Montreal Protocol On Substances That Deplete The Ozone Layer



1998 Assessment Report of the Technology and Economic Assessment Panel

Notice

All Rights Reserved. You may print, reproduce and use the information in, or images from, this document for non-commercial, personal, or educational purposes only, provided that you do not modify such information, and include this copyright notice and the following disclaimer notice and include these notices in all such copies.

Disclaimer

The United Nations Environment Programme (UNEP), the Technology and Economic Assessment Panel (TEAP) co-chairs and members, the Technical and Economic Options Committee, chairs, co-chairs and members, the TEAP Task Forces co-chairs and members, and the companies and organisations that employ them do not endorse the performance, worker safety, or environmental acceptability of any of the technical options discussed. Every industrial operation requires consideration of worker safety and proper disposal of contaminants and waste products. Moreover, as work continues - including additional toxicity evaluation - more information on health, environmental and safety effects of alternatives and replacements will become available for use in selecting among the options discussed in this document.

UNEP, the TEAP co-chairs and members, the Technical and Economic Options Committee, chairs, co-chairs and members, and the Technology and Economic Assessment Panel Task Forces co-chairs and members, in furnishing or distributing this information, do not make any warranty or representation, either express or implied, with respect to the accuracy, completeness, or utility; nor do they assume any liability of any kind whatsoever resulting from the use or reliance upon any information, material, or procedure contained herein, including but not limited to any claims regarding health, safety, environmental effect or fate, efficacy, or performance, made by the source of information.

Mention of any company, association, or product in this document is for information purposes only and does not constitute a recommendation of any such company, association, or product, either express or implied by UNEP, the Technology and Economic Assessment Panel co-chairs or members, the Technical and Economic Options Committee chairs, co-chairs or members, the TEAP Task Forces co-chairs or members or the companies or organisations that employ them.



Montreal Protocol

On Substances that Deplete the Ozone Layer

UNEP 1998 Report of the Technology and Economic Assessment Panel

The text of this report is composed in Times New Roman. Co-ordination: **Technology and Economic Assessment panel**

Reproduction: UNEP Nairobi, Ozone Secretariat

Date: October 1998

Printed in Kenya; 1998.

ISBN 92-807-1725-1

Disclaimer

The United Nations Environment Programme (UNEP), the Technology and Economic Assessment Panel (TEAP) co-chairs and members, the Technical and Economic Options Committee, chairs, co-chairs and members, the TEAP Task Forces co-chairs and members, and the companies and organisations that employ them do not endorse the performance, worker safety, or environmental acceptability of any of the technical options discussed. Every industrial operation requires consideration of worker safety and proper disposal of contaminants and waste products. Moreover, as work continues - including additional toxicity evaluation - more information on health, environmental and safety effects of alternatives and replacements will become available for use in selecting among the options discussed in this document.

UNEP, the TEAP co-chairs and members, the Technical and Economic Options Committee, chairs, co-chairs and members, and the Technology and Economic Assessment Panel Task Forces co-chairs and members, in furnishing or distributing this information, do not make any warranty or representation, either express or implied, with respect to the accuracy, completeness, or utility; nor do they assume any liability of any kind whatsoever resulting from the use or reliance upon any information, material, or procedure contained herein, including but not limited to any claims regarding health, safety, environmental effect or fate, efficacy, or performance, made by the source of information.

Mention of any company, association, or product in this document is for information purposes only and does not constitute a recommendation of any such company, association, or product, either express or implied by UNEP, the Technology and Economic Assessment Panel co-chairs or members, the Technical and Economic Options Committee chairs, co-chairs or members, the TEAP Task Forces co-chairs or members or the companies or organisations that employ them.

Acknowledgement

The UNEP Technology and Economic Assessment Panel acknowledges with thanks the outstanding contributions from all of the individuals and organisations who provided technical support to committee members. In developing this report, particularly the section chairs and co-chairs were instrumental.

The names, addresses and contact numbers of all members of the UNEP Technology and Economic Assessment Panel can be found in Annex B. The opinions expressed are those of the Committee and do not necessarily reflect the views of any sponsoring or supporting organisations.

Index

Section #	Title	Page
ES	Executive Summary	1
ES.1	Aerosol, Sterilants, Miscellaneous Uses and Carbon Tetrachloride	1
ES.1.1	Aerosol products (other than MDIs)	1
ES.1.2	Metered dose inhalers	1
ES.1.3	Sterilants	3
ES.1.4	Miscellaneous Uses	3
ES.1.5	Laboratory and Analytical Uses	4
ES.1.6	Carbon tetrachloride	5
ES.2	Economics Options Committee	6
ES.2.1	Introduction	6
ES.2.2	Implementation: Article 5(1) Parties	7
ES.2.3	Implementation: CEITs	7
ES.2.4	The Use & Cost Effectiveness Criteria of the MLF and GEF	8
ES.2.5	Methyl Bromide	8
ES.2.6	HFCs and HCFCs	8
ES.2.7	Halons	8
ES.2.8	International Trade Issues	9
ES.2.9	Transferability of Lessons Learned from the Montreal Protocol	9
ES.3	Foams Technical Options Committee	9
ES.3.1	Technology Status	9
ES.3.2	Transition Status	10
ES.3.3	Transition Barriers	10
ES.4	Halons Technical Options Committee	11
ES.5	Methyl Bromide	12
ES.5.1	Soil Fumigation	12
ES.5.2	Durable Commodities	12
ES.5.3	Perishable Commodities	12
ES.5.4	Article 5(1) Parties Perspective	13
ES.5.5	Quarantine and Pre-shipment (QPS)	13
ES.5.6	Emission Reduction	13
ES.5.7	Alternatives to Methyl Bromide	13
ES.6	Refrigeration, Air Conditioning and	13
	Heat Pumps Technical Options Committee	
ES.6.1	Introduction	13
ES.6.2	Global CFC and HCFC Production and Consumption	15
ES.6.3	Domestic Refrigeration	15
ES.6.4	Commercial Refrigeration	16
ES.6.5	Industrial Refrigeration and Cold Storage	17
ES.6.6	Air Conditioning and Heat Pumps (Air Cooled Systems)	17
ES.6.7	Air Conditioning (Water Chillers)	17
ES.6.8	Transport Refrigeration	18
ES.6.9	Automotive Air Conditioning	18
ES.6.10	Heating Only Heat Pumps	19
ES.6.11	Refrigerant Conservation	19

Index (continued)

Section #	Title	Page
ES.7	Solvents, Coatings and Adhesives Technical Options Committee	19
ES.7.1	Non-Article 5(1) Party Progress	19
ES.7.2	Article 5(1) Parties Progress	20
ES.7.3	Small- and Medium-Size Enterprises (SMEs)	22
ES.7.4	Carbon Tetrachloride Use in Article 5(1) Parties	22
ES.7.5	HCFCs	23
ES.7.6	Brominated Solvents	24
ES.7.7	Military Progress	24
ES.7.8	Oxygen Systems	25
ES.7.9	Sub-Sector Progress	25
ES.8	Challenges for Article 5(1) and CEIT	26
ES.8.1	Article 5(1) Parties	26
ES.8.2	CEIT	27
1	Introduction - Montreal Protocol Process	29
1.1	Montreal Protocol Developments	29
1.2	The UNEP Technology and Economic Assessment Panel	31
1.3	Adjustment of the focus of TEAP and TOC operations	37
2	Recent Global CFC and HCFC Production and Consumption	51
	Data; Estimates for Near Future Usage of Fluorochemicals	
2.1	Introduction	51
2.2	Data Sources for CFC and HCFC Production and Consumption	52
2.3	Data analysis	52
2.3.1	CFC production 1986 - 1996	52
2.3.2	CFC consumption 1986-1996	53
2.3.3	HCFC Production Data 1989-1996	57
2.3.4	HCFC consumption data 1989-1996	58
2.3.5	HCFC consumption in sectors	62
2.4	Estimates for future use of chemicals	63
2.4.1	HCFC chemicals	63
2.4.2	HFC-chemicals	65
2.5	Carbon Tetrachloride	66
2.5.1	Data Sources for CTC Production and Consumption	66
2.5.2	CTC Production	67
2.5.3	CTC Consumption	67
2.6	Methyl Chloroform (1,1,1-Trichloroethane)	67
2.6.1	Data Sources for MCF Production and Consumption	67
2.6.2	Production of MCF	67
2.6.3	Consumption of MCF	68
2.7	Methyl Bromide	68
2.7.1	Supply	68
2.7.2	Production	68
2.7.3	Consumption and usage	70
2.7.3.1	Comparison of production with consumption	70
2.7.3.2	Usage by sector	70

Index (continued)

Section #	Title	Page
2.8	Halons	71
2.8.1	Halon production	71
2.8.2	Halon Emissions	72
3	Lessons learned and challenges for the future	73
3.1	The sector overviews	73
3.1.1	Aerosols	73
3.1.2	Rigid and Flexible Foams	73
3.1.3	Halons	74
3.1.4	Methyl bromide	74
3.1.5	Refrigeration and Air Conditioning	74
3.1.6	Solvents, Adhesives and Coatings	75
3.2	Experiences under an emerging regulatory framework	75
3.3	The Aerosol Sector	77
3.3.1	The Initial Response	77
3.3.2	Intermediate actions	78
3.3.3	Longer term solutions	79
3.3.4	Future challenges	80
3.4	The Rigid and Flexible Foams Sector	80
3.4.1	The initial response	80
3.4.2	Intermediate actions	81
3.4.3	Longer term solutions	82
3.4.4	Future challenges	83
3.5	The Halons Sector	84
3.5.1	The initial response – reduce unnecessary emissions	84
3.5.2	Intermediate actions – use other existing alternatives	84
3.5.3	Longer term solutions	85
3.5.4	Future challenges	85
3.6	The Methyl Bromide Sector	86
3.6.1	The initial response	86
3.6.1.1	Controls pre-dating Montreal Protocol measures	86
3.6.1.2	Quarantine uses of methyl bromide	87
3.6.1.3	First Protocol controls	87
3.6.1.4	Stakeholder response	88
3.6.1.5	MB recycling and re-use	88
3.6.2	Intermediate actions	89
3.6.2.1	Controls on methyl bromide	89
3.6.2.2	Activities leading to MB reductions	89
3.6.2.3	Multilateral Fund projects	90
3.6.3	Longer term solutions	90
3.6.3.1	Alternatives: a new twist to an old tale	90
3.6.3.2	Measures that assist phase out	90
3.6.3.3	Multilateral Fund assistance	91
3.6.3.4	MB manufacture and technology transfer	91
3.6.4	Future challenges	92
3.6.4.1	Illegal imports	92
3.6.4.2	Exemptions	92
3.6.4.3	Ouarantine and pre-shipment	92

Index (continued)

Section #	Title	Page
3.7	The Refrigeration and Air Conditioning Sector	94
3.7.1	The initial response	94
3.7.2	Intermediate actions	94
3.7.3	Longer term solutions	95
3.7.4	Future challenges	97
3.8	The Solvents Sector	97
3.8.1	The initial response	98
3.8.2	Intermediate actions	98
3.8.3	Longer term solutions	99
3.8.4	Future challenges	100
3.9	Common Themes	100
3.10	Conclusions	101
4	Challenges for Article 5(1) Parties and	103
	Countries with Economies in Transition, CEIT	
4.1	Introduction	103
4.2	Challenges for Article 5(1) Parties	103
4.2.1	Information Exchange and Training	104
4.2.2	Challenges for Governments	105
4.2.2.1	Institutional Aspects	105
4.2.2.2	Regulatory Aspects	106
4.2.3	Technological Challenges	107
4.2.4	Sector Specific Challenges in Article 5(1) Parties	107
4.2.4.1	Aerosols	107
4.2.4.2	Foams	108
4.2.4.3	Halons	109
4.2.4.4	Methyl Bromide	110
4.2.4.5	Refrigeration, Air Conditioning and Heat Pumps	111
4.2.4.6	Solvents	112
4.3	Challenges for CEIT	113
4.4	Special Circumstances of Non-Article 5(1) CEITs	113
5	Executive Summaries of	117
	Technical Options Committee Reports	
5.1	Aerosols, Sterilants, Miscellaneous Uses and Carbon Tetrachloride	117
5.1.1	Aerosol products (other than Metered Dose Inhalers)	117
5.1.2	Metered dose inhalers	119

预览已结束,完整报告链接和二维码如下:

https://www.yunbaogao.cn/report/index/report?reportId=5_12623

