODS in flexible foam without ascertaining whether this was the case at the time of project preparation in 1998. It is also stated that by the end of 1999 consumption of CFC for foam making will be phased out under Department of Environment (DOE) regulations.

### Impact of the Project on the Country's Montreal Protocol Obligations

4. It is stated that when the project is implemented as scheduled, CFC consumption eliminated from the foam sector currently 34.5% of the country's consumption, will be reduced by 8 ODP tonnes. This may not be an accurate assessment since the sector consumption data used as the basis is out of date.
5. The 8 tonnes to be phased out is however 0.2% of Malaysia's reported baseline CFC consumption.

### **The replacement of CFC-11 foam blowing agent by HCFC-141b in the manufacture of insulation panels at Yong Tuck Refrigerators Trading Co.**

1. Yong Tuck Refrigerators Trading Co. is a small scale manufacturer of metal faced rigid foam panels for cold rooms. The foam is produced by premixing the ingredients in simple premixing equipment and manually pouring into the press. It is indicated that the operation is associated with losses of CFC-11 and other chemicals as a result of poor handling during dosing and mixing as well as superfluous use of such chemicals. UNIDO explained that the losses of CFC-11 estimated to be 10% were not included in the CFC-11 consumption of the enterprise.
2. Yong Tuck consumed an average of 9 tonnes of CFC-11 in 1995-1997. The CFC-11 will be phased out by converting to the use of HCFC-141b. A low pressure foaming machine will be provided at a cost of approximately US \$50,000. Other costs include technology transfer, training and trial runs (US \$10,000). Incremental operating cost amounts to US \$17,735.

Justification for the use of HCFC-141b

3. UNIDO provided the following as justification for the use of HCFC-141b as substitute blowing agent in the project.
4. Pentane technology is the preferred solution. It is widely used in Europe but it requires extensive precautionary measures due to the flammable and explosive character of pentane. Its use requires the installation of expensive safety features which would significantly increase the investment cost and make the project prohibitively expensive. In this case it is not a viable option.
5. The counterpart (Yong Tuck Co.) was briefed about the main technical, commercial and other issues related to the available technological options and has decided that HCFC-141b is the technically and economically acceptable one as a transitional solution. The company has decided for a zero ODP solution employing only carbon dioxide generated from the water/isocyanate reaction as an ultimate solution. HCFC-141b will be used as an interim step to the final solution.
6. The technologies for application of HCFC-356 and other new foaming agents (e.g. fluorinated ethers) are not yet mature.
7. In order to use HCFC-134a the temperature of the mould platens should be well controlled. The other disadvantage of this propellant is its higher cost. The use of HCFC-134a would involve further investment in the form of a special premix unit.
8. HCFC-141b, HCFC-22 and HCFC-142b + HCFC-22 blends are transitional substances. The latter two, similarly to HCFC-134a, need a special premixing unit for low boiling point blowing agents.
9. Of all options mentioned above, a water/HCFC-141b based system is preferred from a technical and economical point of view, even though it is considered an interim solution. This system will be used until such time as a fully water blown system becomes available. The ultimate non-ODS technology can then be implemented by the company itself.

Equipment to be destroyed or rendered unusable

10. UNIDO stated that equipment of the foaming section which was operating with CFC-11, will be destroyed or rendered unusable, and an evidence document will be provided by the counterpart, in cooperation with the local ozone officer. The list of equipment was provided.

## SECRETARIAT S COMMENTS AND RECOMMENDATIONS

### COMMENTS

1. The costs of the project have been agreed between UNIDO and the Secretariat. It was agreed to discount the cost of the low pressure machine by 25 percent to account for the absence of a machine in the current operations.
2. The sector information provided in the project document by UNIDO is out of date. It will be more relevant if the information is based on more recent data and demonstrates the significance of foam sector projects on the country's ODS phase out.

### RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the project with the funding level and the associated support cost indicated below.

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
The replacement of CFC-11 foam blowing agent by HCFC-141b in the manufacture of insulation panels at Yong Tuck Refrigerators Trading Co.	61,735	8,026	UNIDO

2. The Executive Committee may wish to request the implementing agencies when preparing projects for the country to provide data in the sector background information that demonstrates the relationship of the ODS phased out in projects in the sector with the country's overall ODS phase out programme or its obligations under the Montreal Protocol.