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

Sixth Meeting  
Montreal, 27-28 February 1992

## **MALAYSIA COUNTRY PROGRAMME**

**This document consists of:**

- a) Evaluation sheet prepared by the Fund Secretariat
- b) Letter of transmittal from the Government of Malaysia
- c) Country Programme Cover Sheet
- d) The Country Programme (revised).

## MALAYSIA'S COUNTRY PROGRAMME EVALUATION SHEET

Malaysia's Country Programme is submitted to the Sixth Meeting of the Executive Committee as document UNEP/OzL.Pro/ExCom/6/4. Comments provided by the Committee during its fifth meeting as well as further comments from the Fund Secretariat were taken into consideration by the Government of Malaysia in preparing this revised version.

The document was revised in accordance with "Guidelines of Country Programme Preparation" (UNEP/OzL.Pro/Ex/Com/5/5/Rev.2). It consists of:

- Letter of transmittal from the Ministry of Science, Technology and Environment.
- Country Programme Cover Sheet.
- Executive summary.
- Introduction.
- Current and projected consumption of controlled substances.
- Institutional framework.
- Policy framework.
- Government and industry response to the Montreal Protocol.
- Strategy, timetable and action plan by the government.
- Responsible national agencies.
- Budget.
- Monitoring arrangements.

In 1989, Malaysia consumed 4621 metric tons of controlled substances. Subject to resources and technical assistance made available, Malaysia has pledged to accelerate its phase-out schedule to match those of industrialized countries and to eliminate consumption of controlled substances ten years before the mandated timetable set by the Montreal Protocol i.e. year 2000. The ODS phase-out till the year 2000 is estimated to be 29,314.5 ODS metric tons.

To achieve this goal, Malaysia developed an action plan for the next three years with implementation schedule and estimated project cost. Monitoring arrangements are explicitly defined in the Country Programme.

The total estimated cost of the scheduled projects is US\$ 256.13 million.

The Country Programme singles out two projects for immediate implementation:

- "The Conservation, Leakage Control and Recycling of CFC-12 and Demonstration Project in Automotive Air-Conditioning Sector";

- "Servicing, Maintenance and Recovery Charging System for Portable Extinguisher (Halon 1211) and Training Project in Halon Sector".

These two projects were submitted as annexes to the Country Programme and were subsequently reviewed by the Secretariat in consultation with the Government of Malaysia. They will be discussed under agenda item 7.

#### RECOMMENDATION

The Fund Secretariat notes the great efforts taken by the Government of Malaysia in preparing its Country Programme. The Fund Secretariat is satisfied with the content and format of this document, and recommends its approval in accordance with item 10 (g) of the Terms of Reference of the Executive Committee.

It should be noted that since most of the project proposals identified by the Government of Malaysia are over US\$ 500,000; individual project documentation should be submitted to the Executive Committee for its consideration and approval.



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Our Ref: AS 91/120/004/002  
Your Ref: (6/)

Date: 30 January 1992

**TRANSMITTAL LETTER**

Dr. Omar E. El-Arini, Chief Officer  
Secretariat  
Interim Multilateral Fund of the Montreal Protocol  
1800 Mc Gill College Avenue, 27th. Floor  
Montreal, Quebec  
CANADA H3A 3J6

Dear Sir,

**Second Revised Malaysia's Country Programme and  
Projects for Funding Under the Multilateral Fund  
for the Implementation of the Montreal Protocol**

I have the honour to forward Malaysia's Country Programme (Second Revision) for the funding under the Interim Multilateral Fund for the Implementation of the Montreal Protocol to be considered in the Sixth EXCOM Meeting at the end of February 1992.

Your kind assistance and consideration of Malaysia's Country Programme is greatly appreciated.

Best regards,

  
( ISMAIL ITHNIN )  
Deputy Director General  
for Director General of Environment  
Malaysia

Prepared by:  
The Fund Secretariat

# COUNTRY PROGRAMME COVER SHEET

Country: Malaysia

Date Received: 30 January 1992

Lead National Agency: Department of Environment

Period covered by  
the Country Programme: 1991-1993

Lead Implementing Agency: -

## 1. Phase-Out Schedule

| Substances           | %     | Current Consumption<br>(tonnes x ODP)<br>in 1990 | Planned total<br>consumption<br>till phase-out | Planned<br>year of<br>phase-out |
|----------------------|-------|--------------------------------------------------|------------------------------------------------|---------------------------------|
| CFC-11               | 26.78 | 1006 x 1.0 = 1006.0                              | not specified                                  | 2000                            |
| CFC-12               | 36.74 | 1381.2 x 1.0 = 1381.2                            | not specified                                  | 2000                            |
| CFC-113              | 26.48 | 1244.2 x 0.8 = 995.4                             | not specified                                  | 2000                            |
| CFC-115              | 0.05  | 3.0 x 0.6 = 1.8                                  | not specified                                  | 2000                            |
| Halon-1211           | 5.61  | 70.3 x 3.0 = 210.9                               | not specified                                  | 2000                            |
| Halon 2402           | 0.34  | 2.1 x 6.0 = 12.6                                 | not specified                                  | 2000                            |
| Halon-1301           | 3.54  | 13.3 x 10.0 = 133.0                              | not specified                                  | 2000                            |
| Methyl<br>Chloroform | 0.46  | 172.16 x 0.1 = 17.2                              | not specified                                  | 2000                            |
|                      |       | 3758.1                                           |                                                |                                 |

## 2. Government Action Plan

| Year(s)<br>Start/End | Description of action                                                                                                                                                               | Sector       | Intended Effect                                                 |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------|
| 1985                 | Establishment of National Steering Committee of ministries, agencies, industry organizations, suppliers, universities, consumer associations and NGOs                               | all          | Creation of institutional framework to facilitate ODS phase-out |
| 1986                 | Establishment of Technical Steering Committee                                                                                                                                       | all          | - " -                                                           |
| 1990                 | Establishment of Industrial Working Groups                                                                                                                                          | all          | - " -                                                           |
| 1985                 | Encourage Use of Substitutes and Promote Investment in Non-CFC Technology                                                                                                           | all          | Facilitation of ODS phase-out                                   |
| 1985                 | Encouraging research and development by universities, related industries and research institutions on CFC alternatives and ozone friendly technologies applicable to domestic needs | all          | Facilitation of ODS phase-out                                   |
| 1989                 | Adoption of Custom Duty Order (Amendment 35) for the purpose of updating of import inventory and monitoring the importation/exportation of ODS                                      | all          | Introduction of control measures facilitating ODS phase-out     |
| 1990                 | Adoption of customs regulations prohibiting CFC and halon imports and exports                                                                                                       | all          | Facilitation of ODS phase-out                                   |
| 1991                 | Adoption of control regulations on use of CFCs as propellants and blowing agents                                                                                                    | aerosol/foam | Facilitation of CFC phase-out                                   |
| 1992                 | Adoption of Amendment to the Environment Quality Act (EQA) of 1974                                                                                                                  | all          | Regulation and prohibition of use of controlled substances      |
| 1990                 | CFC Case Study                                                                                                                                                                      | all          | Development of strategies to facilitate ODS phase-out           |

| Year(s)<br>Start/End | Description of action                                                                            | Sector | Intended Effect                                         |
|----------------------|--------------------------------------------------------------------------------------------------|--------|---------------------------------------------------------|
| 1992                 | Introduction of Tax Incentive System for Reducing ODS consumption                                | all    | Facilitation of ODS phase-out                           |
| 1992                 | Introduction of Import Duty Exemptions for Reducing ODS Consumption                              | all    | Facilitation of ODS phase-out                           |
| Not specified        | Discouraging further investments relating to the production and use of the controlled substances | all    | Facilitation of ODS phase-out                           |
| Not specified        | Participation in international conventions and meetings                                          | all    | Contribution to the objectives of the Montreal Protocol |

## 3. Project Summary

| YEAR                | TYPE OF PROJECT<br>(SECTOR)                            | PROJECT DESCRIPTION                                                                                                                                        | PROJECT<br>COST<br>US DOLLARS | INCREMENTAL<br>COST<br>US DOLLARS | PARTICIPATION<br>OF<br>IMPLEMENTING<br>AGENCIES | TONNES x ODP<br>PHASE-OUT |
|---------------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------------------|-------------------------------------------------|---------------------------|
| 09.1991-<br>12.1992 | <b>Refrigeration</b><br>Automotive<br>Air Conditioning | *1. The conservation, leakage control, recycling of CFC-12, and demonstration project                                                                      | 880,000                       | **                                | World Bank                                      | 370 per year              |
| 08.1991-<br>06.1992 |                                                        | *2. On-the-job training programme                                                                                                                          | 29,334                        | **                                | UNDP                                            | n.a.                      |
| 01.1992-<br>03.1993 |                                                        | *3. Re-training programme                                                                                                                                  | 25,926                        | **                                | UNDP                                            | n.a.                      |
| 08.1991-<br>10.1992 |                                                        | 4. Introduction of coolant-saving components [condenser, evaporator, fitting parts (hose kit)]                                                             | 1,190,000                     |                                   | Not specified                                   | Not specified             |
| 01.1992-<br>06.1993 |                                                        | 5. Manufacture of complete HFC-134A air-conditioning systems (equipment, machinery compressor, and hose kit, obsolescence of existing machinery equipment) | 14,430,000                    |                                   | Not specified                                   | Not specified             |
| 10.1991-<br>01.1993 |                                                        | 6. Research and Development                                                                                                                                | 1,100,000                     |                                   | Not specified                                   | n.a.                      |
| 09.1991-<br>05.1993 | Commercial and<br>residential systems                  | 7. Project of driveline recycling and replacement of large central plant (CFC recovery machine, driveline retrofit, chiller replacements)                  | 140,680,000                   |                                   | Not specified                                   | Not specified             |
| 12.1991-<br>03.1993 |                                                        | 8. Charge tools and dies for residential systems                                                                                                           | 550,000                       |                                   | Not specified                                   | Not specified             |
| not<br>specified    |                                                        | 9. CFC disposal and recycling centre                                                                                                                       | not known                     |                                   | Not specified                                   | Not specified             |

| YEAR                | TYPE OF PROJECT<br>(SECTOR)                         | PROJECT DESCRIPTION                                                   | PROJECT<br>COST<br>US DOLLARS                     | INCREMENTAL<br>COST<br>US DOLLARS | PARTICIPATION<br>OF<br>IMPLEMENTING<br>AGENCIES | TONNES x ODP<br>PHASE-OUT |
|---------------------|-----------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------|-----------------------------------|-------------------------------------------------|---------------------------|
| 07.1991-<br>06.1992 | <b>Refrigeration</b> (Cont'd)<br>Petroleum industry | 10. Recovery and recycling CFC-12 before complete phase-out of CFCs   | 1,190,000                                         |                                   | Not specified                                   | Not specified             |
| 10.1991-<br>02.1992 |                                                     | 11. Complete phase-out of CFC-12 before 1995                          | 3,500,000                                         |                                   | Not specified                                   | Not specified             |
| 02.1992-<br>04.1992 |                                                     | 12. Complete phase-out of HCFC-22 before the year 2010                | 19,950,000                                        |                                   | Not specified                                   | Not specified             |
| 12.1991-<br>11.1992 |                                                     | 13. Education, training, and public awareness in refrigeration sector | 160,000                                           |                                   | Not specified                                   | n.a.                      |
|                     |                                                     |                                                                       | <b>Refrigeration<br/>total</b><br><br>183,685,260 |                                   |                                                 |                           |
| 12.1991-<br>03.1993 | <b>Aerosols</b>                                     | 14. Formulation of product design and packaging                       | 350,000                                           |                                   | Not specified                                   | Not specified             |
| 01.1992-<br>12.1992 |                                                     | 15. Plant configuration, accessories, and machinery                   | 440,000                                           |                                   | Not specified                                   | Not specified             |
| 11.1991-<br>12.1992 |                                                     | 16. Safety needs and necessary approvals                              | 220,000                                           |                                   | Not specified                                   | Not specified             |
|                     |                                                     | 17. Education, training, and public awareness                         | 610,000                                           |                                   |                                                 |                           |
|                     |                                                     |                                                                       | <b>Aerosols<br/>Total</b><br><br>1,620,000        |                                   |                                                 |                           |

| YEAR            | TYPE OF PROJECT<br>(SECTOR) | PROJECT DESCRIPTION                                                                         | PROJECT<br>COST<br>US DOLLARS | INCREMENTAL<br>COST<br>US DOLLARS | PARTICIPATION<br>OF<br>IMPLEMENTING<br>AGENCIES | TONNES x ODP<br>PHASE-OUT |
|-----------------|-----------------------------|---------------------------------------------------------------------------------------------|-------------------------------|-----------------------------------|-------------------------------------------------|---------------------------|
|                 | <b><u>Solvents</u></b>      | 18. Degreasing semi-aqueous alternative in-line system                                      | 4,440,000                     |                                   | Not specified                                   | Not specified             |
|                 |                             | 19. Metal cleaning-aqueous surfactant required downstream waste treatment                   | 550,000                       |                                   | Not specified                                   | Not specified             |
|                 |                             | 20. Precision cleaning - Application for high-tech part and hardware                        | 2,180,000                     |                                   | Not specified                                   | Not specified             |
|                 |                             | Sub-assembly                                                                                |                               |                                   |                                                 |                           |
|                 |                             | 21. Education, training, and public awareness                                               | 370,000                       |                                   | Not specified                                   | Not specified             |
|                 |                             |                                                                                             | <b><u>Solvent Total</u></b>   |                                   |                                                 |                           |
|                 |                             |                                                                                             | <b>7,540,000</b>              |                                   |                                                 |                           |
| 10.1991-09.1992 | <b><u>Halons</u></b>        | *22.Servicing, maintenance and recovery charging kit for portable extinguisher (Halon 1211) | 310,000                       | **                                | World Bank                                      | 300 MT per year*          |
| 12.1991-11.1992 |                             | *23.Central recycling plant                                                                 | 360,000                       | **                                | World Bank                                      |                           |
| 11.1991-10.1992 |                             | *24.Demonstration and training                                                              | 46,470                        | **                                | UNDP                                            | 500 trained operators     |
| 1992-1994       |                             | *25.Re-training                                                                             | 40,000                        | **                                | UNDP                                            | 100 core trained trainers |
| 02.1992-04.1993 |                             | 26. Complete phase-out of halons in petroleum industry before 1995                          | 4,620,000                     |                                   | not specified                                   | not specified             |

| YEAR                      | TYPE OF PROJECT<br>(SECTOR) | PROJECT DESCRIPTION                                                          | PROJECT<br>COST<br>US DOLLARS           | INCREMENTAL<br>COST<br>US DOLLARS | PARTICIPATION<br>OF<br>IMPLEMENTING<br>AGENCIES | TONNES x ODP<br>PHASE-OUT |
|---------------------------|-----------------------------|------------------------------------------------------------------------------|-----------------------------------------|-----------------------------------|-------------------------------------------------|---------------------------|
| 01.1992-<br>01.1993       |                             | 27. Manufacture of CO <sub>2</sub> cylinder and valve                        | 1,850,000                               |                                   | not specified                                   | not specified             |
| 09.1991-<br>06.1994       |                             | 28. Existing Halon 1211 extinguisher to be phased-out by 1999                | 51,850,000                              |                                   | not specified                                   | not specified             |
| 10.1992-<br>08.1994       |                             | 29. National Data Bank: The conversion of existing test facilities           | 3,700,000                               |                                   | not specified                                   | not specified             |
| 1992-<br>1994             |                             | 30. Alternative to halons for fire protection in telecommunication exchanges | not known                               |                                   | under<br>UNEP/<br>SIDA<br>assistance            | not specified             |
| 11.1991-<br>10.1992       |                             | 31. Education, training, and public awareness in halon sector (Phase 1)      | 50,000                                  |                                   |                                                 |                           |
| 11.1992-<br>10.1993       |                             | 32. (Phase 2 - re-training)                                                  | 40,000                                  |                                   |                                                 |                           |
|                           |                             |                                                                              | <b>Halon total</b><br><b>62,866,470</b> |                                   |                                                 |                           |
| <b>TOTAL PROJECT COST</b> |                             |                                                                              | <b>255,711,730</b>                      |                                   |                                                 |                           |

\* These are the projects of priority and will be presented to the Executive Committee for consideration and approval under Agenda item 7.

\*\* The cost of projects represents the incremental cost.

#### 4. Costs

|                                                      |      |             |                 |
|------------------------------------------------------|------|-------------|-----------------|
| Cost of Activities and Projects in Country Programme | \$US | 255,711,730 |                 |
| Estimated cost of complete phase out                 | \$US |             |                 |
| Estimated cost effectiveness                         | \$US |             | per tonne x ODP |

MALAYSIA

COUNTRY PROGRAMME

TO

REDUCE AND ELIMINATE THE CONSUMPTION AND EMISSIONS

OF

OZONE DEPLETING SUBSTANCES

NATIONAL COMMITTEE ON OZONE LAYER PROTECTION

MALAYSIA  
DECEMBER 1991

Department of Environment  
50662 KUALA LUMPUR, MALAYSIA  
Fax.: 603-2931480, 2936006

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## MALAYSIA COUNTRY PROGRAMME

## EXECUTIVE SUMMARY

This country programme paper (second revision) is prepared for funding information under the Interim Multilateral (EXCOM) established under the Montreal Protocol on Substances That Deplete The Ozone Layer on the programme of activities and project proposals to reduce and subsequently eliminate emission of ozone depleting substances (ODS) in Malaysia. It has been revised from the version submitted on 18 November 1991 to conform, to the extent possible, to the guidelines required by the EXCOM.

2. The paper presents the background and current status on the consumption of ODS together with the Institutional and Policy Framework, the actions taken by the the Government and Industry, Implementation Strategies, Future Action Plans, Timeframe and Budget to implement the action plans.
3. From the data declared according to statutory requirements by importers and users to the Malaysian Customs, Malaysia has a calculated consumption of 3,740.7 MT of ODS in 1990 which represented 0.23 kg per capita. Malaysia has initiated the process to reduce and eliminate CFCs and Halon from automobile air conditioners, refrigerant, solvent cleaning, aerosol propellant, foam manufacturing and Halon for fire protection. Subject to resources and technical assistance made available, Malaysia intends to eliminate consumption of CFCs and Halon well before the mandated schedule set in the Protocol i.e. year 2000. Implementation of these projects is scheduled to begin in 1992 and 1993.
4. The total estimated cost of the scheduled projects is US\$256.13 million of which US\$254.35 million is for investment and pre-investment projects and US\$1.78 million for public awareness and training programmes. Of this total amount US\$3 million is immediately required for the implementation of 2 priority projects i.e.:
  - (i) The Conservation, Leakage Control and Recycling of CFC 12 and Demonstration Project in Automotive Air Conditioning Sector; and

(ii)

- (ii) Servicing, Maintenance and Recovery Charging System for Portable Extinguisher (Halon 1211) and Training Project in Halon Sectors.

The detailed funding requests for the remaining projects would be submitted to the Executive Committee as and when **incremental cost component** data is determined, taking into consideration influencing factors, inter alia:

- (i) final cost of emerging substitutes/alternative technologies;
- (ii) reinvestment by industries;
- (iii) financial assistance from other multilateral agencies;
- (iv) bilateral assistance; and
- (v) possible government assistance.

5. The Government of Malaysia is seeking financial support from the Interim Multilateral Fund under the Montreal Protocol to finance these programmes and projects in line with decisions of the Meeting of the Parties in London, 1990.

## 1. INTRODUCTION

### 1.1 PURPOSE

The purpose of this paper is to present to the EXCOM the programmes, activities and project proposals undertaken by Malaysia in compliance with the provisions of the Montreal Protocol on Substances That Deplete the Ozone Layer. The Country Programme seeks to put into perspective the strategy , the action plan on ODS leading to the total elimination of ODS given the scheduled time stipulated by the Protocol. In line with the provision of Article 5, paragraph 1 of the Protocol, Malaysia is seeking financial support to carry out the programmes, activities and projects to eliminate the use of ODS.

### 1.2 STATUS

In line with the decision of the Government to accede to the Protocol on 29 August 1989, a National Steering Committee on CFC and Halon was established; the lead agency being the Department of Environment, Malaysia with assistance from the Ministry of International Trade and Industry and the Ministry of Finance. Other members include the Economic Planning Unit, Ministry of Foreign Affairs, representatives from the private sector and non-governmental organizations. This Steering Committee considered and approved the

Country Programme based on studies conducted by the Department of Environment and a preliminary National ODS Case Study conducted with the aid of CIDA.

The cost of preparation of this Country Programme has been borne by the Government with the support from the various groups representing the industries using CFCs and halons.

### 1.3 ASSISTANCE RECEIVED

The Country Programme has been developed through financial and technical assistance from various sources. These include government agencies, the Working Groups representing the various user sectors, CIDA and SIDA.

## 2. CURRENT SITUATION

### 2.1 CURRENT AND FORECAST CONSUMPTION

#### 2.1.1 Current Consumption

Malaysia does not produce any controlled substances but imports its needs mainly from developed countries. Preliminary trade estimates of the calculated weighted consumption in 1986 of the controlled substances was 3840 MT. Studies have shown that the consumption in 1989 was 4779.3 MT which represents 0.29 kg. consumption per

capita. When Malaysia became a party in November 1989, internal processes were initiated to minimise the use of CFCs and Halon. The Customs Duty (Amendment) (No.35) Order 1989 to monitor the import and use of CFCs and Halon was introduced in December 14, 1989. Preliminary figures obtained through this regulation indicated that in 1990, 3740.7 metric tonnes of CFCs and Halons were consumed which represents 0.23 kg per capita.

**Table 1** shows the different types of CFCs and Halon used in the Malaysian market in 1985-1990. **Table II** shows consumption of ODS by user sector application. The refrigeration and car air-conditioners sector were the main users compared to the electronic, foam and aerosol sectors. The dramatic increase in foreign investments in the electronic industry in 1987 to 1989 especially by multinational companies, increased the consumption of CFCs especially as cleaning solvents.

## 2.2 INDUSTRY STRUCTURE

Malaysia does not produce nor export ODS. It imports all its ODS requirements from the United States, the United Kingdom and Japan. ODS are imported directly by user sectors; especially multinational companies.

### 2.3 INSTITUTIONAL FRAMEWORK

In pursuance of the objective to reduce and eliminate the consumption of CFCs and Halon, Malaysia has established an institutional framework to oversee the programmes being undertaken to meet this objective.

A National Steering Committee on the Ozone Layer (NSC) set up in 1985, whose members include ministries, government agencies, organisations representing the various industries, major suppliers of CFCs and Halon, universities, consumer associations and other non-governmental organisations. **Figure I** shows the organisational structure of the National Steering Committee. The NSC has convened a number of meetings to formulate strategies and control measures in order to comply with the provisions of the Protocol. The Department of Environment (DOE) under the Ministry of Science, Technology and the Environment is the focal point directly involved with the implementation of the provisions of the Protocol, with the various committees under the NSC being responsible for specific issues.

### 2.4 POLICY FRAMEWORK

Malaysia has made known its position in the various environmental meetings of its commitment to the global concern of mankind on the protection of the ozone layer. Malaysia as a party operating under

Article 5, paragraph 1 of the Protocol has been given a ten-year grace period before it is required to initiate actions to reduce the consumption of the controlled substances. Due to the pro-active role of Malaysia on environmental issues, the Government has already started the process to define the policies and regulations which are necessary to restrict the use of the controlled substances, way ahead of the time frame granted.

The Government has initiated, among others, the following strategies and measures.

- (i) Investors in new industries are encouraged to promote investment in ozone friendly technologies especially non-Halon technologies and also to use substitutes or new alternatives.
- (ii) To monitor the use of controlled substances.
- (iii) To encourage the existing industries to use substitutes or new alternatives.
- (iv) To discourage further investments relating to the production and use of the controlled substances.
- (v) To encourage universities, related industries and research institutions to

carry out research on resource development of alternatives to CFCs and ozone friendly technologies which can be applied to domestic needs.

- (vi) To promote educational and public awareness programmes related to ozone protection.
- (vii) To encourage Malaysia's participation in international conventions and meetings to be able to contribute effectively to the objectives of the Protocol.

## **2.5 GOVERNMENT AND INDUSTRY RESPONSES TO THE PROTOCOL**

### **2.5.1 The Role of the Government**

Malaysia's commitment to the protection of the ozone layer is evidenced by the control measures it adopted to reduce and eliminate the consumption of CFC's and Halon. The Customs Duties (Amendment) Order of 1989 to monitor the import of the controlled substances is the initial measure. Other laws and regulations on restriction of usage and mandatory elimination of ODS are being finalised.

The Government is studying proposals to encourage individual corporations and industries in activities related to the reduction in the usage of ODS.

The National ODS Case Study with the cooperation of CIDA and the Industrial Working Groups from various sectors is in the final stages of completion. The action plan and strategies proposed by the National ODS Case Study would accelerate the process of eliminating completely the consumption of ODS.

#### 2.5.2 The Role of Industry

The six Working Groups (WGs) set-up by the related user-sectors have given voluntary support in working towards the objectives of the Protocol. The reports submitted by these W.Gs would form the basis for report preparation of the National Strategy on the Protection of Ozone Layer to be adopted by the Government. An accelerated reduction and elimination is likely in the use of CFCs and Halon from automobile air-conditioners, refrigerant, solvent cleaning, aerosol propellant, foam manufacturing and Halon for fire protection, with the cooperation of the industries concerned.

Table III shows total expected reduction of ODS and Figures II and III show reduction rate of ODS by the different sectors which were proposed by industrial WGs. Overall expected reduction programme would be completed before year 2000.

### 2.5.3 Public Awareness Campaigns

Public awareness promotion campaigns and on-the job training programmes have been proposed. These training programmes will be conducted in automobile air-conditioners, refrigerant, CFC solvent cleaning sector, aerosol manufacturing and Halon Sector. Project description, costs and time schedule for start-up and completion is shown in Table IV.

## 3. IMPLEMENTING PHASE OUT

### 3.1 STRATEGY STATEMENT BY GOVERNMENT

The Government is committed towards compliance with the Montreal Protocol. In line with this, the Government has adopted various regulatory and control measures to facilitate the implementation of the Action Plan as follows:-

- (i) The Customs Duty (Amendment) (No. 35) Order 1989 came into force on 14th December 1989 for the purpose of updating import inventory and to monitor import-export of controlled substances.
- (ii) The following draft regulations have been proposed:

- (a) Customs (Prohibition of Imports and Export) (Montreal Protocol) (CFC's and Halon) Order 199\_\_
- (b) Environment Quality (Use of CFC's and Other Gases as Propellant and Blowing Agent) 199\_\_
- (iii) Amendment to the Environment Quality Act (EQA) 1974 may be necessary to regulate and prohibit use of controlled substances.

#### **Incentive Schemes**

The Government is considering proposals for tax reduction and import duty exemption for activities related to the reduction of consumption of the controlled substances.

#### **Phase-Out Schedule**

Table V, shows the time-frame and a brief description of the action plans that have been undertaken and the proposed action plans up to the year 2000. A review of the strategies, policies and control measures is anticipated when the National Study is completed and the cost of compliance and technical options are determined.

To date 23 potential sub-preinvestment projects and 5 training programmes have been identified (Table IV). A detailed description of the priority projects

and the training activities that need urgent financial support by the Multilateral Fund especially the two priority projects is shown in **Appendix I and II**. It has been proposed that the implementation of these projects should begin in 1992 and 1993.

### **3.2 ACTION PLAN**

#### **3.2.1 Government Actions**

The Government has in line with the strategy adopted to implement the phasing out of ODS taken action through various regulatory and control measures. As stated in 3.1., Regulatory and control measures instituted by the Government would progressively reduce the consumption of ODS. This would affect prices of products containing ODS. To minimize the effect of price increases, the Government has initiated various incentive schemes. To have a more systematic control on the import of ODS, it has been proposed that the AP (Approved Permits) System be used whereby all imports of ODS would need a permit from the Ministry of International Trade and Industry.

#### **3.2.2 Projects**

The WGs set up by the user-sectors have identified several CFCs reduction projects that can be implemented immediately. These projects can

satisfy the criteria set for financial assistance such as technologies that are commercially available, cost-effective, environmentally sound and has short and long term solutions for reduction of ODS. These projects (in order of priority) would bring immediate effects in minimising emission of CFCs and Halon. Activities pertaining to these priority projects which can be categorised under Investment and Pre-investment and Public Awareness and Training Program are as follows:-

#### **Investment and Pre-investment Projects**

##### **Automobile Air-Conditioners**

- (i) Recycling and Recovery Equipment
- (ii) Introduction of coolant saving components
- (iii) Research and Development
- (iv) Manufacture of HFC 134a Air-Conditioning System

##### **Halon Elimination**

- (i) Phase-out of Halon in Petroleum industry
- (ii) Manufacture of CO<sub>2</sub> cylinder and valve
- (iii) Recovery and charging kit for Halon 1211
- (iv) Central Recycling Plant
- (v) Halon 1211 extinguishers phase out by 1999
- (vi) Halon National Data Bank

- (vii) Alternatives in Telecommunication Exchanges  
with assistance from UNEP/SIDA

**Commercial and Residential Refrigerant**

- (i) Project driveline retrofitting and replacement of large central plant (LCP)
- (ii) Change tools and dies for residential system
- (iii) CFC recovery and recycling centre

**CFC 113 of Solvent Reduction**

- (i) Degreasing - semi-aqueous alternatives on-line system
- (ii) Metal cleaning - aqueous surfactant
- (iii) Precision cleaning - application for high-tech piece part and hardware

**Conversion of CFCs in Aerosol System**

- (i) Design of products to packaging component
- (ii) Configuration plant and accessories
- (iii) Safety needs and necessary approval

**CFC Elimination in Petroleum Industry**

- (i) Recovery and Recycling before phase-out
- (ii) Complete phase-out of CFC 12 before 1995
- (iii) Complete phase-out of HCFC 22 before 2010

### **3.3 ROLES IN IMPLEMENTING THE STRATEGY**

The lead agency that will be responsible for the implementation of the Country Programme will be the Department of Environment in collaboration with the Ministry of International Trade and Industry, Ministry of Finance and other relevant government agencies.

The government has identified the Malaysian Industrial Development Finance (MIDF)/and Bank Industri to facilitate funding from the Interim Multinational Fund to Malaysia.

### **3.4 TIME TABLE AND CONSUMPTION IMPLICATIONS**

Forecast consumption and planned consumption are as elaborated under Section 2.1.2.

### **3.5 BUDGET AND FINANCING PROGRAMME**

Through the provision of personnel, equipment and other accessories, the Government has absorbed the cost of developing the country programme through the budgetary system. Detailed costing is not possible at the present moment because the cost component incurred by the Government has yet to be finalised. Assistance sought from the Fund will be used at the present moment for the funding of the two priority projects as indicated below:-

- (i) The conservation ,leakage control and recycling of CFC 12 and demonstration project in automobile air-conditioning sector.
- (ii) Servicing, maintenance and recovery charging kit for portable fire extinguishers (halon 1211) and training project in the halon sector.

#### 3.5.1 Project Funding Priorities

Financial assistance is sought from the Interim Multilateral Fund to fund net incremental costs of the two (2) priority projects under section 3.5 above which are ready for take-off. These two priority projects would reduce the consumption of ODS cheaply and speedily.

These two projects are submitted to the Interim Multilateral Fund Secretariat for evaluation and Malaysia would accept the recommendation for the most appropriate Implementing Agency to implement these projects.

#### 3.6 **MONITORING ARRANGEMENTS**

The Government has undertaken various steps to monitor and regulate the consumption of ODS in the country in compliance with the limits set by the

Montreal Protocol. These include :-

- (i) Reporting by Customs Department on the quantities of the ODS imports.
- (ii) Arrangements within the industry groups and trade associations through the working groups set up with private sector participation.
- (iii) Government proposal to implement the AP System which would effectively monitor the imports of ODS into the country.

Progress on the phase-out schedule and project implementation would be monitored by the lead agency in collaboration with the Ministry of International Trade and Industry, and Ministry of Finance as well as other relevant agencies including the financial intermediaries that is MIDF/ and Bank Industri which would directly supervise the physical implementation of projects.

Table I

MALAYSIA: Consumption Data of CFCs and Halons Controlled by the Montreal Protocol, 1985 - 1990

| Year                     |     | ODP  | Past Supply (Metric Tonne) |      |                   |      |        |      |      |        |                   |        |                   |     |
|--------------------------|-----|------|----------------------------|------|-------------------|------|--------|------|------|--------|-------------------|--------|-------------------|-----|
|                          |     |      | 1985                       |      | 1986 <sup>1</sup> |      | 1987   |      | 1988 |        | 1989 <sup>2</sup> |        | 1990 <sup>3</sup> |     |
| Substance                |     |      |                            |      |                   |      |        |      |      |        |                   |        |                   |     |
|                          |     |      | ACT.                       | ODP  | ACT.              | ODP  | ACT.   | ODP  | ACT. | ODP    | ACT.              | ODP    | ACT.              | ODP |
| ANNEX A                  |     |      |                            |      |                   |      |        |      |      |        |                   |        |                   |     |
| GROUP I                  |     |      |                            |      |                   |      |        |      |      |        |                   |        |                   |     |
| CFC 11                   | 1.0 | 363  | 363                        | 576  | 576               | 810  | 810    | 998  | 998  | 834    | 834               | 1005.8 | 1005.8            |     |
| 12                       | 1.0 | 456  | 456                        | 1064 | 1064              | 1358 | 1358   | 1645 | 1645 | 1470   | 1470              | 1381.2 | 1381.2            |     |
| 113                      | 0.8 | 119  | 95                         | 684  | 547               | 876  | 701    | 1216 | 973  | 1381   | 1104              | 1244.2 | 995.4             |     |
| 114                      | 1.0 | 2    | 2                          | 3    | 3                 | 35   | 35     | 53   | 53   | 30     | 30                | -      | -                 |     |
| 115                      | 0.6 | -    | -                          | -    | -                 | 1    | 0.6    | -    | -    | 5.5    | 3.3               | 1.8    | 1.8               |     |
| CFC Consumption          | -   | 940  | 916                        | 2327 | 2190              | 3080 | 2904.6 | 3912 | 3669 | 3720.5 | 3441.3            | 3633.2 | 3384.2            |     |
| GROUP II                 |     |      |                            |      |                   |      |        |      |      |        |                   |        |                   |     |
| Halon 1211               | 3   | 71   | 213                        | 150  | 450               | 198  | 594    | 270  | 810  | 246    | 738               | 70.3   | 210.9             |     |
| 1301                     | 10  | 56   | 560                        | 120  | 1200              | 101  | 1010   | 38   | 380  | 60     | 600               | 13.3   | 133.0             |     |
| 2402                     | 6   | -    | -                          | -    | -                 | -    | -      | -    | -    | -      | -                 | 2.1    | 12.6              |     |
| Halon Consumption        | -   | 127  | 773                        | 270  | 1650              | 299  | 1604   | 308  | 1190 | 306    | 1338              | 85.7   | 356.5             |     |
| Total Consumption        | -   | 1067 | 1689                       | 2597 | 3840              | 3379 | 4508.6 | 4220 | 4859 | 4026.5 | 4779.3            | 3718.9 | 3740.7            |     |
| KgPerCapita <sup>4</sup> | -   | -    | 0.10                       | -    | 0.24              | -    | 0.27   | -    | 0.29 | -      | 0.29              | -      | 0.23              |     |

Note:

- 1 These inputs were based on the 1986 data supplied by 8 suppliers in Malaysia
- 2 These inputs were based on the 1989 data supplied by 15 suppliers in Malaysia
- 3 These data totally accounted for the year 1990 through the implementation of the Customs Act (1967): Customs Duties (Amendment) Order 1989
- 4 Based on the population of Malaysia, 16.2 million in 1986
- 5 1986 and 1989 official data sent to UNEP

.....contd. Table 1

| Substance         | Year | Past Supply (Metric Tonne) |      |                   |      |       |      |        |      |                   |      |                   |       |
|-------------------|------|----------------------------|------|-------------------|------|-------|------|--------|------|-------------------|------|-------------------|-------|
|                   |      |                            |      |                   |      |       |      |        |      |                   |      |                   |       |
|                   |      |                            |      |                   |      |       |      |        |      |                   |      |                   |       |
|                   | CDP  | 1985                       |      | 1986 <sup>1</sup> |      | 1987  |      | 1988   |      | 1989 <sup>2</sup> |      | 1990 <sup>3</sup> |       |
|                   |      | ACT.                       | CDP  | ACT.              | CDP  | ACT.  | CDP  | ACT.   | CDP  | ACT.              | CDP  | ACT.              | CDP   |
| <u>ANNEX B</u>    |      |                            |      |                   |      |       |      |        |      |                   |      |                   |       |
| GROUP I           |      |                            |      |                   |      |       |      |        |      |                   |      |                   |       |
| CFCs              | -    | -                          | -    | -                 | -    | -     | -    | -      | -    | -                 | -    | -                 | -     |
| GROUP II          |      |                            |      |                   |      |       |      |        |      |                   |      |                   |       |
| CCl <sub>4</sub>  | 1.1  | -                          | -    | -                 | -    | -     | -    | -      | -    | -                 | -    | -                 | -     |
| GROUP III         |      |                            |      |                   |      |       |      |        |      |                   |      |                   |       |
| Methyl Chloroform | 0.1  | 2.7                        | 0.27 | 9.1               | 0.91 | 34.2  | 3.42 | 38.61  | 3.86 | 54.27             | 5.43 | 172.14            | 17.21 |
| <u>ANNEX C</u>    |      |                            |      |                   |      |       |      |        |      |                   |      |                   |       |
| HCFC 22           | -    | 443.5                      |      | 686.8             |      | 910.3 |      | 1098.9 |      | 1296.0            |      | 1309.3            |       |

Table II

MALAYSIA: Consumption of CFCs and Halon  
By Use and Application, 1985-1989

| APPLICATION<br>(USER SECTOR)            | SUBSTANCE      | CONSUMPTION (Metric Tonne) |        |        |        |        |
|-----------------------------------------|----------------|----------------------------|--------|--------|--------|--------|
|                                         |                | 1985                       | 1986   | 1987   | 1988   | 1989   |
| Solvent Cleaning                        | CFC 113        | 119.4                      | 620.8  | 875.2  | 1216.1 | 1351.9 |
| Foam                                    | CFC 11,115,114 | 125.0                      | 199.0  | 275.6  | 432.1  | 464.2  |
| Refrigeration & Car<br>Air-Conditioning | CFC 12         | 751.2                      | 1608.3 | 1962.3 | 2440.4 | 2630.6 |
|                                         | HCFC 22        | 443.5                      | 686.8  | 910.3  | 1098.9 | 1296.0 |
|                                         | CFC 11         | 110.0                      | 235.0  | 220.0  | 272.0  | 300.0  |
| Aerosol                                 | CFC 11,115     | 154.0                      | 368.6  | 410.0  | 449.2  | 290.3  |
| Others                                  | CFC 11,12,115  | 32.0                       | 24.5   | 70.3   | 67.8   | 50.2   |
| Fire Fighting                           | HALON          | 125.2                      | 175.6  | 200.8  | 243.6  | 342.3  |

Table III: TOTAL REDUCTION OF CONTROLLED  
SUBSTANCES (ODS) UP TO THE  
YEAR 2000

| YEAR | CFCs<br>(MT) | HALON<br>(MT) | TOTAL ODS<br>(MT) | % REDUCTION<br>(1989 as base year) |
|------|--------------|---------------|-------------------|------------------------------------|
| 1989 | 4331         | 340           | 4671              | -                                  |
| 1990 | 4183.5       | 120           | 4303.5            | 9                                  |
| 1991 | 3434         | 120           | 3554              | 24                                 |
| 1992 | 3177         | 120           | 3297              | 29                                 |
| 1993 | 3460         | 80            | 3540              | 24                                 |
| 1994 | 3212         | 80            | 3292              | 30                                 |
| 1995 | 2189         | 30            | 2219              | 52                                 |
| 1996 | 1777         | 10            | 1787              | 62                                 |
| 1997 | 1690         | 10            | 1700              | 64                                 |
| 1998 | 1213         | 10            | 1223              | 74                                 |
| 1999 | 550          | 0             | 550               | 88                                 |
| 2000 | 0            | 0             | 0                 | 100                                |

\*NON/tableiv

Table IV: IMPLEMENTATION SCHEDULE AND ESTIMATED PROJECT COST  
OF THE OZONE DEPLETING SUBSTANCES, 1992-1993

| PROJECT DESCRIPTION                                                                  | TOTAL PROJECT COST (millions) |        | DATES (MONTH/YEAR) |        |          |        |        |        |          |        |        |        |          |        |
|--------------------------------------------------------------------------------------|-------------------------------|--------|--------------------|--------|----------|--------|--------|--------|----------|--------|--------|--------|----------|--------|
|                                                                                      |                               |        | A                  |        |          |        | B      |        |          |        | C      |        |          |        |
|                                                                                      |                               |        | Start              |        | Complete |        | Start  |        | Complete |        | Start  |        | Complete |        |
|                                                                                      | (M\$)                         | (US\$) | (a)                | (b)    | (a)      | (b)    | (a)    | (b)    | (a)      | (b)    | (a)    | (b)    | (a)      | (b)    |
|                                                                                      |                               |        |                    |        |          |        |        |        |          |        |        |        |          |        |
| INVESTMENT AND RE-INVESTMENT PROJECT                                                 |                               |        |                    |        |          |        |        |        |          |        |        |        |          |        |
| PROJECT I: AUTOMOTIVE AIR CONDITIONING <sup>1</sup>                                  |                               |        |                    |        |          |        |        |        |          |        |        |        |          |        |
| Project I(a): recycling and recovery equipment of CFC 12                             | 2.400                         | 0.380  | SEP/91             | OCT/91 | NOV/91   | DEC/91 | JAN/92 | JAN/92 | FEB/92   | FEB/92 | MAR/92 | APR/92 | APR/92   | MAY/92 |
| Project I(b): introduction of coolant-saving components                              |                               |        |                    |        |          |        |        |        |          |        |        |        |          |        |
| - condensor                                                                          | 1.980                         | 0.733  | AUG/91             | SEP/91 | OCT/91   | DEC/91 | FEB/92 | MAR/92 | APR/92   | JUN/92 | JUL/92 | AUG/92 | SEP/92   | OCT/92 |
| - evaporator                                                                         |                               |        |                    |        |          |        |        |        |          |        |        |        |          |        |
| - fitting parts(hose kit)                                                            | 1.260                         | 0.466  | AUG/91             | SEP/91 | OCT/91   | DEC/91 | FEB/92 | MAR/92 | APR/92   | JUN/92 | JUL/92 | AUG/92 | SEP/92   | OCT/92 |
| Project I(c): Research and Development                                               | 3.000                         | 1.100  | OCT/91             | NOV/91 | DEC/91   | JAN/92 | FEB/92 | MAR/92 | MAY/92   | JUN/92 | AUG/92 | SEP/92 | NOV/92   | JAN/93 |
| Project I(d): manufacture of complete HCFC 134a air-conditioning systems             |                               |        |                    |        |          |        |        |        |          |        |        |        |          |        |
| - equipment machinery                                                                | 12.000                        | 4.440  | JAN/92             | FEB/92 | APR/92   | MAY/92 | JUL/92 | AUG/92 | OCT/92   | NOV/92 | JAN/93 | FEB/93 | APR/93   | JUN/93 |
| - compressor & hose kit                                                              | 12.000                        | 4.440  | JAN/92             | FEB/92 | APR/92   | MAY/92 | JUL/92 | AUG/92 | OCT/92   | NOV/92 | JAN/93 | FEB/93 | APR/93   | JUN/93 |
| - obsolete of existing machinery equipment (tools, jigs and mould)                   | 15.000                        | 5.550  | JAN/92             | FEB/92 | APR/92   | MAY/92 | JUL/92 | AUG/92 | OCT/92   | NOV/92 | JAN/93 | FEB/93 | APR/93   | JUN/93 |
| TOTAL PROJECT I                                                                      | 47.640                        | 17.610 |                    |        |          |        |        |        |          |        |        |        |          |        |
| PROJECT II: COMMERCIAL AND RESIDENTIAL SYSTEM                                        |                               |        |                    |        |          |        |        |        |          |        |        |        |          |        |
| Project II(a): Project of driveline recycling and replacement of Large Central Plant |                               |        |                    |        |          |        |        |        |          |        |        |        |          |        |
| - CFC recovery machine <sup>2</sup>                                                  | 24.000                        | 8.880  | SEP/91             | OCT/91 | DEC/91   | JAN/92 | FEB/92 | APR/92 | MAY/92   | JUN/92 | AUG/92 | SEP/92 | NOV/92   | DEC/92 |
| - driveline retrofit <sup>3</sup>                                                    | 100.000                       | 40.700 | NOV/91             | DEC/91 | JAN/92   | MAR/92 | MAY/92 | JUN/92 | AUG/92   | OCT/92 | NOV/92 | DEC/92 | FEB/93   | MAY/93 |
| - chiller replacements <sup>4</sup>                                                  | 246.000                       | 91.100 | NOV/91             | DEC/91 | JAN/92   | MAR/92 | MAY/92 | JUN/92 | AUG/92   | OCT/92 | NOV/92 | DEC/92 | FEB/93   | MAY/93 |
| Project II(b): Change tools and Dies for residential system                          | 1.500                         | 0.550  | DEC/91             | JAN/92 | FEB/92   | MAR/92 | MAY/92 | JUN/92 | JUL/92   | AUG/92 | OCT/92 | NOV/92 | JAN/93   | FEB/93 |

| PROJECT DESCRIPTION                                                                                                                                                | TOTAL PROJECT COST (millions) |                | DATES (MONTH/YEAR) |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------|--------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|                                                                                                                                                                    |                               |                | A                  |                  |                  |                  | B                |                  |                  |                  | C                |                  |                  |                  |
|                                                                                                                                                                    |                               |                | Start              |                  | Complete         |                  | Start            |                  | Complete         |                  | Start            |                  | Complete         |                  |
|                                                                                                                                                                    | (M\$)                         | (US\$)         |                    |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
|                                                                                                                                                                    |                               |                | (a)                | (b)              | (a)              | (b)              | (a)              | (b)              | (a)              | (b)              | (a)              | (b)              | (a)              | (b)              |
| Project II(c):<br>CFC Disposal and Recycling<br>Centre                                                                                                             |                               | (NOT KNOWN)    |                    |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| TOTAL PROJECT II                                                                                                                                                   | 571.500                       | 141.230        |                    |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| PROJECT III: CONVERSION COST OF CFCs<br>IN AEROSOLS SYSTEM <sup>5</sup>                                                                                            |                               |                |                    |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| Project III(a):<br>Design to products to packaging<br>components and formulation (R&D)                                                                             | 0.960                         | 0.350          | DEC/91             | JAN/92           | FEB/92           | MAR/92           | APR/92           | MAY/92           | JUN/92           | JUL/92           | OCT/92           | NOV/92           | DEC/92           | FEB/93           |
| Project III(b):<br>Configuration Plant, accessories<br>and machineries                                                                                             | 1.200                         | 0.440          | JAN/92             | FEB/92           | MAR/92           | APR/92           | MAY/92           | JUN/92           | JUL/92           | AUG/92           | SEP/92           | OCT/92           | NOV/92           | DEC/92           |
| Project III(c):<br>Safety needs & necessary<br>approvals                                                                                                           | 0.600                         | 0.220          | NOV/91             | DEC/91           | JAN/92           | FEB/92           | MAR/92           | APR/92           | MAY/92           | JUN/92           | AUG/92           | SEP/92           | OCT/92           | DEC/92           |
| TOTAL PROJECT III                                                                                                                                                  | 2.760                         | 1.010          |                    |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| PROJECT IV: CFC 113 SOLVENT<br>REDUCTION SECTOR                                                                                                                    |                               |                |                    |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| Project IV(a):<br>Degreasing semi-aqueous<br>alternative in-line system<br>- 40 line system<br>- capital cost of equipment,<br>operating material &<br>maintenance | 8.000<br>4.000                | 2.960<br>1.480 | OCT/91<br>OCT/91   | NOV/91<br>NOV/91 | DEC/91<br>DEC/91 | FEB/92<br>FEB/92 | APR/92<br>APR/92 | MAY/92<br>MAY/92 | JUN/92<br>JUN/92 | JUL/92<br>JUL/92 | SEP/92<br>SEP/92 | OCT/92<br>OCT/92 | NOV/92<br>NOV/92 | JAN/93<br>JAN/93 |
| Project IV(b):<br>Metal Cleaning - Aqueous<br>surfactant required downstream<br>waste treatment<br>- capital cost<br>- operating cost                              | 1.200<br>0.400                | 0.400<br>0.150 | JAN/92<br>JAN/92   | FEB/92<br>FEB/92 | MAR/92<br>MAR/92 | APR/92<br>APR/92 | JUN/92<br>JUN/92 | JUL/92<br>JUL/92 | SEP/92<br>SEP/92 | OCT/92<br>OCT/92 | DEC/92<br>DEC/92 | JAN/93<br>JAN/93 | MAR/93<br>MAR/93 | JUN/93<br>JUN/93 |
| Project IV(c):<br>Precision Cleaning - Application<br>for high-tech piece part and<br>hardware sub-assembly<br>- capital cost<br>- operating cost                  | 4.200<br>1.700                | 1.550<br>0.630 | JAN/92<br>JAN/92   | FEB/92<br>FEB/92 | MAR/92<br>MAR/92 | APR/92<br>APR/92 | JUN/92<br>JUN/92 | JUL/92<br>JUL/92 | SEP/92<br>SEP/92 | OCT/92<br>OCT/92 | JAN/93<br>JAN/93 | MAR/93<br>MAR/93 | APR/93<br>APR/93 | JUN/93<br>JUN/93 |
| TOTAL PROJECT IV                                                                                                                                                   | 19.500                        | 7.170          |                    |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |

| PROJECT DESCRIPTION                                                                          | TOTAL PROJECT COST (millions) |               | DATES (MONTH/YEAR) |        |          |        |        |        |          |        |        |        |          |        |
|----------------------------------------------------------------------------------------------|-------------------------------|---------------|--------------------|--------|----------|--------|--------|--------|----------|--------|--------|--------|----------|--------|
|                                                                                              |                               |               | A                  |        |          |        | B      |        |          |        | C      |        |          |        |
|                                                                                              |                               |               | Start              |        | Complete |        | Start  |        | Complete |        | Start  |        | Complete |        |
|                                                                                              | (Rf)                          | (US\$)        |                    |        |          |        |        |        |          |        |        |        |          |        |
|                                                                                              |                               |               | (a)                | (b)    | (a)      | (b)    | (a)    | (b)    | (a)      | (b)    | (a)    | (b)    | (a)      | (b)    |
| <b>PROJECT V: PETROLEUM INDUSTRY <sup>11</sup></b>                                           |                               |               |                    |        |          |        |        |        |          |        |        |        |          |        |
| Project V(a):<br>Recovery and Recycling of<br>CFC 12 before complete<br>phase-out of CFCs    | 3.220                         | 1.190         | JUL/91             | AUG/91 | SEP/91   | OCT/91 | NOV/91 | DEC/91 | JAN/92   | FEB/92 | MAR/92 | APR/92 | MAY/92   | JUN/92 |
| Project V(b):<br>Complete Phase-out of CFC 12<br>before 1995                                 | 9.450                         | 3.500         | OCT/91             | NOV/91 | DEC/91   | JAN/92 | FEB/92 | MAR/92 | MAY/92   | JUN/92 | SEP/92 | NOV/92 | DEC/92   | FEB/93 |
| Project V(c):<br>Complete phase-out of HCFC 22<br>before the year 2010                       | 53.900                        | 19.950        | FEB/92             | MAR/92 | APR/92   | MAY/92 | JUL/92 | AUG/92 | SEP/92   | OCT/92 | NOV/92 | DEC/92 | FEB/93   | APR/92 |
| <b>TOTAL PROJECT V</b>                                                                       | <b>66.570</b>                 | <b>24.640</b> |                    |        |          |        |        |        |          |        |        |        |          |        |
| <b>PROJECT VI: HALON ELIMINATION</b>                                                         |                               |               |                    |        |          |        |        |        |          |        |        |        |          |        |
| Project VI(a):<br>Complete phase-out of Halon<br>before 1995 in Petroleum<br>Industry        | 12.460                        | 4.620         | FEB/92             | MAR/92 | APR/92   | MAY/92 | JUL/92 | AUG/92 | SEP/92   | OCT/92 | NOV/92 | DEC/92 | FEB/93   | APR/93 |
| Project VI(b):<br>Manufacture of CO <sub>2</sub> cylinder and<br>valve                       | 5.000                         | 1.850         | JAN/92             | FEB/92 | MAR/92   | APR/92 | JUN/92 | JUL/92 | SEP/92   | OCT/92 | JAN/93 | MAR/93 | APR/93   | JUN/93 |
| Project VI(c):<br>Recovery and charging kit for<br>BCF (Halon 1211) <sup>12</sup>            | 0.820                         | 0.310         | OCT/91             | NOV/91 | DEC/91   | JAN/92 | FEB/92 | MAR/92 | APR/92   | MAY/92 | JUN/93 | JUL/93 | AUG/93   | SEP/93 |
| Project VI(d):<br>Central Recycling Plant                                                    | 0.980                         | 0.360         | DEC/91             | JAN/92 | FEB/92   | MAR/92 | APR/92 | MAY/92 | JUN/92   | JUL/92 | AUG/93 | SEP/93 | OCT/93   | NOV/93 |
| Project VI(e):<br>Existing Halon 1211 extinguisher<br>to be phased out by 1999 <sup>13</sup> | 140.000                       | 51.850        | SEP/92             | OCT/92 | DEC/92   | JAN/93 | MAR/93 | APR/93 | MAY/93   | JUL/93 | SEP/93 | DEC/93 | APR/94   | JUN/94 |
| Project VI(f):<br>National Data Bank: The<br>conversion of existing test<br>facilities       | 10.000                        | 3.700         | OCT/92             | JAN/93 | FEB/93   | MAR/93 | MAY/93 | JUL/93 | SEP/93   | OCT/93 | NOV/93 | FEB/94 | MAY/94   | AUG/94 |

| PROJECT DESCRIPTION                                                                                                            | TOTAL PROJECT COST |             | DATES (MONTH/YEAR) |        |          |        |        |        |           |        |        |        |          |        |
|--------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------|--------------------|--------|----------|--------|--------|--------|-----------|--------|--------|--------|----------|--------|
|                                                                                                                                | COST               |             | A                  |        |          |        | B      |        |           |        | C      |        |          |        |
|                                                                                                                                | (millions)         |             |                    |        |          |        |        |        |           |        |        |        |          |        |
|                                                                                                                                |                    |             | Start              |        | Complete |        | Start  |        | Complete  |        | Start  |        | Complete |        |
|                                                                                                                                | (M\$)              | (US\$)      | (a)                | (b)    | (a)      | (b)    | (a)    | (b)    | (a)       | (b)    | (a)    | (b)    | (a)      | (b)    |
| Project VI (g):<br>Alternative to Halon for fire<br>protection in Telecommunication<br>Exchanges under UNEP/SIDA<br>assurances |                    | (NOT KNOWN) |                    |        |          |        |        |        | 1992-1994 |        |        |        |          |        |
| TOTAL PROJECT VI                                                                                                               | 169.260            | 62.690      |                    |        |          |        |        |        |           |        |        |        |          |        |
| TOTAL COST OF INVESTMENT AND<br>PRE-INVESTMENT PROJECT                                                                         | 677.230            | 254.350     |                    |        |          |        |        |        |           |        |        |        |          |        |
| EDUCATION, PUBLIC AWARENESS AND<br>TRAINING PROGRAMMES                                                                         |                    |             |                    |        |          |        |        |        |           |        |        |        |          |        |
| Project I:<br>Automotive Air Conditioning <sup>687</sup>                                                                       |                    |             |                    |        |          |        |        |        |           |        |        |        |          |        |
| - Phase I                                                                                                                      | 0.080              | 0.080       | JUL/91             | JUL/91 | AUG/91   | SEP/91 | SEP/91 | OCT/91 | NOV/91    | DEC/91 | FEB/92 | MAR/92 | MAY/92   | JUN/92 |
| - Phase II (Retraining)                                                                                                        | 1.400              | 0.520       | JAN/92             | FEB/92 | MAR/92   | APR/92 | MAY/92 | JUN/92 | JUL/92    | AUG/92 | SEP/92 | OCT/92 | MAY/93   | NOV/93 |
|                                                                                                                                | 1.480              | 0.550       |                    |        |          |        |        |        |           |        |        |        |          |        |
| Project II:<br>Refrigerant Sectors <sup>8</sup>                                                                                |                    |             |                    |        |          |        |        |        |           |        |        |        |          |        |
|                                                                                                                                | 0.418              | 0.160       | DEC/91             | JAN/92 | FEB/92   | MAR/92 | APR/92 | MAY/92 | JUN/92    | JUL/92 | AUG/92 | SEP/92 | OCT/92   | NOV/92 |
|                                                                                                                                | 0.418              | 0.160       |                    |        |          |        |        |        |           |        |        |        |          |        |
| Project III:<br>Aerosol Manufacture System <sup>9</sup>                                                                        |                    |             |                    |        |          |        |        |        |           |        |        |        |          |        |
|                                                                                                                                | 1.620              | 0.610       | AUG/91             | SEP/91 | OCT/91   | NOV/91 | DEC/91 | JAN/92 | FEB/92    | MAR/92 | APR/92 | MAY/92 | JUN/92   | JUL/92 |
|                                                                                                                                | 1.620              | 0.610       |                    |        |          |        |        |        |           |        |        |        |          |        |
| Project IV:<br>CFC 113 Solvent Sectors <sup>10</sup>                                                                           |                    |             |                    |        |          |        |        |        |           |        |        |        |          |        |
|                                                                                                                                | 1.000              | 0.370       | AUG/91             | SEP/91 | OCT/91   | NOV/91 | DEC/91 | JAN/92 | FEB/92    | MAR/92 | APR/92 | MAY/92 | JUL/92   | SEP/92 |
|                                                                                                                                | 1.000              | 0.370       |                    |        |          |        |        |        |           |        |        |        |          |        |
| Project V: <sup>14</sup><br>Halon                                                                                              |                    |             |                    |        |          |        |        |        |           |        |        |        |          |        |
| - Phase I                                                                                                                      | 0.110              | 0.050       | NOV/91             | DEC/91 | JAN/92   | FEB/92 | MAR/92 | APR/92 | MAY/92    | JUN/92 | JUL/92 | AUG/92 | SEP/92   | OCT/92 |
| - Phase II (Retraining)                                                                                                        | 0.11               | 0.04        | NOV/92             | DEC/92 | JAN/93   | FEB/93 | MAR/93 | APR/93 | MAY/93    | JUN/93 | JUL/93 | AUG/93 | SEP/93   | OCT/93 |
|                                                                                                                                | 0.220              | 0.090       |                    |        |          |        |        |        |           |        |        |        |          |        |
| TOTAL COST OF EDUCATION AND<br>PUBLIC AWARENESS PROGRAMME                                                                      | 4.738              | 1.780       |                    |        |          |        |        |        |           |        |        |        |          |        |

NOTE:

- A : Project Identification
- B : Project Preparation
- C : Project Funding
- (a) : Planned
- (b) : Actual

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- 1 No. of Car Air Conditioner Manufacturer = 5
- 2 No. Required = 750 @ M\$32,000
- 3 No. Required = 500 @ M\$220,000
- 4 No. Required = 820 @ M\$300,000
- 5 No. of Aerosol Manufacturer = 6
- 6 No. of Service Dealers = 200
- 7 No. of times Training and Seminar are expected to be conducted = 20
- 8 No. of times Training and Seminar are expected to be conducted = 5
- 9 No. of times Training and Seminar are expected to be conducted = 6
- 10 No. of times Training and Seminar are expected to be conducted = 10
- 11 No. of Petroleum Industry = 7
- 12 No. of recovery charging kits required = 50
- 13 No. of existing Halon 1211 to be phased out = 800,000
- 14 No. of times training and seminar are expected to be conducted = 15  
Currency rate : M\$2.7 = US\$1.0

schedule.cfc3

Table V : Timeframe and Action Plan Activities to Eliminate  
the Ozone Depleting Substances (ODS)

| Activities and Framework                        | Action Plan (Year) |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |  |
|-------------------------------------------------|--------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------|--|
|                                                 | 85                 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 2000 |  |
| I. Committee                                    |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |  |
| a) National Steering Committee                  | X                  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |  |
| b) Technical Steering Committee                 |                    | X  |    |    |    |    |    |    |    |    |    |    |    |    |    |      |  |
| c) Industrial Working Groups                    |                    |    |    |    |    | X  |    |    |    |    |    |    |    |    |    |      |  |
| II. Policy Statement                            |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |  |
| a) Encourage                                    |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |  |
| - use of substitute                             | X                  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |  |
| - promote non CFCs technology investment        | X                  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |  |
| - research & Development                        | X                  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |  |
| III. Control Measures                           |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |  |
| a) Custom Duty (Amendment) Order 1989           |                    |    |    |    | X  |    |    |    |    |    |    |    |    |    |    |      |  |
| b) to study and introduce                       |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |  |
| - Control of import-export                      |                    |    |    |    |    | X  |    |    |    |    |    |    |    |    |    |      |  |
| - Use of CFCs as Propellants and blowing agents |                    |    |    |    |    |    | X  |    |    |    |    |    |    |    |    |      |  |
| - Prohibition under ECA 1974                    |                    |    |    |    |    |    |    | X  |    |    |    |    |    |    |    |      |  |
| IV. CFC Case Study                              |                    |    |    |    |    | X  |    |    |    |    |    |    |    |    |    |      |  |
| V. Incentive                                    |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |  |
| a) Tax incentive                                |                    |    |    |    |    |    |    | X  |    |    |    |    |    |    |    |      |  |
| b) Duty import-export                           |                    |    |    |    |    |    |    | X  |    |    |    |    |    |    |    |      |  |

Timeframe and Action Plan Activities to Eliminate  
the Ozone Depleting Substances (ODS)

| Activities and Framework                               | Action Plan (Year) |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |
|--------------------------------------------------------|--------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------|
|                                                        | 85                 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 2000 |
| VII. Reduction Plan/Strategy                           |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |
| a) Car Air-Conditioning/Refrigerant                    |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |
| b) CFCs Solvent                                        |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |
| c) Foam                                                |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |
| e) Aerosol                                             |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |
| f) Halon                                               |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |
| Overall Ozone Depleting Substances Reduction Programme |                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |      |

Figure I: Ozone Layer Committee

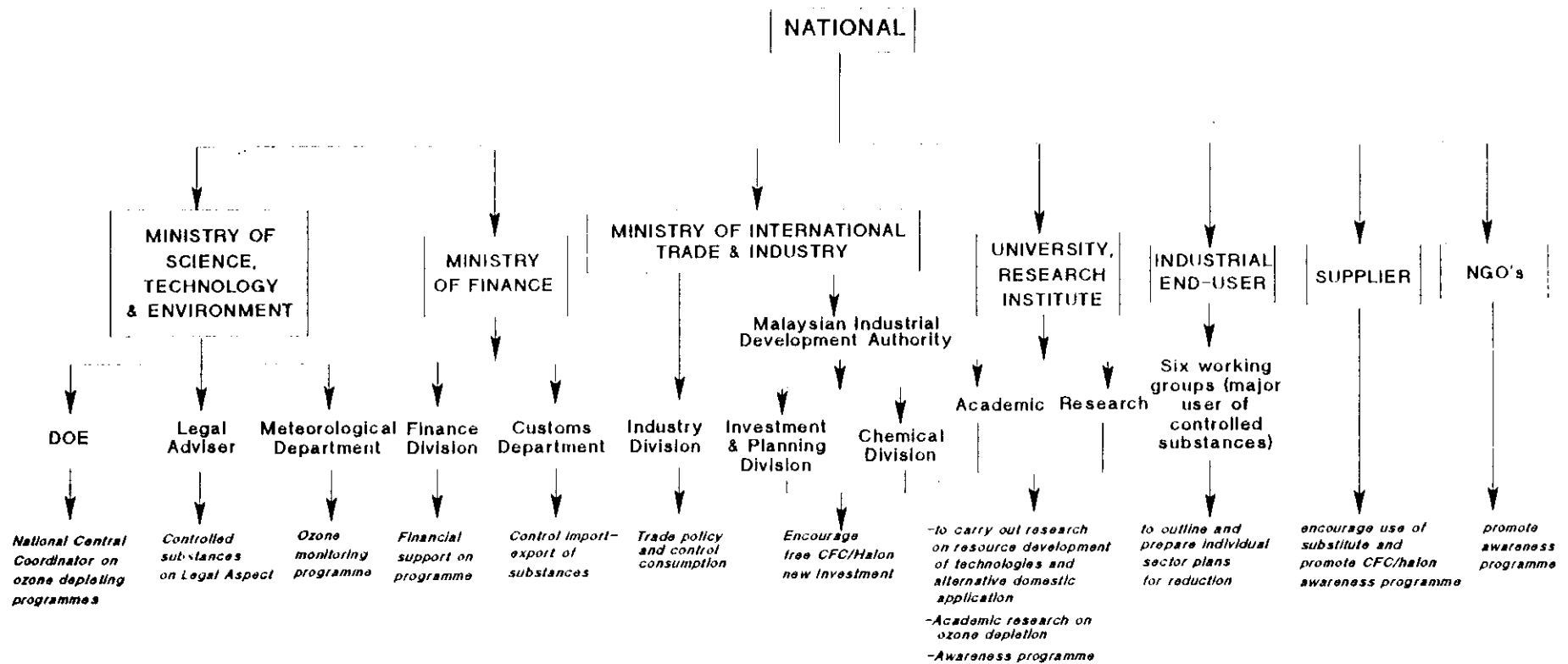
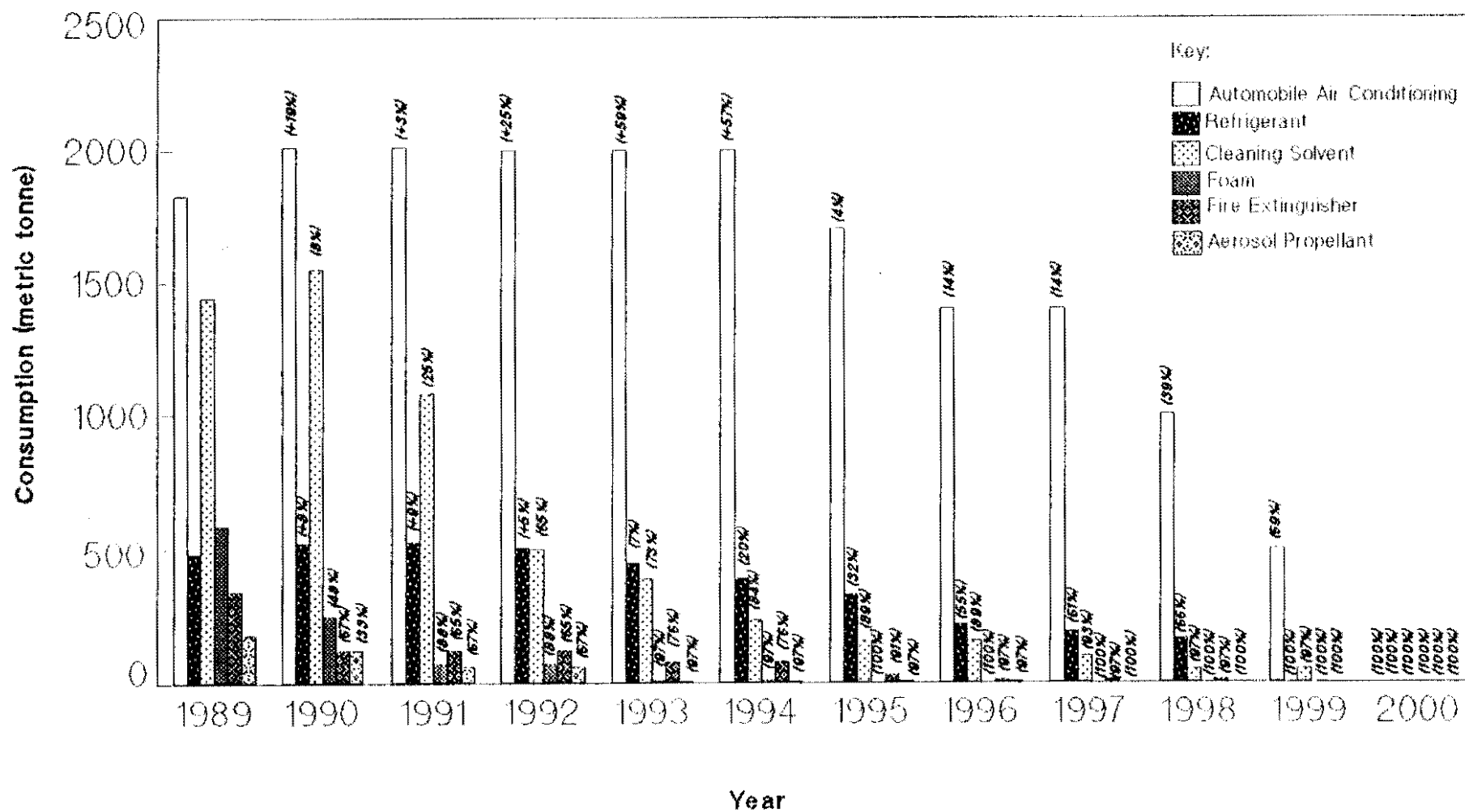


Figure II: Expected Reduction in Quantity of CFCs/Halon  
by Sectors, 1989-2000



**Figure III: Overall Reduction Trend of Controlled Substances (ODS)  
up to the Year 2000**

