# Review of the implementation of Regulation (EC) No 2037/2000 on substances that deplete the ozone layer

**FINAL REPORT**

**Assessment of potential impacts of regulatory options**

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The opinions expressed herein are those of the consultants alone and do not represent the official positions of the European Commission. The report is based on the information gathered in Task 1 of this project from Member States authorities, EU industry, other stakeholders and experts, as well as through a literature research. Any omissions and any errors are entirely unintentional, and corrections are welcomed.

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# Review of the implementation of Regulation (EC) No 2037/2000 on substances that deplete the ozone layer

# Part 2: Assessment of potential impacts of regulatory options

## Table of contents

# Introduction and summary

This report presents an impact assessment of the options proposed for the revision of Regulation (EC) No 2037/2000 on substances that deplete the ozone layer. It reviews the options developed in the separate report presenting this project's legal analysis. The legal options were developed based on an analysis of inputs by Member States, the European Commission, industry and other stakeholders as well as information found in recent studies and reports.

The format and methodology of this impact assessment follows the Commission Impact Assessment Guidelines (2006)[1]. A preliminary draft of this report was presented for discussion at the meeting of the Advisory Group for the revision of the regulation (held on 7 November 2007). This revised assessment has been refined to take account of comments and additional information received at, and following, this meeting. This revised assessment provides a quantitative analysis of the costs and benefits of most of the revisions proposed.

Any assessment needs to take into account the history of the Montreal Protocol and the EC Regulations that have implemented it. Regulation (EC) No. 2037/2000 and its predecessors have reduced greatly EC production and consumption of ozone-depleting substances (ODS): measured in terms of ozone-depleting potential (ODP), EC production of these substances has fallen by 99.5% (compared to baseline levels defined under the Protocol). As a result, a revision to this Regulation will have at most limited impacts in terms of economic and environmental costs and benefits.

***Objectives of the revision***

A key goal for this revision is the simplification and clarification of the text, and this revision forms part of the EC work programme in this area.

At international level, the EC has led efforts for the phase-out of ODS; this is reflected in the current Regulation, which has gone beyond the Protocol in phasing out ODS. Maintaining EC leadership is an important goal for the revision of the Regulation.

Finally, the revision will take into account scientific and technical developments since the Regulation entered into force in 2000.

***Key impacts***

Taken as a whole, the proposed options are projected to reduce ODS emissions by between 10,500 and 29,700 ODP tonnes (equivalent to 90 to 237 million $CO_2$ –equivalent tonnes). These options will cost EC industry between €26 million and €161 million. (See the table on the following page.) In terms of their ODS reduction, they will cost at least €1.2 per ODP kilogramme. In terms of the reduction of climate change impacts, the cost will be under €1 per $CO_2$-equivalent tonne.

The changes in administrative and direct costs for EU industry will be focused on the sectors that produce, import and use ODS, including chemical producers, commercial and industrial refrigeration users and sectors with specific fire fighting needs, such as civilian aviation and the military.

The proposed options will slightly reduce administrative costs for EC industry, for Member State governments and for the European Commission. One key goal of the revision is to simplify and clarify the Regulation. This action will play a key role in reducing administrative costs, in particular for the companies subject to the Regulation, by reducing the time needed to understand the Regulation and its interactions with other EC legislation.

[1] European Commission Impact Assessment Guidelines, June 2005, with March 2006 update. SEC(2005) 791.

| | **Economic impacts** (all costs calculated NPV at 2010 for costs 2010-2019) | | | | **Social impacts** | **Environmental impacts** | |
|---|---|---|---|---|---|---|---|
| | Direct costs to EC industry (million €) | Administrative costs (million €) | | | | Emissions in ODP tonnes (2010 – 2019 total) | GHG emissions in $CO_2$ equiv. (2010 – 2019 total) |
| | | For Industry | For MS | For COM | | | |
| **Total net impact of all proposed options** | | | | | | | |
| | **27 – 161** | -0.32 | -0.15 | -0.05 | **Possible jobs increase** | **10,500 – 29, 700 reduction** | **90 – 237 million reduction** |
| **Impacts of simplification and clarification of the regulation** | | | | | | | |
| | 0 | -2.38 | -0.01 | -0.03 | .. | .. | .. |
| **Impacts of the proposed options in key areas** | | | | | | | |
| Recovery and destruction of ODS | 53 – 85 | 0.43 | 0.22 | 0 | Possible jobs increase | 2300 t reduction | 44 million reduction |
| Early phase-out of HCFC production | 12 – 83 * | 0 | 0 | 0 | Possible jobs loss | 1300 – 5100 reduction** | 45 – 175 million reduction** |
| Quarantine and pre-shipment (QPS) | Net gain of up to 31 million | -0.33 | -0.58 | 0.04 | Reduced health risks | 860 | 7200 |

Notes:
* Will also stimulate production for alternatives to HCFCs; this benefit is not quantified.
** Third-country producers of HCFCs may replace a share of EC production, reducing the net reduction in emissions.

**Net costs and benefits of the options proposed for the revision of Regulation (EC) No. 2037/2000 on ozone-depleting substances**

Overall, the proposals will reduce the time that industry, Member States and the European Commission spend addressing exemptions and the time for reporting; instead, administrative work will be focused on actions related to enforcement and actions for the recovery and destruction of ODS.

The options proposed in three key areas are particularly important, for their direct costs on EC industry as well as the reduction in emissions. The first area are the proposals to strengthen the recovery and destruction of ODS. One important consideration is that the costs here will also represent an economic and jobs benefit for recovery industry. The assessment of costs and benefits also does not include actions to recover ODS from building foams, the largest bank: here, the revised Regulation will require Member States to identify the best approach.

The options propose the phase-out of EC production of HCFCs in 2015, bringing forward the 2020 date agreed by the Parties to the Montreal Protocol. As the Regulation will already have ended EC use of HCFCs, this option will mainly affect exports. Here, EC producers are losing market shares to producers in third countries, in particular China. In the face of this pressure, the range of costs presented here may be overestimates.

While the impact assessment has detailed the economic costs to EC industry, it has not done so for the corresponding benefits. Many of the options are expected to create new economic opportunities. For example, the reduction in EC production of HCFCs as well as the inward processing of these

substances can encourage users in third countries to switch to non-ODS alternatives, a market where EC producers have a stronger competitive advantage.

The impact assessment also highlighted the large size of ODS banks, in particular those contained in building foams. The proposed option for building foams would call on Member States as well as the private sector to address this issue. This may assist operators in the voluntary carbon market who are interested in ODS recovery as a business opportunity for their sale of carbon offsets to the private sector.

Finally, the options will continue the EC's leadership in the implementation of the Montreal Protocol, and thus will strengthen the EC's negotiating position.

# List of abbreviations

| | |
|---|---|
| **Article 5 Parties/ Non Article 5 Parties** | Parties operating under Article 5 of the Montreal Protocol :developing countries) Parties not operating under Article 5 of the Montreal Protocol: industrialised countries |
| **Basel Convention** | Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal |
| **BATs** | Best Available Techniques |
| **BDN** | Basic Domestic Needs |
| **BEPs** | Best Environmental Practices |
| **BPD** | Biocidal Products Directive |
| **CFC** | Chlorofluorocarbons |
| **CIRCA** | Communication & Information Resource Centre Administrator |
| **CITES** | Convention on International Trade in Endangered Species of Wild Fauna & Flora |
| **CLEEN** | Chemicals Legislation European Enforcement Network |
| **CN** | Customs Nomenclature |
| **CoP** | Conference of the Parties |
| **CPL** | Classification, Packaging and Labelling |
| **CRC** | Chemical Review Committee (under the Rotterdam Convention) |
| ***DEF*NET** | Defence Environmental Network |
| **DG SANCO** | Directorate General Health and Consumer Protection |
| **DG TAXUD** | Directorate General Taxation and Customs Union |
| **DNA** | Designated National Authority |
| **EAN** | European Article Numbering |
| **EC** | European Community |
| **ECB** | European Chemicals Bureau |
| **ECHA** | European Chemicals Agency |
| **ECSLA** | European Cold Storage and Logistics Association |
| **EDEXIM** | European Database Export Imports of Dangerous Chemicals |
| **EEC** | European Economic Community |
| **EIA** | Environmental Investigation Agency |
| **ELV** | End of Life Vehicles |
| **EPER** | European Pollutant Emission Register |
| **E-PRTR** | European Pollutant Release and Transfer Register |
| **EU** | European Union |
| **EU-12** | Bulgaria, Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia |
| **F-Gas** | Fluorinated Gas |
| **GHS** | Global Harmonised System of Classification and Labelling of Chemicals |
| **GWP** | Global Warming Potential |
| **HBFC** | Hydrobromofluorocarbons |
| **HC** | Hydrocarbons |
| **HCFC** | Hydrochlorofluorocarbons |
| **ICPM** | Interim Commission on Phytosanitary Measures |
| **IDABC** | Interoperable Delivery of European eGovernment Services to public Administrations, Businesses and Citizens |
| **IMPEL** | European Union Network for the Implementation and Enforcement of Environmental Law |
| **IMPEL-TSF** | IMPEL cluster on Transfrontier Shipments of Waste |
| **IPCC** | Intergovernmental Panel on Climate Change |
| **IPPC** | International Plant Protection Convention |
| **IPR** | Inward Processing Relief |
| **ISPM** | International Standards for Phytosanitary Measures |
| **LNG** | Liquefied Natural Gas |

| | |
|---|---|
| **MB** | Methyl Bromide |
| **MBTOC** | Methyl Bromide Technical Options Committee |
| **MDI** | Metered Dose Inhalers |
| **MoP** | Meeting of the Parties |
| **MP** | Montreal Protocol |
| **ODP** | Ozone Depleting Potential |
| **ODS** | Ozone Depleting Substance(s) |
| **OECD** | Organisation for Economic Cooperation and Development |
| **OJ** | Official Journal |
| **QPS** | Quarantine and Pre-shipment |
| **PBT** | Persistent , Bioaccumulative and Toxic |
| **vPvB** | Very Persistent, Very Bioaccumulative |
| **PCBs/PCTs** | Polychlorinated biphenyls and polychlorinated terphenyls |
| **PIC** | Prior Informed Consent |
| **POPs** | Persistent Organic Pollutants |
| **PPPD** | Plant Protection Products Directive (Directive 91/414/EEC) |
| **REACH** | Registration Evaluation Authorisation of Chemicals |
| **RoHS** | Restriction on Hazardous Substances on Electrical and Electronic Equipment (Directive 2002/95/EC) |
| **Rotterdam Convention** | Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade |
| **SAP** | Scientific Assessment Panel |
| **SCFCAH** | Standing Committee on the Food Chain and Animal Health |
| **SDS** | Safety Data Sheet |
| **SMEs** | Small and Medium Size Enterprises |
| **SNAP** | Significant New Alternatives Policy Programme |
| **Stockholm Convention** | Convention on Persistent Organic Pollutants |

# A. OVERVIEW

## 1. Procedural issues and consultation with stakeholders

This report represents the draft final impact assessment of the proposed options for revision of the Regulation. It builds upon the preliminary draft which was subject to stakeholder review, in particular through a meeting of the Advisory Group for the revision of the ODS Regulation (7 November 2007). A prior meeting of the Advisory Group reviewed the initial set of options for revision, providing initial comments as well as information for this assessment.

This report draws upon information and comments provided by a broad range of stakeholders, including the Commission, Member States officials, industry and environmental NGO representatives, as well as that gathered in Task 1 of this project through written questionnaires, meetings and follow-up discussions.

The report represents a relatively high level of consultation and stakeholder input. At the same time it should be noted that the impact assessment seeks to draw its own conclusions, based on all available information. It does not and should not echo stakeholders' concerns, but considers them, together with all relevant available information and data to form a balanced assessment of probable impacts of proposed changes to the regulation.

## 2. Problem definition

The issues concerning Regulation (EC) No. 2037/2000 range across a series of topics. A single set of cross-cutting options has not been identified. Rather, this assessment considers specific options for each "problem area" identified in the legal analysis (the box below lists the problem areas; the specific options are presented in Part B of this report).

Overall, the structure of this report mirrors that of the legal options report:

1. Effectiveness, efficiency and clarity of the Regulation
2. Exemptions for critical and essential uses
3. Phase-out of the use of HCFCs
4. Import and export requirements
5. Enforcement
6. Recovery, recycling and destruction of ODS
7. New substances
8. Quarantine and pre-shipment
9. Reporting requirements
10. Monitoring requirements and information to the public

Moreover, each section in Part B of this report reflects the reporting format advocated by the Commission Impact Assessment Guidelines.

Due to the different potential significance of changes proposed in specific problem areas, some are analysed in greater detail than others. In other cases, separate research is underway outside of this project. Where this is the case, reference is made to this other work and an impact discussion included, but detailed analysis is not carried out.

# 3. Objectives

The overall objective of Regulation (EC) No 2037/2000 on substances that deplete the ozone layer is to protect human health and the environment by phasing out ozone-depleting substances: in particular, the Regulation implements the Montreal Protocol on Substances that Deplete the Ozone Layer within the European Community. The Regulation is more ambitious than the Protocol: in several areas – such as its phase-out schedules for several ODS and its provisions on products and equipment – the Regulation goes beyond the Protocol. This reflects the EC's role as a leader in global negotiations to phase-out ODS; moreover, the EC's role in the implementation of the Montreal Protocol is part of the Community's broader leadership in global environmental governance.

At the same time, the Protocol and subsequent Decisions of its Parties create a global legal structure for the Regulation. Moreover, the Protocol and the Decisions of the Parties constrain the field of action in terms of any revision of the Regulation. This structure provides minimum requirements across many areas, including for example Member State and industry reporting; moreover, the structure limits scope for introducing greater flexibility into the Regulation.

This revision will modify a Regulation that has been very successful: the EC has phased out about 99.5% of the ODS it produces (see box on the following page). EC consumption has also fallen steeply. The review seeks to take into account scientific and technical developments since the Regulation entered into force in 2000, including developments under the Montreal Protocol, and to tackle key remaining uses of ODS. The new developments allow the phase-out of many of the remaining uses. With these phase-outs, attention also must turn to other areas for action, including the recovery and destruction of ODS in "banks", such as refrigerants and foams. Strengthening the Regulation's provisions for recovery and destruction may involve higher costs than the phase-out of ODS production and consumption.

The review of this Regulation seeks foremost to ensure a smoother overall functioning, on the basis of past experience in its implementation. The review of this Regulation is part of the EC work programme for simplification and clarification in the context of the Communication on "Better Regulation for Growth and Jobs in the European Union"[2] in the framework of the Lisbon Strategy. The Better Regulation initiative seeks to (1) promote appropriate impact assessment; (2) ensure that the regulatory environment is simple and of high quality; and (3) ensure that administrative burdens on businesses and authorities are minimised: in sum, the initiative's goal is that regulation is used only when necessary and that the burdens imposed are proportionate to the aim.[3]

In this assessment, the revised Regulation is assumed to take effect in 2010 at the earliest.

# 4. Methodology issues and evaluation categorie

## 4.1 Impact assessment

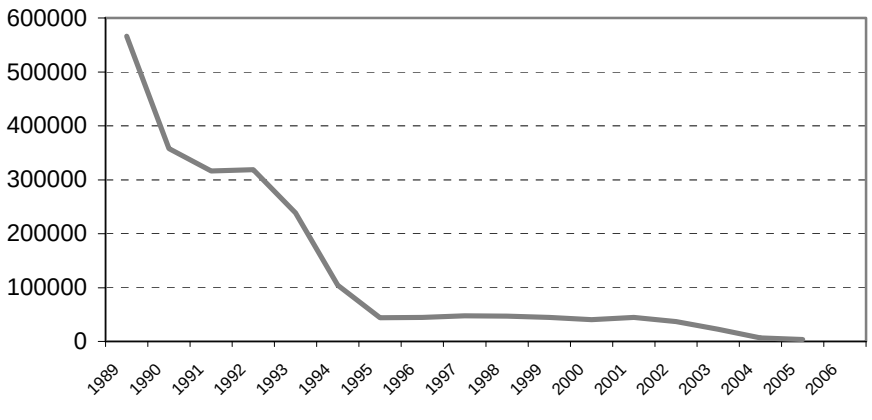
The assessment has been carried out in line with the Commission's Guidelines on Impact Assessment,[4] and each chapter of this report follows the format suggested by these guidelines.

[2] COM (2005)97 final
[3] European Commission Enterprise and Industry Better Regulation resources: http://ec.europa.eu/enterprise/regulation/better_regulation/index_en.htm (accessed 03-09-07)
[4] European Commission Impact Assessment Guidelines, June 2005, with March 2006 update. SEC(2005) 791.

**Box 1 The phase-out of ODS production and consumption in the EC**

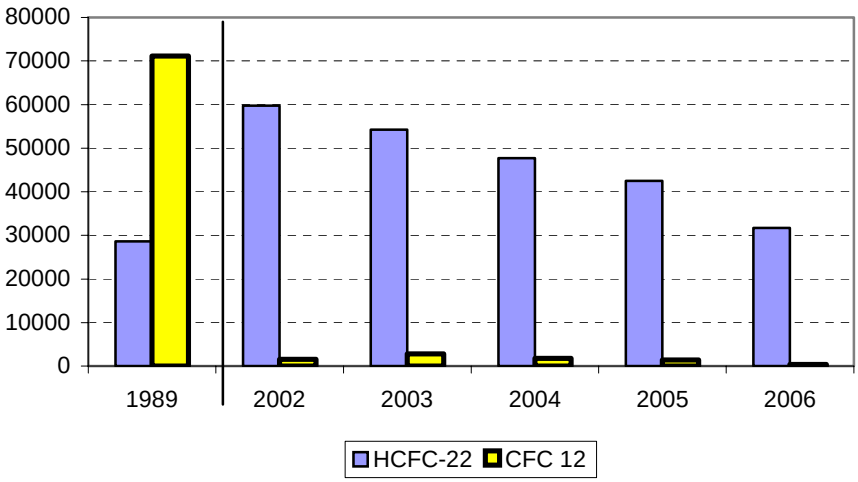
The production of ODS in the EC has fallen sharply since 1989, as can be seen in the figure below.

**Figure 1 Total EC production of ozone-depleting substances (in ODP tonnes)**




EC consumption of ODS has also fallen drastically. For example, consumption of chlorofluorocarbons has ended except for selected essential uses, such as for medical devices and laboratory uses. Medical uses will end by 2010. Figure 2 shows the decline in EC sales of once-common CFC-12. Many of its uses were replaced by HCFC-22, which has a far lower ozone-depleting potential. This substance is also being phased-out, and its consumption has declined steadily in recent years.

**Figure 2 EU production and domestic sales of CFC-12 and HCFC-22 (metric tonnes)**



The information gathered for this project and the subsequent legal analysis have identified a large number of options for amending the Regulation across 10 specific problem areas. Many of the options proposed are very specific in their focus, and the likely impacts are expected to be limited in terms of direct costs. The sections of Part B of this report present, for each topic area:

- the nature of the problem
- the main options, including the "no EU action" option (providing the "business as usual" baseline) and
- a quantitative analysis of the most important impacts identified (step 2 of the impact assessment process in the Commission's Guidelines).

The impact tables in Annex II provide a detailed qualitative identification of impacts (step 1 of the impact assessment process). This supports and expands on the quantified impacts presented in the main report, in particular as many impacts are difficult to quantify.

## 4.2 Information on which this assessment is based

This impact assessment is based on information gathered through a literature review, three questionnaires focussed on specific stakeholder groups (Member States, Industry and NGOs), follow up interviews (face to face and phone), personal communications by email, as well as a number of meetings with DG Environment and the Advisory Group. The preliminary stages of information gathering and discussion had as their primary focus the identification of legal options for revising the Regulation. However, questions also sought economic, administrative cost and other implementation information, and a concerted effort has been made to bring together as much quantified information as possible.

The level of information made available was in some areas rather limited. One specific problem is that the information gathering produced little quantitative data relevant for an advanced analysis of impacts (step 3 of the impact assessment process). This is at least in part due to the sensitive and confidential nature of much industry information in this sector. Nonetheless we have calculated quantified impacts for all key proposed options. In some cases this quantification has had to rely on assumptions concerning cost factors; however, this is considered usual practice in impact assessment where data is scarce. To ensure transparency, wherever assumptions have been made this is clearly noted.

Finally, this evaluation does not consider the broader macro-economic implications of the regulatory options. It is felt these are likely to be limited. The European Commission's impact assessment for REACH considered that this much more far-reaching legislation was not likely to have significant macro-economic impacts.[5] Possible changes to the ODS Regulation, which has a more restricted focus and affects relatively few EC businesses, will be less significant.

## 4.3 Impact categories

The impacts of the different regulatory options are considered in terms of the three standard main areas for impact assessment proposed by the Commission's impact assessment guidelines: economic, social and environmental impacts. In these three main areas, 16 specific categories were identified based on an initial review of the options and of the information and comments gathered in the project.

[5] European Commission, REACH Extended Impact Assessment, Commission Staff Working Paper, SEC (2003) 1171, 29.10.2003. Page 20

| Overall impact categories | Full qualitative analytical list | Short list of categories |
|---|---|---|
| Economic | Direct costs (or benefits) to EU industry (with particular consideration of SMEs) | **Direct costs for EU industry** |
| | Admin. costs (or benefits) on EU business | **Administrative costs for EU industry** |
| | Costs (or benefits) to downstream users | Other economic impacts |
| | International competitiveness | |
| | Competition in the internal market | |
| | Specific sectors and regions | |
| | Innovation and research | |
| | Public authorities: administration and enforcement | **Admin. costs for Member States** |
| | | **Administrative costs for the COM** |
| Social | Employment | Social impacts |
| | Health and safety | |
| | Crime: especially illegal trade | |
| Environmental | Ozone layer | **Ozone depleting emissions** |
| | Climate change | **Greenhouse gas emissions** |
| | Waste management | Other environmental impacts |
| | Local impacts (on biodiversity, flora and fauna and water quality) | |
| | EC Leadership in international negotiations | EC position in global negotiations |

**Table 1. Categories for the impact analysis**

The full list of 16 impact categories was used in the qualitative analysis of options presented in Chapter B and the tables in Annex II (Table 1 lists these categories). This analysis identified a short list of the 10 most important impact categories, also provided in Table 1. Quantified assessments were prepared for 6 of the 10 categories (these six are listed are in bold in the short list). The other four categories remain important.

The initial analysis also identified the main stakeholders potentially affected by a revision to the Regulation. Table 2 lists the key stakeholders and indicates the topics where options are most likely to affect them.

Overall, revisions to the Regulation are expected to affect relatively few industries. The EU currently has only about a dozen producers of ODS (counting subsidiaries as a single producer). The revisions proposed are likely to have a relatively minor impact on these producers in comparison with the current phase-out requirements and with developments in the global market for ODS. The Regulation no longer allows the use of ODS in new products and equipment placed on the EC market (except for certain exemptions, notably for halons). On the other hand, stronger provisions on recovery and destruction will have an impact on the waste management sector.

No impacts are foreseen for consumers and households.

The impacts on third countries will be minor. Where these occur, for example for ending inward processing (and thus re-export) of methyl bromide, third countries will either identify alternative sources or accelerate the phase-out schedule already required in the Montreal Protocol.

## Table 2. Key stakeholders and topic areas where the revision of Regulation 2037/2000 may affect them (both benefits and costs)

| | End critical use of MB | Phase-out dates for halons | Revisions for lab/ analytical uses | End HCFC exemptions | Phase-out of HCFC Production | End inward proc. | Export controls | Recovery, recycling and destruction | Revisions for QPS | Modify reporting requirements | Reporting on new substances |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Commission** | | | | | | | | | | | |
| **Member State governments** | | | | | | | | | | | |
| **Industry** | | | | | | | | | | | |
| EU producers of ODS | | | | | | | | | | | |
| EU importers of ODS | | | | | | | | | | | |
| Distributors of ODS | | | | | | | | | | | |
| Manufacturers of products and equip. containing ODS | | | | | | | | | | | |
| *Industries that use ODS:* | | | | | | | | | | | |
| Agriculture | | | | | | | | | | | |
| Cold storage/logistics | | | | | | | | | | | |
| Air conditioning (buildings) | | | | | | | | | | | |
| Civil aviation | | | | | | | | | | | |
| Military | | | | | | | | | | | |
| Fire services (civilian) | | | | | | | | | | | |
| Oil, gas and petroleum | | | | | | | | | | | |
| Medical/health | | | | | | | | | | | |
| Laboratories/research | | | | | | | | | | | |
| Exporters under ISPM15 | | | | | | | | | | | |
| Waste mgmt. sector | | | | | | | | | | | |
| **Consumers/households** | | | | | | | | | | | |
| **Third Countries** | | | | | | | | | | | |

Impact expected:
Minor impact expected:

# 5. Comparison of the options

## 5.1 Introduction

The legal analysis for the revision of the ODS Regulation has proposed a series of options across ten "problem areas". Most of the options were originally suggested by stakeholders, including industry, Member States and the Commission. The legal analysis reviewed these suggestions and developed them into a series of proposed options.

This impact assessment compares the proposed options to the "no EU action" option. Sections 5.2 and 5.3 of this section provide an overview. Part B and the tables in Annex II of this impact report provide detailed quantitative and qualitative assessments of specific impacts. Due to the large number of options, the impact analysis presented in Part B and Annex II is rather detailed.

In several topic areas, stakeholders suggested further options that have not been taken forward. The most important of these other options are described and assessed in Part B.

***Proposed options***

The options proposed in the legal analysis are listed in the box below and on the following page.

**1. Clarification and simplification of the Regulation**
- Remove obsolete sections
- Improve structure of provisions
- Clarify administrative procedures by specifying details in a implementing Regulation
- Better definitions of terms to remove ambiguities

**2. Exemptions for critical uses and essential uses**

Critical use of methyl bromide (MB)
- End critical use of MB; and
- Include an emergency use clause in the Regulation with clear requirements (excluding the applications of clauses under the PPPD and BPD to MB)

Essential laboratory and analytical uses
- Establish a cap and a multi-year exemption process and compulsory registration for laboratories

**3. Phase-out of the use and production of HCFCs**
- End the Article 5(3) exemption
- End the Article 5(7) exemption
- Accelerate the phase-out of HCFC production (as per the Decision XIX/6 of the Parties at MoP 19) and consider the possibility of phasing out the production in the EC as of 2015
- End production of ODS for basic domestic needs (BDN) with an exception for 1,1,1 Tetrachloride until 2015.

**4. Improve import and export requirements**

Imports of substances and products/equipment
- End the inward processing regime for MB and HBFC, and HCFC by 2015; and
- Clarify the general ban on imports of products and equipment containing or relying on ODS

Exports of ODS (*options under analysis*)
- Extend current iPIC procedure

Exports of products and equipment containing or relying on ODS
- Clarify the ban on products and equipment containing or relying on ODS
- Improve controls of exports of products and equipment by extending the current authorisation for products and equipment containing halons to all products and equipment

**5. Enhancing enforcement**

Improving provisions on inspection and penalties

- Specify requirements for inspection under Article 20
- Record –keeping obligations for users and distributors
- Specify breaches that should be punished under Article 21 on penalties

Improving identification of ODS and products and equipment containing ODS: labelling provisions

- Link the ODS Regulation to requirements for labelling and packaging of ODS under classification, packaging and labelling (CPL) legislation; and
- Include labelling requirements for products and equipment containing ODS.

Other recommendations: training and exchange of information (establish an enforcement group and a mechanism similar to RAPEX or TWIX

**6. Recovery, recycling and destruction of ODS**

Clearly allocate responsibilities for waste management and links to other EC legislation

Ensure regulatory transparency for destruction by:

- Specifying authorised methods for destruction
- Specifying other environmentally acceptable destruction technology
- Establishing a preference for destruction for products and equipment containing ODS (with the exception of products and equipment containing HCFC)

Adopt standards for recovery with minimum % for recovery

Refer to the issue of foams in building by requiring Member States to address recovery by regulation or voluntary agreements

Guidance note on waste issues and ODS

**7. New substances**

- Re-establish Annex II, with two parts, Part A and B: Part A would have the characteristics of the current Annex II. Part B would include substances subject to reporting requirements.
- Include four new ODS to Annex II
- Establish links with REACH

**8. Quarantine and Pre-shipment**

- If MB is de-register under PPPD, all MB applications, including QPS will end
- If MB is registered under the PPPD:
  - Harmonise definitions
  - Establishing clear requirements for Quarantine applications, while adjusting the cap mechanism, and
  - Ending Pre-shipment applications

  Non legislative initiatives
  - Guidelines for QPS
  - Support international negotiations

**9. Reporting requirements**

Options for simplifying Member State Reporting obligations

- Set up electronic or on-line reporting for Member States
- Establish a single yearly consolidated report with two parts, one including reporting requirements for the Commission and a second with the information to be reported to UNEP
- Establish a single article on reporting

Options for company/user reporting

- Introducing a regulatory tool for non-reporting
- Establish On-line reporting

**10. Monitoring, information to the public and research**

- Establish provisions on monitoring, on awareness raising and information to the public and on research on ODS and depletion of the ozone layer.

***Discarded and alternative options***

The legal and policy analysis reviewed several options that were not proposed. Their impacts are presented in Part 13 of this report.

## 5.2 Results of the qualitative analysis

As noted above and in line with the Impact Assessment Guidelines, impacts were initially identified qualitatively, to provide the basis for prioritisation and identification of those impacts likely to be most significant. The initial, qualitative results were presented in a Preliminary Impact Assessment report submitted to the Advisory Group on 7 November 2007. Following this initial identification of impacts, a more detailed and quantified assessment has been made of key impacts across all proposed options.

| **Options** | **(i) Proposed options** | | **(ii) No EU action** |
|---|---|---|---|
| **Impact categories** | (i.a) All proposed options *except* recovery | (i.b) Proposals addressing recovery and destruction | |
| **Economic** | | | |
| (1) Direct costs for EU industry | **+/0*** | **-** | **0** |
| (2) Admin. costs for EU industry | **+/0** | **+/-** | **0** |
| (3) Admin. costs for MS | **+/0** | **-** | **0** |
| (4) Admin. costs for Commission | **+/-** | **-** | **0** |
| (5) Other economic impacts | **+** | **+** | **0** |
| **Social** | | | |
| (6) Social impacts | **+** | **+** | **0/-** |
| **Environmental** | | | |
| (7) ozone-depleting emissions | **+** | **++** | **+/0** |
| (8) global warming emissions | **+** | **++** | **+/0** |
| (9) EC position in global negotiations | **++** | **++** | **0** |
| (10) Other environmental impacts | **+** | **++** | **0** |

* Mixed impact predictions are a result of the expected impacts of different specific changes within the proposed option. For example (i.a) combines in one "option" both a suggested simplification of reporting requirements (which would be expected to reduce administrative costs for Industry, Member States and the Commission), but also a suggested strengthening of enforcement (which would may at least initially increase administrative costs for Member States and the Commission). These specific impacts are assessed and discussed in detail in Part B and Annex II.

(++) significant positive impact expected
(+) minor positive impact expected
(0) no measurable or significant impact expected
(-) minor negative impact expect
(--) significant negative impact expected

**Table 3. Qualitative comparison of options**

Table 3 provides an overall qualitative summary of the impacts of the proposed options compared with the business as usual option (no EU action). Impacts are scored on a five point scale from significant negative impact (--) to significant positive impact (++) as set out below. Positive impacts include reductions in administrative and direct costs on EU industry as well as reductions in environmental pressures. Where no impact is expected, a zero (0) score is assigned. Scores can also be mixed, for example where the manner in which a proposed option is implemented or interpreted at the Member

State level might impact upon the scale and nature of the impact. [6] The results refer to future impacts relative to the expected baseline (2010) situation. More detailed analysis is found in Part B and Annex II.

While many of the impacts are explored further in the quantitative assessment, the qualitative analysis does provide several conclusions that are not quantifiable.

Notably, these qualitatitive results include *social impacts* such as the effects on employment, human health and crime.

The impact assessment found that the employment effects of the proposed options should be very low. While a few options may result in measurable job losses (where these could be quantified, they are provided in Part B), there is no indication that the options as a whole would have a negative impact on employment. Indeed, the experience in implementation of the Montreal Protocol and the ODS Regulation has shown that ending ODS uses can indeed create opportunities for new employment.

The proposed options are also expected to result in improved compliance and reduced crime, due to improved import and export requirements, strengthened enforcement and better legal clarity. In particular, illegal trade is an important concern. Their impact on illegal trade cannot, however, be quantified, as information on crime and illegal trade is mostly anecdotal.

The phase-out of ODS will also have benefits for human health. In one area, ending EC uses of methyl bromide, these will be direct benefits: this substance poses important health and safety risks (it is classified as toxic under EC legislation). Even where methyl bromide may be replaced by other chemicals, most alternatives are of a lower hazard class. Other alternatives include non-chemical methods. These health benefits will occur in agriculture and in EC ports where cargo is treated.

The reduction in ODS releases to the atmosphere will protect the ozone layer. The US EPA has estimated that the full global phase-out of ODS will save about 6 million US lives from skin cancer deaths.[7] Benefits in the EC, which its larger population, may be even greater. As EC production and consumption of ODS have already fallen greatly, the health benefits arising from the options proposed here will be relatively small compared to the overall phase-out. Nonetheless, actions to improve the recovery and destruction of ODS banks in particular will provide an important reduction in EC emissions of ODS.

In terms of *environmental impacts*, the proposed options will reduce emissions: this impact is quantified in the following pages, to the degree possible. One important result is, however, difficult to quantify: they will strengthen the EC position as a global leader in phasing out and controlling the use of ODS and thus the EC role in international negotiations in this regard. In parallel, initiatives to phase-out ODS in the EC could encourage further action by other Parties to the Montreal Protocol.

For a few topic areas, only qualitative analyses were prepared, as separate studies or reviews are underway. This areas are: the critical use of halons; the phase-out date for the use of recycled and reclaimed HCFCs for maintenance and servicing; and the certification of recycled and reclaimed HCFCs.

[6] This scoring system enables comparison where units of measurement (for example financial costs compared to reduction in illegal crime to global warming impacts) and the nature of impacts (which in this case are complex and multi-faceted, due to the range and number of options) make other comparative impact assessment difficult. See section 5, "How do the options compare?" of the European Commission's Impact Assessment Guidelines

[7] US Environmental Protection Agency, Achievements in Stratospheric Ozone Protection, April 2007. These lives will be saved over the period from 1990 to 2165.

## 5.3 Results of the quantitative analysis: overview

In the next stage of analysis, quantitative estimates were developed of the proposed options. Table 4 presents an overview of the net impacts of these proposals.

All costs and benefits are quantified for the ten years beginning in 2010, the date when the revised regulation is expected to be introduced, i.e. 2010 to 2019. The monetary values are presented as net present values at 2010. Environmental impacts are quantified in terms of net emissions of ODS, in both their ozone-depleting impact (ODP tonnes) and their climate change impact ($CO_2$-equivalent tonnes).

| | **Economic impacts** (all costs calculated NPV at 2010 for costs 2010-2019) | | | | **Social impacts** | **Environmental impacts** | |
|---|---|---|---|---|---|---|---|
| | Direct costs to EC industry (million €) | Administrative costs (million €) | | | | Emissions in ODP tonnes (2010 – 2019 total) | GHG emissions in $CO_2$ equiv. (2010 – 2019 total) |
| | | For Industry | For MS | For COM | | | |
| **Total net impact of all proposed options** | | | | | | | |
| | **27 – 161** | **-0.32** | **-0.15** | **-0.05** | **Possible jobs increase** | **10,500 – 29, 700 reduction** | **90 – 237 million reduction** |
| **Impacts of simplification and clarification of the regulation** | | | | | | | |
| | 0 | -2.38 | -0.01 | -0.03 | .. | .. | .. |
| **Impacts of the proposed options in key areas** | | | | | | | |
| Recovery and destruction of ODS | 53 – 85 | 0.43 | 0.22 | 0 | Possible jobs increase | 2300 t reduction | 44 million reduction |
| Early phase-out of HCFC production | 12 – 83 * | 0 | 0 | 0 | Possible jobs loss | 1300 – 5100 reduction** | 45 – 175 million reduction** |
| Quarantine and pre-shipment (QPS) | Net gain of up to 31 million | -0.33 | -0.58 | 0.04 | Reduced health risks | 860 | 7200 |

Notes:
* Will also stimulate production for alternatives to HCFCs; this benefit is not quantified.
** Third-country producers of HCFCs may replace a share of EC production, reducing the net reduction in emissions.

**Table 4. Net costs and benefits of the options proposed for the revision of Regulation (EC) No. 2037/2000 on ozone-depleting substances**

Taken as a whole, the proposed options are projected to reduce ODS emissions by between 10,500 and 29,700 ODP tonnes (equivalent to 90 to 237 million $CO_2$ –equivalent tonnes). These options will cost EC industry between €26 million and €161 million.

The proposed options will slightly reduce administrative costs for EC industry, for Member State governments and for the European Commission. One key goal of the revision is to simplify and clarify the Regulation. This action will play a key role in reducing administrative costs, in particular for the companies subject to the Regulation, by reducing the time needed to understand the Regulation and its interactions with other EC legislation.

Overall, the proposals will reduce the time that industry, Member States and the European Commission spend addressing exemptions and the time for reporting; instead, administrative work will be focused on actions related to enforcement and actions for the recovery and destruction of ODS.

The options proposed in three key areas are particularly important, both for their impact in terms of direct costs on EC industry as well as the reduction in emissions. The first area are the proposals to strengthen the recovery and destruction of ODS. Here, the costs will also represent an economic and jobs benefit for recovery industry. In this area, the assessment of costs and benefits does not include actions to recover ODS from building foams, the largest bank: here, the revised Regulation will require Member States to identify the best approach.

The options propose the phase-out of EC production of HCFCs in 2015, bringing forward the 2020 date agreed by the Parties to the Montreal Protocol. As the Regulation will already have ended EC use of HCFCs, this option will mainly affect exports. Here, EC producers are losing market shares to producers in third countries, in particular China. In the face of this pressure, the range of costs presented here may be overestimates. On the other hand, this option may encourage users in third countries to switch to non-ODS alternatives, a market where EC producers have a stronger advantage.

In at least one area – improved controls on QPS – the proposed options should reduce overall costs to EC industry while reducing ODS emissions by requiring the recapture of methyl bromide.

In one area, reporting requirements for new ODS, the cost estimates are quite uncertain. The analysis suggests that the proposed reporting requirements will create low administrative costs and will have little affect on market potential. In contrast, industry representatives have stated that the proposed option may limit the market potential for new substances that are now being brought to market. The detailed assessment in Part B presents scenarios for both the expected outcome and the industry view.

In terms of protecting the ozone layer, the proposals together would reduce emissions at a net cost between 1200 €/ODP tonne to 15 000 €/ODP tonne. In terms of the reduction of climate change impacts, however, the cost will be under €1 per $CO_2$-equivalent tonne. This reflects the fact that a large share of the reductions are in HCFCs, substances that have a low ozone-depleting potential but a high global warming impact.

## 5.4 Results of the quantitative analysis by topic areas

As this overview has noted, the impacts vary across the many topic areas addressed in the revision. This section provides a detailed summary of impacts for each major area.

### Clarification and simplification of the Regulation

In their responses to the project questionnaire, Member States as well as other stakeholders underlined the need to simplify and clarify the ODS Regulation. Moreover, the revision of this Regulation will apply the approach of the European Commission's "Better Regulation" package.[8]

The proposed options would:

- Remove obsolete sections of the legal text
- Provide a clearer overall structure
- Strengthen synergies with other EC legislation
- Revise definitions for clarity and to harmonise with other EC legislation (e.g. in the area of "placing on the market")

[8] COM(2006) 689 final and Annex 1 of COM(2006) 690 final

These revisions will simplify and clarify the legal text and in doing so will reduce administrative costs for EC companies, in particular those tied to understanding the Regulation and its interaction with other EC legislation. A conservative estimate of these costs and benefits is provided in the table below.

| | Economic impacts (all costs calculated in million €, NPV in 2010 for costs 2010-2019) | | | | Social impacts | Environmental impacts (Total for 2010 – 2019) | |
|---|---|---|---|---|---|---|---|
| | Direct costs to EC industry | Administrative costs | | | | Emissions in ODP tonnes | GHG emissions in $CO_2$ equiv. tonnes/year |
| | | For Industry | For MS | For COM | | | |
| **No EU action** | | | | | | | |
| Costs related to interpreting the Regulation | .. | 5.54 | 0.04 | 0.08 | .. | .. | .. |
| **Proposed options** | | | | | | | |
| Costs for the revised Regulation * | .. | 3.16 | 0.03 | 0.05 | .. | .. | .. |

* Includes one-time costs related to learning about the new Regulation.

**Table 5. Comparison of the costs related to simplification and clarification of the Regulation**

Clarification of the Regulation's requirements should also improve compliance with and enforcement of the Regulation. These benefits have not been quantified.

**Exemptions for critical and essential uses**

The Montreal Protocol and the ODS Regulation have phased out the regular uses of nearly all ODS in the EC. The Protocol, subsequent Decisions of the Parties and the ODS Regulation allow a series of exemptions for critical and essential uses. At present, there are four main areas for these critical and essential uses exemptions:

- Essential uses of CFCs for medical devices (metered dose inhalers, MDIs)
- Critical uses of methyl bromide
- Critical uses of halons
- Essential laboratory and analytical uses.

Member States and the Commission have agreed to end the first area, the essential use of CFCs for MDIs, by 2010, as alternatives are available and in fact are currently in use in most Member States. For this reason, the proposed option to end these uses would not have an impact, as under the business as usual scenario they will end by 2010. Nonetheless, it should be noted that the Commission and the Member States have spent significant administrative resources managing this exemption.

Member States and the Commission are close to a similar agreement to end the critical uses of methyl bromide as well. Moreover, the only critical uses remaining are pesticide uses, and the registration of methyl bromide under the Plant Protection Products Directive is under review, with a decision likely in early 2008. (Methyl bromide was not supported under the Biocidal Products Directive, and this means that any critical uses that were biocidal ended in 2006.)

The proposed options will end this second area, the critical uses of methyl bromide, as well. This is not expected to have any direct economic or environmental impacts due to the expected agreement, which should end these critical uses after 2009. The impact assessment has however also elaborated a "worst-case" scenario, in the event that an agreement to end these uses is not confirmed – this is

provided in the detailed discussion in Part B. Under the option, the revised Regulation would contain a clause for the "emergency use" of methyl bromide, in case of unlikely and unexpected events such as pest outbreaks that cannot be addressed by other means.

| | Economic impacts (all costs calculated in million €, NPV in 2010 for costs 2010-2019) | | | | Social impacts | Environmental impacts (Total for 2010 – 2019) | |
|---|---|---|---|---|---|---|---|
| | Direct costs to EC industry | Administrative costs | | | | Emissions in ODP tonnes | GHG emissions in $CO_2$ equiv. tonnes/year |
| | | For Industry | For MS | For COM | | | |
| **No EU action** | | | | | | | |
| Critical use of methyl bromide | 0 | 0 * | 0 * | 0 * | Health and safety risks** | 0 | 0 |
| Essential laboratory and analytical uses | 0 | 0.11 | 0.05 | 0.11 | .. | 1200 | 4 300 000 |
| **Proposed options** | | | | | | | |
| Ending critical use of methyl bromide | 0 * | 0 | 0 | 0 | * | 0 | 0 |
| Essential lab. and anal. uses: cap + multi-year exemption | 0 | 0.09 | 0.03 | 0.07 | .. | 1060 | 3 810 000 |

* In the worst-case scenario, there will be costs and benefits for the period 2010-2012: see Part B of this report for details.
** Methyl bromide classified as toxic, with high health and safety risks. Key alternatives are of a lower risk class.
Note: the impacts of alternative options for essential laboratory and analytical uses are provided in the detailed assessment.

**Table 6. Comparison of the options for critical and essential uses**

The third exemption concerns halons, which have been used mainly in fire fighting. While the use of halons has been phased out in the EC, Annex VII to Regulation (EC) No. 2037/2000 lists a series of critical uses for which halons are still permitted. Most of these critical uses are for fire fighting in the military, civil aviation and other sectors (including ensuring that spaces containing flammable gas or liquids remain inert).

A December 2006 study for the European Commission reviewed the availability of alternatives for the critical uses of halon listed in Annex VII and recommended phase-out dates for them.[9] The European Commission is currently reviewing these phase-out dates. For this reason, this review has not considered the potential impacts of phase-out. However, it is noted that a range of alternatives is available and already in use both in new equipment and also in certain existing equipment that had been converted. (Part B lists the dates proposed in the 2006 study.)

In the fourth area, a range of ODS are employed for laboratory and analytical purposes. The proposed option would establish a cap for these uses and would also allow the granting of multi-year exemptions (rather than the current annual exemptions). Table 6, above, compares the impacts of this option with the "no EU action" option. (The detailed review in Part B also assesses the impact of only setting a cap or only granting multi-year exemptions.) The proposed option would slightly reduce administrative costs as well as emissions in terms of both ozone-depleting potential (OD) and climate change ($CO_2$ equivalent).

[9] ICF International, *Review of Halon Critical Uses Specified in Annex VII of Regulation (EC) No 2037/2000 on Substances that Deplete the Ozone Layer (Final Report)*, December 2006

**Quarantine and pre-shipment**

Though Regulation 2037/2000 has phased out the placing on the market and use of methyl bromide in the EC, it allows quarantine and pre-shipment (QPS) applications of this ODS. These applications are mainly for phytosanitary purposes, to prevent the international spread of plant diseases and pests in exports of plants and plant products. Such phytosanitary treatments are governed by the International Plant Protection Convention (IPPC). Decisions of the Parties to the Montreal Protocol as well as a Recommendation under the IPPC call for reducing QPS uses of methyl bromide. Alternatives exist for many types of QPS treatments: in a 2004 survey, Parties to the Montreal Protocol in 2004 reported widespread availability of alternatives.

The proposed option would require the use of equipment to recapture methyl bromide for QPS. It would also eliminate pre-shipment treatments. Finally, it would call on exporters to use methyl bromide only where the importing country explicitly requires it, and alternatives do not exist.

These measures should reduce overall costs to EC industry while reducing methyl bromide emissions. Notably, EC exporters will benefit from lower costs from fewer QPS treatments, even though the recapture requirements will increase costs. In this area, the impact assessment reviewed an alternative option: the complete elimination of methyl bromide for QPS. This would increase costs, but end the related emissions. While alternative methods are currently used, efforts may be needed to ensure that importing countries accept EC goods treated using such methods.

| | Economic impacts (all costs calculated in million €, NPV in 2010 for costs 2010-2019) | | | | Social impacts | Environmental impacts (Total for 2010 – 2019) | |
|---|---|---|---|---|---|---|---|
| | Direct costs to EC industry | Administrative costs | | | | Emissions in ODP tonnes | GHG emissions in $CO_2$ equiv. tonnes/year |
| | | For Industry | For MS | For COM | | | |
| **No EU action** | | | | | | | |
| Continue current QPS practices | 85.7 | 0.50 | 0.71 | 0.08 | Health risks from MB use | 1810 | 15 100 |
| **Proposed options** | | | | | | | |
| Restrict Q, end PS, recapture methyl bromide | 54.5 | 0.17 | 0.13 | 0.12 | Health risks from MB use | 950 | 7 900 |
| **Alternative option** | | | | | | | |
| End all QPS treatments with MB | 61 to 122; Some export risks | 0 | 0 | 0 | No MB use | 0 | 0 |

**Table 7. Comparison of options for quarantine and pre-shipment**

**Phase-out of the use and production and HCFCs and other ODS**

The ODS Regulation has phased out the use of HCFCs in all new products and equipment placed on the EC market. This section reviews possible changes to the Regulation for both remaining uses (exemptions, derogations and maintenance uses) and for the current phase-out schedule for production.

The first proposed option would end current derogations and exemptions for the use of HCFCs to replace halons as fire-fighting agents (Article 5(3)), and for the placing on the market and use of HCFCs in cases where "technically and economically feasible" alternatives are not available (Article

5(7)). In both areas, the number of exemptions granted has been quite low in recent years. Thus, the impacts of this option are expected to be low.

The second option would bring forward the phase-out of EC production of HCFCs to 2015. The Regulation currently sets a phase-out in 2025, and Decision XIX/6 of the 19th Meeting of the Parties in September 2007 has now set a 2020 phase-out.[10] This option will reduce HCFC production and the resulting emissions. It will also involve a direct cost on industry: the size of this impact depends on the projections of HCFC production within the EC from 2015 to 2020. In recent years, EC production has decreased significantly, due in part to strong competition from countries such as China. In the assessment, this decline in EC production is predicted to continue for market-based reasons. Moreover, the assessment looks at two scenarios, one where prices of HCFCs fall: here, the costs of a fast-track phase-out would lead to costs of only 12 million €. In contrast, if the price remains high, then the costs of the earlier phase-out would be higher: 85 million €.

On the other hand, the reduction in EC production of HCFCs can be expected to create new economic opportunities, as it may encourage users in third countries to switch to non-ODS alternatives, a market where EC producers have a stronger competitive advantage. This economic benefit has not been quantified.

| | Economic impacts (all costs calculated in million €, NPV in 2010 for costs 2010-2019) | | | | Social impacts | Environmental impacts (Total for 2010 – 2019) | |
|---|---|---|---|---|---|---|---|
| | Direct costs to EC industry | Administrative costs | | | | Emissions in ODP tonnes | GHG emissions in $CO_2$ equiv. tonnes/year |
| | | For Industry | For MS | For COM | | | |
| **No EU action** | | | | | | | |
| Art. 5(3) derogation and 5(7) exemption | 0 | 0.03 | 0.04 | 0.07 | .. | Low | Low |
| HCFC production (2015 onwards) | 0 | 0 | 0 | 0 | .. | 5146 | 45 - 175 million |
| **Proposed options** | | | | | | | |
| Removal of Articles 5(3) and 5(7) | 0 | 0 | 0 | 0 | .. | 0 | 0 |
| Advanced phase-out of HCFCs (2015) * | 12 - 83 | 0 | 0 | 0 | .. | 0 | 0 |

* The direct costs to EC industry will be at least partially offset by increased exports of alternative substances. On the other hand, reduced ODS emissions due to the end of EC production of HCFCs may be partially offset by higher production in third parties.
Note: The assessment considers the costs and benefits from 2015 to 2019.

**Table 8. Comparison of the options for HCFCs**

Finally, this section does not review the impacts of options in two further areas: a possible change to the schedule for the phase-out of the use of recycled and reclaimed HCFCs (these currently can be used for maintenance and servicing of refrigeration and air conditioning equipment until 2015). Nor does it consider the certification of recycled and reclaimed HCFCs, to distinguish them from "virgin" HCFCs, whose use will no longer be allowed within the EC from 2010. These issues have been the subject of separate studies for the European Commission.[11]

[10] Between 2020 and 2029, Article 2 Parties could produce 0.5% of the baseline level. For details see the full Decision XIX/6 at http://ozone.unep.org/Meeting_Documents/mop/19mop/MOP-19-7E.pdf

[11] The first study is: ICF International, *Supply and Demand of Recycled Hydrochlorofluorocarbons (HCFCs) in Existing Refrigeration and Air Conditioning Equipment Beyond 2009: Analysis of Regulatory Phaseout Scenarios*, August 2006. The follow-on study should be available in the first half of 2008.

**End production and export of ODS for BDN**

The EC produces and exports ODS for the "basic domestic needs" of developing countries. The Montreal Protocol, which allows production specifically for these basic domestic needs, is phasing out this provision for most ODS.

The proposed option would end all basic domestic needs in 2010: this will effectively bring forward one last phase-out date under the Protocol, for 1,1,1-trichloroethane, from 2015.[12] For the other ODS that the EC currently produces and exports for the basic domestic needs of developing countries, the Protocol specifies a 2010 phase-out.

The direct cost of this option will be low, as current exports of 1,1,1-trichloroethane for basic domestic needs are low and falling. Quantitative projections are not presented due to confidentiality, as less than three companies are involved. They are included in the estimates for Table 4 presenting overall impact results.

**Import requirements**

The proposed options for imports would end the inward processing regime for methyl bromide in 2010 and that for HCFCs from 2015. The specific costs will depend on future sales. For methyl bromide, the projections are not presented for reasons of confidentiality, as less than three companies currently undertake inward processing of this ODS. For HCFCs, the total direct costs (calculated in NPV at 2010) are between € 0.12 and € 1.76 million.

| | Economic impacts (all costs calculated in million €, NPV in 2010 for costs 2010-2019) | | | | Social impacts | Environmental impacts (Total for 2010 – 2019) | |
|---|---|---|---|---|---|---|---|
| | Direct costs to EC industry | Administrative costs | | | | Emissions in ODP tonnes | GHG emissions in $CO_2$ equiv. tonnes/year |
| | | For Industry | For MS | For COM | | | |
| **No EU action** | | | | | | | |
| Inward processing for methyl bromide | * | * | * | * | * | * | * |
| Inward processing for HCFCs | 0 | 0.21 | 0 | 0.08 | 0 | Up to 590 | Up to 17 million |
| Art. 5(4) and 4(6): imports of products and equipment | Potential net cost of up to €6.2 million | 0 | 0 | 0 | 0 | 1.5 | 2 640 |
| **Proposed options** | | | | | | | |
| End inward proc. for methyl bromide | * | * | * | * | * | * | * |
| End inward proc. for HCFCs in 2015 | 0.12 - 1.76 | 0 | 0 | 0 | 0 | 0 ** | 0 ** |
| Amend Articles 5(4) and 4(6) – products and equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

* Data not provided for confidentiality, as less than three companies are involved. Results are included in overall totals.
** Emissions reduction due to end of inward processing of HCFCs may be partially offset by higher production in third parties.

[12] The Protocol also specifies a 2015 phase-out date for methyl bromide, but this substance is no longer produced in the EC.

**Table 9. Comparison of the options for import requirements**

For methyl bromide, ending inward processing of methyl bromide is expected to support the phase-out of this toxic ODS under the Montreal Protocol. For HCFCs, ending inward processing should encourage the adoption of alternatives, which can support EC exports. In both cases, the end to inward processing is expected to strengthen the EC negotiating position within the Montreal Protocol.

A separate option would more clearly enunciate the Regulation's current prohibition on the importation and placing on the market of products and equipment containing or relying on ODS. An exception would be made for products and equipment containing HCFCs and already on the EU market before 2010, for the period until 2014, as these may be refilled with recycled or reclaimed HCFCs.

This provision is projected to create a net benefit for EC industry, as it would end importation of some used products and equipment, improving sales for new products and equipment that do not contain ODS.

**Exports**

The European Union remains an important exporter of ODS, in particular to Article 5 countries where their use has not yet been phased out under the Montreal Protocol. Several Member States called for greater controls on exports in the survey for this review. In 2007 the European Commission has introduced an informal system of prior informed consent (iPIC) for certain export shipment. This system is integrated into an existing, voluntary system among Asia Pacific countries, and thus is only used for exports to participating countries.

| | Economic impacts (all costs calculated in million €, NPV in 2010 for costs 2010-2019) | | | | Social impacts | Environmental impacts (Total for 2010 – 2019) | |
|---|---|---|---|---|---|---|---|
| | Direct costs to EC industry | Administrative costs | | | | Emissions in ODP tonnes | GHG emissions in $CO_2$ equiv. tonnes/year |
| | | For Industry | For MS | For COM | | | |
| **No EU action** | | | | | | | |
| Exports of ODS | 0 | 0.64 | 0.01 | 0.19 | 0 | 0 | 0 |
| **Proposed option** | | | | | | | |
| Expansion of current iPIC procedure | Costs when importing country rejects shipment | 0.78 | 0.01 | 0.22 | Improved enforcement | Possible decrease | Possible decrease |
| **Alternative options** | | | | | | | |
| Export notification under PIC Regulation | Possible impact on SME operations | 0.21 | 0.01 | 0.19 | Improved enforcement | Possible decrease | Possible decrease |
| Notified ex-ante export licensing | Possible impact on SME operations | 0.78 | 0.01 | 0.22 | Improved enforcement | Possible decrease | Possible decrease |

**Table 10. Comparison of the options for export requirements**

The proposed option would specify the iPIC procedure in the Regulation and expand it. Under the current iPIC system, importing countries have on occasion not granted permission to shipments; this

could continue and expand under this option. This system would thus play an important role in reducing undesired global trade in ODS and therefore potential illegal and harmful trade.

This option is compared to two alternatives: incorporating ODS into the prior notification system of the PIC Regulation, and introducing a notified ex-ante export licensing procedure for exports to countries not in the iPIC system. Both of these risk increasing administrative costs for industry, in comparison with the iPIC approach, which may result in lower administrative costs.

**Enforcement**

In the area of enforcement, the impact assessment will strengthen the Regulation's requirements for Member State penalties and inspections. It will also establish labelling requirements for products and equipment containing ODS.

| | Economic impacts (all costs calculated in million €, NPV in 2010 for costs 2010-2019) | | | | Social impacts | Environmental impacts (Total for 2010 – 2019) | |
|---|---|---|---|---|---|---|---|
| | Direct costs to EC industry | Administrative costs | | | | Emissions in ODP tonnes | GHG emissions in $CO_2$ equiv. tonnes/year |
| | | For Industry | For MS | For COM | | | |
| **No EU action** | | | | | | | |
| Current inspections | 0 | 0 | 0.35 | 0 | 0 | .. | .. |
| **Proposed options** | | | | | | | |
| Strengthen Art. 20 on inspections | 0 | 0 | 0.35 – 1.73 | 0 | | Decrease expected | Decrease expected |
| Labelling requirements | 0 | 2.44 | 0.26 | 0.02 | | Decrease expected | Decrease expected |

**Table 10. Comparison of the options for enforcement**

The revised requirements for penalties are not expected to create new costs, as most Member States already have clearly established these penalties. For this reason, this option is not presented in the table. The requirements for inspections, on the other hand, are expected to increase administrative costs, in particular for business and Member States, while reducing emissions. Finally, a non-legislative option is also proposed: greater cooperation and exchange of information among Member State enforcement officials, as occurs in other policy areas, such as CITES. As this is not a legislative change, but this option is not included here or in the overall costs of the option; an initial cost estimate is provided in Part B,.

**Recovery, recycling and destruction of ODS**

While the Montreal Protocol and EC legislation have almost ended the use and related emissions of ODS in the Community, a large amount of ODS are still found in existing products and equipment. A recent IPCC/TEAP study indicated that these "banks" of ODS have significant ozone-depletion and global warming potentials. These banks include ODS found as refrigerants, as well as ODS still contained in foams they were used to blow (see box).

The current ODS Regulation requires recovery, recycling and destruction for ODS in many types of products and equipment. However, the rate of collection for waste products and equipment and the rate of recovery and destruction of their ODS are reported to vary across the EC (see section 8 in Part B). New products and equipment do not contain ODS (except for essential and critical uses). Moreover,

the amount of ODS found in banks in refrigerators and air conditioners is decreasing steadily due to leakages and end of product life. This means that any action to improve the recovery of ODS from these banks should be taken quickly, possibly before a new Regulation comes into force. In particular, immediate EC-wide improvements in the collection of waste refrigerators and freezers under the WEEE Directive [13] will increase the amount of ODS recovered and destroyed.

**ODS banks**

The Montreal Protocol has greatly reduced the production and use of ozone-depleting substances and, most notably, one of the most widely used and harmful ODS, CFCs. However, a substantial fraction of CFCs and other ODS have not been released to the atmosphere yet, but are still enclosed in products and equipment, including foams and refrigerator coils. These reservoirs of ODS are referred to as banks.

As a rough estimate, the banks of ODS in the EU 27 are over 700 000 ODP tonnes and over 5 billion $CO_2$ equivalent tonnes. Foams and in particular building foams are the largest bank (see Annex I). Over half of these banks are estimated to be in the form of CFCs and thus are on the same order of magnitude as the amount of CFCs produced per year in the EU-25 during the time of peak production.

The ODS banks in the EU are estimated to represent about a third of the global banks. The total global "banks" are, in addition to their high total ODP, equivalent to one year's global emissions of $CO_2$.

The Regulation calls for the recovery of ODS in other products and equipment (such as building foams, which contain large amounts of ODS) "if practicable". This is a vital issue, as building foams contain the largest single "bank" of ODS recovered.

The proposed options cover several aspects of recovery, recycling and destruction. Two provide clarification for the legal text: one proposes to allocate responsibilities for waste management more clearly and to establish links with other relevant EC acts, such as the WEEE Directive; the other would specify the authorised methods for destruction. While these two options provide greater legal clarity, their impacts have not been quantified.

The other options call for:

- specifying a preference for destruction over recycling and reclamation in the revised Regulation
- adopting standards for recovery
- encouraging action to address ODS banks in building foams

These options can create both higher direct costs for recovery and destruction as well as important potential benefits in terms of reduced ODS emissions. It should be recognised that the costs that are presented here will also be an economic and jobs benefit for the EC recovery industry.

The lion's share of ODS recovered today are destroyed rather than recovered or reclaimed, according to data reported by the Member States to the European Commission. Moreover, as ODS consumption is declining in the EC, this share is expected to fall even further for all ODS except HCFCs. As noted, recycled and reclaimed HCFCs can be used from 2010 to 2014, but not "virgin" HCFCs: this should increase demand for the recycled and reclaimed ones.

[13] Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE)

Under this option, the declining share of recovered ODS that will be recycled or reclaimed from 2010 to 2019 would instead go to destruction. This option will complement the phase-out of ODS production and consumption already specified in the Regulation. For HCFCs, this requirement only takes force in 2015.

The ODS Regulation currently requires the recovery of ODS from certain products and equipment, including all refrigeration and air conditioning equipment (Article 16(1) and 16(2)). The level of recovery reportedly varies among Member States. Here, the proposed option would establish standards for the recovery (and destruction) of ODS contained in used products and equipment, focusing on the recovery of ODS contained in refrigerators and freezers. This option would increase costs of recovery, as well as amounts of ODS destroyed instead of released to the atmosphere.

This option will have its most important impacts in the EU12: in many of these Member States, recovery levels are reportedly lower than in the EU15. Moreover, the EU15 phased out the use of ODS, such as CFCs in refrigerators, already in 1992. As a result, most EU15 refrigerators sent to the waste stream from 2010 on will not contain ODS, but replacement products such as HFCs and HCs.

| | Economic impacts (all costs calculated in million €, NPV in 2010 for costs 2010-2019) | | | | Social impacts | Environmental impacts (Total for 2010 – 2019) | |
|---|---|---|---|---|---|---|---|
| | Direct costs to EC industry | Administrative costs | | | | Emissions in ODP tonnes | GHG emissions in $CO_2$ equiv. tonnes/year |
| | | For Industry | For MS | For COM | | | |
| **No EU action** | | | | | | | |
| No preference for destruction * | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Standards for recovery ** | 5.29 *** | 0.43 | 0.19 | 0 | | - 170 (ODP t destroyed) | - 2 015 000 |
| Building foams | Depends on extent of MS and private action | 0 | 0 | 0 | 0 | Action not certain | Action not certain |
| No guidance document | 0 | > 0.17 | > 0.02 | 0.04 | .. | 1200 | 4 300 000 |
| **Proposed options** | | | | | | | |
| Preference for destruction * | 47.7 – 79.5 | 0 | 0 | 0 | 0 | - 2100 (destroyed) | Up to - 42 300 000 |
| Standards for recovery ** | 8.05 *** | 0.63 | 0.33 | 0.02 | | -260 (destroyed) | - 3 160 000 (destroyed) |
| Building foams: encourage MS and voluntary action | Increased with stronger MS and vol. action | 0 | 0 | 0 | 0 | Increased levels of ODS destruction | Increased levels of ODS destruction |
| Guidance document | 0 | 0.04 | 0.01 | 0.03 | .. | Higher rates of ODS recovery and destruction | |

* The costs and benefits presented here are incremental ones: they do not include the ODS sent for destruction without any revision of the Regulation.
*** Costs only for ODS, not for other refrigerants
** Costs for recovery and destruction of ODS in household refrigerators and freezers.

**Table 11. Comparison of options for recovery and destruction of ODS**

A third action would address the issue of building foams: this is the largest single bank of ODS. The Regulation currently calls for recovery of these ODS "if practicable" (Art. 16(3)). As yet, systematic recovery of these ODS has not been carried out in any Member States. Norway plans to address this issue under new building waste legislation. In the UK, a private test has been run.

The proposal would establish a call in the Regulation for Member States to address this issue. This will strengthen current requirements. While the detailed description in Part B provides some estimates of the potential costs of recovering ODS from building panels, strong data on the extent of these banks and the cost of their recovery is limited. Moreover, new private sector actors in the voluntary carbon market, may be interested in providing the necessary finance to address this issue. The proposal would ensure that Member States address this lack of information. This issue is a major concern; in contrast with ODS in waste refrigerators, the long lifetimes of building panels provide the time to assess the best approach for ODS recovery and destruction.

**New substances**

The options for new substances address two specific issues. First, the option proposes a mechanism and procedures for the inclusion of new ODS substances, including a possible link between the ODS Regulation with EC chemicals legislation, notably the provisions of REACH for the notification and registration of chemicals, as some may be new ODS.

Second, the option calls for listing three, short-lived substances with low ozone depleting potentials in a new Annex IIB under the Regulation: EC companies would be required to report on the level of production or import of substances in this Annex. The goal is to provide clear information to avoid unpredictable policy actions in the future, should overall production and use of these low-ODP substances reach levels that in the aggregate could be of concern. (The option calls for listing a fourth substance, halon 1202, which is not used in the EC, in Annex I to the Regulation.)

| | Economic impacts (all costs calculated in million €, NPV in 2010 for costs 2010-2019) | | | | Social impacts | Environmental impacts (Total for 2010 – 2019) | |
|---|---|---|---|---|---|---|---|
| | Direct costs to EC industry | Administrative costs | | | | Emissions in ODP tonnes | GHG emissions in $CO_2$ equiv. tonnes/year |
| | | For Industry | For MS | For COM | | | |
| **No EU action** | | | | | | | |
| No requirements for new ODS | Risk of future caps on production | 0 | 0 | 0 | | Depend on market potentials * | Estimates of $CO_2$ equiv. not availal. |
| **Proposed options** | | | | | | | |
| Creation of Annex IIB. With reporting requirement | No market disruption ** | 0.05 | 0 | 0.03 | | Small reduction | Estimates of $CO_2$ equiv. not availal. |

* The ODP of the new substances is still under research

** In contrast, industry representatives state that the option could lead to a loss of market potential

**Table 12. Comparison of options for new substances**

The impact assessment identified mainly administrative costs for the reporting requirements for the new substances to be listed in Annex IIB. Under this analysis, while the listing may create a substitution effect if production and import levels are high, this is not expected to be the case in the period 2010 to 2019. It should be noted, however, that an industry representative stated any listing would limit market potentials for new substances. While this is not considered to be the likely effect, the impact assessment ran a separate scenario following this assumption (see Part B).

Both administrative costs and any direct impacts would fall upon companies producing or importing substances listed in Annex IIB. These would not, however, be deadweight losses: rather, any share of

key markets, such as refrigerants, lost by these companies would go to companies producing alternative substances.

**Reporting**

Appropriate monitoring and reporting are vital for effective policy implementation, but can create high administrative costs. The proposed options would revise current reporting for Member States in particular. They would: establish electronic or on-line reporting; streamline reporting to UNEP and the Commission; and have facilities involved in ODS recovery, recycling and destruction report to the European Commission rather than the Member States.

For industry as well, the proposal would establish on-line reporting.

| | Economic impacts (all costs calculated in million €, NPV in 2010 for costs 2010-2019) | | | | Social impacts | Environmental impacts (Total for 2010 – 2019) | |
|---|---|---|---|---|---|---|---|
| | Direct costs to EC industry | Administrative costs | | | | Emissions in ODP tonnes | GHG emissions in $CO_2$ equiv. tonnes/year |
| | | For Industry | For MS | For COM | | | |
| **No EU action** | | | | | | | |
| No change in reporting | Risk of future caps on production | 0.56 | 1.50 | 0.56 | | Depend on market potentials * | Estimates of $CO_2$ equiv. not availal. |
| **Proposed options** | | | | | | | |
| MS electronic reporting; single yearly report; industry on-line reporting; etc. | No market disruption ** | 0.56 | 1.31 | 0.62 | | Small reduction | Estimates of $CO_2$ equiv. not availal. |

* The ODP of the new substances is still under research

** In contrast, industry representatives state that the option could lead to a loss of market potential

**Table 13. Comparison of options for reporting**

The proposal would slightly reduce the cost of reporting for Member States, though it would increase for the European Commission. Costs for industry would remain the same overall, although ODS recovery and destruction facilities will face additional reporting costs, reflecting the increased importance given this issue in the revised Regulation.

**Monitoring requirements, information to the public, including awareness raising and research**

The proposed options would include a provision on awareness raising and information to the public, similar to the approaches in the Directive on ozone in ambient air and the POPs Regulation. They would also call on Member States and the Commission to promote and facilitate research on ODS and depletion of the ozone layer, with special attention on the public.

These provisions, which reflect similar requirements in the Montreal Protocol, would not change costs, though they may improve public awareness and research.

# B. IMPACT ASSESSMENTS OF SPECIFIC TOPIC AREAS

## 1. Clarification and simplification of the legal text

### 1.1 Problem

In their responses to the project questionnaire, Member States rated the clarity of the Regulation as relatively poor (in contrast, they gave the Regulation a high score for its effectiveness in phasing out ODS). In written comments, a large number of Member States as well as other stakeholders underlined the need to simplify and clarify the ODS Regulation. This is an important goal for the revision of this Regulation, which is included in the European Commission's "Better Regulation" package.[14]

Member States and stakeholders highlighted four main areas for the simplification and clarification of the Regulation:

- Remove sections rendered unnecessary due to completed phase-outs
- Simplification of structure
- Simplification of text so that it does not require prior knowledge
- Clarification of definitions

One of the main objectives of the revision of the Regulation will be to ensure the simplification and clarification of the legal text, in the context of the "Better Regulation" initiative.

### 1.2 The benefits of simplification and clarification

***No EU action***

This option would continue the current structure of the Regulation. Under this and previous Regulations, the European Commission, Member State governments, industry and other stakeholders have greatly reduced ODS. Nonetheless, the lack of clarity in the text creates ongoing *direct and administrative costs* to EU industry, Member State governments and the European Commission.

An estimate of the administrative costs has been made, including the time that EU businesses incurring of interpreting the legal text and the time for support from trade associations at EU and national level to their member companies.

These problems may impose a particular burden on SMEs, where the cost may be relatively higher compared to operating costs: in the survey for this review, several Member States mentioned a concern that smaller companies may have difficulties understanding and implementing the Regulation.

The legal analysis has identified that in several areas, Member States have differing interpretations of the Regulation's provisions.[15] The various interpretations imply that businesses across the EC may face differences in regulatory conditions. Moreover, these interpretations will raise the costs of business across the single market.

[14] COM(2006) 689 final and Annex 1 of COM(2006) 690 final

[15] One important example is the difference in the interpretation of "placing on the market" (see the Task 2.2/Part 1 report). Another is whether recapture systems are needed for quarantine and pre-shipment treatments (see section 13).

Member States highlighted the lack of clarity in the legal text: this can lead to problems in administration and enforcement for Member States and the Commission and this *could add to administration and enforcement costs for public authorities*.

These additional costs affect enterprises and industry associations across the European Union. A very conservative estimate of the additional costs required per company and association to understand and interpret the Regulation yields a total of at least 12 full-time equivalents of professional staff per year per year. Member State governments and the European Commission also face increased costs due to the lack of clarity, including costs related to understanding interrelationships with other EC legislation.

***Proposed option: Simplification and clarification of the legal text***

In terms of costs to EU, improving the clarity of the text is likely to *reduce direct and administrative costs* by minimising the risk of interpretation errors. Easier to read and more understandable text is likely to reduce administrative costs in applying the Regulation for businesses, and this *may benefit SMEs* (and any possible new entrants).

As part of this effort, the revisions will simplify the regulation by also removing provisions that are obsolete or otherwise no longer needed. These include provisions for:

- Essential uses of CFCs for medical devices
- Critical uses of methyl bromide
- Exemptions and derogations for HCFC use
- Most of the exemptions to the prohibition on exports of products and equipment containing or relying on ODS

If the simplification and clarification reduces administrative costs, EU industry will save at least half of the costs estimated – even considering that a revised regulation will require some learning effort when introduced.

***Comparison of options***

Compared to the "no EU action" option of leaving current complexities and lack of clarity, option (1) would be expected to reduce economic costs for industry, the Commission and Member States and should increase compliance with the Regulation. The current complexity and lack of clarity is felt to particularly disadvantage SMEs and new entrants to the market. Simplifying and clarifying the legal text may also strengthen and simplify enforcement procedure, and thus reduce the costs for Member States.

| | **No EU action** | **Proposed option: clarification and simplification of the legal text** |
|---|---|---|
| Total admin. costs on industry (total for 2010-2019) (NPV at 2010, € mio) | 5.54 | 3.16 |
| Total admin. costs on MS (total for 2010-2019) (NPV at 2010, € mio) | 0.04 | 0.03 |
| Total admin. costs on COM (total for 2010-2019) (NPV at 2010, € mio) | 0.08 | 0.05 |

**Table 1.1. Comparison of estimated administrative costs: No EU action compared with clarification and simplification of the legal text**

# 2. Exemptions for critical uses and essential uses

## 2.1 The problem(s)

The regular uses of nearly all ODS have been phased out under the Montreal Protocol and the ODS Regulation. The Protocol, subsequent Decisions of the Parties and the ODS Regulation allow a series of exemptions for critical and essential uses. In the Decisions of the Parties, two key criteria are established for decisions concerning critical and essential uses:

(i) The importance of the use
(ii) The lack of availability of technically and economically feasible alternatives

Implementing the exemptions for essential and critical uses imposes a significant administrative cost on the Commission and Member States (as well as the companies affected). The bulk of these costs have gone to the management of the procedures for these exemptions. In addition, an analysis indicates that the ODS Management Committee spends about one-half of its meeting time discussing these exemptions, including issues not clearly defined in the Regulation.[16]

This section considers three areas of exemptions: the essential use of CFCs for medical devices; critical uses of methyl bromide; critical uses of halons; and, essential laboratory and analytical uses.

In the first area, the essential use of CFCs for medical devices (metered dose inhalers, MDIs, for applying asthma and other respiratory medicines), the European Commission and the Member States declared at the 19th Meeting of the Parties that this use would end from 2010 due to the availability of substitutes. The European Commission and the Member States are close to a similar agreement to end the critical uses of methyl bromide. These two exemptions have created high administrative costs, which will end under the revised Regulation. The benefits of ending these exemptions and their administrative costs are not, however, counted in this impact assessment as the relevant decisions have already been reached. For completeness, the assessment also considers a "worst-case scenario" where the phase-out of methyl bromide takes an additional two years.

## 2.2 The essential use exemption for CFCs in MDIs

Each year, a Commission Decision authorises essential uses of ODS, including CFCs for "essential medical uses": these essential medical uses are for metered dose inhalers (MDIs) used by sufferers of asthma and other respiratory illnesses. The CFCs are used as propellants. In 2007, Commission Decision 2007/211/EC (OJ L 94 2007) allocated just over 316 ODP tonnes for this purpose.

The Commission and the Member States have agreed to phase out the use of CFCs in MDIs by 2010, as alternatives are available. The quantities used have decreased steadily: the 2007 level of 316 ODP tonnes is about one-sixth of the 2003 level (1895 ODP tonnes) – despite the increase in Member States from 15 to 27. By early 2007, nine Member States had completely phased out MDIs using CFCs, and all other Member States had approved alternatives for at least some MDIs, but not yet for all (according to the Annex to Commission Decision 2007/211/EC). At the September Meeting of the Parties to the Montreal Protocol, the EC announced that it would no submit requests to the Parties for the essential use of CFCs for MDIs after 2009.

The revised Regulation thus will delete provision for this essential use.

[16] Estimate based on an analysis of the minutes of Management Committee meetings in 2005 and 2006.

| | Est. admin. costs, 2007 (work-months) | Est. admin. costs, 2007 (€) |
|---|---|---|
| Industry | 3.75 | 16 800 |
| Member States | 4.05 | 15 900 |
| European Commission | 4.81 | 38 500 |

**Table 2.1. Estimated annual administrative costs for the essential use of CFCs in MDIs, 2007**

The estimates of the administrative costs in 2007, presented above, are based on the 2007 Commission Decision. These costs are not included in the impact assessment, as this essential use exemption will no longer be in use when the revised Regulation is introduced.

## 2.3 Critical use of methyl bromide

The critical uses of methyl bromide are soil fumigation and other applications in the food chain, such as fumigation of flour mills.[17] With the introduction of alternative methods and substances, EC use has fallen steadily: from an estimated 14 385 metric tonnes in 1993 to 1 655 metric tonnes licensed in 2006 and 522 metric tonnes licensed in 2007 (see Table 2.2).

The main uses are in southern Europe. Under the 2007 Commission Decision authorising these uses, over 85% of the total was allocated for use in Italy and Spain (203 and 252 metric tonnes, respectively); the remaining share was apportioned to France (39 t), the Netherlands (0.1 t) and Poland (27 t).[18] Soil fumigation accounts for about 90% of authorised uses.[19]

Methyl bromide is no longer produced in the EU. The number of businesses fumigating or using methyl bromide has steadily decreased. In 2005 there were 128 registered fumigation enterprises eligible to use methyl bromide for critical uses in 10 Member States, while in 2007 this fell to 57 registered MB fumigation enterprises in 5 Member States. While some fumigators have relied exclusively on MB, others have diversified.

The two main crops where methyl bromide was used in 2007 were tomatoes and strawberries (both runners and fruit). For both, use has fallen drastically in recent years – indeed, by 85% for tomatoes from 2006 to 2007 and by 50% for strawberries (see table below). Moreover, the areas now treated with methyl bromide represent a tiny share of total crop areas. In Italy, for example, the 2,120 ha of tomato cultivations treated with methyl bromide in 2006 represented less than 2% of the total land used for tomato production.[20] This share fell further in 2007 and is expected to decrease to 0 by 2009.

The Technology and Economic Assessment Panel (TEAP) of the Montreal Protocol reported that "technical alternatives exist for almost all controlled uses of methyl bromide", though often more than one alternative must be applied.[21] The EC has considerably reduced its critical use of methyl bromide since the 1990s through the adoption of alternatives, without sign of disruption in European agriculture. The European Commission and Member States have identified a series of alternatives for the remaining uses: these include both alternative active substances as well as alternative techniques for pest control.

[17] Methyl bromide is also used in the fumigation of products and pallets for Quarantine and Pre-Shipment purposes: this is discussed separately in Section 9.
[18] Commission Decision 2007/386 of 5 June 2007. Figures are rounded.
[19] European Commission, *Management Strategy for the phase-out of the critical uses of methyl bromide,* submitted to UNEP, 2007
[20] Maczey *et al,* Pre-harvest Study Report to Promote the Phase-out of Critical Uses of Methyl Bromide in the European Community: Final Report, CAB International, December 2006
[21] TEAP, Report Of The Methyl Bromide Technical Options Committee, 2006, p. 5

| Crops/uses | 1993 (estimated for 8 major Member States) | | 2006 (CUEs licensed for 25 Member States) | | 2007 (CUEs licensed for 27 Member States) | |
|---|---|---|---|---|---|---|
| | Metric tonnes | Percent | Metric tonnes | Percent | Metric tonnes | Percent |
| Tomato | [4,270] | 29% | 532 | 32% | 80 | 15% |
| Strawberry (fruit + runners) | 3,055 | 21% | 618 | 37% | 302 | 58% |
| Flowers, bulbs, ornamentals | 1,049 | 75% | 140 | 9% | 65 | 12% |
| Cucumber | 847 | 6% | 0 | 0 | 0 | 0 |
| Melon | 775 | 5% | 38 | 2% | 0 | 0 |
| Vegetables, salad – unspecified | 731 | 5% | - | - | 0 | 0 |
| Fruit – unspecified | >715 | 5% | - | - | 0 | 0 |
| Pepper, eggplant | 697 | 5% | 163 | 10% | 50 | 10% |
| Nurseries | 487 | 3% | 6 | <1% | 2 | <1% |
| Potting soil | 298 | 2% | 0 | 0 | 0 | 0 |
| Tobacco seedbeds | 125 | 1% | 0 | 0 | 0 | 0 |
| Potato, lettuce, citrus, mushrooms | 165 | 1% | 0 | 0 | 0 | 0 |
| Post-harvest uses | […] | .. | 145 | 9% | 23 | 4% |
| Miscellaneous | 170 | 1% | 0 | 0 | 0 | 0 |
| **Total** | **[14,385]** | **100%** | **1,655** | **100%** | **522** | **100%** |

Source: European Commission, *Management Strategy for the phase-out of the critical uses of methyl bromide,* May 2007

**Table 2.2. Major methyl bromide uses and consumption in the EC (metric tonnes), 1993 compared to 2006 and 2007**

In terms of the economic impact of these alternatives, research has shown that many alternative applications have net benefits.[22] Moreover, this switch has contributed – along with the reductions in recent years – to a *positive impact on innovation and research*, albeit on a small scale.[23] The phase-out of methyl bromide has also *reduced health and safety risks*, as this substance is a toxic chemical under EC legislation. Even where it is replaced by other pesticides, many of the alternative chemicals have a lower risk rating.

Finally, techniques developed and used to replace methyl bromide may have applications outside the EU, in other Parties that are slower to phase-out methyl bromide: thus, the EC phase-out creates potential export markets for EU know-how.

***Decisions on methyl bromide under other EC legislation***

Methyl bromide is regulated as an ODS under Regulation (EC) No. 2037/2000. Here, the European Commission and the Member States have tentatively agreed to end all Member State allocations this critical use and that the last request for use under the Montreal Protocol may be made for treatments in 2009. Moreover, the amount of methyl bromide licensed in the EC for this critical use is expected to

[22] Maczey *et al,* Pre-harvest Study Report to Promote the Phase-out of Critical Uses of Methyl Bromide in the European Community: Final Report, CAB International, December 2006; and Vos and Bridge, Cases of MB Alternatives Used in Commercial Practice: Summary Sheets, CAB International, November 2006

[23] The EC management strategy for the phase-out of methyl bromide stresses that "soil sector phase-out programmes implemented in Member States … led to major technical innovations and agricultural improvements, which increased grower skills and knowledge of pest and disease control, and ultimately increased crop production".

continue falling from 2007 levels in both 2008 (to about 200 tonnes) and 2009, when applications are likely to fall to zero.

Two other pieces of EC Regulation are particularly important in governing its use. The Plant Protection Product Directive (BPD) determines rules for the use of methyl bromide in soil fumigation and for other plant protection purposes. The Biocidal Products Directive (BPD) governs biocidal (*i.e.* non-agricultural) uses.

Methyl bromide was not supported for registration under the BPD in 2006. This means that it can no longer be employed for biocidal uses.

A review of methyl bromide under the PPPD is expected to propose the de-registration of methyl bromide. Such a decision would end all agricultural uses of the substance – and thus all remaining critical uses. The discussions on the proposal will take place in March 2008, and thus the final decision can not be assumed final. If the final decision is taken, it will imply that by 2010 methyl bromide will already be phased out.

These separate developments suggest there is a strong likelihood that there will be no critical uses of methyl bromide in the EC from 2010 on.

***The options for revising the Regulation***

Two mutually exclusive legislative options for the revision of the Regulation are assessed:

- No EU action
- End critical use of MB; and include an emergency use clause in the Regulation for the use of methyl bromide based on the MP Decision IX/7 and exclude methyl bromide from the emergency authorisations under the PPPD and BPD to methyl bromide.

***Option: No EU action***

In assessing the two options, a key uncertainty needs to be considered: whether or not these critical uses will end independently, due to the tentative agreement between the Commission and Member States mentioned above plus or due the possible de-registration of methyl bromide under the PPPD. The assessment addresses this uncertainty through two scenarios.

| | Assumptions | Yearly EC use of MB (metric tonnes) |
|---|---|---|
| Expected scenario | MS and COM agree to end critical use requests to the Meeting of the Parties: 2009 last year of MB application | 0 |
| Worst-case scenario | Phase-out of MB in MS is slower than expected, and de-registration under PPPD includes long transition times: restricted MB applications continue to 2012 | 100 |

**Table 2.3. Alternative scenarios for methyl bromide under the PPPD**

In the expected scenario, critical uses end in 2009. In the alternative, "worst-case scenario", a delayed phase-out means that a total of 100 tonnes of methyl bromide for critical uses is used each year from from 2010 to 2012 (see table 2.3).

Under the worst-case scenario, it is assumed that a low level of methyl bromide uses remains: 100 metric tonnes per year from 2010 to 2012, with final phase-out from 2012. This represents a "worst-case" or "slow phase-out" scenario: while methyl bromide use continues to decline, the proposed schedule for ending all critical uses by 2010 is not met. It is assumed that with the fall in methyl bromide use, the administrative costs can also fall – though some items, in particular preparation of the yearly Commission Decision, remain fixed. Under this scenario, administrative costs are significantly lower – but nonetheless continue.

*Administrative costs (current)*

The current administrative procedure for granting this critical use exemption is lengthy. It involves two consecutive year-long cycles, the first for the request to the Meeting of the Parties for an EC-wide quota, the second within the EC, to allocate Member State quotas. In both cycles, the European Commission uses an outside consultant for expert review of Member State requests for critical methyl bromide uses. Member States manage their national requests, and as noted, discussions in the Management Committee have been lengthy.

The table below presents an estimate of these administrative costs.

| | Est. admin. costs, 2007 (work-months) | Est. admin. costs, 2007 (€) |
|---|---|---|
| Industry/users | 16.1 | 72 100 |
| Member States | 22.8 | 89 300 |
| European Commission | 9.3 | 74 300 |

**Table 2.4. Estimated annual administrative costs of the critical use exemption for methyl bromide, 2007**

*Administrative costs (2010 on)*

In the expected scenario, administrative costs will be zero from 2010 on, as critical uses will end. In the worst-case scenario, industry, Member States and the Commission will continue to face administrative costs for uses until 2012: the European Commission and the Member States would manage the allocation of the last quotas for methyl bromide use. Moreover, importers would continue to need import licenses for these uses. The total estimated administrative costs are as follows:

| | Est. admin. costs, 2007 (work-months) | Est. admin. costs, 2007 (€) |
|---|---|---|
| Industry/users | 2.1 | 9 800 |
| Member States | 7.8 | 30 600 |
| European Commission | 4.0 | 32 300 |

**Table 2.5. Estimated annual administrative costs for critical uses of methyl bromide, worst-case scenario, 2010-2012**

***Option: End critical use of methyl bromide and include an emergency use clause***

The net impact of this option depends on the scenario. Under the expected scenario, critical uses of methyl bromide will end in 2009. Thus, the change to the Regulation will have no net impact, though it will create legal clarity by establishing an emergency use clause.

*Worst-case scenario: direct costs on agriculture*

Under the worst-case scenario, the normal phase-out of this critical use would not occur until 2012. Thus, a change to the Regulation will bring forward the last critical use of methyl bromide from 2012 to 2010, *i.e.*, by two years. The administrative costs related to these critical uses would be cut.

Under this scenario, the agricultural sector would face some remaining direct costs due to an end to methyl bromide applications in 2010 rather than 2012. A few sectors are affected: importers, fumigators and agricultural producers.

The change would reduce imports of methyl bromide (which is not produced within the EC). At the same time, the change would increase consumption of alternative chemicals, some of which may be produced with the EC (thus yielding a higher value-added within Europe). For this reason, the loss to methyl bromide importers is considered to be more than balanced by the gain to other sectors.

For the fumigators, the EC Management Strategy notes that:

> Some [pest control operators], including fumigators, offer alternative fumigants or alternative methods (steam/heat systems), supply of equipment, products and materials related to the use of alternatives, skilled pest identification and monitoring services, user training and consultancy services. Some former MB [operators] report that sales of pest monitoring and advisory services are as profitable as selling methyl bromide fumigations alone.[24]

This analysis implies that, while single fumigators may face transitional costs, the sector as a whole will not lose business. Thus, the net costs are expected to be zero.

For growers as well, the shift away from methyl bromide can have both costs and benefits. While the specific costs and benefits vary by crop and by country, the EC Management Strategy notes that many key alternatives may have transitional costs but yield net benefits. The Strategy refers to the case of the Netherlands, which phased out methyl bromide in the 1980s: the shift to alternative methods, in particular for methyl bromide applications on flowers, required capital investments in areas such as the introduction of substrates. These investments led to a growth in overall net benefits.

Recent studies of methyl bromide alternatives in the EU point to the same conclusions.[25] For example, for tomato cultivation, a methyl bromide use that remains only in Italy, the alternatives identified are expected to result in net benefits for growers. These alternatives can include the use of alternative chemicals. Some of these alternatives (notably 1,3-D[26] and chloropicrin) may themselves be de-registered under the PPPD. Others (such as metam sodium) may require new equipment. Non-chemical alternatives include the use of grafted plants (widespread in other countries) and substrates (with high initial costs but greater yields). Many if not all of these alternatives are expected to result in

[24] European Commission, *Management Strategy for the phase-out of the critical uses of methyl bromide,* submitted to UNEP, 2007.

[25] See Maczey *et al,* Pre-harvest Study Report to Promote the Phase-out of Critical Uses of Methyl Bromide in the European Community: Final Report, CAB International, December 2006; and Vos and Bridge, Cases of MB Alternatives Used in Commercial Practice: Summary Sheets, CAB International, November 2006.

[26] 1,3-D has already been deregistered under the PPPD, but with a long transitional period in view of a deregistration of methyl bromide.

net benefits in this sector.[27] This conclusion is supported by the fact that methyl bromide use for tomato cultivation has fallen significantly in the EC and that in 2007 only Italy uses methyl bromide and only on a tiny share of its total tomato growing area.

While the same overall conclusions are expected in other sectors, the replacement of methyl bromide has moved more slowly in sectors such as the production of strawberry runners and fruit. In 2007, three Member States still make this use. The "worst case" scenario assumes at least one of these Member States continue to request methyl bromide from 2010 to 2012. To make a worst-case estimate of the costs of this option, it is assumed that methyl bromide is replaced with dazomet, an agricultural chemical whose use has been shown in one Member State to have lower net benefits, considering both the change in costs of the chemical inputs and the change in growing yields. As a worst-case scenario, the current difference in net economic costs estimated in this Member State is used as a proxy for calculating the costs across the EU. On this basis, as a conservative estimate, the total area of application in 2010 under a business as usual scenario might be half of current area. The table below represents a calculation using data provided in Maczey et al:

| | |
|---|---|
| Net loss per hectare seen in Poland | 1350 € * |
| Poland area (2007)/total EC area (2007) | 8% |
| Poland area (2007)/est. total EC area (2010) | 25% |
| Approximate total loss | 337 000 € |

* Estimated equivalent to a 10% loss in total revenues.

**Table 2.6. Worst-case estimate: direct annual cost of ending MB applications for strawberry runners in EC (replacement with dazomet)**

Thus, for this "worst-case" scenario, where it is assumed that the planned phase-out of critical uses of methyl bromide in 2009 is delayed, ending the critical use of methyl bromide in 2010 would result in a total net loss for the strawberry sector of €337 000. Again, this represents a *worst-case* estimate. It should be noted that the use of methyl bromide for strawberries has fallen drastically in the past years. Moreover, even in this sector, an alternative is available that creates net long-term benefits: the use of substrates (this alternative does require high initial costs).

These impacts would affect growers in a few Member States: In 2007 the Commission Decision[28] authorised critical uses of methyl bromide for strawberry fruit and runner production in five Member States for: France, Italy, Netherlands (post-harvest disinfection only), Poland and Spain.

*Other impacts*

Due to the health and environmental effects of methyl bromide, ending the critical use exemption may have *a small positive impact on health and safety and on the local environment* at the point of application. The extent of improvement will depend on the alternatives adopted: in some cases, non-chemical techniques can be used; in others, alternatives substances, which will also have local health and environmental consequences.

The most important impact of ending this critical use will be at global scale, and in particular in terms of the EC's leadership in Montreal negotiations. This action will show that other non-Article 5 Parties should be able to end their critical uses, and it will encourage Article 5 Parties not to seek critical use exemptions once their regular methyl bromide consumption is phased out under the Protocol in 2015.

[27] Maczey *et al*, cited above

[28] Commission Decision 2007/386/EC determining the quantities of methyl bromide permitted to be used for critical uses in the Community from 1 January to 31 December 2007 under Regulation (EC) No 2037/2000

***Comparison of options***

The table below compares the two options: no EU action; and an end to the critical use of methyl bromide. It does so for two scenarios. In the "expected" scenario, these critical uses of methyl bromide will be phased out in 2009, through agreement between the Commission and Member States. This means that removing this provision from the revised Regulation will have no effect.

| | **No EU action** | | **Proposed option: end to critical uses of methyl bromide** | |
|---|---|---|---|---|
| | Expected | Worst-case* | Expected | Worst-case* |
| **Economic and Social impacts** | | | | |
| Total direct costs on industry (NPV at 2010, € mio) | 0 | 0 | 0 | 0.94 |
| Total admin. costs on industry (NPV at 2010, € mio) | 0 | 0.03 | 0 | 0 |
| Total admin. costs on MS (NPV at 2010, € mio) | 0 | 0.08 | 0 | 0 |
| Total admin. costs on COM (NPV at 2010, € mio) | 0 | 0.09 | 0 | 0 |
| **Other impacts (e.g. social)** | | | | Reduced health risks |
| **Emissions in ODP tonnes, 2010-2012** | 0 | 60 | 0 | 0 |
| **Emissions in GHG-equivalent tonnes, 2010-2012** | 0 | 500 | 0 | 0 |

**Table 2.7. Comparison of the options for the critical use of methyl bromide**

In the "worst-case" scenario, the expected phase-out is delayed until 2012. This imposes administrative costs on industry, Member States and the European Commission for the three years from 2010 to 2012, under the "no EU action". In this scenario, the delay in normal phase-out would assumed to be related to unexpected costs in one sector (strawberry runners). In this "worst-case" scenario, ending the critical use exemption in the Regulation from 2010 would impose costs on that sector, in terms of lower yields, until investments can be made in alternative methods that provide higher yields. Overall, the impact is quite minor compared the total value-added of EU agriculture, which stood at just under €150 billion in 2006.

The impact in terms of reduction in ODP emissions will be modest, due to the considerable progress the EC has already made in phasing out the critical use of methyl bromide.

The option will reduce health and safety impacts, as methyl bromide is a toxic chemical under EC legislation: most chemical alternatives are of a lower hazard class, and non-chemical alternatives will have pose lower risks.

The most important benefit of the end to critical uses will be in terms of the EC's negotiating position in the Montreal Protocol. This may allow the EC to challenge high levels of critical uses in other Parties and to encourage Article 5 Parties – where methyl bromide will be phased out of regular use in 2015 – to introduce alternatives rather than request critical use exemptions.

## 2.4 Critical use of halons

Halons have been used mainly in fire fighting. While the use of halons has been phased out in the EC, Annex VII of the Regulation (EC) No. 2037/2000 lists a series of critical uses for which halons are still permitted. Most of these critical uses are for fire fighting in specific military, civil aviation and other sectors (including ensuring that spaces containing flammable gas or liquids remain inert).

A December 2006 study for the European Commission reviewed the availability of alternatives and the possibility for phase-out of these uses.[29] The study recommends phase-out dates for critical uses that are specified in Annex VII to the Regulation. The proposed dates are found in the table below.

The Commission is undertaking a separate review of Annex VII, including discussion of the proposed phase-out dates for these critical uses. The review should be completed by the end of 2007. For this reason, options for modifying the provisions of the Regulation in this field are not assessed at this point. Nonetheless, this revision is likely to:

- Provide clarity to the regulatory framework, and thus enable certainty in long term planning and investment decisions for users, and
- Encourage the development and take up of alternatives, with a possible positive impact on innovation and research, and related investment.

**Table 2.8.**
**Recommended Phase-out dates for Critical Military and Civil Halon Applications**

| CURRENT EXEMPTED HALON USE | | PERMITTED HALON TYPES[a] | RECOMMENDED DATES FOR THE TERMINATION OF EXEMPTIONS (All Dates are 1 January) | |
|---|---|---|---|---|
| | | | New Uses[b] | Existing Uses[c] |
| **Military Ground Vehicles** | For the protection of engine compartments | 1301<br>1211<br>2402 | **2009** | **2015** |
| | For the protection of crew compartments | 1301<br>2402 | **2010** | **2020** |
| | In portable extinguishers | 1211<br>1301 | **2009** | **2015** |
| **Military Surface Ships** | For the protection of machinery spaces | 1301<br>1211<br>2402 | **2009** | **2020** |
| | For the protection of engine spaces | 1211<br>1301 | **2009** | **2020** |
| | For the protection of crew compartments | 1211<br>1301 | **2009** | **2020** |
| | For the protection of electrical compartments | 1211<br>1301 | **2009** | **2015** |
| | For the protection of command centres | 1211<br>1301 | **2009** | **2020** |
| | For the protection of fuel pump rooms | 1301 | **2009** | **2020** |
| | For the protection of flammable stores | 1211<br>1301<br>2402 | **2009** | **2030** |
| | In portable extinguishers | 1211 | **2009** | **2015** |
| **Military Submarines** | For the protection of command centres, diesel generator spaces, electrical compartments, and machinery spaces | 1301 | **2009** | **2030** |

[29] ICF International, *Review of Halon Critical Uses Specified in Annex VII of Regulation (EC) No 2037/2000 on Substances that Deplete the Ozone Layer* (Final Report), June 2007

| CURRENT EXEMPTED HALON USE | | PERMITTED HALON TYPES[a] | RECOMMENDED DATES FOR THE TERMINATION OF EXEMPTIONS (All Dates are 1 January) | |
|---|---|---|---|---|
| | | | New Uses[b] | Existing Uses[c] |
| **Aircraft** | For the protection of cargo bays | 1301<br>1211 | **2015** | **2030** |
| | For the protection of crew compartments | 1301 | **2010** | **2030** |
| | For the protection of dry bays | 1211<br>1301<br>2402 | **2010** | **2030** |
| | For the protection of engine nacelles and auxiliary power units | 1211<br>1301<br>2402 | **2010** | **2030** |
| | For the making inert of fuel tanks[d] | 1301 | **2010** | **2030** |
| | For the protection of lavatory waste receptacles | 1211<br>1301 | **2010** | **2015** |
| | In portable extinguishers for use onboard aircraft | 1211<br>1301 | **2010** | **2015** |
| **Commercial Shipping and Oil / Petrochemicals Sector** | For the making inert of occupied spaces where flammable liquid and/or gas release could occur in cargo ships[e] | 1301<br>2402 | **2009** | **2020** |
| | For the protection of occupied spaces where flammable liquid and/or gas release could occur in the oil, gas and petrochemicals sector | 1301<br>2402 | **2009** | **2010** |
| | For the making inert of occupied spaces where flammable liquid and/or gas release could occur in the oil, gas and petrochemicals sector[d] | 1301<br>2402 | **2009** | **2020** |
| **Land-Based Communication and Command Centres** | For the protection of existing manned communication and command centres of the Armed Forces or others, essential for national security | 1211<br>1301<br>2402 | **2009** | **2015** |
| **Flight Lines / Hangars** | In fixed extinguisher equipment for the protection of flight lines and hangars | 1211<br>1301 | **2009** | **2020** |
| | In portable extinguishers for the protection of flight lines and hangars | 1211<br>1301 | **2009** | **2015** |
| **Other Applications** | In portable extinguishers essential to personal safety used for initial extinguishing by fire brigades and for by police and military personnel | 1211 | **2009** | **2010** |
| | For the protection of spaces where there may be a risk of dispersion of radioactive matter | 1301 | **2009** | **2015** |
| | For the protection of Channel Tunnel and associated installations and rolling stock | 1301 | **2009** | **2015** |

[a] Halon-1301 and Halon-1211 for EU-25, Halon-2402 for EU-10 only.

[b] **"**New use" is defined as "A use in a new design, or a redesign, of halon-containing equipment or a facility, where the procurement or redevelopment contract is let after the specified new use termination date." For example, a portable extinguisher that has been removed from older equipment, re-certified, refilled and installed in new equipment would be considered a new use.

[c] "Existing use" is defined as "A use in an existing design of halon-containing equipment or a facility, where the procurement contract is let before the specified new use termination date."

[d] **"**Make inert**"** is defined as "The pre-emptive release of halon into an enclosed, occupied space in response to the detection of a hydrocarbon gas release prior to an explosive gas cloud being formed, and at a concentration that will render the atmosphere within the enclosure incapable of supporting combustion."

[e] **"**Cargo ship**"** is defined as "A ship that is not a passenger ship, is over 500 tons gross weight, and embarks on an international voyage, per the SOLAS definition of these terms. SOLAS defines a "passenger ship" as "a ship that carries more than twelve passengers" and an "international voyage" as "a voyage from a country to which the present Convention applies to a port outside such country, or conversely."

Source: ICF International, *Review of Halon Critical Uses Specified in Annex VII of Regulation (EC) No 2037/2000 on Substances that Deplete the Ozone Layer* (Final Report), June 2007

The costs will depend on the availability of alternatives for each sector and type of use. Both the 2006 EC study as well as the 2006 TEAP report that noted many sectors, including the military, have made strong progress in developing and introducing alternatives to halons. Both reports note, however, that the civilian aircraft industry has not made strong progress: TEAP, for example, calls on the sector to show greater "leadership" on this issue.[30] For this sector in particular, further discussions with key stakeholders may be needed at EC level.

As this relates to the tail end of the phase-out of halons, the remaining environmental benefits are expected to be small. In 2007, critical uses of halons in the EC are estimated to consume about 30 metric tonnes of halons. A phase-out may, however, strengthen the EC's negotiating position in the Montreal Protocol. Moreover, the need to develop alternatives should stimulate EC innovation and research and may provide future competitive advantage as halon use is phased out globally.

## 2.5 Essential laboratory and analytical uses

A range of ODS are employed for laboratory and analytical purposes. The Parties to the Montreal Protocol have established a non-exhaustive list of these uses, and have also identified laboratory and analytical uses that do not benefit from the exemption (*i.e.* for which alternatives exist).[31]

Annually, importers and producers submit quantitative requests for laboratory and analytical uses for the following year. Inside the EC, a yearly Commission Decision allocates total permissible production and import quantities for each group of substances (the groups are defined in Annex I to Regulation (EC) No. 2037/2000), based on the sum of the importer and producer requests.

This Decision also covers the other essential use exemption currently granted, for metered dose inhalers (see section 2.1).

***Current levels of ODS for laboratory and analytical uses***

For 2007, a Commission Decision[32] approved the importation and placing on the market of approximately 215 ODP tonnes of substances across 7 of the groups listed in Annex I to the Regulation. During the year, individual producers and importers request licenses for the imports or production levels under these laboratory and analytical allocations.

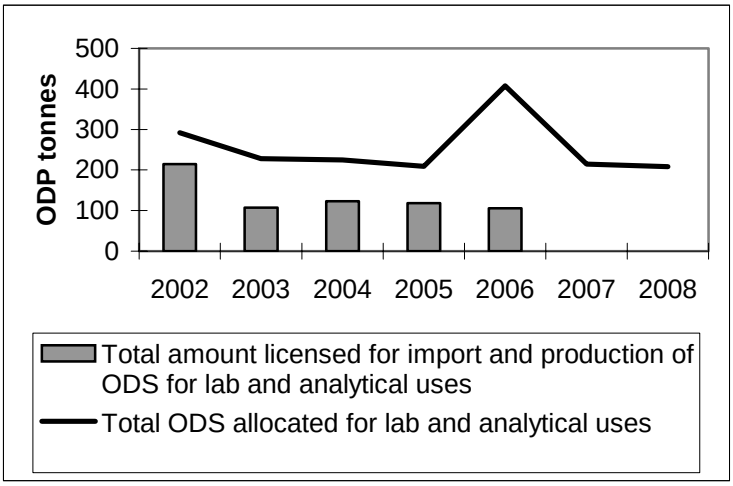
The total of the actual license requests has in recent years consistently been below the total essential use allocations requested by the same importers and producers: in 2006, this total was only 106 ODP tonnes (equivalent to a global warming impact of approximately 380 000 tonnes of $CO_2$ equivalent).[33] The license requests indicate the level of actual use (actual use may in fact be less, as importers and producers may not use the complete license levels). Using this measure, the level of actual use has been steady from 2003 to 2006, as shown in figure 2.1 below, despite variations in the quota level.

[30] UNEP, 2006 Assessment Report of the Technology And Economic Assessment Panel, p. 54

[31] Annex IV of the report of the Seventh Meeting of the Parties, subsequently modified by Decision VII/11 and Decision XI/15 as well as decisions taken at the 19th Meeting of the Parties in 2007.

[32] Commission Decision 2007/211/EC: Commission decision of 27 March 2007 on the allocation of quantities of controlled substances allowed for essential uses in the Community in 2007 under Regulation (EC) No 2037/2000 of the European Parliament and of the Council (OJ L 94/39 of 4.4.2007)

[33] Calculated based on average $CO_2$ equivalents for each category of substance.




Source: European Commission

**Figure 2.1. Allocations and licensed amounts of ODS for essential laboratory and analytical uses, 2002-2008 (ODP tonnes)**

***Options***

This section assesses four mutually exclusive options for the revision of the Regulation:

- No EU action
- Cap and a multi-year exemption process:
  - a cap on total ODS consumption (expressed in ODP tonnes) for laboratory and analytical uses, at a level close to that of actual use
  - a mechanism to further reduce the cap on the basis of alternatives
  - a process to grant multi-year exemptions (e.g. longer than two years in length) rather than yearly exemptions
  - a clause calling on laboratory and analytical users to take all practicable measures to contain ODS emissions, reuse and recycle their ODS and adopt alternatives
- Cap on laboratory and analytical uses without a multi-year exemption process
- Multi-year exemption process without a cap

A separate, non-legislative initiative is also assessed: the European Commission on its website informs laboratories of the alternatives to ODS and where possible, Member States provide such information in national languages on their web sites.

***No EU action***

Under this option, the current level of laboratory and analytical use is expected to continue throughout 2010 and into the period beyond. Thus, it is estimated that the amount of ODS requested for essential laboratory and analytical uses will not change from current levels (the value of 120 ODP tonnes, slightly above the actual 2006 level is used). It is also considered that the number of importers and producers do not change.

Overall, the administrative costs will remain the same as in 2007. These costs include the following steps:

- Allocation requests by importers and producers of ODS for this essential use

- License requests by importers and producers
- Commission review and preparation of a Commission Decision
- Member State discussion and co-decision
- Issuance of licences by the Commission

The estimated administrative cost is presented in the table below:

| | Estimated annual administrative costs | |
|---|---|---|
| | (work-months) | (€) |
| Industry/users | 3.15 | 14 100 |
| Member States | 1.69 | 6 600 |
| European Commission | 1.76 | 14 100 |

**Table 2.9. Estimated annual administrative cost of the laboratory and analytical use exemption, 2010+ (no EU Action option)**

***Proposed option: Cap and a multi-year exemption process***

The multi-year exemption will reduce the administrative costs. This depends on the number of years of the exemption: these will have to be tied to the Decisions of the Parties on laboratory and analytical uses. In many cases, these Decisions are taken every four year; however, it may be less in the initial years. The table below provides an estimate of the annual administrative costs for the multi-year exemption, based on an average two-year process. Note that importers and producers will still have to request licenses on a yearly basis.

| | Estimated annual administrative costs | |
|---|---|---|
| | (work-months) | (€) |
| Industry/users | 2.55 | 11 400 |
| Member States | 1.01 | 4 000 |
| European Commission | 1.02 | 8 700 |

**Table 2.10. Estimated annual administrative cost of the laboratory and analytical use exemption, 2010+ (proposed option)**

In addition, the multi-year exemption will improve regulatory certainty for importers and producers. This seems likely to have a beneficial economic effect, this however, is not possible to quantify.

It is assumed that the initial cap will be set close to current levels licensed for import and production – *i.e*. close to 120 ODP tonnes, and thus not influence consumption levels.

In the future, negotiations on the cap level could steadily reduce analytical and laboratory uses of ODS. This is expected to be a slow but steady process, as alternatives are slowly brought into use, and also without major efforts to develop alternative techniques. The cap negotiations are expected to result in only minor reductions in ODP tonnes – approximately 10% with each negotiation. Thus, the level in 2019 (approximately 88 ODP) is assumed to be under 75% that of the initial level in 2010.

It seems reasonable to assume that *this cap would impose no significant direct cost on EU businesses* that make use of these exemptions. Nor would these gradual changes have any negative influence on *research and development* in the EU.

This option would also insert a clause requiring all laboratories to register on the Commission's on-line web page. Actual registration should only take five minutes. However, the web page is in English only. Approximately 4500 laboratories have done so. If this represents only half of the total end users of ODS, completing registration will represent a one-time cost of approximately 2.5 work-months. Note, however, that this is currently a requirement – however, one that is not clearly stated and not strictly observed. For this reason, this cost is not included in the total administrative costs of the revision.

***Alternative option: Cap on laboratory and analytical uses***

This option would have the same administrative costs as the "no EU action" option.

***Alternative option: Multi-year exemption process***

This option would see the cost savings of the multi-year exemption. It would assume, however, no change in the cap – and thus no decrease in ODS consumption would be seen.

It should be noted that in the survey for this review, some Member States raised the concern that a multi-year exemption process would lead to less oversight of laboratory and analytical uses and thus less incentives to adopt alternatives. Moreover, some respondents mentioned an ongoing risk of the deviation of ODS to other, non-laboratory purposes.

***Comparison of options***

The proposed option – a cap plus a multi-year exemption process – would lower administrative costs and also lead to a slow reduction in ODS for the laboratory and analytical use exemption, in comparison with the "No EU action" option (the Table below compares the options based on *average annual* impacts for the 10-year period starting 2010). Of the two other options for action, the cap alone would reduce ODS levels but would increase administrative costs; the multi-year exemption process alone would reduce administrative costs but leave ODS levels unchanged. Moreover, some Member States saw this last option as posing a risk that ODS would more easily be diverted illegally to other uses.

| | **No EU action** | **Proposed: cap plus multi-year exemption process** | Alternative options: | |
|---|---|---|---|---|
| | | | Cap on lab. and anal. uses | Multi-year exemption process |
| **Economic and Social impacts (2010-2019** | | | | |
| Total direct costs on industry (NPV at 2010, € mio) | 0 | 0 | 0. | 0 |
| Total admin. costs on industry (NPV at 2010, € mio) | 0.11 | 0.93 | 0.11 | 0.93 |
| Total admin. costs on MS (NPV at 2010, € mio) | 0.05 | 0.03 | 0.05 | 0.03 |
| Total admin. costs on COM (NPV at 2010, € mio) | 0.11 | 0.07 | 0.11 | 0.07 |
| **Other impacts (e.g. social)** | | | | Concern that ODS may be diverted illegally to other uses |
| **Emissions: ODP tonnes** | 1200 | 1060 | 1060 | 1200 |
| **Emissions: GHG-equivalent tonnes, 2010-2012** | 4 300 000 | 3 810 000 | 3 810 000 | 4 300 000 |

**Table 2.11. Average annual impacts of the options for essential laboratory and analytical uses (2010-2019)**

The impacts in terms on climate change are calculated based on the share of different ODS currently licensed for import and production under the laboratory and analytical use exemption.

Given the nature of the exemptions being considered under these options, the only *sectors affected* would be producers and importers of ODS, distributors of laboratory chemicals and laboratories and research institutions in the public and private sector. No regionally specific impact is expected.

***Non-legislative initiatives***

The non-legislative initiative proposed is a web-based source of information to be hosted and maintained by the Commission and, where possible, by Member States also providing such information on their web sites. This initiative could be taken independently – and before – a revision of the Regulation takes effect. Tied to this, the Commission should set up a dedicated web page for laboratory and analytical uses – this would allow laboratories to find information and the registration site more easily.

As a rough estimate, these web changes would cost about the Commission about one to two work-months to manage the process, make the web page updates and coordinate with Member States. Each Member State would each spend about the equivalent of one work-month for translation of the information and web updates. These updates would occur only *once.*

This provision of information could have a *minor positive impact on innovation and research.* Easy access to information on the availability and use of alternatives to ODS laboratory and research uses may streamline the uptake of alternatives and have a positive effect in terms of the reduction of these uses and related emissions.

# 3. Quarantine and pre-shipment (QPS)

## 3.1 The problem

Though Regulation (EC) No. 2037/2000 has phased out the placing on the market and use of methyl bromide in the EC, it allows quarantine and pre-shipment applications of this ODS. Quarantine and pre-shipment (QPS) applications are mainly for phytosanitary purposes, to prevent the international spread of plant diseases and pests through exports of plants and plant products. Such phytosanitary treatments are governed by the International Plant Protection Convention (IPPC).[34]

In 2004, the then 25 Member States used approximately 400 ODP tonnes of methyl bromide for QPS,[35] equivalent to about 670 metric tonnes of the substance.

Decisions of the Parties to the Montreal Protocol as well as a Recommendation under the IPPC call for reducing QPS uses of methyl bromide.[36] Alternatives exist for many types of QPS treatments: in a 2004 survey, Parties to the Montreal Protocol in 2004 reported widespread availability of alternatives. However, the same study noted that "cost, location of facilities, and lack of acceptance by trading partners are impediments to their implementation". [37]

The current use of methyl bromide for QPS in the EC raises several concerns:

- While QPS treatments should respond to phytosanitary needs in importing countries, some treatments of EC exports may be carried out even when there is not a requirement to do so on the part of the importer.
- The conditions for pre-shipment uses are quite specific; some treatments reported by Member States for pre-shipment reasons may not meet these requirements.
- Both a Decision of the Parties and the current ODS Regulation call for minimising emissions of methyl bromide during QPS treatments. However, few Member States have established requirements to do so.[38]

Thus, the EC could go further in meeting international objectives to reduce methyl bromide use and emissions.

In their responses to the questionnaire for this study a number of Member States also requested greater clarity regarding QPS. As an example, Annex III of the Regulation sets a cap on total EC use of

[34] The definition of "quarantine" in the Decisions of the Parties is slightly broader than the corresponding definition of "quarantine pest" under the IPPC (ISPM 5). Moreover, quarantine and pre-shipment under the Montreal Protocol includes several non-plant-related applications that do not fall under the IPPC. (In general, such non-plant-related applications, such as the shipment of used car tyres, should be banned in the EC as MB has not been supported under the BPD). The Agreement on the Application of Sanitary and Phytosanitary Measures under the World Trade Organization also refers to the IPPC and standards developed under it. For a review of QPS definitions, agreements and applications, see: Ozone Convention Secretariat, *Quarantine and pre-shipment: Report by the Secretariat*, Open-ended Working Group of the Parties to the Montreal Protocol (Nairobi, 4-7 June 2007).

[35] European Commission, based on Member State reporting.

[36] See Decisions VI/11, VII/5 and XVI/11 of the Parties to the Montreal Protocol and Interim Commission on Phytosanitary Measures (ICPM), *Recommendation on the Future of Methyl Bromide for Phytosanitary Purposes* (ICPM-5, Appendix VIII), 2003

[37] Ogden, S.C., 2004, *Preliminary results of an international survey on the use of Methyl Bromide for quarantine and pre-shipment*, Market Access Solutionz Ltd, New Zealand (financed by the European Commission).

[38] Decision VI/11 calls for minimising emissions and use of methyl bromide "through containment and recovery and recycling methodology to the extent possible". Article 17(2) of the Regulation calls for "all precautionary measures practicable ... to prevent and minimise leakages of methyl bromide" in operations where it is used. In Belgium, national legislation requires the use of recapture systems, and these are employed in some other Member States.

methyl bromide for QPS; however, as described below[39], this is not the actual cap. Finally, a few Member States called for an end to the use of methyl bromide in QPS.

The use of methyl bromide for QPS is influenced by other EC legislation. Methyl bromide was not supported for registration under the Biocidal Products Directive, and thus from September 2006, its biocidal use in QPS is no longer allowed. The implications of this change are considered in this section. The registration of methyl bromide under the Plant Protection Products Directive is now under review. If methyl bromide were to be completely de-registered, its use for QPS would end.

## 3.2 Options for the revision of the Regulation: cap on QPS uses

***Assessment of the options***

This section considers three mutually exclusive options for the cap on QPS uses:

- No EU action
- Establishing clear requirements for quarantine applications, while adjusting the cap mechanism, and ending pre-shipment applications.
- End QPS uses of methyl bromide.

***Option: No EU action***

Under this option, QPS treatments will continue.

*Current level of methyl bromide use for QPS*

The amount of methyl bromide used for QPS in 2004 was approximately 400 metric tonnes, equivalent to approximately 667 metric tonnes. This level of use means that an estimated 130 000 containers exported from the EC were fumigated for QPS that year.[40]

The current cost of fumigation can vary significantly, depending on location, labour costs and other factors, including climate. Initial information suggests that costs for fumigation in large ports in northern Europe can range from €65 to €135 per container.[41] For the purposes of this analysis, an average of €105 per container is used. On this basis, fumigation for QPS is currently a business of approximately €23.5 million per year (in terms of the cost paid by EC exporters).

In addition to these direct costs for QPS treatments, there are administrative costs. The requirements under the Regulation call for Member States to report on levels of methyl bromide use for QPS as well as the alternatives employed. This reporting requirement also affects fumigators, who in turn have to report to Member State governments. As a rough estimate, it is assumed that approximately 60 fumigators in the EC each report on a monthly basis to their Member States. This is estimated to

[39] Annex III to Regulation 2037/2000 specifies a cap of 607 tonnes of methyl bromide for QPS use. However, the actual cap is lower: Article 4.2(iii) states that each producer or importer can not place on the market more than the average of their 1996, 1997 and 1998 levels. This total was just over 400 tonnes for the EU15, and with the accession of the EU12, it is about 500 tonnes per year.

[40] This estimate is based on an average amount of 3 kg of MB used per container, an estimate cited by MBTOC. Actual amounts used vary depending on several conditions, including importing country requirements.

[41] The low costs were from a market operator in Belgium, and the high costs from a study in the Netherlands: T. Vermeulen and A. Kool, *Phase-out of methyl bromide as ISPM 15-treatment: Analysis of options to reduce the use of methyl bromide and of possible alternatives*, CLM Research, March 2006.

require a total of 18 work-months of time per year. As methyl bromide is not produced in the EC, it must be imported, creating administrative costs.

*Levels of QPS from 2010 onwards*

While the 2004 level of methyl bromide use, cited above, provides a baseline for that year, it should be noted that an important regulatory change occurred in 2006: from September of that year, methyl bromide could no longer be used under the Biocidal Products Directive. This is because the substance had not been supported by a manufacturer or user for registration under that Directive.

While treatments carried out under the International Plant Protection Convention (IPPC) are for phytosanitary purposes – and thus are carried out in the EC under the requirements of the Plant Protection Products Directive – other treatments, including some pre-shipment treatments, may fall instead outside the scope of that Convention. Many such treatments would be regulated in the EC under the Biocidal Products Directive – and thus from September 2006 these could no longer use methyl bromide.

This implies that actual use of methyl bromide for QPS should fall in 2007. As data on the year are not yet available, this factor will have to be checked in early 2008.

As noted above, a decision to de-register methyl bromide under the Plant Protection Products Directive would end all QPS uses. The fate of methyl bromide under the PPPD should be known in early 2008. For the purposes of this assessment, the use of methyl bromide is assumed to continue.

Quantitative estimates of impacts are included in the discussion of the following option.

***Option: Establish clear requirements for quarantine applications, while adjusting the cap mechanism, and ending pre-shipment applications***

The proposed option would establish several requirements:

- Methyl bromide applications for quarantine should only be possible where required by the importing country to protect against an officially listed quarantine pest and where alternatives do not exist.
- Pre-shipment treatments would no longer be allowed.
- Methyl bromide should be recaptured and recovered from each treatment.
- The cap should be adjusted to the level of the effective cap.

Each of these requirements is assessed in turn.

*Applications only where required to protect against an officially listed quarantine pest*

One Member State, Netherlands, has put in place requirements to restrict QPS to those uses strictly necessary. QPS treatments declined from 2004 to 2006, apparently in response to the new rules:[42]

| | MB used for QPS (kg) |
|---|---|
| 2003 | 1687 |
| 2004 | 2678 |
| 2005 | 1648 |
| 2006 | 1025 |

**Table 3.1. Quantities of methyl bromide used for QPS treatments in the Netherlands**

[42] Johan Havinge, Ministry of Housing, Spatial Planning and the Environment, Netherlands, November 2007

While 2003 levels were higher, an almost 50% decrease was seen from the 2003-2005 average to 2006. Moreover, Netherlands authorities believe, on the basis of contacts with counterparts in neighbouring countries, that shipments have not been re-routed from Rotterdam to major nearby ports such as Antwerp or Hamburg.[43]

It should be noted that the end to biocidal uses of methyl bromide for QPS occurred in September 2006. Thus, while the Netherlands regulation had an impact, most likely the end to biocidal treatments is also reflected in this data. We use as a simple assumption that each factor is responsible for half of the 50% reduction in consumption of methyl bromide seen in the Netherlands. On this basis, a requirement to use methyl bromide for QPS only where strictly necessary could yield a 25% reduction in its use.

This requirement would actually save exporters the costs of unnecessary treatments. It is assumed that exporters make such treatments because they are not always aware of the requirements of the importing country. Indeed, to ensure adequate implementation of this restriction, the Commission should prepare a list of the countries and situations where methyl bromide treatments are strictly required.

One further element should be noted: one market operator remarked that some exporters do not always treat shipments where required by the importing country. In other words, to save the cost of treatment, "compliance" with import requirements for fumigation may not be complete, if an exporter believes that the importing country's enforcement is lax. On the other hand, if an importing country strengthens controls because of concerns about pest outbreaks, EC exporters may increase their treatments. This suggests that methyl bromide use may vary, even with the introduction of this requirement.

*End to pre-shipment applications*

In principle, numerous pre-shipment applications were biocidal applications, as they do not respond to international phytosanitary requirements. In the absence of further information on pre-shipment applications and quantities, it is assumed that this requirement will not change the required costs or uses of methyl bromide for exporters, but rather reflect the change already in place with the end to uses of the substance under the Biocidal Products Directive.

*Recapture and recovery*

The current wording of the Regulation calls on Member States to reduce emissions related to methyl bromide treatments for QPS. [44] One Member State, Belgium, specifically requires the recovery of methyl bromide from all QPS applications (from 1 July 2007). Thus, the results and the costs of an EC-wide requirement for recapture and recovery can be calculated based on the experience in Belgium.

In Belgium, the costs for methyl bromide treatment vary from winter (when the substance needs to be heated before application) to summer. Treatment methods with recapture are competitive with winter prices before the new requirement, though significantly higher than summer prices. If recapture is required across the EC, the cost difference should not be significant. As a high estimate, costs may be 25% above current treatment costs.

Under current international phytosanitary rules, at least 50% of the methyl bromide applied should remain in the container after fumigation. The other 50% could be recaptured and recovered for new

[43] Johan Havinga, Ministry of Housing, Spatial Planning and the Environment, Netherlands, November 2007
[44] Article 17(2) specifies that "All precautionary measures practicable shall be taken to prevent and minimise leakages of methyl bromide from fumigation installations …"

use. Current systems can recapture over 99% of this share – however, doing so requires several hours, and the resulting personnel costs are not competitive with simple degassing and release to the atmosphere. Belgium requires a recapture rate of 80%, which current equipment can achieve in under an hour. In other words, the effective recapture is 40% of the methyl bromide used (80% of the 50% that does not have to remain). The theoretical capture rate for equipment used in Belgium is much higher (over 99%), but this would require several hours for recapture per container rather than one hour total for treatment. The higher recapture rates would be difficult to implement considering the time.

| | Estimated cost per container (€) | Net use of methyl bromide (kg per container) |
|---|---|---|
| With recapture of methyl bromide | 135.75 | 1.8 |
| Without recapture of methyl bromide | 105.00 | 3.0 |

**Table 3.2. Cost of methyl bromide treatment: with and without recapture**

These data provide the basis for the overall comparison between the use of recapture and recovery equipment and business as usual. The table below compares the sum of the results of the different elements of this option. The final calculation (*i.e.* for the level in 2010 and onward, with recapture of methyl bromide) includes one further element: it assumes that compliance with the new requirement is not complete, and rather that an average 75% compliance rate with the use of recapture equipment occurs across the EC.

| | **2004 level** | **Business as usual, 2010+** | **Proposed option, 2010+** |
|---|---|---|---|
| | | 2010+ level: 25% reduction due to end to biocidal applications | 2010+ level with recapture of methyl bromide (assuming 75% compliance) and use only when strictly required |
| Yearly consumption of MB (metric tonnes) | 402 | 302 | 158 |
| Yearly consumption of MB (ODP tonnes) | 241 | 181 | 95 |
| Yearly costs of application (million €) | 14.1 | 10.6 | 6.7 |

**Table 3.3. Options for QPS: estimates of annual quantities and costs**

One further element may be important in terms of the distribution of these costs and benefits. At present, all quarantine activities are carried out in ports. However, new IMO rules apparently will allow quarantine treatments to be carried out at the point where a container is packed for shipment – which can occur throughout the EC.[45] This is not a technical problem: the recapture equipment introduced in Belgium is mobile (based on medium-sized trucks), and thus can be used anywhere. However, the change in rules implies that enforcement of recapture requirements will be more difficult than if these were only carried out in ports.

[45] International Maritime Dangerous Goods Code, and specifically the rules governing fumigated containers, UN 3359.

For this reason, the requirement should also specify that fumigators should report on each treatment to the Member State government. Belgium plans to introduce electronic reporting, which should reduce costs for both fumigators and national government.

Recapture would require fumigators in nearly all Member States to invest in new equipment. This cost forms part of the price increase for exporters. If fumigators are to invest in this equipment – which most likely will not be useable for other types of quarantine treatments – they will want to have a clear, long-term regulatory climate. In particular, uncertainty over methyl bromide's registration under the PPPD would discourage investment in recapture equipment.

As part of this option, Member States could request fumigators to report their applications electronically, matching a proposal that should be implemented in Belgium from January 2008. This could be implemented directly with the investment in new systems. It would greatly lower administrative costs for industry and for Member States.

*Cap to the effective level*

This change would set the cap in Annex III of the ODS Regulation to the lower, effective cap. However, current use is below the level of the effective cap. For this reason, a reduction in the cap is not expected to create direct costs for EC exporters or fumigators.

| | **Quantity (ODP tonnes)** |
|---|---|
| Cap according to Annex III | 607 |
| Effective cap, as per the provisions of Art. 4(2)(iii) | ~ 500 |
| Actual consumption of MB for QPS, 2004 | ~ 400 |

**Table 3.4. The cap(s) for methyl bromide use in QPS**

*Further considerations*

Establishing clear requirements for quarantine, ending pre-shipment and adjusting the cap mechanism to the actual cap would provide legal clarification for the Regulation. A provision for the cap to be further adjusted by comitology and ending pre-shipment would *reduce administrative costs* for the European Commission and Member States, in the event of future decisions to change the cap level or future accessions.

***Alternative Option: End QPS uses of methyl bromide***

Although the questionnaire did not ask about an end to QPS uses of methyl bromide, three Member States proposed this option: they affirmed that alternatives existed. Two other Member States noted that they had phased out the use of methyl bromide. If methyl bromide is de-registered under the PPPD, all QPS uses would end: in this case, the ODS Regulation should remove QPS.

The Methyl Bromide Technical Options Committee under TEAP has identified many alternative QPS treatments for various perishable and durable commodities. These alternatives range from alternative chemical treatments to carbon dioxide treatments and to heat treatments.

The most important use of methyl bromide is for the treatment of wood packaging. Here, the international standard under the IPPC, ISPM 15,[46] specifies only two main types of treatment for wood packaging: methyl bromide and heat treatment. For this reason, the cost of heat treatment of containers is used as the sole alternative.

According to one recent study of alternatives to methyl bromide for QPS, the costs of heat treatment range from approximately €75 to €150 per container.[47] These cost estimates are used for the comparison, assuming 2010 levels of methyl bromide. The business as usual and the heat treatment costs are calculated based on a 25% reduction in the number of containers to be fumigated compared to the 2004 level, to account for the end to biocidal treatments. The proposed option considers a further reduction due to the requirement of applying treatments only where strictly required (this is an option for the ODS Regulation; it does not apply to heat treatment, as this method does not use ODS).

| | No EU action | Proposed option: Methyl bromide for QPS | Alternative option: heat treatment for QPS |
|---|---|---|---|
| Estimated cost per container (€) | 105 | 131 | 75 -150 |
| Estimated total costs for EU27 (million €) | 10.6 | 6.7 | 7.5 – 15.1 |

**Table 3.5. Comparison of the annual costs for methyl bromide and heat treatment**

Thus, ending the use of methyl bromide for QPS would double the costs for EC exporters, compared to "no EU action". The costs would be more than three times those of the proposed option.

Several further issues need to be considered beyond this comparison. First, the most effective way of treating wood is not when it is in the container, but rather in manufacture, via kiln drying. No data were found, however, on the costs of the more stringent requirement to use only kiln-dried wood. This alternative would, on the one hand, mean that EC exporters could not reuse pallets and other packaging materials from imports. On the other hand, one fumigator using methyl bromide stated that only kiln-dried wood can be assured to provide control for pests: the heat treatment of filled containers may not do so, and in particular may encourage fungus growth. As a last consideration, it should be noted that shippers use wood not only for packaging but also to stabilise goods in containers. These small pieces of wood (dunnage) in principle need to be treated as well. As they are often small pieces of scrap, requiring kiln drying is not practical: thus, their treatment is easier to achieve via treatment of the whole container.

In terms of its *environmental results*, the ban would reduce methyl bromide use.

[46] *International Standards for Phytosanitary Measures No. 15, Guidelines for Regulating Wood Packaging Materials in International Trade* (2002; modified 2006). Available at www.ippc.int.

[47] Mr Koen Zuiderwijk, $ECO_2$ company, Netherlands: personal communication, December 2007. According to Zuiderwij, the lower cost would be valid for widespread treatment. A 2006 report provides higher costs: see T. Vermeulen and A. Kool, *Phase-out of methyl bromide as ISPM 15-treatment: Analysis of options to reduce the use of methyl bromide and of possible alternatives*, CLM Research, March 2006, p. 9. Zujderwijk states that his company has seen perfected heat treatment, and thus prices have fallen. The report also presents the costs for a third method with very low environmental impacts, the use of controlled atmosphere (using $CO_2$). These costs are higher: €300 - €350 per container. This method is not used in the comparison as it is not specified under ISPM 15 at present.

## 3.3 Options for the revision of the Regulation: Define "quarantine"

Under this option, the revised Regulation would provide a definition of "quarantine" (and pre-shipment, but only if the Regulation keeps the possibility for pre-shipment treatments). The definition would be based on the one developed in the Decisions of the Parties, though it would also refer to definitions under the IPPC.

***No EU action***

The current Regulation does not contain a definition of the terms "quarantine and pre-shipment". These terms are used in the Montreal Protocol and defined in subsequent Decisions of the Parties. Under this option, the Regulation lacks clarity.

***Specify QPS definitions***

Under this option, the revised Regulation would provide a definition of "quarantine".

The clarification could provide greater legal certainty, thus potentially reducing *administrative costs* for business, Member State governments and the European Commission. It is not expected to lead to any major additional costs for EU businesses or downstream users.

It is possible that future modifications to definitions used at international level (*e.g*. under the Montreal Protocol) would impose administrative costs on the European Commission in having to modify the definition in the Regulation.

Clarification of legal requirements for QPS applications of methyl bromide may assist in ending unnecessary uses. These impacts are difficult to quantify directly. Overall, this option supports the proposed option for QPS.

## 3.4 Non-legislative initiatives

This section reviews two options for action that do not require revision of the Regulation. Under the first, the European Commission would study current QPS uses of methyl bromide within the Community and develop guidelines for best practices. The study should also review third country requirements for QPS and establish a clear list of situations where methyl bromide is required: the guidelines could then specify that treatment with methyl bromide should be carried out only for these instances. The guidelines could cover a series of topics, including best practice for recapture of methyl bromide.

In the second action, the Commission and the Member States should support efforts underway, both under the Montreal Protocol and the IPPC, to reduce QPS uses of methyl bromide. This support could include both international negotiations as well as actions to support the preparation of international studies, standards and guidelines on the topic.

***Identification of impacts***

By producing guidelines for the use of methyl bromide for QPS, businesses may choose to change or adapt their procedures, which *could impose additional direct costs.* However, in that these would be guidelines, the decision to make these changes would be voluntary. This action would also help to harmonise practice within the EU and should reduce cost differences for exporters that may currently exist due to more stringent controls in some Member States compared to others.

Developing guidelines would represent an administrative cost for the Commission and an occasional cost if these guidelines require updates due to changing international circumstances. As a rough estimate, preparing the guidelines may require the following costs:

By setting EU guidelines for best practice, standards of use should rise, and the associated health and safety risks fall. This impact may be limited, as the standards would be voluntary. At the same time, EU best practice may have a wider impact by influencing practices in other parts of the world.

***Comparison of options***

This comparison focuses on the costs of three main options:

- No EU action
- The articulated proposal, which includes the requirement to restrict QPS treatments to cases where strictly required as well as recapture requirements
- An end to the use of methyl bromide for QPS.

| | **No EU action** | **Proposed: restrict Q, end PS recapture MB, develop guidelines** | **End all QPS treatments with MB** |
|---|---|---|---|
| **Economic and Social impacts** | | | |
| Total direct costs on industry (NPV at 2010, € mio) | 85.65 | 54.49 | 61 – 122 |
| Total admin. costs on industry (NPV at 2010, € mio) | 0.50 | 0.17 | 0 |
| Total admin. costs on MS (NPV at 2010, € mio) | 0.71 | 0.13 | 0 |
| Total admin. costs on COM (NPV at 2010, € mio) | 0.08 | 0.12 | 0 |
| **Other impacts: health** | Health risks from local release of MB | Slightly lower MB use | No health risks from MB |
| **Impact in ODP tonnes, total 2010-2019** | 1810 | 950 | 0 |
| **Impact in GHG-equivalent tonnes** | 15100 | 7900 | 0 |

**Table 3.6. Comparison of the options for QPS: yearly impacts**

The proposed option will lower direct costs on industry and also administrative costs for both industry and Member States. The Commission's administrative costs would rise slightly, in part due to the cost of developing guidelines.

Ending all use of methyl bromide for QPS would create higher costs for industry than the proposed option – but may cost less than business as usual. This option may create difficulties for the acceptance of EC exports on the part of some importing countries. This possible impact would need to be studied further before choosing the option. Greater EC dialogue with importing countries – both bilaterally and in IPPC forums – may be necessary to address potential problems.

Lowering or eliminating the use of methyl bromide for QPS will reduce health and safety risks, both for workers applying QPS treatments as well as others in ports. The new IMO rules that will allow QPS treatments of containers outside of port areas may lead to treated containers travelling from exporter to EC ports, with release of trace amounts of methyl bromide during this transit. The health risks are expected to be low – but could affect the general population in addition to workers.

# 4. Phase-out of the use and production of HCFCs

## 4.1 The problems

The ODS Regulation has phased out the use of HCFCs in all new products and equipment placed on the EC market. This section reviews possible changes to the Regulation for remaining uses (maintenance uses, exemptions and derogations). The section also reviews a possible revision to the phase-out schedule for the production of HCFCs.

One main use remains (apart from the derogations and exemptions listed in Articles 5(2) through 5(4)). While the use of HCFCs is prohibited in all new equipment, according to Article 5(1)(v) of the Regulation, HCFCs can still be used for the maintenance and servicing of refrigeration and air-conditioning equipment. In 2010, the use of "virgin" HCFCs in the maintenance and servicing of refrigeration and air-conditioning equipment will be prohibited. All other HCFCs *(i.e.* recycled and reclaimed) are prohibited for this use from 1 January 2015.

Thus between 2010 and 2015 only recycled or reclaimed HCFCs[48] can be used for the maintenance and servicing refrigeration and air-conditioning equipment, and from 2015 no HCFCs can be used for this purpose. Article 5(1) calls on the European Commission to study "the technical and economic availability of alternatives" to recycled HCFCs and on this basis to decide whether or not to adapt their 1 January 2015 phase-out date – a change that would require a revision of the Regulation.

A second issue concerns verification of recycled and reclaimed HCFCs. From 2010, a mechanism may be needed to certify that HCFCs for servicing and maintenance are in fact recycled and reclaimed and thus help ensure that virgin HCFCs are not employed illegally.

A third issue is that some of the derogations and exemptions established in the current Regulation for the use of HCFCs may no longer be necessary due to the availability of alternatives and therefore can be ended.

## 4.2 Phase-out of use of recycled and reclaimed HCFC

A 2006 study for the European Commission collected and compiled available data from EU-25 Member States, as well as Bulgaria and Romania, to develop a top-down consumption model for estimating the supply and demand for recycled HCFCs from refrigeration and air conditioning equipment, by country and by year.[49] The study assessed three phase-out scenarios:

- Reference scenario: existing measures in the Regulation are maintained (i.e., phase-out of recycled and reclaimed HCFCs occurs in 2015);
- Advanced phase-out scenario: 2012 phase-out of recycled and reclaimed HCFCs;
- Extended phase-out scenario: 2020.

[48] Article 2 of the current Regulation defines "recycling" as "a basic cleaning operation" and states that it "normally involves recharge back into equipment as is often carried out on site". In contrast, "reclamation" involves "reprocessing and upgrading" and typically occurs off site. The provision would in particular affected reclaimed HCFCs.

[49] ICF International, *Supply and Demand of Recycled Hydrochlorofluorocarbons (HCFCs) in Existing Refrigeration and Air Conditioning Equipment Beyond 2009: Analysis of Regulatory Phaseout Scenarios*, August 2006

The main sectors identified as being potentially affected were: small commercial refrigeration; large commercial refrigeration; refrigerated transport; industrial process refrigeration; small stationary A/C; large stationary A/C.

The study concluded that alternatives to HCFCs are available for all equipment types. The study also concluded that:

- In some end-uses (A/C, retail food systems etc.) only alternatives with high global warming potentials (principally HFCs) are currently available.
- An earlier phase-out of HCFCs will entail a greater dependence on HFCs, as less time will be available to develop and advance alternatives.
- Industry raised concerns that an advanced phase-out date earlier than 2015 would impose "disproportionate" economic and technical burdens on European companies, particularly SMEs.

The study recommended no change to the overall phase-out date (2015), but it also raised the possibility of an earlier, 2012 phase-out for the sector of industrial process refrigeration only.[50]

The European Commission has launched a second study from a "bottom-up" perspective to check the initial conclusions and recommendations and in particular the feasibility of an earlier phase-out date for industrial process refrigeration. This second study should provide results in early 2008. For this reason, no options and no impact assessment are presented here.

### 4.3 Certification of recycled and reclaimed HCFCs

Following 2010, "virgin" HCFCs can no longer be used for the maintenance and servicing of refrigeration and air conditioning equipment. However, "virgin" HCFCs are difficult to distinguish from recycled and reclaimed HCFCs.[51] If recycled and reclaimed HCFCs have a high price, a market for illegal "virgin" HCFCs – from stockpiles or illegal imports – could develop.

The European Commission's second study on HCFC phase-out includes work to define how a certification system could be set up. The results of this study are not available yet but will be important for the assessment of impacts of such a proposal.

[50] Industrial process refrigeration includes process cooling systems, such as those for food processing and machine cooling as well as cooling for ice rinks.

[51] One industry representative commented that "it is very simple to introduce impurities into virgin material to give a product that is indistinguishable from recycled material. It only needs to be filled into 'dirty' cylinders, or passed briefly through a working refrigeration system. So both stockpiled and pre-imported virgin material could be 'conditioned' very simply and quickly."

## 4.4 Exemptions for HCFC uses and the halon replacement derogation

One option to consider would be to remove derogations and exemptions in two areas. First, the current ODS Regulation provides a derogation for the use of HCFCs to replace halons as fire-fighting agents (Article 5(3)). This derogation has been little used in recent years: the last request was in 2005 and involved only 25 kg. A previous request was made in 2002. In general, substances that are not ozone-depleting are now available for fire-fighting systems.

Second, while the Regulation has phased out nearly all uses of HCFCs, it allows exemptions for the placing on the market and use of HCFCs in cases where "technically and economically feasible" alternatives are not available (Article 5(7)). The number of exemptions granted has been quite low in recent years (see table below).

The information provided with the 2006 and 2007 requests indicates that alternatives will be available for these needs. One request made in 2006 was for use of HCFCs as a process agent: the request was granted through 2010, and the company involved stated that alternatives should be available at the end of this period. The other two requests in 2006 came from new Member States wishing to refill existing fire-fighting equipment that used HCFCs; these exemptions were granted for 10 years. The two requests made in 2007 were both for the use of HCFCs to blow foam for the Ariane rocket. Both companies involved are reportedly identifying alternatives.

| | Exemptions requested | Exemptions granted |
|---|---|---|
| 2004 | 3 | 2 |
| 2005 | 4 | 1 |
| 2006 | 3 | 3 |
| 2007 | 2 | 2 |

Source: European Commission

**Table 4.1. Article 5(7) requests, 2004 - 2007**

***Assessment of the options***

- No EU action
- Removal of the derogation for the use of HCFCs to replace halons as fire-fighting agents (Article 5(3)) and the exemptions for HCFCs (Article 5(7))

***Option: No EU action***

Under this option, it would still be possible to request these exemptions. The number of requests is expected to be low: for this assessment, no requests are expected under Article 5(3). The assessment estimates that on average there will be one request every other year after 2010. These may include requests to extend the 2006 exemption for the use of HCFCs in fire-fighting systems in two Member States.

The exemption requests pose an administrative burden on the Commission, Member States and industry. Each company or organisation making a request prepares a dossier explaining the reasons

why alternatives are not "technically and economically feasible" at the time. Requests are typically made via the ODS unit of Member State where the company is located, and thus requires time on the part of those officials. The Commission reviews each request closely. Requests are discussed in the Management Committee. Some requests in recent years have been controversial, requiring extensive discussion. Finally, exemptions are granted via Commission Decisions (which typically are not published to protect company confidentiality).

| | Estimated annual administrative costs (work-months) |
|---|---|
| Industry/users | 0.62 |
| Member States | 0.46 |
| European Commission | 1.15 |

**Table 4.2. Annualised administrative costs for Article 5(7) exemption requests under the "no EU action" option**

As the amount of work for these rare requests will be quite low, the equivalent value in millions of Euros is not provided.

***Option: end the derogation in Article 5(3) and the exemptions for HCFCs (Article 5(7))***

Ending HCFC exemptions from 2010 will create savings equal to the administrative costs estimated for the "no EU action" option.

No direct costs on industry are expected: all the recent industry requests for exemptions have indicated that alternatives will be available. One use, however, may need to continue beyond the current exemption: in two EU10 Member States, some fire fighting equipment using HCFCs remains in place.[52] Replacing such equipment before its natural end of life would entail costs for the operators. Thus, a specific clause may be needed to provide a continuing exemption only for these specific uses in the two new Member States.

A further issue might arise with future accessions to the EU. Future Member States may need exemptions to refill existing equipment, as in the case of the fire-fighting equipment in the two EU10 Member States requiring an Article 5(7) exemption in 2006. Under this option, such needs will have to be identified before accession and addressed in the Treaty of Accession.

This option is expected to have minimal impacts in terms of any reduction in *ODS emissions*: the most recent uses have been for HCFCs as a process agent, with low emissions expected, and for foam for the Ariane rocket.

***Comparison of options***

A comparison shows that the proposed option will mainly reduce administrative costs for industry, Member States and the European Commission in terms of fewer work-months required to process applications for exemptions.

[52] These Member States introduced fire-fighting equipment using HCFCs before accession (and thus did not use the Article 5(3) derogation).

Information is not available on the amounts of ODS involved. Nonetheless, thiese are believed to be relatively low, and thus the impact of the two options will be low, both in terms of ODP and GHG-equivalent tonnes.

| | No EU action | End Article 5(3) derogation and (Article 5(7)) exemptions |
|---|---|---|
| **Economic and Social impacts** | | |
| Total direct costs on industry (NPV at 2010, € mio) | No impacts identified | No impacts identified |
| Total admin. costs on industry (NPV at 2010, € mio) | 0.03 | 0 |
| Total admin. costs on MS (NPV at 2010, € mio) | 0.04 | 0 |
| Total admin. costs on COM (NPV at 2010, € mio) | 0.07 | 0 |
| **Other impacts (e.g. social)** | No impacts identified | No impacts identified |
| **Impact in ODP tonnes** | Low | Low |
| **Impact in GHG-equivalent tonnes** | Low | Low |
| **Other environmental impacts** | No impacts identified | No impacts identified |

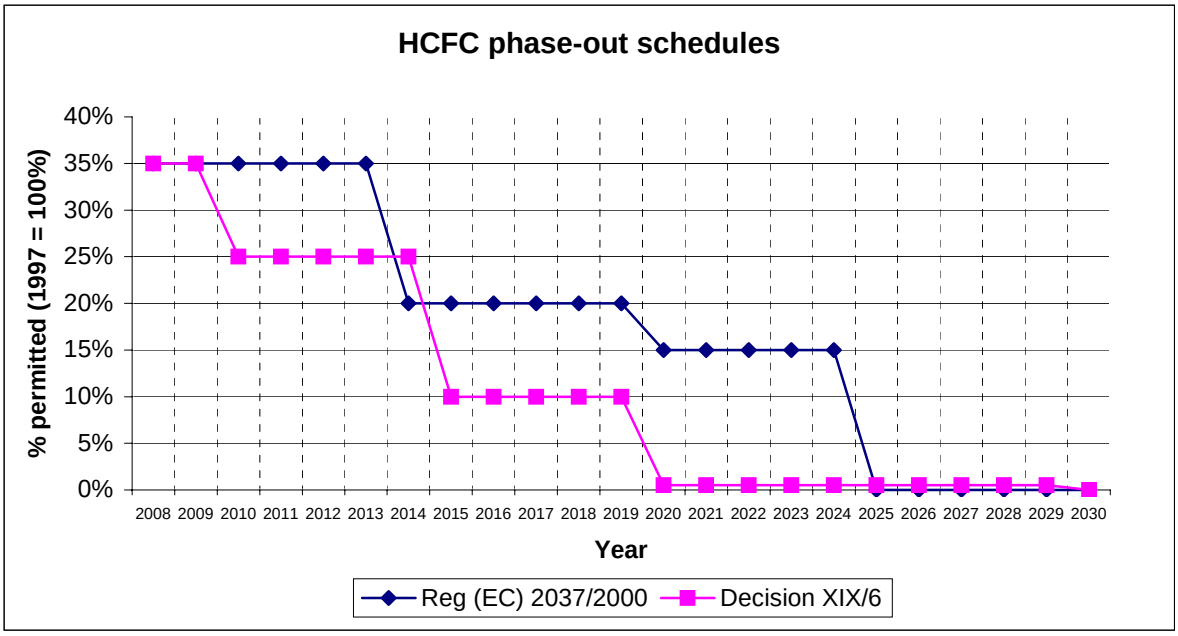
**Table 4.3. Comparison of the options for the HCFC exemption**

It should be noted that ending the Article 5(3) derogation and the Article 5(7) exemptions for HCFCs may create some additional administrative costs for the accession countries and for the European Commission, to ensure that any needs in future accessions are addressed in the relevant treaty rather than through an exemption process.

## 4.5 Modifications to the phase-out of the production of HCFCs

Regulation (EC) No. 2037/2000 sets a graduated phase-out of the production of HCFCs with significant dates including 2008 (production must be 65% below the 1997 baseline), 2014 (80% below the baseline), 2020 (85% below the baseline) and a complete phase-out by 2025.

At their 19th Meeting, held in Montreal in late 2007, the Parties agreed to accelerate the phase-out of the production of HCFCs. In non-Article 5 countries (*i.e.*, developed countries, including EC Members), significant reductions will start in 2010. In the past, the Montreal Protocol set a phase-out date for the consumption of HCFCs in non-Article 5 countries. Production of HCFCs was only frozen at baseline levels. The new schedule will accelerate the phase-out of HCFC production established in Regulation (EC) No. 2037/2000 (see Figure 4.1 below), in particular in 2015 and 2020.




| | Regulation No. (EC) 2037/2000 | Implied maximum production (ODP tonnes) | Decision of the Parties XIX/6 | Implied maximum production (ODP tonnes) |
|---|---|---|---|---|
| 1997 (baseline) | | 10292.7 | | As Regulation |
| 2008 | 65% | 3602.4 | | |
| 2010 | … | | 75% | 2573.2 |
| 2014 | 80% | 2058.5 | … | |
| 2015 | … | | 90% | 1029.3 |
| 2020 | 85% | 1543.9 | 99.5%* | 51.5 |
| 2025 | 100% | 0 | | |
| 2030 | | | 100% | 0 |

*Phase-out essentially complete in 2020, however 0.5% allowed for servicing between 2020-2030[53]

**Figure 4.1. Current phase-out schedules for HCFCs: The ODS Regulation and Decision XIX/6 compared**

This modification to the Regulation is expected to be made on a fast timetable, *i.e.*, before other revisions. Moreover, as this option has been agreed at international level by all Parties, it is already considered part of the "no EU action" option.

***Current production levels in ODP and metric tonnes***

Total EU production for emissive and non-emissive uses of HCFCs in 2006 was 10,838.43 ODP tonnes. However, based on the term "production" as it is used in the Montreal Protocol[54] production (for emissive uses only) is calculated as being 4,542.7 ODP tonnes.[55] It is worth noting that this production level for 2006 is almost 1000 ODP tonnes above the allowed maximum EU production for 2008, as set out in Regulation (EC) 2037/2000, which is 3,602.4 ODP tonnes. EU production (as

[53] Under Decision XIX/6 (paragraph 13) it was also agreed to review in 2015 the need for the 0.5% for servicing provided for in this decision, so this may yet be reduced or removed.

[54] "Production" means the amount of controlled substances produced, minus the amount destroyed by technologies to be approved by the Parties and minus the amount entirely used as feedstock in the manufacture of other chemicals. The amount recycled and reused is not to be considered as "production".

[55] Data provided by the European Commission. Total is equal to 10,838.43 – 5,855.69 (sales for feedstock use) and 440.05 (exports outside EU for feedstock use).

defined in the Montreal Protocol) of HCFCs has fallen consistently since 1997; this is shown in Figure 4.2, based on data supplied by the Commission.

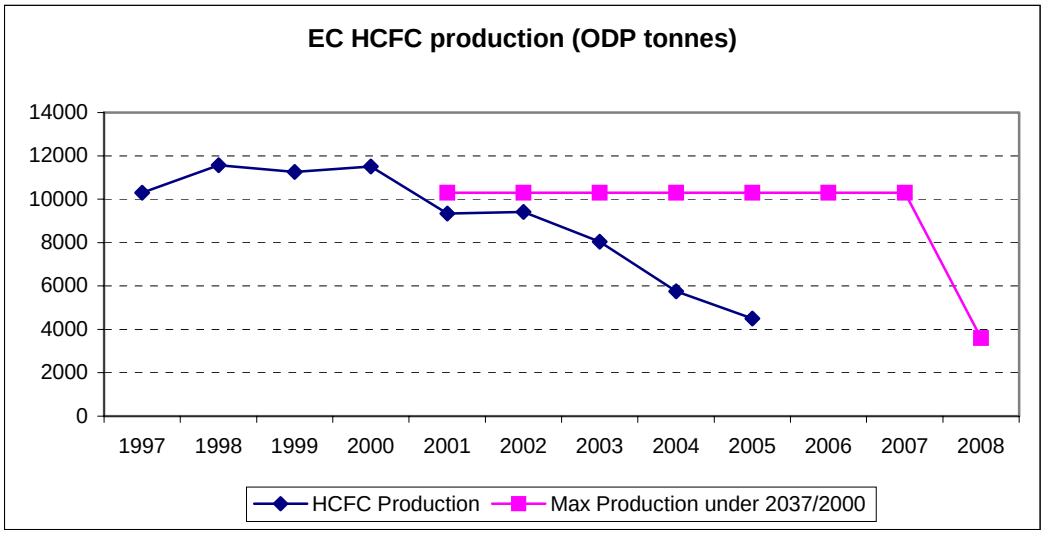



**Figure 4.2. HCFC production trend 1997 - 2005**

At the same time, a report by EIA in 2007[56] reports that production of HCFCs in China has risen from about 4,000 ODP tonnes in 2000, to around 18,000 ODP tonnes in 2005.

| Substance | ODP Tonnes | Metric Tonnes |
|---|---|---|
| HCFC-22 | 3357.28 | 61041.51 |
| HCFC-123 | 6.09 | 304.6077 |
| HCFC-124 | 0.00 | 0 |
| HCFC-133 | 2.58 | 42.97371 |
| HCFC-141b | 279.23 | 2538.436 |
| HCFC-142b | 897.52 | 12821.69 |
| HCFC-225ca | 0.00 | 0 |
| HCFC-225cb | 0.00 | 0 |
| Total HCFCs | 4542.70 | 76749.22 |

**Table 4.4. Current EU production by HCFC type (2006)**

***Assessment of the options***

The impact assessment compares no EU action with a proposed option for a further advance in the phase-out of HCFCs.

- No EU action: integration of Decision XIX/6 into the ODS Regulation.
- Advanced phase-out of HCFCs: continue the EC lead in ODS phase-out by setting a total phase-out of HCFCs from 2015.

[56] EIA (September 2007), An Early Freeze to Stop the Warming.

***Option: No EU action***

Figure 4.1 above sets out the predicted ODP implications of the current phase-out under the Regulation (EC) and the advanced phase-out agreed by Decision XIX/6 of the MoP.

As whichever controlling mechanism has the highest restriction will take precedence, the current baseline can be interpreted as set out in Table 4.5, below.

| | Combined baseline Regulations + Decision XIX/6 | Implied maximum annual HCFC production (ODP tonnes) | Implied maximum annual HCFC production (Metric tonnes) | Approximate market values[57] (Millions Euro) |
|---|---|---|---|---|
| 1997 (baseline) | | 10292.7 | 173895.85 | 173 - 296 |
| 2008 | 65% | 3602.4 | 60863.55 | 61 – 103 |
| 2010 | 75% | 2573.2 | 43473.96 | 43 – 74 |
| 2014 | 80% | 2058.5 | 34779.17 | 35 – 59 |
| 2015 | 90% | 1029.3 | 17389.59 | 17 – 30 |
| 2020 | 99.5% | 51.5 | 869.48 | 0.87 – 1.5 |
| 2025 | 100% | 0 | 0 | 0 |
| 2030 | - | - | - | - |

**Table 4.5. Baseline phase-out and implied production**

***Option: Advanced phase-out***

As Decision of the Parties XIX/6 effectively ends production from 2020 (leaving only minimal production at 0.5% of the baseline for servicing, to be reviewed in 2015), the critical period for the impact assessment is between 2015, which is the proposed advanced complete phase-out, and 2020, when this phase-out will occur on the basis of the Montreal Protocol. Equally we do not seek to estimate the impact of the greater restrictions on production imposed by Decision XIX/6 between 2010 and 2014, as the EC has already made this commitment at the Meeting of the Parties.

Table 4.6 below shows baseline production estimates for the years 2015 – 2020 expressed in ODP tonnes and metric tonnes. An advanced phase-out from 2015 would imply that production was zero for these years.

| HCFC | | 2015 | 2020 |
|---|---|---|---|
| HCFC-22 | Metric tonnes | 13830.58 | 691.53 |
| HCFC-123 | Metric tonnes | 69.02 | 3.45 |
| HCFC-124 | Metric tonnes | 0.00 | 0.00 |
| HCFC-133 | Metric tonnes | 9.74 | 0.49 |
| HCFC-141b | Metric tonnes | 575.15 | 28.76 |
| HCFC-142b | Metric tonnes | 2905.10 | 145.25 |
| HCFC-225ca | Metric tonnes | 0.00 | 0.00 |
| HCFC-225cb | Metric tonnes | 0.00 | 0.00 |
| | | | |
| Total | Metric tonnes | 17389.59 | 869.48 |
| | ODP tonnes | 1029.27 | 51.46 |

**Table 4.6. Baseline HCFC production 2015 - 2020**

[57] Based on available estimates of market price of HCFCs which include World Bank (2002) Production Presentation which notes a price of €1.2 per kg for HCFC-22 and €1.7 for HCFC-142b. A recent report by EIA states that HCFC-22 is available in the Middle East and Latin America for as little as €1.0 per kg. Thus €1.7 is taken as the "high" value price and €1.0 is taken as the "low" value price.

***Impact on ODP emissions and environmental benefits***

The difference in production for the full period (2015-2020) implied in an advanced phase-out is a total of 87 817 metric tonnes of HCFCs, equivalent to 5,197.81 ODP tonnes. (ODP tonnes were calculated using the ratio of different HCFCs produced in the EC in 2006, as reported by the European Commission to UNEP.)

***Economic impact***

To calculate a monetary value for the difference in HCFC production we applied an estimated price for HCFCs based on values included in a presentation by the World Bank (2002) and a more recent report by EIA (2007).[58] The EIA report includes data which suggest that production of HCFCs in China has risen from about 4,000 ODP tonnes in 2000, to around 18,000 ODP tonnes in 2005. Significant increases in availability of HCFCs from third countries are certainly having a depressant effect on HCFC prices globally, and it seems likely this trend will continue. (Another source has reported anecdotally that EC producers are losing market share to low-cost production from developing countries, in particular China).

Table 4.7 below presents estimates for HCFCs, based on this information.

| HCFC | Low value | High value |
|---|---|---|
| HCFC-22 | 0.67* | 1.2* |
| HCFC-123 | 1.0† | 1.7† |
| HCFC-124 | 1.0† | 1.7† |
| HCFC-133 | 1.0† | 1.7† |
| HCFC-141b | 1.0† | 1.7† |
| HCFC-142b | 1.0† | 1.7* |
| HCFC-225ca | 1.0† | 1.7† |
| HCFC-225cb | 1.0† | 1.7† |

*Based on external reporting
†Estimated
Sources: World Bank (2002) and EIA (2007)

**Table 4.7. Estimated Prices of HCFCs, Euros per kg**

Two scenarios are compared, based on these high and low level price estimates, and different assumptions are made about the future evolution of the market for HCFCs in the EU and globally.

*Scenario 1*
High value – prices remain buoyant (at high-end of estimated range) and 100% of market remains viable for EU producers.

*Scenario 2*
Low value – prices fall (to low-end of estimated range) due to third country production, and EU producers have declining global sales due to increased global competition: production is estimated to fall to only 25% of the quota.

Under scenario 1 we estimate the total market value of HCFC production "lost" to be in the region of €84 million over the period 2015 - 2020 expressed, as 2010 NPV. However it should be noted that phasing out HCFC production in the EU will further stimulate the production and sales of viable

[58] EIA (September 2007), *An Early Freeze to Stop the Warming*.

alternatives, so this should not be interpreted as a dead-weight loss to EU industry. Industry has acknowledged that the Regulation has had some positive economic impact on the chemical industry by stimulating the development and sale of new products. High global prices for HCFCs may encourage a shift to newer alternatives, as there will be a smaller difference with the expected higher price of the alternatives.

Under scenario 2 we estimate the total market value of HCFC production "lost" to be approximately €12 million over the period 2015 – 2020 expressed as 2010 NPV. This is significantly lower than under scenario 1.

| | **Annualised average cost (€ million)** | **Total cost 2015-2019 (NPV 2010) (€ million)** |
|---|---|---|
| Scenario 1 | 19.1 | 82.8 |
| Scenario 2 | 2.7 | 11.7 |

**Table 4.8. The advanced phase-out: comparison of the scenarios**

***Comparison of the options***

Compared to the option of "no EU action", the adoption of an advanced phase-out has a potential cost to EU industry in terms of the value of HCFC production no longer permitted. Under the two scenarios the total value to EU industry over the period which the advanced phase-out will impact upon comes to between €12 million and €84 million (€2.7 million and €19.1 million average per annum). However it should also be noted that this loss would not be a dead-weight loss as a phase-out may stimulate EU based research and development, and the market value will be absorbed by that for alternatives, which may be produced in the EU.

Moving to an advanced phase-out is estimated to reduce the production of ODP within the EU by approximately 5,197.81 ODP tonnes over the period 2015 – 2020, equivalent to 1300 ODP tonnes per year. In metric tonnes production negated is equal to 87,817.43 tonnes.

| | **No EU action** | | **Advanced phase-out (2015)** | |
|---|---|---|---|---|
| | Scenario 1 High demand | Scenario 2 Low demand | Scenario 1 High demand | Scenario 2 Low demand |
| **Economic and Social impacts** | | | | |
| Total direct costs on industry (NPV at 2010, € mio) | 0 | 0 | 82.8 | 11.7 |
| Total admin. costs on industry (NPV at 2010, € mio) | 0 | 0 | 0 | 0 |
| Total admin. costs on MS (NPV at 2010, € mio) | 0 | 0 | 0 | 0 |
| Total admin. costs on COM (NPV at 2010, € mio) | 0 | 0 | 0 | 0 |
| **Other impacts (e.g. social)** | | | | |
| **Emissions in ODP tonnes (total for 2015 - 2019)** | 5146 | 1287 | 0 ** | 0 ** |
| **Emissions in GHG-equivalent tonnes (total for 2015 – 2019) *** | Approx. 175 million | Approx. 45 million | 0 ** | 0 ** |
| **Other env. impacts** | No impacts identified | No impacts identified | No impacts identified | No impacts identified |

* GHG-equivalent tonnes calculated based on approximate 2006 mix of HCFC exports HCFC-22
** Level of EC production. Third country producers may replace some EC market share.

**Table 4.9. Phase-out of HCFC Production: Comparison of the Options**

# 5. Production of ODS for basic domestic needs (BDN)

The proposed option would end the production and export of ODS for the basic domestic needs (BDN) of Article 5 Parties (developing countries). Current levels are low and are declining as the Montreal Protocol will phase-out BDN production and consumption of nearly all ODS.

***No EU action***

After 2010, the EC will be able to produce and export only one ODS for basic domestic needs: 1,1,1-trichloroethane.[59]

The EC's current level of BDN exports of 1,1,1-trichloroethane is under 1000 metric tonnes low and has fallen in recent years. In addition, the number of importing countries has also fallen. (Exact data are not provided as less than three companies produce and export this substance for BDN).

Under the no EU action option, the level of EC exports of 1,1,1-trichloroethane for BDN will depend on demand in developing countries for the substance for their basic domestic needs from 2010 and 2014. This demand has been declining. For the assessment, a high and a low estimate were made. Under the high estimate, demand in 2010 would be at one-half the 2006 level and it would fall after that (as the production involves less than three companies, this projection remains confidential). Under the low estimate, export demand from 2010 onwards will be zero.

The Montreal Protocol will end all production and export of 1,1,1-trichloroethane for BDN in 2015.

The production and export of this substance for basic domestic needs will create administrative costs, mainly for the producers and for the European Commission.

***Proposed option***

The proposed option would have a *direct cost* on EC producers and exporters, as it would end these exports in 2010 rather than 2015. These costs are projected to be low, as few countries are currently importing this substance from the EC for their basic domestic needs. Under the low scenario of export demand, the cost would be zero.

Under the high demand scenario, the end to BDN exports would also end the *administrative costs* for the high estimate of export demand.

***Comparison of the options***

Ending export for basic domestic needs is projected to create low direct costs for EC industry, and also to end administrative costs. As fewer than three companies are involved, quantitative projections are not presented here; they are included in the overall quantitative assessment for the recommended options.

[59] In 2006, the EC also produced and exported CFCs (several types) and carbon tetrachloride (CTC) for basic domestic needs: in 2010 basic domestic needs for CFCs and CTC will end due to the phase-outs under the Montreal Protocol.

| | No EU action | | Proposed option: end to EC production and export for BDN | |
|---|---|---|---|---|
| | High demand projection | Low demand: no EC production for BDN | High demand projection | Low demand projection |
| **Economic and Social impacts** | | | | |
| Total direct costs on industry | 0 | 0 | Low | 0 |
| Total admin. costs on industry | Low | 0 | 0 | 0 |
| Total admin. costs on MS | Low | 0 | 0 | 0 |
| Total admin. costs on COM | Low | 0 | 0 | 0 |
| **Other impacts (e.g. social)** | 0 | 0 | Low | |
| **Impact in ODP tonnes (total for 2010 – 2019)** | Low | 0 | 0 | 0 |
| **Impact in GHG-equivalent tonnes** | Low | 0 | 0 | 0 |

**Table 5.1. Comparison of the options for Basic Domestic Needs**

# 6. Import and export requirements

## 6.1 The problems

***Imports of substances and of products and equipment***

Two main issues have been identified in relation to the import of ODS and of products and equipment containing ODS.

The first is the inward processing regime:[60] here, ODS are imported to the European Community for repackaging and export.[61] All quantities imported in a given calendar year are exported in the same or the following year (in the processing, the methyl bromide may be blended with other, non-ODS substances). Article 6(1) of the ODS Regulation allows the issue of import licenses for the inward processing of methyl bromide (group VI in Annex I), hydrobromofluorocarbons (Group VII) and HCFCs (Group VIII).

Currently, inward processing is carried out only for methyl bromide and HCFCs. Within the EC, methyl bromide has been phased out for regular use; while critical uses continue, these should fall in coming years and their phase-out has been proposed (see section 3.2). Moreover, the Montreal Protocol phases out the regular use of methyl bromide in "Article 5" (developing) countries in 2015: after this date, only a few uses, such as QPS and critical uses, will be allowed globally. Section 5.2 below reviews options for the inward processing of methyl bromide.

The last use of HCFCs in the EC is scheduled to end in 2015. Regarding production, the Parties to the Montreal Protocol decided at their 19th Meeting on a phase-out schedule for HCFCs; a separate option (see section 4.6) proposes to align the phase-out of EC production with the end to HCFC consumption in 2015. Section 5.3 reviews options for the inward processing of HCFCs. (There is no inward processing of HBFCs, hydrobromofluorocarbons; for this reason, ending this regime will have not impact.)

The second issue concerns illegal trade. The European Union is phasing out the use of key ozone depleting substances such as HCFCs more rapidly than most other Parties to the Montreal Protocol. More generally, the ODS Regulation sets more rapid phase-out schedules than the requirements of the Protocol for other Parties with developed economies – and thus other major users such as the United States. Moreover, "Article 5" countries under the Protocol (developing countries) have much longer phase-out schedules than developed countries. These differences in phase-out schedules create opportunities for illegal imports. Section 5.3 presents and assesses regulatory options to address possible illegal imports. (Section 6 assesses options to strengthen enforcement.)

***Export requirements***

The EC remains a major exporter of ODS, in particular to Article 5 countries where their use has not yet been phased out under the Montreal Protocol. Nonetheless, individual Parties – both developed and

[60] Inward processing allows imported raw materials or semi-manufactured goods to be processed for re-export within the Community by Community manufacturers without a requirement that the manufacturers have to pay customs duty and VAT on the goods being used.

[61] According to the US EPA, "The vast majority of this [methyl bromide] is manufactured by three companies: two located in the U.S. … and one in Israel…" (see http://www.epa.gov/ozone/mbr/qa.html). Reportedly, an important share of methyl bromide inwardly processed in the EC is shipped to North Africa and the Middle East, thus avoiding embargoes and other political difficulties. The only other producer of methyl bromide is China.

developing – can set more stringent phase-out schedules. Some ODS exports may be destined for critical and essential uses, or uses that are not controlled under the Protocol (such as feedstock uses).

Several Member States, the European Commission, other Parties to the Protocol as well as environmental NGOs have all called for stronger international control of transboundary movements of ODS and ODS-containing products and equipment, to ensure that all shipments are for allowed uses. The European Union, as an important exporter, can play a key role. At present, however, the European Commission does not have a strong legal basis to reject any export authorisation request. In their responses to the survey for this review, several Member States called for greater controls on exports.

Section 5.4 presents and assesses options for controlling and better monitoring exports of ODS, while section 5.5 addresses exports of products and equipment.

## 6.2 The inward processing regime for methyl bromide

Two options are reviewed:

- No EU action.
- End inward processing of methyl bromide

***Option: No EU action***

One company in the EC carries out inward processing of methyl bromide.[62] For reasons of confidentiality, data on its level of activities are not provided. Nonetheless, these activities, as measured by the company's import license requests, appear to have risen between 2003 and 2006. This, however, is an indirect measure, as actual imports of methyl bromide for IPR may have been less than the total license requests.

In a communication to the European Commission, the company noted that global consumption of methyl bromide is decreasing due to its phase-out under the Montreal Protocol, and that IPR volumes are expected to follow the same trend.[63]

The level of activity will depend on future demand for methyl bromide. Projections have been developed for two scenarios: in the first, inward processing activities declines slowly from current levels until January 2015, the date when the Montreal Protocol phases out the consumption of methyl bromide in Article 5 countries. After this date, global demand for methyl bromide decreases more rapidly, as only critical uses will continue. Under this scenario, global prices for methyl bromide remain at current levels.

In the second scenario, IPR for methyl bromide declines rapidly until 2015 and ends two years after that phase-out date. This scenario implies both a rapid switch to alternative methods in the importing countries as well as increased competition from other sources.[64] The low-demand scenario also assumes that global prices for methyl bromide will fall.

[62] While two additional companies have made import declarations for the inward processing of methyl bromide in 2007, neither has requested the import licenses to carry it out.
[63] August, 2007
[64] The EC's "comparative advantage" for selling methyl bromide via IPR is in part political. Production from other sources, such as China, or improved Middle East cooperation, could reduce this comparative advantage.

The continuation of IPR will also require ongoing administrative costs.

The EC has played a leading role in promoting the phase-out of methyl bromide, both within the Community and at global scale. The continuation of inward processing will create a *significant loss*, undermining the credibility of the EC's negotiating position in the Montreal Protocol.

***Option (proposed): Ending inward processing regime for methyl bromide***

The proposed option would end inward processing of methyl bromide in 2010, the date when critical uses of this substance will end in the EC.
Ending the inward processing regime will stop inward processing operations from 2010, and thus will impose a *direct cost on the company engaged in inward processing*, in that it will either need to cease operations in this regard, or move them outside the EC. The size of these direct costs depends on the amount of business lost; this is different in the high and low-demand scenarios.

Ending IPR for methyl bromide would have *employment impacts in the specific location* where inward processing occurs. These impacts will be limited: in total, under 50 employees are involved. The projected decline in inward processing of methyl bromide will likely reduce the number of jobs involved though the company engages also in other activities. In addition, IPR is carried out in a region with about 6% unemployment in 2007, below the EC average, suggesting that those affected have strong chances of finding alternative employment relatively quickly.

The *administrative costs* for the European Commission and the Member States would end.

The end to inward processing will *strengthen the EC's international negotiating position* in the Montreal Protocol. Moreover, this option may encourage third countries that currently use methyl bromide to accelerate the adoption of alternatives. Some of the alternative substances and methods they adopt may be produced in the EC. The extent of this effect will be difficult to estimate. Moreover, methyl bromide will remain available from other sources.

The end to inward processing should *reduce emissions* from the use of methyl bromide. Nonetheless, some methyl bromide may be supplied by other sources. Any reduction in methyl bromide use should also *reduce health and safety risks* in the importing countries, as alternative chemicals and methods will almost certainly have lower risks.

***Comparison of the options***

The table below compares the two options.

| | **No EU action** | **End to IPR for methyl bromide** |
|---|---|---|
| **Economic and Social impacts** | | |
| Direct costs on industry (millions of €) | 0 | * |
| Total admin. costs on industry (NPV at 2010, € mio) | * | 0 |
| Total admin. costs on MS (NPV at 2010, € mio) | 0.01 | 0 |
| Total admin. costs on COM (NPV at 2010, € mio) | 0.29 | 0 |
| **Social impacts** | | |
| Employment | | Loss of a few jobs |

| | | |
|---|---|---|
| Health and safety | | Reduced risks |
| **Impact in ODP tonnes** | | Fall in third country consumption of MB |
| **Impact in GHG equivalent tonnes** | | |
| **Other impacts** | Loss of credibility for EC | Strengthens EC negotiating position |

* Since less than three companies are involved, data is not provided for confidentiality reasons (the projectsions are included in totals in Table 4, Part A)

**Table 6.1. IPR for methyl bromide: comparison of the options**

The most important economic impacts appear to be the direct costs to the company involved: estimates, however, are not provided for confidentiality reasons, since only one company is involved. A small number of jobs would be lost. The impacts would affect the EC economy; it is possible that the company itself will shift operations to a location outside the EC.

The impacts in terms of a net reduction in methyl bromide consumption and emissions will depend on the extent to which supplies of methyl bromide from other replace IPR in the EC and the extent to which importing countries switch to alternative methods (which, as noted in sections 3 and 9, are available for nearly all agricultural and QPS uses of methyl bromide).

The most important environmental impact, however, is in terms of the EC's negotiating position in the Montreal Protocol. Ending IPR, together with an end to critical uses of methyl bromide, will strengthen the EC position for a quick phase-out of critical and other uses of the substance.

## 6.3 End IPR for HCFCs in 2015 in 2010

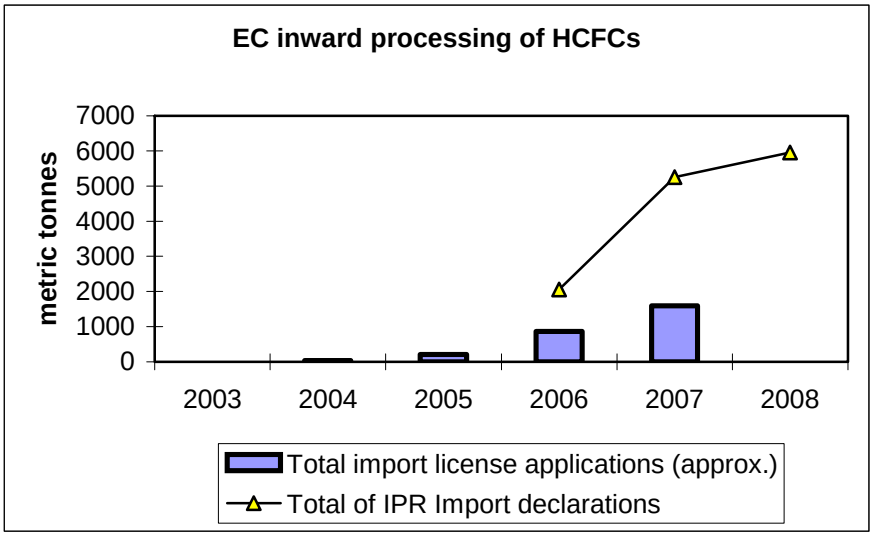
Inward processing is also carried for HCFCs.

The last use of HCFCs within the European Commission will end in January 2015 (this is the servicing and maintenance of existing refrigerators and air conditioners with recycled and reclaimed HCFCs). A separate proposal for the revision of the ODS Regulation would end EC production of HCFCs in 2015. In line with practice for previous phase-outs, the option proposed would end IPR for HCFCs in 2015 as well.

- No EU action.
- End inward processing of HCFCs by 2015

***Option: No EU action***

Five companies in the European Commission carried out inward processing of HCFCs in 2007. Under this option, companies in the EC will continue to carry out IPR for HCFCs in the period from 2015 to 2019. The amounts they have processed have increased in recent years, based on their import declarations (see figure below).




Source: European Commission

**Figure 6.1 EC inward processing of HCFCs**

At the same time, the level of inward processing in the period of 2015 to 2019 could be influenced by many factors. To account for this uncertainty, two scenarios are developed. Under the first, high-demand scenario, IPR continues at slightly above 2007 levels through 2019. Under the second, low-demand scenario, these exports remain at current levels in 2010 and decline thereafter. Among the factors that could lead to such a decline are a fall in demand for HCFCs in importing countries, as Article 5 countries shift to other refrigerants and increased competition as HCFC producers, such as China, which could become more skilled in preparing and selling HCFCs in the kinds of packages and formats for end users that inward processing companies now provide.

*Administrative costs*

The administrative costs for the inward processing for HCFCs are presented in the table below: these have been estimated based on current levels.

| | Estimated annual administrative costs | |
|---|---|---|
| | (work-months) | (€) |
| Industry/users | 5.75 | 25 800 |
| Member States | 0.09 | 400 |
| European Commission | 1.18 | 9 500 |

**Table 6.2 Inward processing for HCFCs: annual administrative costs, 2015 – 2019**

***Proposed option: Ending the inward-processing regime***

Ending the regime would create direct costs for the companies involved – essentially, a loss of these exports. The value of these losses depends on the scenario. In this case, the costs are calculated based on the global market price of HCFCs; inward processing is assumed to provide one-fifth of this price.

The table below presents the overall costs for the two scenarios:

| | High-demand scenario (M €) | Low-demand scenario (M €) |
|---|---|---|
| Direct costs to companies (NPV at 2010) | 1.76 | 0.12 |

**Table 6.3 Ending the inward processing of HCFCs: Average annual direct costs for industry for the period 2015-2019**

Under the high-demand scenario, ending the IPR regime would cost EC business the equivalent of €1.76 million between 2015 and 2019 (NPV at 2010). Losses would be far less, €0.12 million, under the low-demand scenario, which assumes lower global prices for HCFCs. Indeed, under the low-demand scenario, some EC businesses might exit from the IPR business before 2019.

While this option ends inward processing, these exports may be replaced in part by increased third country demand for alternative exports from the EC, in particular substances that are not ODS.

***Comparison of the options***

The table below compares the proposed option with the "no action" option.

The proposed option is not considered to have overall environmental impacts or benefits: inward processing in the EC appears to account for a small share of global HCFC demand, and in the event of an end to IPR, customers would likely shift to other sources, such as China.

On the other hand, there could be a significant environmental impact in terms of the EC's negotiating position in the Montreal Protocol. Ending IPR – along with an accelerated phase-out for the production of HCFCs – would strengthen the EC negotiating position in favour of the a faster global phase-out of these substances.

| | **No EU action** | **End to IPR for HCFCs** | |
|---|---|---|---|
| | | High-demand scenario | Low-demand scenario |
| **Economic and Social impacts** | | | |
| Direct costs on industry (millions of €) | 0 | €1.76 million | €0.12 million |
| Total admin. costs on industry (NPV at 2010, € mio) | 0.21 | 0 | 0 |
| Total admin. costs on MS (NPV at 2010, € mio) | 0 | 0 | 0 |
| Total admin. costs on COM (NPV at 2010, € mio) | 0.08 | 0 | 0 |
| **Social impacts (jobs lost)** | | Possible impact | Low impact |
| **Impact in ODP tonnes (total, 2015-2019)** | Up to 590 | Possible fall in third country consumption of HCFCs | |
| **Impact in GHG-equivalent tonnes** | Up to 17 million | | |
| **Other impacts** | | Strengthens EC negotiating position for ODS phase-out | |

**Table 6.4. IPR for HCFCs: comparison of the options**

## 6.4 Import/placing on the market of products and equipment

***Assessment of the options***

This section reviews two options:

- No EU action.
- Amend Article 5(4) exception for products and equipment containing HCFC and end Article 4(6) exception for products and equipment containing other ODS.

Article 4(6) allows the importation and placing on the market of products and equipment containing all ODS (except HCFCs) manufactured before the entry into force of the Regulation, and Article 5(4) allows the importation and placing on the market of products and equipment containing HCFCs manufactured before the date of entry of the specific use restriction.

These provisions appear to be transitional clauses to reduce economic disruption. The last use ban for commercial products and equipment took effect in 2004, and the last ban for military equipment will take effect in 2009. Thus, by 2010 such transitional clauses will no longer be necessary.

Nonetheless, the clauses contain a loophole: they refer to products and equipment containing ODS, but not to those *relying* on ODS. In at least one new Member State, second-hand refrigerators and air-conditioners relying on HCFCs have been imported *without* their HCFCs with the intention of being refilled and sold in the EC, thus passing through the loophole.

This option would clearly enunciate a general prohibition according to which products and equipment containing *or* relying on ODS for which use bans have taken effect cannot be placed on the EU market. The proposed change would end any EC imports of used products and equipment relying on but not containing ODS and it would also ensure that imported products and equipment containing ODS would have to claim to have been manufactured before a use ban date. The proposed change would also end any second-hand markets for such products and equipment.

Two exceptions to this general prohibition are proposed:

(1) products and equipment containing HCFCs that were already on the EU market before 2010. These products and equipment would be able to be serviced and maintained with recycled and reclaimed HCFCs in the period from 2010 through 2014. Thus, they may have market value and could under this exception be sold in second hand markets within the EU.

(2) Products and equipment containing halons to satisfy the critical needs under Annex VII would be allowed to be placed on the EU market. (A separate proposal would establish phase-out dates for various Annex VII categories: see section 3.2.) Thus, imports of these products and equipment could be retained but an authorisation regime should be established to control movements, as exists for exports.

***Option: No EU action***

Under this option, the legislation would remain unclear and the opportunity for import of used products and equipment containing ODS manufactured before the Regulation's entry into force would remain. Moreover, the loophole would remain, allowing the import of products and equipment relying

on ODS or even containing ODS if manufactured before 2000 (for CFCs) or 2004 (for HCFCs), and these could then be refilled in the EC.

*Imported products and equipment*

Under this option, it is assumed that refrigerators and freezers relying on ODS would continue to be imported into the EC, in particular into the new Member States. As a preliminary estimate, it is assumed that these are equivalent to 5% of the refrigerator market in Bulgaria and Romania and 0.1% of the remaining EC market.

On this, perhaps worst-case basis, up to 45 000 refrigerators and freezers relying on HCFCs may be imported annually from 2010 to 2014. It is assumed that none are imported afterwards, as recycled and reclaimed HCFCs will no longer be available on the EC market to refill these units.

| | |
|---|---|
| No. of refrigerators and freezers imported | 45000 |
| Kg of HCFCs consumed to refill these imports | 5400 |
| ODP kg of HCFCs for refilling (assuming HCFC-22) | 297 |

**Table 6.5 Estimated annual imports of household refrigerators and freezers relying on HCFCs, 2010 – 2014**

*Second-hand EC market*

The option would affect one second-hand market within the EC: used refrigerators containing CFCs could no longer be sold. As an initial estimate, the second-hand market for refrigerators and freezers is considered to be 4% of the total EC market for these products and equipment. The share of these refrigerators and freezers containing CFCs can be estimated based on production times and product lifetimes (this approach is described in section 7). On the basis of these estimates, the annual second-hand markets will be:

| | Total no. of refrigerators and freezers | Number Containing CFCs |
|---|---|---|
| EU15 second-hand market for refrigerators and freezers | 450 000 | 45 000 |
| EU12 second-hand market for refrigerators and freezers | 150 000 | 55 000 |

**Table 6.6. Estimated annual second-hand market, 2010 to 2014**

While the second-hand market is much larger in the EU15, a much higher share of used refrigerators and freezers in the EU12 will contain CFCs due to the later phase-out of these substances in the new Member States. The last household refrigerators using CFCs on the EU15 market were sold in 1992. Considering that refrigerators have an average life of 15 years, from 2010 on a declining share will remain in operation or be available for resale. Indeed, the estimates above suggest that a higher total number of used, CFC-containing refrigerators will be sold in the EU12.

***Proposed option: Amend Articles 5(4) and 4(6)***

*Imported products and equipment*

This option would end the current imports of used refrigerators and freezers relying on HCFCs, as well as any other imports of products and equipment containing ODS and manufactured before the relevant use ban.
On the one hand, this would represent a loss for current EC importers. On the other hand, this option would increase sales of non-ODS containing refrigerators and freezers on the EC market, including those manufactured in the EC. As a first estimate, it is assumed that – due to higher prices – new sales replace only half of the imports of HCFC-containing refrigerators and freezers. Even so, there is a net economic benefit to EC operators.

| | **Value (million €)** |
|---|---|
| Loss to EC importers of used fridges relying on HCFCs | 0.225 |
| Gain to EC importers and retailers of non-HCFC fridges | 0.850 |
| **Net gain** | **0.625** |

**Table 6.7. Estimated annual economic gains and losses to EC operators for the proposed option**

These annual costs and benefits are assumed to take place only through 2014: as noted above, the imports are expected to cease in 2015. The total NPV of these five years will be a net benefit of €2.78 million. In addition, this option would reduce HCFC consumption in the EC by the 5.4 tonnes (0.3 ODP tonnes) per year estimated above.

On a global basis, however, little environmental benefit is expected, as the used products and equipment would remain in the third countries, or possibly be exported to non-EC countries.

*Second-hand EC market*

This option would require an end to sales of used refrigerators and freezers containing CFCs. Part of this market occurs via shops and associations that sell used refrigerators. However, a large portion of the second-hand market occurs directly among individuals through sales advertised via classified ads or Internet. Member State governments can provide information to individuals to reduce such sales (Internet sales platforms may agree to post such information). Nonetheless, enforcement would be difficult and not worth the cost. Moreover, it likely will be more valuable to provide public information on positive actions – such as ensuring proper collection of used refrigerators (with only a mention of the ban on resale of ODS-containing fridges) – rather than warnings to stop negative actions.

Thus, this ban is expected to largely affect shops and associations selling used refrigerators. A simple accounting matrix is presented here. This assumes that only one half of used refrigerators and freezers containing ODS are sold via shops and other dealers. It also assumes that ending these sales will increase sales of new refrigerators – but only by half, as new products will be more expensive and thus many prospective buyers will choose to delay their purchases.

| | EU15 | EU12 |
|---|---|---|
| Loss to sellers of used fridges | 1.1 | 1.6 |
| Gain for sellers of new fridges | 1.3 | 2.0 |
| **Net economic benefits (million €)** | **0.2** | **0.4** |

**Table 6.8. Annual net gains and losses for the proposed option, million €**

These impacts are assumed to take place in the EU15 only until 2013 – after which, few CFC-containing fridges will be placed on the market (see section 7). In the EU12, they will continue until 2017.

As the refrigerators would in all cases remain in the EC, the ban on resale of these used refrigerators should not change the eventual recovery of their ODS, though it may hasten their consignment to the waste stream. For this reason, no changes in terms of ODS emissions are expected.

Products and equipment containing HCFCs on the EU market before the use ban can continue to be sold. This exception will allow a second-hand market in products and equipment containing HCFCs, and also allow maintenance outside the EU (a possible case for ships containing HCFC foams). The box below provides a rough estimate of this market.

*Other impacts*

The option will provide greater legal clarity for enforcement against possible illegal imports of products and equipment and thus could reduce administrative costs for enforcement on the part of the Member States.

***Assessing the need to allow a second-hand market in products and equipment containing HCFCs***

This option proposes an exception for used products and equipment containing HCFCs until 2015. This would allow the used market in commercial refrigerators and freezers to continue (the provision would have little effect on EC domestic refrigerators and freezers, few of which contain HCFCs).

Almost 2.5 million new commercial refrigerators and freezers are sold in the EC each year.[65] A recent EC study noted that there is a "robust" market for used commercial refrigerators and freezers.[66] Many of these are exported to third countries, in particular developing countries as well as countries of the former Soviet Union, though others are sold inside the EC for uses in less important sites, including in lower income Member States. Under Article 11 of the ODS Regulation, equipment that contains or relies on ODS can not be exported, implying that it will remain on the EC market.

In the EC, new commercial refrigerators and freezers have an average lifetime (for all uses) of under 9 years.[67] Second-hand sale occur before this end of life. For the purposes of these estimates, this second-hand sale is projected to occur after 5-6 years for about 80% of commercial refrigerators and freezers.

[65] This total refers only to free-standing products and equipment, not to fixed installations integrated into buildings, such as supermarket cold rooms.

[66] The projections elaborated here are based on data from: Bio-Intelligence Service s.a.s., *Economic and market analysis, commercial refrigerators and freezers* (Task 2 of Lot 12 of the Preparatory studies for Eco-design requirements of EuPs for DG Transport and Energy, European Commission), March 2007

[67] Based on the study cited above and personal communication from Sanaée Iyama, Bio-Intelligence Service

In the EU15, the ODS Regulation ended the placing on the market of new use of refrigerators and freezers containing HCFCs from 1 July 2002 for small units (larger units had been phased out earlier). In the EU12, this requirement took effect on accession. This means that some second-hand commercial refrigerators and freezers will still be on EC markets from 2010 until 2015. The projections suggest that in 2010 and 2011, the number of second-hand commercial refrigerators and freezers containing HCFCs will coming onto the EU market will be similar in EU15 and EU12. From 2012 onwards, more will be placed on the EU12 market. The figure below presents estimates of the potential second-hand market.

Export from the EC of products and equipment containing ODS is now banned (and the proposed revisions to the Regulation will strengthen this ban). For this reason, used commercial refrigerators and freezers containing HCFCs should be sold within the EC, or sent to the waste stream. Many may be sold from one Member State to another, including from higher-income to lower-income Member States (this trade will take place in particular among EU12).

The costs for ending this market in 2015 are considered low, and have not been calculated.

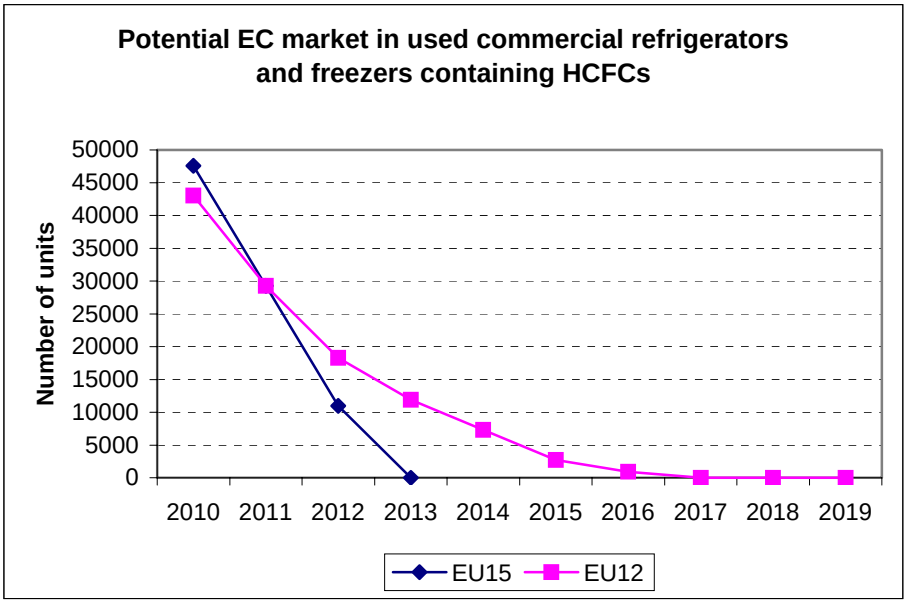



**Figure 6.2 Potential second-hand market in used commercial refrigerators and freezers**

***Comparison of the options***

The proposed option to amend Articles 5(4) and 4(6) is projected to have a net gain for EC industry. It will also reduce ODS emissions inside the EC, as HCFCs will not be used to refill imported products and equipment.

| | No EU action | Amend Articles 5(4) and 4(6) on import/placing on the market of products and equipment containing ODS |
|---|---|---|
| **Economic and Social impacts** | | |
| Direct costs on industry (NPV at 2010, million €) | 0 | An estimated net gain of up to €6.2 million |
| Admin. costs on industry | 0 | 0 |
| Admin. costs, MS | 0 | 0 |
| Admin. costs, COM | 0 | 0 |
| **Other impacts (e.g. social)** | | |
| **Emissions in ODP tonnes** | 1.5 | 0 |
| **Emissions in GHG-equivalent tonnes** | 2640 | 0 |

**Table 6.9. Comparison of the options for products and equipment containing (or relying on) ODS**

## 6.5 Exports of ODS

The European Union remains an important exporter of ODS, exporting in 2006 a total of over 34,000 metric tonnes of ODS (see Table 6.10, below), in particular to Article 5 countries where their use has not yet been phased out under the Montreal Protocol.

| EXPORTS | 1986 | 1989 | 2002* | 2003* | 2004* | 2005* | 2006* |
|---|---|---|---|---|---|---|---|
| CFC 11 | 51,391 | 53,201 | 6,410 | 2,603 | 1,583 | 1,212 | 390 |
| CFC 12 | 60,058 | 53,467 | 18,093 | 8,603 | 4,562 | 4,966 | 1,794 |
| CFC 113 | 16,411 | 22,341 | 19 | 0 | 0 | 0 | 0 |
| CFC 114 | 1,940 | 1,899 | 54 | 16 | 9 | 7 | 2 |
| CFC 115 | 4,509 | 6,559 | 139 | 5 | 1 | 0 | 0 |
| HCFC 22 | @ | 28,614 | 59.711 | 54,229 | 47,681 | 42,492 | 31,728 |
| Halon 1211, 1301 & 2402 | 7,026 | 6,115 | 0 | 0 | 0 | 0 | 0 |
| Carbon tetrachloride | @ | 12,132 | 113# | 1433# | 1,678# | 1,508# | 511# |

*1) Data does not include production, imports, EU sales and exports for feedstock uses.*
*2) Data could include sales from stocks.*
*3) Data for methyl bromide is not included since it is considered to be company confidential information.*
*@ : No legal basis for data collection*
** : EU sales, imports and exports include essential uses*
*# : 2006 - 2006 Carbon tetrachloride data include sales to Article 5 countries for basic domestic needs*
*Source: European Commission*

**Table 6.10. EC exports of ODS**

Exports of ODS currently require an authorisation from the European Commission. This section reviews three options to strengthen the authorisation requirements.

The section starts by presenting an overview of the baseline situation concerning exports of ODS from the EC at the beginning of 2007. It then forecasts what the baseline for exports of ODS from the EC will be in 2010, when the revised Regulation is likely to come into force. The 2010 baseline is essentially the "zero" option, if the EU takes no further action. Finally, the section assesses the three options suggested for achieving greater controls over exports of ODS from the EC.

The purpose of these options is to improve the control of transboundary movements of ODS and bring the export of ODS from the EU into closer compliance with Decision XIX/12[68] and with other Decisions of the Parties in this regard.

***Options for the revision of the Regulation***

This assessment compares the "no EU action" option with the proposed option, specifying the current iPIC procedure in the Regulation. The assessment also considers two alternative options.

- No EU action.
- Specifying the current iPIC procedure in the Regulation and expanding it.
- Export notification by incorporating ODS and products and equipment containing ODS into the PIC Regulation (Regulation (EC) No. 304/2003).
- Introducing a notified ex-ante export licensing procedure in the ODS Regulation.

***The baseline at the beginning of 2007***

DG Environment's database of applications for ODS export licenses provides an overview of current exports[69]. Table 6.11 below shows that the number of applications for export authorisation numbers has decreased from 2002 to 2006 for four of the six categories.

| Type of application | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|
| Generic export authorisation (EA) | 65 | 60 | 54 | 46 | 49 |
| EA for CFC MDI to non-A5 | | | 1 | 101 | |
| EA for BDN | 1713 | 1084 | 714 | 653 | 360 |
| EA for Halon | | | 17 | 37 | 42 |
| EA for IPR | | 216 | 313 | 238 | 512 |
| EA for essential use | 136 | 131 | 82 | 8 | 5 |
| **Total** | **1914** | **1491** | **1181** | **1083** | **968** |

Source: European Commission

**Table 6.11. Number of applications in the ODS database:**

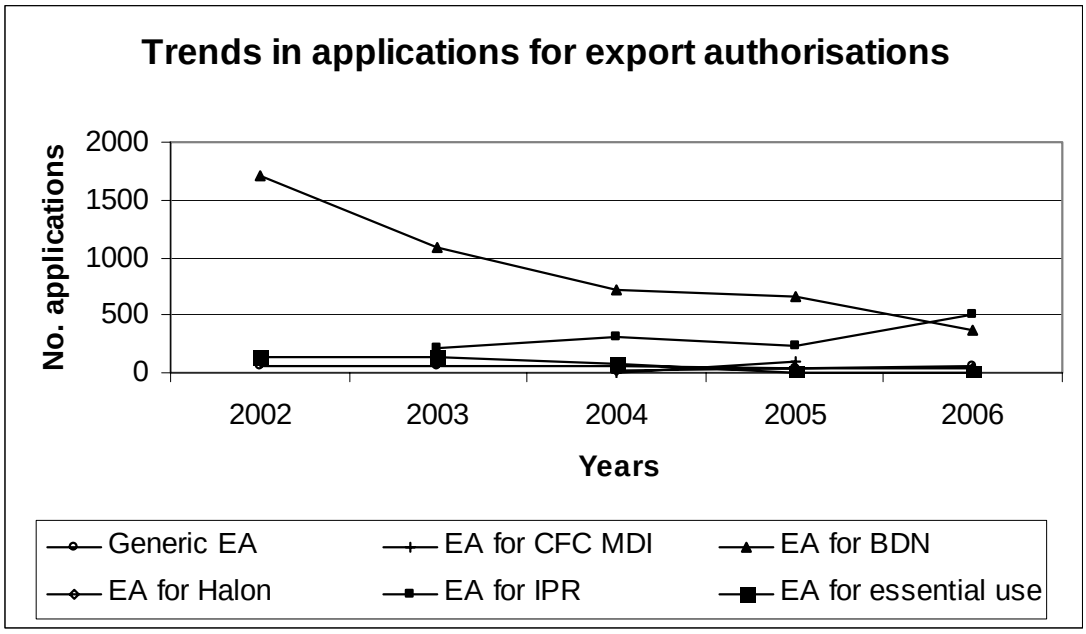
[68] Decision XIX/12 proposes a list of measures to improve implementation and enforcement of licensing systems in order to combat illegal trade more effectively, such as: participation in the informal prior informed consent procedure, import and/or export quotas; permits for each shipment and obliging importers and exporters to report domestically on the use of such permits; monitoring transit movements (trans-shipments) of ODS, including those passing through duty-free zones (for instance by identifying each shipment with a unique consignment reference number); banning or controlling the use of non-refillable containers; establishing appropriate minimum requirements for labelling and documentation to assist in the monitoring of trade of ODS; cross-checking trade information; including any other relevant recommendations from the ozone-depleting substances tracking study.

[69] It should be noted that the number of licences actually issued is somewhat less because some applications were rejected, cancelled, etc.

One of the categories where numbers of applications are decreasing is for the generic export authorisation (EA). This is an annual application that covers the total net quantity of all exports to be made by the applicant during a given calendar year. In 2006 exports in this category consisted of all exports of HCFCs and MB (except IPR) and other exports of other ODS for feedstock and as process agents.

Applications for export authorisations under the other five categories are for each individual shipment. No applications for exports of CFCs for metered dose inhalers (EA for CFC MDI) were received in 2006, reflecting the phase-out of this use after the development of alternatives. Applications for exports for essential use (EA for essential use) have shrunk from 136 in 2002 to only 5 in 2006, and these exports are also essentially phased out. The number of applications received for individual exports to Article 5 countries for basic domestic needs (EA for BDN) has also decreased dramatically.

Applications for export authorisations have increased for only two categories: exports of halons (EHS), here not significantly, and exports due to the inward processing regime, likely due to an increase in HCFC IPR exports.




***Administrative costs*** for operating the EC system of export authorisation are incurred by (1) the companies applying for the EAN, (2) the European Commission, (3) the Member States.

*(1) Costs incurred by the applicant*

The company submitting an application for an EAN incurs an administrative cost.

| | % of 968 | no. EANs | Work-months |
|---|---|---|---|
| **Commission** | | | |
| Generic EANs (annual) | 10% | 97 | |
| EAN (individual, requiring individual authorisation) | 85% | 823 | |
| EAN (individual, iPIC) | 5% | 48 | |
| | | **968** | 6 |
| **Applicant** | | | |

| | | | |
|---|---|---|---|
| Generic EANs (annual) | | 49 | |
| EAN for BDN | | 360 | |
| EAN for halon | | 42 | |
| EAN for IPR | | 512 | |
| EAN for ESU | | 5 | |
| | | **968** | 24 |
| **Member State (halons)** | | | |
| EAN for halon | | 42 | 0.3 |
| **overall total** | | | **30.3** |

**Table 6.11. Administrative cost of export authorisation (2006)**

*(2) Costs incurred by the European Commission*

The Commission has set up an on-line system for submitting applications for EANs. After the application is submitted, a Commission staff person must review the application and, where appropriate, issue the authorisation.

Another type of application that may take longer to process is an EAN request for BDN, IPR, halon and essential uses going to certain Asia Pacific countries. Since March 2007, the Commission has applied a voluntary "iPIC" procedure ("informal prior informed consent") to such requests, because of concerns in these countries over levels of illegal trade. The iPIC procedure is usually applied for all substances subject to expect authorisation per shipment. Under iPIC, the final destination country is asked to confirm that the export is according to its national law and will not bring the country into non-compliance with the Montreal Protocol (*i.e.*, by exceeding its national import quota). When the application is received, the Commission first checks whether the information provided by the exporter is in conformity with the documentation provided by the destination country. If the export/import cannot be verified, the Commission contacts the corresponding National Ozone Unit (NOU) in the destination country. If the Commission does not receive an answer after one week, the Commission sends a reminder. If there is no answer after two weeks, the EAN request is accepted.

Data supplied by the Commission on iPIC show that between March and October 2007, of the total EANs, 21 included iPIC. Of these 12 received a response, 7 were accepted and 5 were rejected by the third country.

In 2006, the Commission processed a total of 968 EANs, 360 (37%) of which were for individual exports for BDN. These BDN exports were mainly for CFC-11 (to 23 countries) and CFC-12 (to 52 countries).

*(3) Costs incurred by Member State competent authorities*

The competent authority of the exporter's Member State must approve EANs for halons. In 2006 the Commission received applications for 42 individual EANs for halons.

Table 6.11 shows the estimated total annual administrative cost to the Commission, applicants and Member States of the current regulations (at 2006). This is calculated at approximately 6 work months for the Commission, 24 work-months across all industry applicants and less than 1 work-month for all member states.

***No EU action: the expected baseline in 2010***

By 2010, the date the revised Regulation is likely to come into force, a number of export categories will have disappeared. Exports of CFCs for MDI to non-Article 5 countries and EAN for essential uses are already phased out.

In the case of generic export authorisations (annual EANs for exports of HCFCs), decreases in applications are likely to continue simply because of market forces, given that lower priced HCFCs manufactured in China are now undercutting those produced in the EC (as noted under assessment of options for the phase-out of HCFCs – see Section 4).

Even the two categories where applications are currently increasing, EAN for IPR and EAN for halons, are expected to experience decreases. The number of applications for EAN for IPR should decrease, since IPR for methyl bromide will be prohibited as of 2010, leaving IPR as a possibility only for HCFCs. Here, we assume that 25% of EANs for IPR in 2006 are for methyl bromide. Moreover, a parallel study on halons currently under way for the Commission is expected to propose that all exports of halons be prohibited, except for a limited number of critical uses.

In the case of EANs for exports for BDN (mostly CFCs), the trend is also for further decreases. This decreasing trend is also evident in the Commission's statistics concerning metric tonnes of CFCs exported in the years 2002 – 2006 (see table below). As the production of CFCs for BDN will no longer be allowed from 2010 (under the Montreal Protocol) the number of applications for EANs is assumed to continue this downward trend, and decrease essentially to zero, as will iPIC.

| EXPORTS | 2002* | 2003* | 2004* | 2005* | 2006* |
|---|---|---|---|---|---|
| CFC 11 | 6,410 | 2,603 | 1,583 | 1,212 | 390 |
| | 100.0% | 40.6% | 24.7% | 18.9% | 6.1% |
| CFC 12 | 18,093 | 8,603 | 4,562 | 4,966 | 1,794 |
| | 100.0% | 47.5% | 25.2% | 27.4% | 9.9% |

**Table 6.12. EC Exports of CFCs**

Finally, this study suggests phasing out the production of all ODS for basic domestic needs (BDN) in 2010, and all IPR exports of HCFCs by 2015. The table below provides a summary view of the expected situation in 2010 with respect to exports of ODS, if the proposals made in this study and in the parallel study on halons are adopted.

| Type of application | 2006 EANs | Estimated 2010 EANs | Notes / Assumptions |
|---|---|---|---|
| Generic EAN | 49 | 40 | Stabilising at about 40 |
| EAN for CFC MDI to non-A5 | | 0 | phase-out complete |
| EAN for BDN | 360 | 0 | Essentially phased out under MP |
| EAN for Halon | 42 | 40 | No significant change |
| EAN for IPR | 512 | 384[70] | MB phased out; HCFCs 2010-2015 then phased out |
| EAN for essential use | 5 | 5 | Assumed to remain at very low level[71] |
| **Total** | **968** | **469** | |

**Table 6.13. Export authorisations: 2006 levels and 2010 estimates**

[70] Based on assumption that 1/4 of EANs for IPR are MB - this is thought to be a low estimate - and may be revised upwards if / when new data are made available

[71] However, it is possible that exports for laboratory uses in Aticle-5 countries will switch from BDN to essential uses, so applications in this category may in fact increase. For this impact assessment we assume they remain at a low level.

Based on assumptions made, the projected baseline administrative costs for 2010 are shown in Table 6.14. EAN for IPR is estimated to be equivalent to about 9.5 work-months for industry, and 2.4 work-months for the Commission.

This analysis leads to two conclusions: (1) with the phase-outs already underway, there will be increasing pressures from illegal trade and therefore a need for a more rigorous system of export controls; (2) the export authorisation regime will become less difficult to administer because the number of applications for EANs will continue to decrease.

| | % of469 | no. EANs | Work-months |
|---|---|---|---|
| **Commission** | | | |
| Classic EANs (annual) | 10% | 47 | |
| EAN (individual, requiring individual authorisation) | 85% | 399 | |
| EAN (individual, iPIC) | 5% | 23 | |
| | | **469** | 3 |
| | | | |
| **Applicant** | | | |
| Classic EANs (annual) | | 40 | |
| EAN for BDN | | 2 | |
| EAN for halon | | 40 | |
| EAN for IPR | | 384 | |
| EAN for ESU | | 5 | |
| | | **469** | 12 |
| | | | |
| **Member State (halons)** | | | |
| EAN for halon | | 40 | 0.25 |
| | | | |
| **overall total** | | | **15.25** |

**Table 6.14. Administrative cost of export authorisation (2010 baseline)**

***Assessment of the three options***

Assumptions made in assessing the options:

- Of the 49 applications for classic EAN in 2006 10% are assumed to be from maritime servicing sector; based on information provided there are 5 companies in this category.[72]
- Where an EAN is already subject to individual authorisation (including subcategory iPIC) no additional cost is assumed for the applicant company.

For assessing the impact on industry an important factor for the impact assessment is the number of countries they export to. For the purposes of this impact assessment we therefore make the following assumptions:

- That companies fall into 2 types: (i) those who export to only 1 to 4 country and (ii) those who export to many. Based on an analysis of EAN per shipment data for 2006 made available to us by the Commission, this seems a fair assumption.

[72] Hans-J. Koblischke, Barwil Unitor Ships Service, personal communications, November 2007

- Further we assume that of 31 companies completing EANs (in 2006), 12 (40%) are exporting to multiple countries (between 5 and 30) and the remaining 20 (60%) only export to one to four countries.

*No EU action*

The first option for controls over exports of ODS is the "no change" option. This is essentially the expected baseline situation for 2010, analysed above.

| | **Annual administrative cost** (work-months) |
|---|---|
| **Commission** | 3 |
| **Companies** | 12 |
| **Member states** | 0.25 |

**Table 6.15 Baseline for 2010**

*Strengthening the legal basis and expanding the current iPIC procedure: establishing an authorisation regime for each export shipment*[73]

Extending iPIC to all substances and countries will have a significant impact on only current exports which are not already subject to individual authorisation (including those already under iPIC).

Based on the estimated 2010 baseline, an annual total of 47 current EANs may be subject to change representing additional administrative costs. These will be almost entirely made up of HCFC exports.

The costs of expanding the current iPIC are estimated to be similar to those under the previous option, thus it is expected that this option might increase administrative costs for the Commission by at least 0.6 work-months per annum and for industry by at least 2 work-months.

Although iPIC should not raise administrative costs for Member States, it may be that some training of customs officials is necessary to ensure awareness of new procedures. The costs may be compensated by links to EXEDIM and current customs trainings under EC environmental legislation.

| | **Net annual cost (*additional* work months compared to option (0))** |
|---|---|
| **Commission** | 0.6 – 3.5 |
| **Companies** | 2 – 14 |
| **Member states** | 0 |

**Table 6.16. Administrative costs under Option (c)**

This Option does however have significant benefits in terms of improved control over exports (enforcement and reduction of illegal trade) and in harmonising the regulatory requirements placed on

[73] As noted previously, there may be a case for exempting the maritime servicing sector from a requirement to apply for authorisation of each shipment, however in our analysis this issue is not explicitly addressed.

all exporters. This will help to reduce concerns raised at MoP 19[74] regarding the scale of illegal trade and smuggling, although the latter may not be influenced by such changes, and would enforce the EC position as a global leader in this regard.

*Establish export notification procedure under the PIC Regulation*

The legal options report (Task 2.2 Part 1) notes that the first option is to add all ODS to Annex I Part 1 of the PIC Regulation, thereby extending the export notification regime to all ODS. Since the Export Notification Procedure already covers two ODS (carbon tetrachloride and 1,1,1-trichloroethane), this would be the best place to include other ODS in the Regulation. In addition the export notification procedure is very similar to the current iPIC procedure.

For the Commission there would be a cost in amending the PIC Regulation in line with the proposed option. The PIC Regulation is advanced in the process of revision, and there is thus some uncertainty as to how it may change. Here it is assumed that adding ODS to the PIC as outlined in the Legal Options report (Task 2.2 Part 1) would be done through comitology and would represent a one off administrative cost in the region of 4 man-days for the Commission and 2 man-days for each Member State.

Once the changes are implemented, it is estimated that there would be limited administrative cost impact for the Commission depending on how the PIC procedure works in practice. If we assume that the PIC procedure will replace the current procedure of issuing export licences for each shipment, and will thus lead to a simplified notification system for the Commission, a minor cost saving is possible. An alternative could be that this change has no measurable impact on the Commission's administrative cost, where inclusion of ODS under PIC does not change the current practice of issuing an export authorisation for each shipment. This impact will therefore depend on whether the Commission decides to retain the current export authorisation for each shipment, which might be inevitable given the obligations under the Montreal Protocol.

The additional information on substances and hazards provided by the PIC procedures is also likely to be very useful in monitoring and enforcement of transboundary movements of ODS.

It should be noted that PIC notified movements would be controlled and registered in the existing EDEXIM database. This is currently managed by the European Chemicals Bureau (ECB), but will be transferred to the European Chemicals Agency (ECHA). Thus a share of any administrative cost saving to the Commission may in fact present an increased administrative cost for whichever agency is responsible for EDEXIM. There may also be a small cost in adapting the EDEXIM database for the inclusion of ODS.

For industry, PIC export notifications would be done via an online database – therefore relatively quick and easy to enter for companies. For current Classic EANs it is assumed that the additional establishment of export notification under the PIC Regulation will increase administrative costs by 1 man-hour per notification. The impact in relation to existing BDN, Halon, IPR and ESU EANs would represent a cost saving as it would mean moving from an individual to annual notification for these notifications, which while increasing the cost per notification, would greatly reduce the number of notifications required. We assume here that it is reduced to 20% of the individual number of notifications.

[74] Environmental Investigation Agency and Chatham House, *ODS Tracking. Feasibility study on developing a system for monitoring the transboundary movement of controlled ozone-depleting substances between the Parties to the Montreal Protocol - A report produced according to the terms of reference of Decision XVII/16 of the Montreal Protocol*", September 2006 available at http://www.eia-international.org/files/reports146-1.pdf.

Aside these costs, there is also the need to potentially have a 30 day waiting period allowed for replies from importing countries. This may present a cost to some exporters, and affect business planning and delivery schedules.

It should also be noted that there may be an issue relating to the maritime servicing sector. For these companies current classic EANs in fact include multiple shipments (it has been reported to us as often being more than 1000) due to the nature of this industry.[75] In addition there would be the practical implications of imposing PIC procedures on shipping, which would in theory impose a waiting period (while export authorisations are processed) for individual ships in European ports, a situation which may be unworkable in practice.

Based on these assumptions this option is estimated to represent the following administrative costs:

| | **Annual administrative cost** (work-months) | **Net annual benefit (compared to option (0))** (work-months) |
|---|---|---|
| **Commission** | 3 | 0 |
| **Companies** | 4 | 8 |
| **Member states** | 0.25 | 0 |

**Table 6.17. Administrative costs under Option (a)**

As noted in the Legal Options Report, this option has a number of short comings from a practical perspective.

*Introduce a notified ex-ante export licensing procedure in the ODS Regulation*

This option will only have a significant cost impact on current exports not subject individual authorisation (including iPIC). Based on the estimated 2010 baseline this is equal to 47 EANs, as an EAN is already required for each shipment of halons, BDN, IPR and ESU exports.[76] This means that a total of 47 current EANs may be subject to change representing a significant difference in administrative costs incurred.

Based on our previous assumptions, for type (i) companies – small number of exports to a limited number of countries – the additional cost is predicted to be small, as these companies are only exporting to 1 or 2 countries annually in any case. For type (ii) companies – large number of exports to many countries – the impacts could be more significant, as they will be required to provide all their export declaration details (countries, products, quantities) in one notification at the beginning of the year. It should be noted that this will only be an additional cost where these exports are not currently covered by individual export notification requirements (including subcategory iPIC).

A further issue for industry may be that this notification system, due to the nature of import quotas, could essentially "reward" those who complete notifications early in a given year. Thus a small

[75] One industry representative reported that this could be as many as 1000 individual EANs per application, due to multiple shipments. This data cannot be independently verified, however if this is accurate modifying this procedure could create a significant cost for the maritime industry. Based on assumptions used in this chapter, this cost could be in the region of 5000 applications (1000 from each of 5 companies) taking an estimate 5 work hours each. Though this may be a high estimate of this potential administrative cost, it is clear this would represent an unacceptable cost to the maritime servicing sector.

[76] As noted previously, there may be a case for exempting the maritime servicing sector from a requirement to apply for authorisation of each shipment, however in our analysis this issue is not explicitly addressed due to a lack of accurate data.

company exporting to one country could find that its proposed export is blocked due to the import quota being exceeded already as a result of previous notifications.

This may present a significant impact on SMEs and companies with specialist operations, as they may have lower administrative and planning capacity, and therefore submit notifications later and on a more "ad-hoc" basis than large companies with established administrative and export procedures.

A further issue for the Commission may arise due to the nature of a notified ex-ante export licensing procedure, which could act as incentive for businesses to submit notifications as early in a given year as possible, in order to reduce the risk that an import quota may have been exceeded. This seems likely to create an administrative "bottleneck" for the Commission, and may mean that the additional administrative cost identified is in fact concentrated within a short period of time.

For authorities in Member States (customs and enforcement) the additional information made available under this option would be likely to decrease administrative costs, and potentially improve levels of enforcement (assuming use of the EDEXIM website to notify when import quotas have been reached and other information such as on licenses and countries preferences for not receiving certain imports).

| | **Net annual cost (*additional* work months compared to option (0))** |
|---|---|
| **Commission** | 0.6 – 3.5 |
| **Companies** | 2 – 14 |
| **Member states** | Training of customs officials |

**Table 6.18. Administrative costs under the notified ex-ante procedure**

***Comparison of options***

A comparison shows that the proposed options, the iPIC procedure, will mainly reduce administrative costs for industry, Member States and the European Commission.

One of the primary aims of these proposed options is to better control transboundary movements of ODS, in particular to control illegal trade, and ensure use quotas are not exceeded in importing countries. Thus, although not quantifiable, in can be assumed that under BAU emissions related to these movements will continue, whereas under each of the proposed options, these are expected to fall. This is for 3 reasons: illegal trade will be reduced; export authorisations refused (e.g. those already refused under iPIC) will further reduce emissions; and, by better controlling exports the possibility of national quotas being exceeded will be reduced.

| | No EU action | Proposed option: Expansion of iPIC procedure | Alternative options | |
|---|---|---|---|---|
| | | | Export notification under PIC | Notified ex-ante export licensing |
| **Economic and Social impacts** | | | | |
| Total direct costs on industry (NPV at 2010, € mio) | No impact expected | No impact expected | No impact expected | Possible impact on SMEs |
| Total admin. costs on industry (NPV at 2010, € mio) | 0.64 | 0.78 | 0.21 | 0.78 |
| Total admin. costs on MS (NPV at 2010, € mio) | 0.01 | 0.01 | 0.01 | 0.01 |
| Total admin. costs on COM (NPV at 2010, € mio) | 0.19 | 0.22 | 0.19 | 0.22 |
| **Other impacts: health** | | | | |
| **Impact in ODP tonnes, total 2010-2019** | | Possible Decrease | Possible Decrease | Possible Decrease |
| **Impact in GHG-equivalent tonnes** | | Possible Decrease | Possible Decrease | Possible Decrease |

**Table 6.19. Comparison of the options**

## 6.6 Exports of products and equipment containing ODS

***Assessment of options***

This section assesses two options to change requirements concerning the export of products and equipment containing ODS (the two options are not mutually exclusive):

- No EU action
- Clarifying that used products and equipment are subject to Article 11 and defining "personal use" and "personal effects"
- Extending authorisation requirements to products and equipment

***No EU action***

The current legal text is not clear with regards to the export of used products and equipment. In addition, in some cases used products and equipments are reportedly exported for either private international assistance or for commercial sale but claimed as "personal effects": such sales might continue under the current text. While some Member States have taken steps to enforce the Regulation and control such steps, it appears that many have not.

Under this option, used products and equipment might continue to be sent to developing and transitional countries; many do not have facilities for the proper recovery of ODS. Thus, the ODS they contain will be released, while if they are disposed of in the EC their ODS should be properly recovered.

***Clarifying that used products and equipment are subject to Article 11 and defining "personal use" and "personal effects"***

This option will create *direct costs* on EC businesses that currently export used products and equipment that contain ODS (or rely on ODS for their functioning) – at least to the extent that Member States do not enforce the current (not clearly stated) provisions of the Regulation.

The option should *reduce emissions of ODS* by ensuring that fewer used products and equipment go to third countries, where recovery facilities and procedures are likely to be less stringent than in the EC.

***Extending authorisation requirements to products and equipment***

This option would create *minor administrative costs* for EC businesses. Only a few sectors are expected to continue such exports after 2012. Exports of products and equipment containing halons, which can include civil aircraft and military equipment, are currently required to receive an export authorisation (Article 12.4). Moreover, option (a) would restrict exports of used products and equipment.

The option may create *minor additional administrative and enforcement efforts* and associated costs for the Commission and Member States. However, in the long term, a better system of information sharing, as well as a clearer procedure, should reduce enforcement costs for Member States.

The option will reinforce option (a) in *reducing emissions of ODS* by ensuring that fewer used products and equipment are sent to third countries, where recovery facilities and procedures are likely to be less stringent than in the EC.

***Comparison of options***

Overall, the impacts of the proposed options are expected to be minor. Moreover, many costs to EC businesses for reduced exports represent the application of current requirements. For these reasons, the costs and benefits have not been justified.

# 7. Enforcement

## 7.1 Problem

In the survey for this review of the ODS Regulation, nearly half of the Member States that responded called for strong enforcement of import and export requirements across the EC. Moreover, several industry respondents reported cases of illegal imports of ODS. A further concern is that the upcoming phase-out of the use of "virgin" HCFCs for the maintenance and servicing of refrigeration and air conditioning equipment could fuel illegal traffic in "virgin" HCFCs.

The provisions in the current ODS Regulation concerning enforcement are limited, perhaps due to the fact that responsibility for enforcement action rests with the Member States. However, there are indications that there is much for Member States to do in this area. A 2003 study for the European Commission on environmental crime[77] reported high estimates of global illegal ODS traffic in the 1990s. A 2006 report of the Environmental Investigation Agency (EIA), an NGO, warns about the emerging global problem of illegal trade in HCFCs.[78] A concern is that used cars containing ODS are exported when they are actually destined for disposal.

In addition to illegal or harmful trade, there are concerns about ODS emissions within the EU due to levels of leakages from stationary and mobile refrigeration units. Under the EurOzone pilot project carried out in 2001-02 under the auspices of CLEEN[79], eight countries (Austria, Belgium, Finland, France, Germany, Netherlands, Norway and the UK) participated in carrying out inspections of such units. All cooling installations have leakages to a certain extent; under the pilot project, leakage rates of 10% were considered acceptable. Of the 2815 installations inspected, leakages above limit were found at 569 installations, or 20%. In addition, several cases of illegal use of CFCs were detected.

Inspections are also needed during waste management operations, e.g. to ensure sufficient rates of recovery during dismantling of cars and refrigerators, and environmentally sound destruction of ODS. The WEEE Directive and ELV Directive do not contain specific provisions requiring inspections for ODS during waste management operations.

In the course of the information gathering and legal analysis for this project, three main enforcement issues to be addressed were identified. First, the ODS Regulation's provisions on inspections and penalties are not very detailed compared to those in other EC legislation, such as the Waste Shipment Regulation.[80] A recent Commission Communication concluded that the 2001 Recommendation on minimum criteria for environmental inspections has only been implemented by few Member States. The Commission recommends establishing legally binding requirements for environmental inspections in specific legislation, such as the WEEE and ROHS Directives, and the ODS Regulation. Section 7.2 assesses the recommendations formulated to address this.

A second concern, raised in many responses to the survey, is that customs officials find it difficult to identify ODS and to distinguish products and equipment that contain controlled substances from those which do not. Section 7.3 analyses the recommended labelling provisions to address this problem

[77] *Final Report. Organised environmental crime in the EU Member States*, Betreuungsgesellschaft für Umweltfragen, 15 May 2003.
[78] *An Unwelcome Encore. The illegal trade in HCFCs*, EIA, October 2006. See: http://www.eia-international.org/cgi/reports/reports.cgi?t=template&a=132.
[79] Chemical Legislation European Enforcement Network, European Enforcement Project on Ozone Depleting Substances (EurOzone), Final Report (April 2003), p.17.
[80] Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste.

Section 7.4 analyses possible impacts from the recommended non-legislative options for strengthening enforcement, while a final issue refers to the future integration of current export procedures with the planned EC "Single Window" for exports. This latter possibility cannot be assessed at this point because the practical modalities are still under study. The revised Regulation should, however, take account of the plans for the Single Window, pending results of the study.

## 7.2 Options to improve provisions on inspections and penalties

***Options assessed***

- No EU action
- Amend Article 20 on inspections to specify Member State obligations for inspections and producer, importer and exporter requirements for record-keeping, and to refer to the chemical enforcement forum.
- Amend Article 21on penalties to list the acts that should be considered as offences.

***Option: No EU action (baseline)***

Under the "business as usual" scenario, Member States would continue to follow greatly different approaches for inspections for the enforcement of the ODS Regulation. Moreover, penalties could differ significantly across Member States. These differences could provide a window for illegal trade as well as for lax practices in operations where ODS are used.[81]

In the absence of a comprehensive survey of Member State environmental inspectorates and customs authorities, it is difficult to derive a baseline estimate of the costs of current Member State enforcement activities. As noted above, three types of inspections involving different authorities would seem to be necessary for a baseline control of the Regulation's requirements:

(1) customs controls aimed at spotting illegal trade;
(2) inspections of waste management operators handling ODS; and
(3) inspections of large refrigeration installations to check for leakages.

Article 20 does not specify the types of inspections that would need to be carried out in the Member States. Nevertheless, it requires the Member States to report on the random import checks that have been carried out. However, customs authorities face strict time restraints for carrying out inspections. One Member State noted that the current attention of customs for anti-terrorism measures has as a consequence lowered the priority of carrying out inspections for illegal trade in ODS. It would seem therefore that the number of random checks on imports of ODS actually carried out are quite low.

We assumed that customs authorities in Member States with large international ports will carry out, at the most, 20 random checks on imports per year whereas in Member States with small ports or no ports a maximum of 5 random checks would be carried out per year. If a random import check takes about 3 hours, the following costs are involved:

[81] Differences in enforcement and penalties among Member States are a concern for other environmental legislation, such as the Wildlife Trade Regulation. See, for example, the 2006 study by TRAFFIC for the European Commission: http://ec.europa.eu/environment/cites/pdf/studies/sanctions_wildlife_trade.pdf.

| | Number of inspection rounds per year (of 3h.) | Time involved in inspection per year (hours) | Total cost per Member State (if average labour cost 32€ per hour ) | Total cost (if average labour cost 32€ per hour) |
|---|---|---|---|---|
| MS with large international port (8 MS) | 20 inspections (per MS) | 60 hours / MS | €1,920 | €15,360 |
| MS with small or no international port (19 MS) | 5 inspections (per MS) | 15 hours / MS | €480 | €9,120 |

**Table 7.1. Enforcement in ports**

Because Member States are not required to report on other types of ODS-related inspections, it is assumed that very few of these types of inspections are taking place. On the other hand, it is assumed that most Member State environmental inspectorates do inspect waste management installations, including recovery facilities under the WEEE and ELV Directives where ODS-containing products and equipment might be treated. These inspections would however be carried out under EC waste management legislation and would not be specifically related to checking compliance with the ODS Regulation.

***Option: Amendments to Article 20 on inspections***

Under this option, Article 20 would be amended to specify details regarding Member State obligations for carrying out inspections, including record-keeping requirements for producers, importers and exporters, as well as exchanges of information between customs & inspectors and annual reporting by Member States.

Companies producing, importing and exporting ODS are expected to keep appropriate records for the requirements. Nonetheless, some companies may have to devote additional effort to organise and maintain these records. Thus, these provisions may slightly increase *administrative costs* for EC companies; this cost may in particular affect small and medium-sized enterprises.

The larger burden would be expected to fall on Member State environmental inspectorates and customs officials if they were required to step up their inspection and enforcement activities as a result. The EurOzone pilot project organised by CLEEN in 2001-2002 would seem to be an indication of what a more ambitious inspection programme might entail. It was not possible for this study to reach the organisers of the EurOzone project for their estimates of the costs of carrying out the pilot project.

In the absence of better information, it has been necessary to make a number of assumptions about the costs of these inspections. During the leakages pilot project, 2815 cooling installations at 535 companies were inspected or approximately 5 installations per company. Three (3) hours would seem to be a reasonable estimate of the amount of time each on-site inspection would require, plus time to write up the inspection report. This comes to a total of 1605 hours per company inspected. Since inspectorates from 8 countries were involved, the average number of hours per country would come to 200. At an average cost of €25 per hour for labour, the cost would come to approximately €5000 per country. Extrapolating this cost to the EU-27 provides a total cost of €135,000 per year for on-site inspections of large cooling installations for environmental management and leakages.

This figure may well be the high range. Since only seven Member States participated in the EurOzone pilot project, it could probably be assumed that the remaining Member States would devote much less

time to ODS-related inspection activities, perhaps 25% (50 hours a year). Thus it seems reasonable to estimate that the total cost to Member State administrations from setting in place specific obligations for carrying out ODS-related inspections would range from range from a low of €34,000 to a high of some €135,000 a year, across all 27 Member States.

***Option: Amendments to Article 21 on penalties***

Article 21 would be amended to provide an explicit list of infringements that should be sanctioned under national law. This text would be drafted in accord with similar provisions in other EC environmental legislation.

Analysis of a recent study for the European Commission on Member State sanctions in the area of environment[82] has shown that almost all Member States have already adopted a comprehensive package of sanctions, under either criminal or administrative law, for ODS-related infringements.

Nearly all Member States had sanctions for illegal trade in ODS, products and equipment containing or relying upon ODS and waste ODS. Only two Member States did not have specific legislation establishing sanctions for illegal trade in ODS, on top of the general prohibition of smuggling goods. About 20 Member States have also established sanctions specifically for use or placing on the market of ODS in violation of the ODS Regulation or the national legislation subsequently adopted. Quite a few Member States have determined a package of sanctions for all violations of Regulation 2037/2000.

This overview suggests that this option will have an impact on only a small share of Member States, since EC regulations have direct effect in the Member States. This means that a revision of Article 20 will not require Member States to adopt legislation implementing these offences into national law. While national legislation will have to specify the sanctions applicable to such offences, in principle a revision would not create a new obligation for the Member States as Article 21 of the ODS Regulation already required Member States to determine the necessary, effective, proportionate and dissuasive sanctions for breaches of the ODS Regulation. The legal option does therefore not require any new legislation from the Member States.

However, while most Member States have set sanctions as required under the current Article 21, there is still variation in what types of acts are considered breaches of the ODS Regulation and therefore should be prosecuted and punished, if the case can be made.

The explicit listing of infringements can have an important impact in terms of the implementation of the Regulation. A recent study for the Nordic Council found that prosecutions for violations of the ODS Regulation have been hampered in a few cases due to the unclear wording of the Regulation in areas such as the export of products and equipment. The revision to the Regulation overall, and the revision to Article 20, should help to address these problems and thus strengthen enforcement.

Thus the more explicit listing of possible breaches should contribute to *reducing crime*, notably illegal trade in ODS but also other types of infractions as well. These provisions may increase *administrative costs* for Member State authorities and enforcement agencies, in the form of costs to amend national legislation as well as the increased cost of pursuing enforcement actions because of the clarity concerning what constituted a breach of obligations. These additional costs have not been quantified.

[82] Huglo Lepage & Partners, *Study on environmental crime in the 27 Member States*. See Annex I: "Complete tables per Member States", 5 April 2007.

***Comparison of costs for improving inspections and penalties***

The costs for no EU action compared to those for the proposed option are presented in the table below.

| | No EU action | Proposed option: specify inspection requirements in Article 20 |
|---|---|---|
| **Economic and Social impacts** | | |
| Total direct costs on industry (NPV at 2010, € mio) | 0 | 0 |
| Total admin. costs on industry (NPV at 2010, € mio) | 0 | 0 |
| Total admin. costs on MS (NPV at 2010, € mio) | 0.35 | 0.35 - 1.73 |
| Total admin. costs on COM (NPV at 2010, € mio) | 0 | 0 |
| **Other impacts: social** | - | Reduction in illegal trade |
| **Impact in ODP tonnes, total 2010-2019** | - | Decrease expected |
| **Impact in GHG-equivalent tonnes** | - | Decrease expected |

**Table 7.2. Comparison of costs for improving inspections and penalties**

## 7.3 Options to improve identification of ODS

***Options assessed***

- No EU action
- The revised Regulation should refer to the labelling requirements under EC chemicals legislation, and also introduce a labelling provision for products and equipment containing ODS.

***No EU action***

Under current provisions of EC chemicals legislation, producers, importers and exporters of substances classified as ozone-depleting under classification and labelling legislation are already obliged to label ODS (and provide safety data sheets) with information concerning the classification and package them accordingly.

There is however no explicit requirement on labelling of products and equipment containing or relying on ODS, and this has led to a number of difficulties on the part of Member States trying to identify products and equipment containing ODS. Moreover, purchasers and users will have less information on how to manage products and equipment at the end of their useful life, e.g., any need to recover and destroy ODS.

***Option proposed: Improve labelling provisions***

**(a) Linking to requirements for labelling & packaging of ODS under existing EU legislation.** For ODS, this option would simply refer to existing and future labelling requirements under EC legislation (Directive 67/548/EEC, REACH and the proposed Regulation on Classification, Packaging and Labelling). Certification requirements for recycled and reclaimed HCFCs have been considered separately in Section 4.

**(b) Requiring labelling of products & equipment similar to the F-Gas Regulation's Article 7.** For equipment and products containing ODS, a labelling requirement would not be completely new: there are requirements under the Waste Shipment Regulation to label WEEE, as well as some relevant provisions under the End-of-Life Vehicle Directive. As ODS are already subject to labelling requirements under other EC legislation, the option should not create significant additional costs, but would rather clarify the ODS Regulation.

The European Commission may face some *administrative costs* developing a label: this would however be based on existing labels for ODS. The costs of developing the label are expected to be minor, but the consultation process could take time. This cost is therefore estimated to be one-off and to cost approximately €20,000 including overheads.

The labelling requirement would mainly affect used products and equipments. It would impose *direct costs on businesses,* in particular producers, distributors of products and equipment containing ODS as well as resellers of used products and equipments. Here the requirements would primarily fall on commercially sold refrigeration and air conditioning equipment containing HCFCs. The costs – estimated at €37,000 annually between 2010 and 2014 -- should be low, as this market is expected to be restricted when the revised Regulation comes into force. (Products and equipment sold among individuals, such as used household refrigerators, would not be affected.)

**(c) Requiring labelling by operators refilling products & equipment with HCFCs.** Operators who service cooling installations, e.g. by reclaiming existing ODS and topping up any losses from leakages, would also incur costs in terms of the time to fill out and affix labels to the equipment they service. The costs – some €548,000 annually for operators across the EU-27 -- should decline over time, as few new products and equipment containing ODS are placed on the EC market.

Labelling may also have some positive impact by aiding enforcement against *illegal trade*. Moreover, labelling of products and equipment could alert buyers to the need to recover the ODS at end of life, and thus *reduce emissions*. Finally, labelling may encourage purchasers to prefer products and equipment that do not contain ODS, thus speeding the phase-out of these substances.

***Comparison of costs for improving identification of ODS***

The proposed option will create administrative costs for industry and Member States, mainly from 2010 through 2014. After this period, the Regulation will no longer allow the refilling of most products and equipment with ODS (this is due in particular to the requirement for the servicing and maintenance of refrigeration and air conditioning containing HCFCs), nor their second-hand sale.

The costs for industry fall in particular on servicing personnel and on the distributors and retailers of used products and equipment containing ODS.

The European Commission will mainly face one-time costs to support implementation of the labelling requirements in the Member States.

| | No EU action | Proposed option for labelling |
|---|---|---|
| **Economic and Social impacts** | | |
| Total direct costs on industry (NPV at 2010, € mio) | | |
| Total admin. costs on industry (NPV at 2010, € mio) | 0 | 2.44 |
| Total admin. costs on MS (NPV at 2010, € mio) | 0 | 0.26 |
| Total admin. costs on COM (NPV at 2010, € mio) | 0 | 0.02 |
| **Other impacts** | | |
| **Impact in ODP tonnes** | No impact | The option should reduce ODS emissions from leakages and also through better collection and recovery of products and equipment containing ODS |
| **Impact in GHG-equivalent tonnes** | No impact | |

**Table 7.3. Comparison of the options for labelling**

## 7.4 Other options to enhance enforcement

One non-legislative option is also assessed: the Commission and the Member States should launch a new initiative to strengthen inspections and enforcement, in particular by Member State customs. This initiative could include:

- Strengthening inspections and enforcement through training and exchange of experience (perhaps through IMPEL or CLEEN).
- Preparing and distributing a handbook to assist implementation of the Regulations for dissemination to customs authorities.

The second action would cost little, as the Nordic Council of Ministers is currently preparing such a handbook (in English) for use in Nordic countries. The European Commission and the officials participating in the Management Committee could disseminate this handbook within other Member States.

For the first action, the Commission could organise a joint workshop together with IMPEL or CLEEN to discuss enforcement issues, in particular for Customs. Such a workshop could:

- Disseminate the Nordic brochure to other Member States
- Exchange information on good practices in enforcement of ODS imports and exports
- Identify priority issues for enforcement in coming years

The estimated costs of such a workshop are presented in the table below:

| | Unit |
|---|---|
| Organisation of the workshop (Commission) | 3 months |
| Participation in the workshop by officials from 27 Member States (2 days participation, 2 days preparation and travel, 1 day follow-up) | 5 months |
| Travel and related costs | 12 000 Euros |
| Venue costs | 2 000 Euros |

**Table 7.4. Costs of a workshop on enforcement**

This activity will be valuable in particular if repeated regularly: e.g. every other year.

These initiatives would result in stronger enforcement and more efficient application of the Regulations, reducing crime. The impact of these activities on enforcement action is difficult to estimate. A recent report for the Nordic Council noted that in these countries:

> "…there is presently very limited active enforcement to ensure that the restrictions are followed and, consequently, very little knowledge as to what extent the restrictions are violated."[83]

It is therefore reasonable to assume that enhancement of enforcement will result in more knowledge about violations and hence a reduction in illegal activity.

## 7.5 The EC "Single Window" for Customs

The Single Window system for customs inside the Community is now being developed by the European Commission; implementation should begin in 2009 and the Single Window should be in force by 2012. The Single Window will create a co-ordinated approach across authorities and agencies, including through the exchange of data. It will be necessary to integrate the export requirements and systems for the import and export of ODS into the Single Window. As the Single Window proposal is still under preparation, it will be necessary to address its impacts at a later stage.

The European Commission is currently studying the practical modalities of the Single Window system for Customs. The results of the work will have to be integrated into a revised Regulation.

[83] Ingrid Kökeritz, IKZ Environment Consulting, unpublished report to the Nordic Council, August 2006

# 8. Recovery, recycling and destruction of ODS

## 8.1 The problem

While the Montreal Protocol and EC legislation have significantly reduced the use and related emissions of ODS in the Community, a large amount of ODS are still found in existing products and equipment. A recent IPCC/TEAP study indicated that these "banks" of ODS have significant ozone-depleting and global warming potentials. These banks include ODS found as refrigerants, as well as ODS still contained in foams they were used to blow. For this assessment, estimates of EC banks were prepared on the basis of the IPCC/TEAP's global estimates (see Annex I).

The ODS Regulation requires the recovery of ODS in several types of equipment, including refrigerators and air conditioning (Article 16(1) and 16(2), but does not include standards for recovery. Information gathered in this study indicates that effective recovery levels vary across the Member States.[84] Stronger and more uniform recovery rates would reduce EC emissions.

Article 16 calls for recovery of ODS from other products and equipment, such as building foams, "where practicable". The estimates produced by IPCC/TEAP and other studies show that recovery of ODS from building foams could greatly reduce EC emissions that affect both the ozone layer and global warming if recovery is technically and economically feasible.[85]

## 8.2 Options for revision of the Regulation

This section reviews four independent options to strengthen recovery, recycling and destruction of ODS, as well as the option for "no EU action".

- No EU action.
- Clearly allocate responsibilities for waste management and links to other EC acts.
- Ensure regulatory transparency for destruction by:
  - Specifying authorised methods for destruction
  - Specifying other environmentally acceptable destruction technology
  - Establishing a preference for destruction for products and equipment containing ODS (with the exception of products and equipment containing HCFC)
- Adopt standards for recovery with minimum % for recovery and destruction
- Revise Article 16(3) to encourage Member State and voluntary action to address ODS banks in building foams.
- Develop guidance document on links between the ODS Regulation and waste legislation, in particular WEEE, ELV and Shipment of Waste Legislation.

[84] For refrigerators, for example, RAL considers that under best practice over 90% of domestic refrigerators go to recycling plants and that over 90% of their ODS is recovered. RAL estimates that very few Member States meet this best practice. Portuguese NGOs claimed at the Meeting of the Parties that only 5% of ODS is recovered from WEEE in that Member State (ENDS Daily, 18 September 2007).

[85] As far as can be determined, hardly any ODS are recovered from building foams at present in the EC.

## 8.3 ODS banks in the EC

At global level, TEAP (also working with IPCC) has made estimates of ODS banks, using a top-down approach based on past production of ODS and the estimated content of these substances in refrigeration, air-conditioning, foams and other sectors. Several Member States have prepared national estimates, some of them using a "bottom-up" approach, based on estimates of their products and equipment and their ODS contents.

The estimates made for this review (see Annex I) are based on TEAP estimates. On this basis, EU banks totalled about 653 000 metric tonnes of CFCs, 610 800 metric tonnes of HCFCs and 23 900 tonnes of halons in 2007. Foams are the largest single component of these banks: they contain over 575 000 metric tonnes of CFCs and 317 700 metric tonnes of HCFCs (See Table 8.1). In this estimate, the foam banks include both ODS found in insulation foams for refrigeration (the amount of ODS here should be more or less equivalent to the amount of ODS in the refrigerants)[86] and foams used for building insulation and related applications (*e.g.* foams to insulate pipes and some road surfaces, such as runways). The building and related foams make up the lion's share of the total.

| | Refrigeration | Air conditioning | | Foams | Medical Aerosol | Fire Protection | Others | Total |
|---|---|---|---|---|---|---|---|---|
| | | stationary | mobile | | | | | |
| **EU banks in 2007** | | | | | | | | |
| **CFCs** | 45.5 | 12.4 | 19.3 | 575.9 | 0.2 | 0.0 | 0.0 | **653.3** |
| **HCFCs** | 91.1 | 194.1 | 4.0 | 317.7 | 1.0 | 0.8 | 2.2 | **610.8** |
| **Halons** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 23.9 | 0.0 | **23.9** |
| **EU banks in 2010** | | | | | | | | |
| **CFCs** | 33.3 | 9.8 | 13.1 | 531.2 | 0.2 | 0.0 | 0.0 | **587.6** |
| **HCFCs** | 90.3 | 187.1 | 4.0 | 237.5 | 0.6 | 0.8 | 2.2 | **522.5** |
| **Halons** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 18.1 | 0.0 | **18.1** |

Data elaborated from IPCC/TEAP global estimates

**Table 8.1. Estimate of the European Union's ODS banks (thousand metric tonnes)**

By 2010, EC foam banks will have declined somewhat: for example, the ODS contained in foams will fall to about 530 000 metric tonnes. Other banks will also decline. This change will occur as products and equipment reach the end of their lives and enter the waste stream.[87] In addition, leakages to the atmosphere from foams and refrigerator coils in products and equipment still in use will reduce the level of the banks. For foams in use, emissions are believed to be low, according to TEAP.

| EU 2010 | metric tonnes | ODP tonnes |
|---|---|---|
| **CFCs** | 587.6 | 587.6 |
| **HCFCs** | 522.5 | 30.8 |
| **Halons** | 18.1 | 114.6 |

**Table 8.2. Estimated ODP of EU banks, 2010 (thousands of ODP tonnes)**

[86] Based on comments by Christoph Becker, RAL: the experience with the recycling of household refrigerators shows that more or less equal amount of ODS are recovered from refrigerant and foams.

[87] ODS in refrigerator coils can be assumed to be quickly released to the atmosphere if it is not recovered. On the other hand, ODS in building foams sent to landfills will be released only slowly (and some may degrade anaerobically to HFCs).

The estimates in Table 8.1 are in metric tonnes. In terms of the ozone-depleting potential of these banks (see Table 8.2), the halon banks are second to those of CFCs.[88]

## 8.4 Assessment of the options for legal clarity

***Clarification of responsibilities for waste management***

The current Regulation does not designate who is responsible to recover, reclaim or destroy ODS and ODS-containing equipment. The text implies however that the general rules on waste management apply, *i.e.*, the obligation is on the holder of waste.

Under this option, the revised Regulation would clarify responsibilities for recovery, through wording similar to that in the F-Gas Regulation, which makes "operators" responsible. For further clarity, cross-references to other relevant EC legislation – notably the WEEE Directive – would be introduced.

The main effect here will be to clarify the legal text. This is expected to reduce legal uncertainty and related administrative costs for EC businesses. This impact, however, is not assessed in quantitative terms.

***Authorised methods of destruction***

Under this option, the revised Regulation will list in an Annex those approved technologies identified by the Parties to the Montreal Protocol. The Annex would also identify criteria for "any other environmentally acceptable destruction technology", cited in the current text of Article 16(1). This Annex could be amended by comitology to adapt to any new Decisions of the Parties on this topic as well as any advances in technology.

This option would strengthen the legal framework. By specifying criteria for destruction technology not on the list, the option would remove uncertainty and ensure a more uniform application across Member States – thus providing greater legal clarity. The criteria would furthermore ensure that any alternative technologies are at least as effective as those specified.

According to a 2005 study on best available technologies for the European Commission, the destruction methods currently used in the EU27 – as well as methods in Japan and the US – are currently on the list identified by the Decisions of the Parties.[89] For this reason, this option would have an impact only in the event of the introduction of new methods, and possibly new technology. This impact is expected to be small and is not quantified.

[88] The ODP of the halon banks has been roughly estimated using a direct average of three halons.

[89] ICF International, *Review of the best available technologies and best environmental practices concerning the prevention and minimisation of leakages and emissions of controlled substances in connection with recovery, recycling, reclamation and destruction*, April 2005.

## 8.5 Assessment of the option for a preference for destruction

Currently the Regulation establishes no hierarchy between recycling, reclamation and destruction of ODS. However, as most remaining uses of ODS are being phased out, recycling and reclamation have less application within the EC.

In their responses to the questionnaire, a number of Member State and industry respondents called for a preference for the destruction of recovered ODS in the revision to the Regulation. Moreover, when the revised Regulation comes into force (possibly in 2010), few uses will remain for ODS in the EC. The only important remaining use will be that of recycled and reclaimed HCFCs for the servicing of refrigeration and air conditioning equipment.

According to Member States, the lion's share of ODS that are recovered are currently sent for destruction. The data reported by Member States to the European Commission raise some doubts concerning their accuracy.[90] Figure 7.5 shows this data for three main categories of ODS: CFCs, HCFCs and halons. (Quantities for other categories are much smaller.)

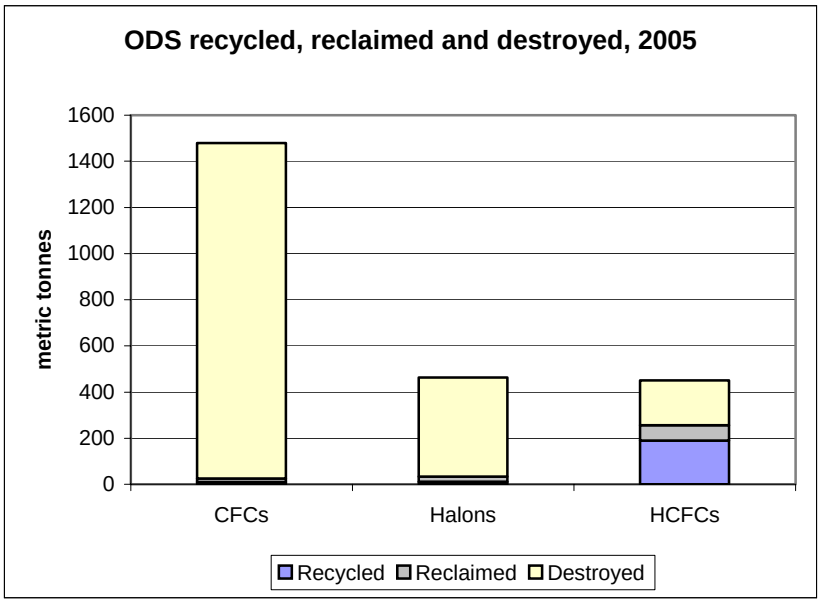



**Figure 8.1. Recycling, reclamation and destruction of ODS in the EU27 (2005)**

According to this data, for both CFCs and halons, the lion's share of ODS recovered goes for destruction already.[91] On the other hand, only about 40% of HCFCs recovered are destroyed: the majority are either recycled or reclaimed.

[90] For example, all ODS recovered should be either recycled, reclaimed or destroyed. The data show gaps between the amounts recovered and the total amounts recycled, reclaimed and destroyed: it is not clear if these can be accounted for by shipments between Member States and temporary storage for later recycling, reclamation or recovery. Figure 7.4 does not provide the amount recovered.

[91] Several Member States reported ODS that are reclaimed or destroyed in blends. These were not included in Figure 7.4, as no information was provided on the share of specific ODS within the blends. It should be noted that nearly all the CFCs reclaimed in 2005 come from one Member State: this may represent a one-time event rather than an example of a long-term trend.

The analysis of the options looks first at possible trends in the share of recycled and reclaimed ODS without EU action. The cost of the option for destruction is calculated based on the cost of destroying this remaining share.

***Option: No EU action***

Even without EU action, the share of CFCs and halons sent for destruction is expected to increase, as opportunities and thus market demand for their use within the EC fall. Moreover, opportunities for export will decline with global phase-outs. Finally, exports of ODS (including recycled and reclaimed ODS) are currently restricted.

Without EU action, the assessment assumes that the current levels of CFCs *not* destroyed – in other words, those recycled and reclaimed – are assumed to fall to one-fifth by 2010 and decline further in the decade thereafter: this will be due to the low level of CFCs available for recovery as well as the lack of potential uses for recycled and reclaimed CFCs. (These represent – as figure 7.5 shows – a small share of the total amount of CFCs recovered: the lion's share will continue to be destroyed.)

| | |
|---|---|
| Est. quantity of CFCs recycled and reclaimed, 2005 (kg) | 24 900 |
| Projected quantity of CFCs recycled and reclaimed, 2010 (kg) | 5 000 |
| Projected quantity of CFCs recycled and reclaimed, 2019 (kg) | 0 |

**Table 8.3. Quantities of CFCs destroyed: 2005 estimate and 2010-19 projections**

For halons, the assessment assumes that the decline in quantities will be less rapid, both due to a slower decline in the share of halons sent for recovery and also to a continued EC market for recycled and reclaimed halons for critical uses. (Again, the following estimates and projections are only of the halons sent for recycling and reclamation: here too, most halons recovered go to destruction already).

| | |
|---|---|
| Est. quantity of halons recycled and reclaimed, 2005 (kg) | 33 100 |
| Projected quantity of halons recycled and reclaimed, 2010 (kg) | 16 500 |
| Projected quantity of halons recycled and reclaimed, 2019 (kg) | 1 650 |

**Table 8.4. Quantities of halons destroyed: 2005 estimate and 2010-2019 projections**

The maintenance and servicing of refrigeration and air conditioning will continue to use recycled and reclaimed HCFCs through the end of 2014. According to a 2006 study for the European Commission, the estimated end-of-year supply of recycled HCFCs is expected to be quite large: approximately 21 000 metric tonnes in 2010 across the EU27. This supply is expected to come largely from commercial and industrial refrigerators and freezers, and much of it is expected to be used for servicing and maintenance.

This study estimates that, while the levels of HCFCs going to recovery will decline steadily in the years after 2010, large amounts will continue to go for recovery after the phase-out of the use of recycled and reclaimed HCFCs in 2015. According to the study, the total amount in the period from 2015 to 2019 will be approximately 13 816 metric tonnes.

Under the business as usual option, it is assumed that a large share – perhaps 75% - will be recycled or reclaimed for export. This assumes that recycling and reclamation operate at a high level (as expected in the 2006 study) between 2010 and 2014. Maintaining these operations will provide a lower cost option for the recovery of ODS than destruction; thus, operators of commercial and industrial refrigeration air conditioning are likely to prefer to pay for recycling and reclamation rather than destruction. The recycled and reclaimed HCFCs would be exported, as no use would be allowed in the EC.

If such exports completely replace virgin HCFCs on the global market (these would be HCFCs produced in other countries, such as China), the exports would not lead to a net change in global emissions of HCFCs. On the other hand, if the exports lead to an increase in global consumption of HCFCs and delay some users from switching to substances that are not ODS, the exports would increase global emissions.

***Option: Preference for destruction***

Under this option, the *CFCs* that would be recycled or reclaimed under the "business as usual" option instead would go for destruction. (The impacts of the option relate to the costs and benefits for the destruction of this tranche of recovered CFCs.)

The total amounts of additional CFCs and halons destroyed, compared to the no EU option (business as usual, based on the projections cited above are listed in Table 8.5. Destruction is estimated to cost between €4.50/kg and €7.50/kg,[92] producing high and low cost estimates.

| | CFCs | Halons |
|---|---|---|
| Total quantity of additional ODS destroyed (metric tonnes)<br>(ODS destined for recycling or reclamation under BAU, 2010-2019) | 24.9 | 91.0 |
| Equivalent ODP tonnes | 24.8 | 558.2 |
| Equivalent GHG-equivalent tonnes | 170 600 | 120 400 |
| Low cost estimate (million €, NPV 2010)<br>(Total destruction costs for 2010 – 2019, at €4.5/kg) | 0.097 | 0.354 |
| High cost estimate (million €, NPV 2010)<br>(Total destruction costs for 2010 – 2019, at €7.5/kg) | 0.162 | 0.590 |

**Table 8.5. Additional CFCs destroyed under the option, 2010-2019**

For *HCFCs*, the costs and benefits of this option will only take place from 2015 and 2019. The analysis focuses on HCFCs recovered from commercial and industrial refrigeration – these are estimated to be the main banks of HCFCs destined for recovery in this period (the amounts from household refrigerators and other sources are considered to be far lower). The total supply of recovered HCFC-22 (also called R-22: this substance accounts for 96% of all HCFCs used as refrigerants in commercial and industrial equipment) are taken from a report on the phase-out of HCFCs prepared for the European Commission in 2006.[93]

| | |
|---|---|
| Total supply of recovered R-22 (2015-2019) (kg) | 13 816 |
| Low cost estimate<br>(Total destruction costs in million € at €4.50/kg, NPV at 2010) | 47.2 |
| Low cost estimate<br>(Total destruction costs in million € at €4.50/kg, NPV at 2010) | 78.7 |
| ODP destroyed (tonnes) | 1519 |
| GWP destroyed (tonnes) | 41,994,008 |

**Table 8.6. HCFCs destroyed, costs and benefits from 2015 to 2019**

[92] This low cost is consistent with the costs reported for different destruction technologies in a 2005 report for the European Commission. The high cost estimate represents the possible impact of ongoing high energy costs. ICF International, *Review of the best available technologies and best environmental practices concerning the prevention and minimisation of leakages and emissions of controlled substances in connection with recovery, recycling, reclamation and destruction*, April 2005.

[93] ICF International, *Supply and Demand of Recycled Hydrochlorofluorocarbons (HCFCs) in Existing Refrigeration and Air Conditioning Equipment Beyond 2009: Analysis of Regulatory Phaseout Scenarios*, August 2006

***Comparison of the options***

| | No EU action | Proposed option: Preference for destruction |
|---|---|---|
| **Economic and Social impacts** | | |
| Direct costs for industry (NPV at 2010)<br>- CFCs + Halons (million €)<br>- HCFCs (million €) | <br>0<br>0 | <br>0.45 – 0.75<br>47.2 – 78.7 |
| Admin. costs for industry | 0 | 0 |
| Admin. costs on MS: (work-months) | 0 | 0 |
| Admin. costs on on COM: (work-months) | 0 | 0 |
| **Other impacts (e.g. social)** | None identified | None identified |
| **Impact in ODP tonnes** | 2100 | 0 |
| **Impact in GHG-equivalent tonnes** | 42 300 000 | 0 |

**Table 8.7. Comparison of the options: destruction**

Table 8.7. summarises the assessment results presented in this section.

## 8.6 Assessment of the option regarding standards for recovery

Several types of products and equipment containing ODS are covered under the provisions of the WEEE Directive, which establishes producer responsibility for the collection and recovery at end of product life. By far, the most important sector is that of refrigerators and freezers.

A recent review of the WEEE Directive suggests that the collection of WEEE in general so far has not functioned well: this study estimated that in 2005, only 27% of waste refrigerators and freezers were collected as required in the EU27.[94]

For refrigerators and freezers that are collected, under best practice about 90% of the ODS from refrigerators that are collected and sent to recycling plants can be recovered. Under best practice, about 90% of the ODS from refrigerators that are collected and sent to recycling plants can be recovered. However, according estimates by RAL, an organisation that establishes standards for refrigerator recovery, in only a few Member States does recovery reach these levels. (Member States prepare annual reports to the European Commission on the recovery of ODS. This data, however, does not refer to the specific sources of the ODS recovery. Moreover, the data has some discrepancies, as described below in section 7.6.)

***Current recovery levels***

The amount of ODS recovered and destroyed from household refrigerators and freezers depends on the rate of collection – the number of waste refrigerators and freezers that are properly collected – and subsequently on the rate of recovery and destruction, the amount of ODS effectively removed. The box below discusses these parameters and compares them to a third, simpler one, the rate of destruction.

[94] United Nations University *et al*, *2008 Review of Directive 2002/96 on Waste Electrical and Electronic Equipment (WEEE)*, 5 August 2007, p. iv and elsewhere. The study used a top-down approach to estimate the share of refrigerators and freezers based on the level of overall WEEE waste collection.

**Box 7.3. Parameters to measure collection, recovery and destruction**

Different efficiency goals can be set across different parameters:

- *Collection* refers to the share of waste products and equipment that are brought to designated recovery facilities. According to RAL, about 90% of waste household refrigerators and freezers are collected in those Member States with the most effective collection systems, in contrast with the average 23% reported across the EC in a recent UNU review of the WEEE Directive for the European Commission.
- *Destruction and removal efficiency* is specified in Decisions of the Parties for destruction technologies (e.g. Decision XV/9). The 2002 TEAP Assessment of Destruction Technologies noted that this refers specifically to stack efficiencies.
- A recent TEAP report proposed a comprehensive parameter, *Recovery and destruction efficiency (RDE)*, to cover all end-of-life management steps after collection. (TEAP, *Report of the Task Force on Foam End-Of-Life Issues*, Vol. III, May 2005)

An estimate of the amount of ODS currently recovered from refrigerators and freezers is made based on the current rate of collection for waste refrigerators and freezers (which, according to the UNU study, was 27.3% in the EU27 in 2005) together with an estimate of the rate of recovery and destruction of the ODS these waste refrigerators and freezers contain. This estimate refers to collection via WEEE producer responsibility schemes; actual collection rates believed to be slightly higher. (A rate of 35% is used in estimating current recovery levels.)

Estimates from RAL have shown that recovery and destruction rates in a few Member States have reached best practice level, in which approximately 90% of the ODS in waste refrigerators and freezers that are collected and brought to recycling plants are recovered and then destroyed. Most Member States, however, fall below this level. RAL estimates suggest that the average recovery and destruction rate for ODS from EU27 refrigerators and freezers is under 60%.

Based on these estimates, the following table provides an overview of current recovery levels.

| | **EU27** |
|---|---|
| Number of refrigerators and freezers entering the waste stream | 19.5 million |
| Average rate of collection | 35% |
| Number of refrigerators and freezers arriving at recycling plants | 6.7 million |
| Average rate of recovery and destruction of ODS | 57% |
| Refrigerant recovered and destroyed | 1360 metric t |
| CFCs recovered and destroyed* | 1090 metric t |

* About 80% of all collected refrigerators contained CFCs in 2007 (C. Becker, RAL)

**Table 8.8. Estimated recovery and destruction of ODS from household refrigerators and freezers, 2007**

### *The future bank of ODS in refrigerators and freezers*

In looking at options for the future, one important factor is that the bank of ODS in refrigerators is rapidly declining as old refrigerators enter the waste stream. After 1992, new refrigerators in the EU15 could no longer use CFCs. Some manufacturers converted to HCFCs. However, most of the refrigerators sold in the EU in the 1990s instead were manufactured using HFCs and hydrocarbons (HCs), which are not ODS (the ODS Regulation has since ended the first placing on the market of new refrigerators containing any ozone-depleting substances). In the EU12, the use of CFCs continued longer, and a larger share of refrigerators containing CFCs and HCFCs is believed to remain in use.

The EU15 phase-out of CFCs in the early 1990s is important, because refrigerators have an average lifetime of 15 years.[95] In other words, until recently, nearly all end-of-life refrigerators contained CFCs (both for refrigerants and as blowing agents in their foams). From 2007, the share of waste refrigerators containing CFCs will fall rapidly.

Figure 7.1 shows the study's estimate of the ODS content in EU15 refrigerators from 2010 through 2019. These estimates indicate that by 2010, only a small share of refrigerators and freezers that contain ODS will remain in the EU15 for future collection. This is important because the EU15 contains the great majority of refrigerators: approximately 15.3 million household refrigerators and freezers enter the waste stream each year in EU15 Member States. At the same time, refrigerators containing CFCs will continue to enter the EU15 waste stream in 2019 and beyond, as a small share of consumers hold on to their appliances for a long time before replacement.

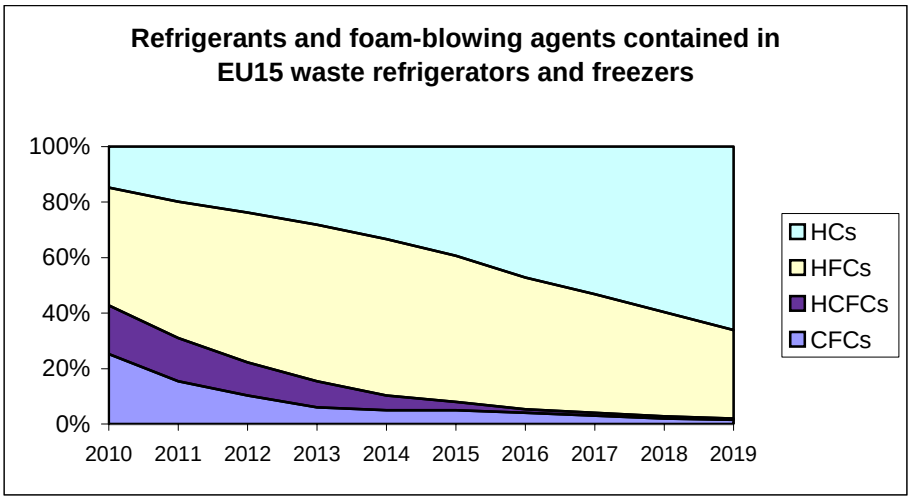



**Figure 8.2. Preliminary estimate of refrigerant and foam-blowing agent in EU15 end-of-life refrigerators, 2010-2019**

In contrast, the EU12 did not phase-out CFCs in 1992. Not only did refrigerators and freezers use these ODS for longer; reportedly, a larger share of these products and equipment sold in the 1990s use HCFCs. Overall, the move away from ODS to HFCs and HCs took longer. For this reason, the EU12 markets still contain a large share of refrigerators with CFCs and HCFCs, and many of these will enter the waste stream from 2010 on. The EU12 market, however, is smaller than the EU15 market: only about 4.1 million refrigerators and freezers are discarded each year.

[95] Christoph Becker, RAL, and Luigi Meli of CECED both refer to the 15-year average lifetime. Luigi Meli mentioned a "long tail end" of the distribution curve for refrigerator and freezer lifetimes: this is captured in the calculations used (see Figure 7.1 and 7.2).

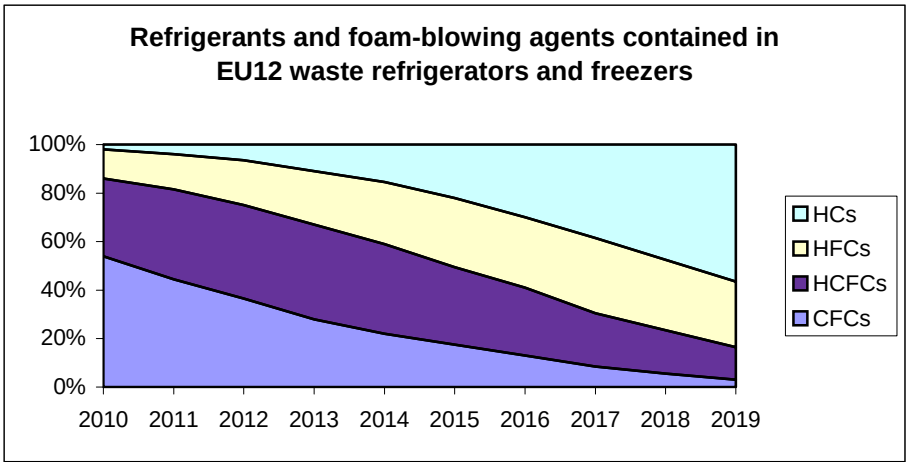



**Figure 8.3. Preliminary estimate of refrigerant and foam-blowing agent in EU12 end-of-life refrigerators, 2010-2019**

The estimate for the EU12 is more uncertain that that for the EU15: these Member States did not have uniform phase-out dates for CFCs and then HCFCs. Moreover, less information has been found on the replacement refrigerants used, and thus more assumptions on the type of refrigerant and blowing agent were made.

***Option: No EU action***

The "No EU action" assumes that Member States will seek to improve their recovery of WEEE from current low levels: in the EU15, an average rate of 50% would be recovered through the ongoing improvement of current systems – in other words, without major new policy action (the WEEE Review cites a 75% rate as attainable in the EU15, though this likely will require new initiatives in the field of EC waste policy). The collection rates in many EU12 are quite low. Here, it is assumed that an average rate of 25% across the decade of 2010 to 2019 would be reached without new policy and legal developments.

The number of refrigerators and freezers entering the waste stream is expected to remain constant.[96] In addition, the rate of ODS recovery and destruction is also assumed to remain the same as in 2007.

| | **EU27** |
|---|---|
| Number of refrigerators and freezers entering the waste stream | 19.5 million |
| Average rate of collection | 44% |
| Number of refrigerators and freezers arriving at recycling plants | 8.7 million |
| Average rate of recovery and destruction of ODS | 57% |
| Cost of collection, recovery and destruction (€) | 42.7 million |
| Refrigerant recovered and destroyed | 1740 metric t |
| CFCs recovered and destroyed | 160 metric t |
| HCFCs recovered and destroyed | 150 metric t |

**Table 8.9. Estimated recovery and destruction of ODS from household refrigerators and freezers, average annual levels 2010-2019: No EU action**

[96] There may be a slight increase, as population has increased slowly in the EU in recent decades while average household size has decreased: both factors imply that refrigerators and freezer purchases increased slightly in recent decades, and thus the number going to the waste stream should also increase slightly in coming years.

Under the business as usual scenario, about 50% more refrigerators and freezers go to the waste stream than in 2007, due to improvement in WEEE systems. The amount of CFCs recovered annually in the decade from 2010 to 2019 will, however, fall significantly. Table 8.9 presents average annual data. While the average annual amount of refrigerant recovered increases, the average annual share of CFCs recovered will fall, as fewer refrigerators and freezers will contain these ODS. Indeed, very few refrigerators or freezers in the EU15 waste stream will contain these after 2014. In the EU12 as well, the share of ODS, including HCFCs, will decline steadily.

The cost is estimated at over 40 million € per year. This is based on current average costs of refrigerator collection plus ODS recovery and destruction, which total approximately five € per refrigerator.[97] While costs vary among Member States an EU27 average cost is used for this impact assessment. [98]

***Proposed option: Establish standards for recovery and destruction***

The analysis of standards focuses on the most important type of products and equipment sent for recovery, household refrigerators and freezers.

The option would establish standards setting a minimum percentage of recovery and ODS from waste products and equipment. It is assumed that the standard sets a 90% level: current standards, such as those by RAL, set this level, and a few Member States currently achieve it.

In the impact assessment, it is assumed that reaching this level will take Member States some time (*i.e.*, that many Member States will reach this level a few years after 2010); moreover, not all Member States will reach the 90% standard. Thus, for the assessment, an average 75% level is used for the period of 2010 to 2019.

The assessment uses the same collection rate as the business as usual scenario: an EU27 average of 44% of waste refrigerators and freezers are collected under WEEE Directive schemes, with a lower level in the EU12. The recent review of the WEEE Directive noted that higher levels can be achieved: this, however, is an issue under that directive.

In terms of overall costs, the level of effective ODS recovery and destruction is only one component. Indeed, RAL has argued that reaching best standards should not involve additional costs in many MS. For this analysis, the RAL level of no additional costs is used as the lower bound; as an upper bound a 50% increase in costs has been chosen.

[97] C. Becker, RAL.

[98] Key factors shaping Member State costs include: the number of collection systems and recycling plants available in the Member State (costs are higher in Member States without little competition in these areas); the number of refrigerators sent to the waste stream (costs are higher in smaller Member States); and finally, the effectiveness of recovery, as best techniques can cost higher. Costs are particularly high for Member States without recycling plants, and in particular small island states such as Malta and Cyprus.

| | EU27 |
|---|---|
| Number of refrigerators and freezers entering the waste stream | 19.5 million |
| Average rate of collection | 44% |
| Number of refrigerators and freezers arriving at recycling plants | 8.7 million |
| Average rate of recovery and destruction of ODS | **75%** |
| Cost of collection, recovery and destruction (€) | 42.7 – 65.0 million € |
| Refrigerant recovered and destroyed | 2600 metric t |
| CFCs recovered and destroyed | 250 metric t |
| HCFCs recovered and destroyed | 240 metric t |

**Table 8.10. Estimated recovery and destruction of ODS from household refrigerators and freezers, average annual levels 2010-2019: BAT option**

The increase in ODS recovered and destroyed is shown in the graphs in Figure 8.4, below.

This option will require administrative costs: according to RAL, the implementation of BAT standards needs to be monitored by national authorities: without appropriate enforcement, cost pressures in the industry will drive down effective results.

The following estimates are based on a minimum level of one inspection per waste facility per year, which is assumed to be an increase from current levels. In addition, the current total of about 60 facilities across the EC would grow to 70.

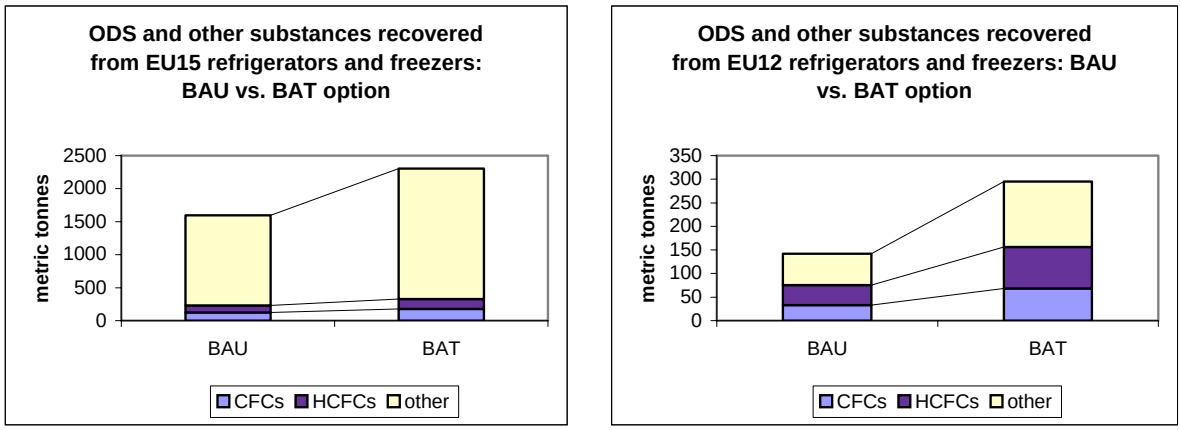



**Figure 8.4. Average annual increase in ODS recovery from business as usual to BAT option: EU15 and EU12 (metric tonnes per year, 2010 to 2019)**

***Comparison of the options***

Standards for recovery and destruction will increase the costs of recovering ODS, and reduce emissions of ODS. The costs presented here are only those related to ODS (i.e. without the costs related to improved recovery of HFCs and HCs). The option requires additional administrative effort on the part of Member States to provide better monitoring and enforcement of recovery plants, and this will in turn increase administrative costs for the recycling industry. The European Commission and Member States will also need some administrative resources to discuss and identify the set of standards. As standards have already been developed, these costs should be relatively low.

| | **No EU action** | **Proposed option: Standards for recovery** |
|---|---|---|
| **Economic and Social impacts** | | |
| Direct costs on industry (millions of €, NPV at 2010) | 5.29 | 8.05 million |
| Total admin. costs on industry (NPV at 2010, € mio) | 0.43 | 0.63 |
| Total admin. costs on MS (NPV at 2010, € mio) | 0.19 | 0.33 |
| Total admin. costs on COM (NPV at 2010, € mio) | 0 | 0.02 |
| **Other impacts (e.g. social)** | n.a. | n.a. |
| **Emissions in ODP tonnes** (total, 2010-2019) | Reduction of 170 ODP tonnes | Reduction of 260 ODP tonnes |
| **Emissions in GHG-equivalent tonnes** | 2 015 000 | 3 160 000 |

**Table 8.11. Comparison of the options: standards**

## 8.7 Assessment of the option regarding ODS banks in building foams

The recovery of ODS from building foams is currently covered by Article 16(3) of the ODS Regulation, which states that substances in "other" products, installations and equipment shall be recovered "if practicable". As building foams represent the largest single bank of ODS, their possible recovery is an important issue.

***The size of ODS banks in building foams***

For building foams as for refrigerators, CFCs were used almost exclusively in the EC until the early 1990s, when they were replaced as blowing agents by HCFCs as well as other substances. The use of these foams started in the 1960s and became more common following the energy crises of the 1970s and 1980s, as insulation became more important in building design and construction.

The lifetimes of these foams are tied to the lifetimes of the buildings: the foams are typically in place for 30 to 70 years before removal in demolition or renovation. As HCFCs were used only from the early 1990s, nearly all building foams entering the waste stream through 2020 should contain HCFCs.

Figure 7.3 provides TEAP's global estimates for blowing agents used for one of the key applications, discontinuous panels.

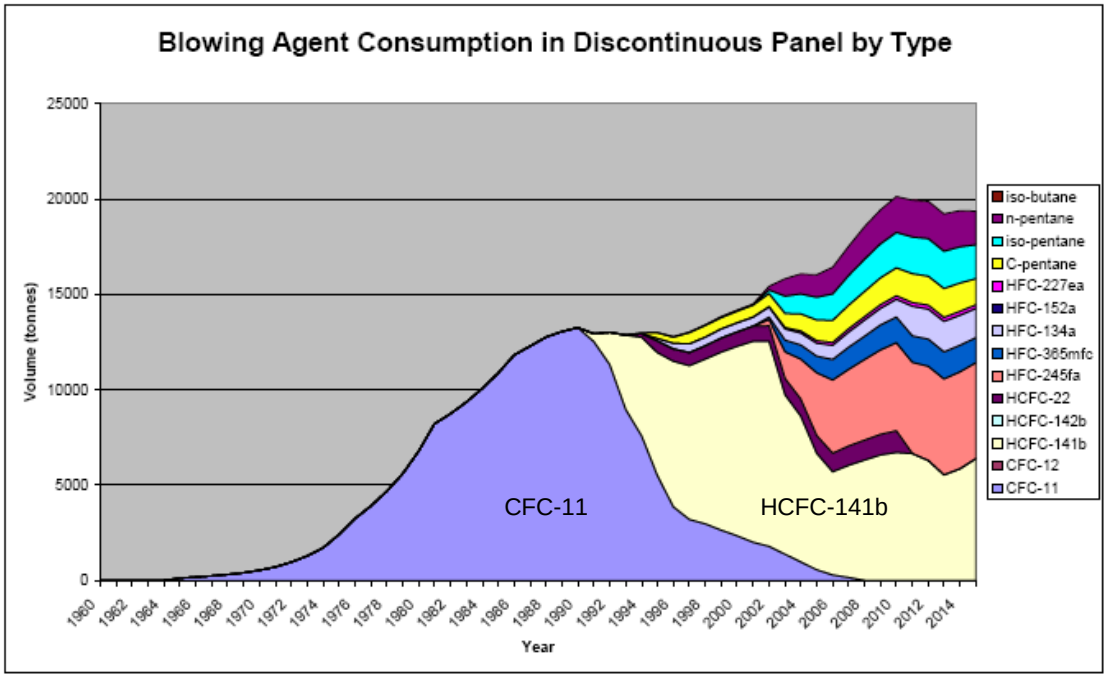



**Figure 8.5. Global use of blowing agents in discontinuous panels (including sandwich panels)**
(reproduced from TEAP, *Report of The Task Force on Foam End-Of-Life* Issues, May 2005)

The specific types of building products that contain foams with ODS include:[99]

- Sandwich panels, with steel, aluminium or glass-fibre facing on polyurethane (PU) foams
- Boardstock and foams with flexible-faced lamination, containing either PU or polyiso-cyanurate (PIR) foams
- Sprayed foams, applied using separate and isocyanate liquids
- Slabstock to insulate pipes and storage tanks, containing rigid PU foams
- Pipe-in-pipe foams sections of PU foam
- Extruded polystyrene insulation boards used for roof, floor and wall insulation and for some construction applications (e.g. underneath roads and airport runways)
- Extruded polystyrene cell-surface boards for wall insulation
- Phenolic foam laminates for wall and roof insulation

***Sandwich panels***

The TEAP Task Force on Foam End-of-Life Issues reported that prefabricated sandwich panels, with two rigid sides and a layer of insulting foam in between, offer the best opportunity for ODS recovery in terms of both technical and economic feasibility. For other categories, costs of recovery may be prohibitive; for some, such as sprayed foams, recovery of ODS is not technically possible.

Sandwich panels contain approximately 12% of the ODS used for building foams in Austria, according to a detailed study carried out there. Such panels have been widely used in many other EU15. To estimate the amount of ODS that will be sent to the building waste stream, it is assumed that 10% of all ODS used in building foams are in sandwich panels. Moreover, it is assumed that these buildings (typically commercial or industrial buildings) have a 40 year lifespan.

On the basis of these assumptions, the amount of ODS in these panels entering the waste stream will rise steadily in coming decades (see Figure 7.4). This projection is based first on the estimate that

[99] TEAP, *Report of the Task Force on Foam End-of-Life Issues*, May 2005, pp. 19-23.

panels contain approximately 15% of all building foams.[100] A second issue is the extent to which the ODS will be emitted over the lifetime of the panels. The figure presents projections for both a low average emissions rate (1% per year) and a high average rate (3% per year).

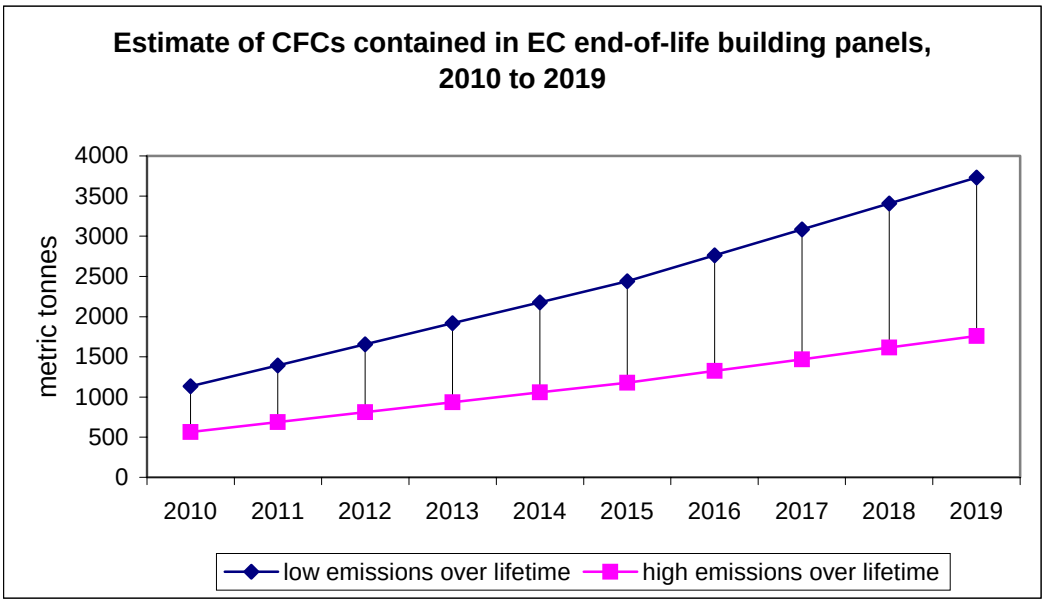



**Figure 8.6 Estimated quantities of CFCs contained in sandwich panels sent to the waste stream, EU27**

Building foams containing ODS are found mainly in the EU15. Information on ODS banks from several EU12 countries – Bulgaria, Hungary and Poland – suggest that few ODS are found in building foams in the EU12. These data match anecdotal information that foams were little used for building insulation in socialist economies. Thus, recovery of these foams will be an issue mainly for the EU15.

***National studies and policy actions***

As yet, there has been no concerted attempt to recover ODS in building foams, either in Europe or elsewhere. The issue has been studied in Japan: after consideration of the costs, Japan chose to promote voluntary action under its Construction Material Recycling Law instead of setting requirements for recovery of ODS from building foam.[101]

In Norway, however, 2007 amendments to the Norwegian Regulation on Recovery and Treatment of Waste will require producers of waste from the demolition of large building sites to prepare plans for its proper treatment.[102] These plans are expected to include the destruction of building foams containing ODS.[103]

The Norwegian decision is notable in that ODS recovery is decided within the context of new legislation regarding building and demolition waste. In Japan as well, the voluntary provisions form

[100] The 15% estimate is provided by Paul Ashford, TEAP. The studies reviewed provide similar numbers: for example, the Obernosterer study estimated that panels in Austria contained 12% of ODS in all building foams.
[101] TEAP, *Report of the Rigid and Flexible Foams Technical Options Committee*, 2006.
[102] Outline of Chapter 15 of The Norwegian Regulation on Recovery and Treatment of Waste ("Waste Regulation" – "Avfallsforskriften").
[103] Sophia Mylona, Norwegian Pollution Control Authority: personal communication, November 2007

part of the national law on building waste. In the EC, in contrast, no action is expected in the area of building wastes in the immediate future.[104]

In both Austria and Sweden, the national government has commissioned studies of the amounts of ODS in building foams; the Austrian study looked at options for recovery.[105] However, no policy options for recovery have been reported in these two Member States.

***The possible role of the voluntary carbon market***

A new actor is now assessing the potential for financing the recovery of ODS from building foams: the "voluntary market" for climate change abatement. This market could offer a large source of finance to recover building foams: by one estimate, the market may grow to a total volume of $4 billion (approximately €3 billion) in 2010.[106] The market could be interested in recovering and destroying ODS in building foams to mitigate their greenhouse gas impacts.

In the voluntary carbon market, businesses and non-profit organisations sell voluntary "carbon credits" to companies and individuals seeking to offset their impact on climate change. The sales in voluntary carbon offsets have been used to finance projects in various fields, such as renewable energy and afforestation. The sellers of carbon offsets are interested in the recovery of building foams due to the high global warming potential of the ODS they contain. The recovery and destruction of this ODS offers a new option and, notably, a more measurable and certifiable level of GHG reduction than, for example, forestry projects.

The voluntary carbon market operates independently of the international climate agreements binding states. For this reason, the voluntary market can claim carbon offset credits for its customers from ODS. In contrast, the UN Framework Convention for Climate Change and its Kyoto Protocol do not include ODS, as these are addressed under the Vienna Convention and the Montreal Protocol. (In their responses to the questionnaire for this review, several Member States and industry respondents proposed linking ODS recovery and destruction to greenhouse gas mechanisms – a tie that would allow action via legislative mechanisms such as the EC Emission Trading Scheme. However, international agreement on such a link appears distant at present.)

Reputable operators in the voluntary market seek to ensure that their carbon offsets are legitimate, through standards and verification systems.[107] These systems follow some of the methods for official carbon projects, such as those under Joint Implementation and the Clean Development Mechanisms, set up under the Kyoto Protocol. (While these methods are used, it should again be emphasised that the voluntary carbon market operates outside international and EC climate agreements.)

[104] The Sixth Environmental Action Programme mentions recovery of building waste. As yet, however, legislation in this area is not under discussion.

[105] Richard Obernosterer, Roman Smutny and Erika Jäger, *Nachhaltige FCKW – Bewirtschaftung Österreich*, Final report to Österreichisches Bundesministeriums für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (BMLFUW), June 2005; Peter Norderg, EcoManagement, *Kartläggning av kvarvarande områden med ozonnedbrytande ämnen och uppföljning*, 2002.

[106] Fiona Harvey and Stephen Fidler, "Industry caught in carbon 'smokescreen'", *Financial Times*, April 25, 2007.

[107] One standards organisation is the Voluntary Carbon Standard, whose founders include the World Business Council for Sustainable Development. See www.v-c-s.org. The issue of accountability is of growing importance to actors in the market, with reports of many disreputable operators: for example, the Environmental Audit Committee of the UK Parliament held a hearing in January 2007 on accountability in the market and the possible need for its regulation.

Such requirements include "additionality": assurance that money spent for carbon offset projects will reduce greenhouse gas emissions or provide carbon sinks that would not have occurred without the financing. Additionality typically requires meeting at least one of four tests:[108]

- The project is not common practice
- The project is not required under legislation
- The project does not receive financing or credits for the carbon reduction from another source
- The project is not the least-cost option for providing a product or service

The second test is particularly relevant in considering the possible role of the voluntary carbon market in ODS recovery. In the current wording of Article 16(3) of the ODS Regulation, building foams would be among the various "other" products and equipment whose ODS is to be recovered "if practicable".

The application of this wording to the additionality test is not clear. For example, if one or more Member States decides to require recovery of ODS from building foams, this may create uncertainty whether or not recovery is "practicable" in other Member States.

***Proposed option***

The proposed option would require Member States to ensure recovery of ODS in building foams where technically and economically feasible, either by establishing compulsory requirements for recovery of ODS in building foams or via voluntary mechanisms. The provision could specifically mention the possibility to integrate ODS recovery from building foams in waste management plans developed by Member States (or regional entities) dealing with construction and demolition waste.

The option would also require Member States to assess their ODS banks, as has been done in Austria, including those in foams: this could supplement current reporting requirements.

Current information on ODS banks in building foams are based on estimates and on studies carried out in a few Member States. Indeed, even the estimates of the size of these banks are subject to large margins of error. This implies that further information will be needed before deciding on new legislative requirements. On the other hand, the need for action is not pressing at this time. Building panels have lifetimes of 30 to 70 years, meaning that the bulk of the CFCs found in these banks have yet to enter the waste stream.

This option would give the initiative for addressing this issue to individual Member and to the voluntary carbon market. While estimates of possible recovery levels could be made, the most important element is that this option would allow the basis for greater information to be obtained from experiences in the coming years, including pilot projects and possibly full-scale work by the voluntary market. The initial lessons from Norway, with its new building waste requirements, will also be valuable.

***Potential costs of ODS recovery from building panels***

The impacts of the option are difficult to assess with accuracy at this point, as the recovery and destruction of CFCs contained in these banks has as yet been carried out only on an experimental basis and cost information is limited.

[108] Summarised from Verification Protocol and Criteria (Version 1 for Consultation), Voluntary Carbon Standard (undated).

| | JTTCM study (Japan) | Kingspan pilot tests (UK) | Austria study |
|---|---|---|---|
| Dismantling | Up to 50 | Not assessed | Not assessed |
| Sorting | 3 – 4 | 4 – 6 | Not assessed |
| Transport | 20 – 25 | Not assessed | 20 – 30 |
| Destruction | 20 – 25 | 25 – 35 | |
| **Total** | Approx 100 | Not assessed | Not assessed |

Source: data elaborated by Paul Ashford, Caleb Consulting and TEAP

**Table 8.12. Recent estimates of the costs of recovering ODS from building panels (€/kg CFCs)**

The table above presents the estimates that have been found of the costs of recovering ODS from building panels. In Japan, a major study was carried out.[109] In the UK, a building panel manufacturer tested the recovery of ODS from its panels.[110] And in Austria, the Obernosterer desk study previously cited was carried out. The work in Japan provides the clearest breakdown of the costs: these show that destruction forms only about one-quarter of the total, while the costs of dismantling the building panels and then transporting them require up to 75% of the total.

| | |
|---|---|
| Initial cost estimate (million €)<br>(NPV 2010 for 2010 – 2019) | 1 847 |

**Table 8.13. Initial cost estimate for recovering ODS from building panels in the EC, 2010 to 2019**

An initial cost estimate was prepared using the data from Japan, which represents the most complete study of building panels. According to this estimate, the recovery of ODS from these panels would cost approximately €1.8 billion. This estimate uses a cost of €100/kg of ODS recovered, which is equivalent to a cost of approximately €21 per $CO_2$ equivalent tonne. These estimates should be treated with caution: while the Japanese study appears to have been the most comprehensive yet on the topic and provides the most complete cost data available, the Japanese situation may be different from that in the EC.

Moreover, a review all three studies point to several factors that need further research:[111]

- The costs can vary substantially from building to building, based on the types of building foams used and the costs of dismantling and transport
- Costs are expected to be higher for older building panels, which contained thinner foam layers. Panels constructed after the 1980s typically contained thicker foam for better insulation. As a result, the costs would decrease as more of these panels enter the waste stream.

*The role of building and demolition waste policies*

The current cost estimates show that dismantling, sorting and transportation form the lion's share of the costs of ODS recovery. This indicates that the recovery of ODS from building panels will be substantially lower if policies and legislation establish high levels of recycling and reuse of building waste.

[109] Some information in English is available in: Kiyoshi Hara, Fluorocarbon Recovery from Building Insulation in Japan, Presentation to the Report for F-TOC Meeting in Salt Lake City, September 2006

[110] Caleb Consulting and Kingspan, *Advancing the prospects for recycling of insulated panels*, summary report, undated

[111] Paul Ashford, personal communication: December 2007

| Country | year | C&D W arising (thousand metric tonnes) | % recycled or reused | quantity recycled (thousand metric tonnes) |
|---|---|---|---|---|
| Austria | 2004 | 6271 | 70 | 4390 |
| Belgium[(a)] | 2006 | 9000 | 90 | 8100 |
| Denmark | 2003 | 3785 | 84 | 3179 |
| Czech Republic[(a)] | 2006 | 11893 | 85 | |
| Estonia[(a)] | 2006 | 2270 | 91 | 2066 |
| Finland | n.a. | 8000 | 27 | 2160 |
| France | n.a. | 35000 | 10 | 3500 |
| Germany | 2003 | 73000 | 70 | 51100 |
| Ireland | 2001 | 5000 | 50 | 2500 |
| Italy | n.a. | 24000 | 40 | 9600 |
| Luxembourg | n.a. | 7300 | 50 | 3650 |
| Netherlands | n.a. | 26500 | 90 | 23850 |
| Portugal | 2006 | 4400 | 5 | 220 |
| Romania | 2005 | 467 | n.a. | n.a. |
| Slovenia | 2006 | 1000 | 50 | 500 |
| Sweden | n.a. | 6000 | 40 | 2400 |
| UK | 2006 | 100000 | 50 | 50000 |
| **SUB-TOTAL** | **n.a.** | **323886** | **55** | **177324** |
| **TOTAL EU-27** | | **450 000** | **55** | **243000** |

Source: VITO and BIO, with Institute for European Environmental Policy and IVM (see original document for details on methods and primary source)

**Table 8.14. Amount of construction and demolition waste arising, its recycling rate and the quantity recycled in selected Member States**

Building and demolition waste policies do not exist at EC level. Although the sixth Environmental Action Programme mentions this as a policy area for action, no legislative proposals are currently on the table. In Member States, the level of recycling and reuse of building waste varies greatly. While some Member States recycle and reuse a large share of building wastes, others do so for only small amounts. According to a recent study for DG Environment, the amounts vary from 5% of all construction and building waste to 90%.[112]

The current systems of building and demolition waste recovery are not, however, appropriate for ODS in building panels. Under these systems, the waste is brought in an undifferentiated mass to a sorting plant where it is sent through sieving machines. This method would not work for the recovery of ODS from foam building panels, as the panels would have to be removed and brought to a recycling facility intact.

Member States with high levels of building waste recycling and reuse may nonetheless face lower additional costs for recovering ODS from foam building panels. A second estimate considers that costs would be perhaps three-quarters of the initial estimate in Member States where building waste recovery is above 50%, and perhaps one-half of that initial cost estimate in Member States with building waste recovery above 75%.

[112] VITO and BIO, with Institute for European Environmental Policy and IVM, Fact sheet E3 – Sorting of construction and demolition waste (from the Final Report on Data gathering and impact assessment for a review and possible widening of the scope of the IPPC Directive in relation to waste treatment activities), 2007

| | million € |
|---|---|
| Initial cost estimate<br>(NPV 2010 for 2010 – 2019) | 1 372 |

**Table 8.15. Revised cost estimate for recovering ODS from building panels in the EC, considering national levels of building waste recycling**

Under this estimate, the cost averages about €75/kg of CFCs recovered for the EU27 as a whole. This is equivalent about under €17 per $CO_2$ equivalent tonne.

*Considerations for voluntary carbon market*

On the basis of the cost per tonne of $CO_2$ -equivalent, the low estimate is not far from current carbon prices. For example, in November 2007, the cost of one tonne of carbon on the over-the-counter market ranged between €21 and €23 per tonnes.[113] This is the price for carbon traded under the Emissions Trading Scheme (ETS) Directive. Carbon offsets in the voluntary market may currently sell for less: one prominent carbon offset company sells these at about €10/tonne, though prices can range higher.[114]

***Comparison of the options***

The proposed option will require Member States to address the issue of recovering ODS from building foams. This will clarify and strengthen current requirements, but it will leave Member States the initiative. The results will depend closely on the technical and economic feasibility of recovery. While the technical feasibility of recovering CFCs from building panels has been demonstrated, including in the recent UK initiatives, the costs remain uncertain. For this reason, the impacts of current and proposed requirements are difficult to compare quantitatively.

This option also calls on Member States to study the issue further, and this will create an administrative cost. This cost will be largest for the EU15, as the EU12 appear to have relatively few building foams in place containing ODS.

| | **No EU action** | **Proposed option: Require MS and voluntary action** |
|---|---|---|
| **Economic and social impacts** | | |
| Total direct costs on industry | Depends on MS action | Depends on MS action |
| Total admin. costs on industry<br>(NPV at 2010, € mio) | 0 | 0 |
| Total admin. costs on MS<br>(NPV at 2010, € mio) | Some MS may study the issue further | 0.23 |
| Total admin. costs on COM<br>(NPV at 2010, € mio) | 0 | 0.05 |
| **Other impacts (e.g. social)** | Not clear | Job creation for ODS recovery |
| **Impact in ODP tonnes** (total, 2010-2019) | Depends on MS and voluntary action | Higher level of ODS recovery |
| **Impact in GHG-equivalent tonnes** | Depends on MS and voluntary action | Higher level of ODS recovery |

**Table 8.16. Comparison of the options: building foams**

[113] Price data obtained from www.pointcarbon.com.
[114] Personal communication, Climate Care Trust Ltd, undated.

## 8.8 Assessment of the non-legislative option: preparation of a guidance document on links with EC waste legislation

Under this option, the European Commission in consultation with the Member States would prepare a guidance document to clarify the links between the revised ODS Regulation and EC waste legislation, in particular for WEEE, end-of-life vehicles and the shipment of waste.

Preparation of this guidance document will require a one-time administrative cost for staff time on the part of the European Commission and the time for review and discussion on the part of Member State officials.

The guidance document is expected to assist Member States in implementing this legislation, thus is expected to reduce future administrative costs for industry and Member State governments. By providing greater clarity to users, this option should improve collection of WEEE containing ODS, and thus should lead to greater recovery and destruction of ODS.

In their comments for this review, both Member States and industry raised the problem of the administrative costs for shipments of ODS and waste products and equipment containing ODS among Member States, and noted that this hindered recovery and destruction of ODS. While this is an issue under EC waste legislation, and so has not been addressed in this review, the involvement of both EC waste and ODS officials in the preparation of a guidance document could lead to the identification of methods to reduce administrative costs in this area, and thus further increasing the recovery and destruction of ODS.

| | **No EU action** | **Proposed option: Preparation of guidance document** |
|---|---|---|
| **Economic and Social impacts** | | |
| Direct costs on industry (millions of €, NPV at 2010) | 0 | 0 |
| Total admin. costs on industry (NPV at 2010, € mio) | At least 0.17 | 0.04 |
| Total admin. costs on MS (NPV at 2010, € mio) | At least 0.02 | 0.01 |
| Total admin. costs on COM (NPV at 2010, € mio) | 0.04 | 0.03 |
| **Other impacts (e.g. social)** | | |
| **Impact in ODP tonnes** (total, 2010-2019) | No change | Positive impact: higher rate of ODS recovery |
| **Impact in GHG-equivalent tonnes** | | |

**Table 8.17. Comparison of the options: guidance document**

The quantitative comparison of the options focuses on the administrative costs that industry and Member States currently face in terms of interpreting the interaction between EC legislation on ODS and legislation on waste. These are felt to be low estimates: if the guidance document reduces the administrative costs related to transboundary shipments of waste, the reduction in costs (and corresponding increase in ODS recovery will be much higher.

For this reason, the Commission and Member States should consider starting work on such a document before the revision of the Regulation comes into effect.

# 9. New substances

## 9.1 The problem

The problem here concerns two specific issues. The first relates to the mechanisms and procedures for the inclusion of new substances, given that Annex II of Regulation (EC) No. 2037/2000 was deleted in 2003.[115] In addition, the legal analysis for this project highlighted the need to link the ODS Regulation with EC chemicals legislation, notably the provisions of REACH for the notification and registration of chemicals (some of which may be new ODS).

The second issue is which specific substances should be included. In their responses to the questionnaire, Member States proposed four new ODS for inclusion under the Regulation. Three of these are substances that are short-lived in the atmosphere and have low ozone depleting potentials. Concern would arise only if these substances came to be produced in such large quantities that in aggregate they would have a significant ODP. The fourth is a halon with a much higher ODP.

## 9.2 Options for the revision of the Regulation and their impacts

The legal analysis for this project has formulated a single, articulated option to address both issues identified above.

1. The revised Regulation should re-establish the former Annex II, with two parts.
- Part B would comprise substances which have been identified under REACH notification and registration processes as having an ODP.
- Producers and importers of substances listed in Part II.B should report every two years on the quantities produced or imported in the EC.
- Part A would include all new ODS that have been identified by the Scientific Assessment Panel as having a "significant ozone-depleting potential". The production, release for free circulation in the Community, inward processing and placing on the market or use of these substances would be prohibited (as per the current Article 22 for Annex II).

2. Three of the four new ODS identified by Member States should be included in Annex II.B:
- n-propyl bromide
- ethyl bromide and
- trifluoroiodomethane (or trifluoromethyl iodide) ($CF_3I$)

3. One ODS (dibromodifluoromethane, Halon 1202) should be included in Annex I with other halons.

4. The Regulation should formally establish links with REACH:
- Include identification of substances with ODP in a surveillance mechanism
- Ensure consistency between REACH authorisation revisions and new substances potentially banned or restricted under the ODS Regulation

5. The development of a definition of ozone-depleting potential (ODP) in EC legislation should be considered.

[115] Regulation (EC) No. 1804/2003 deleted Annex II and moved the sole ODS there listed, bromochloromethane, to Annex I (as Group IX), stating in its recital (9) that the Annex "does not provide the same level of control" for this ODS as for others.

This option is compared with the "no EU action" option (i.e. no change in the current Regulation).

***The ODPs of new short-lived substances***

The new substances proposed for Annex II.B have low ozone-depleting potentials (ODPs): the Scientific Assessment Panel refers to them as very short-lived substances (VSLS), as they break down quickly in the atmosphere, in comparison to long-lived ODS such as CFCs. Any future new substances are expected to be in this category of low-ODP, VSLS. Nevertheless these may have a significant impact on the ozone layer depending on the total amounts emitted.

The 2006 Scientific Assessment report provides the following values for the ODPs of the new substances:

| Substance | ODP | Notes |
|---|---|---|
| n-propyl bromide | 0.1<br>0.02 – 0.03 | Tropical emissions<br>Emission at northern mid-latitudes |
| $CF_3I$ | 0.011 – 0.018 | Surface emissions at mid-latitudes |

**Table 9.1. ODP values for n-propyl bromide and $CF_3I$ (Scientific Assessment Panel)**

Further research is underway into the ODP values of n-propyl bromide and $CF_3I$. One scientist, Dr. Donald J. Wuebbles, has reported lower values than the Scientific Assessment Panel, based on recent research results: 0.016 for n-propyl bromide at northern mid-latitudes ($30^0$ to $60^0$ North); and 0.0068 for $CF_3I$.[116]

No values were found for ethyl bromide.

Halon 1202, which is proposed for inclusion in Annex I with other halons, is not a VSLS. The 2006 Scientific Assessment report lists its ODP as 1.3. [117] It is reportedly used only outside the EC, in a few military aircraft and as feedstock for the production of halon 1211.

## 9.3 Assessment of the impact on the market potential of new substances

The assessment focuses on the potential impacts of inclusion in Annex II.B on new substances, and in particular on the market values of currently identified and possible future very short-lived substances.

***Market potential of new substances***

A reporting requirement for new substances would create an administrative cost for industry, and a potential direct cost, if the listing in the proposed Annex II.B influences the market potential for such substances. These direct costs are uncertain. One new substance – n-propyl bromide – is currently used in solvents. Another, ethyl bromide, has been used in fire-fighting equipment in at least two EU-12 Member States. In both cases, their market potential is expected to be small. Global consumption of n-propyl bromide is estimated at 10,000 – 20,000 metric tonnes per year[118]. As an approximation, if

[116] Dr Donald J. Wuebbles, University of Illinois (Urbana-Champaign), written communication to the European Commission: 18 July 2007.
[117] A 2003 report by the World Meteorological Organization is the original source for this value.
[118] UNEP (2007), Issues for discussion by and information for the attention of the nineteenth meeting of the parties, note by the secretariat.

we assume that this figure equates to consumption in OECD countries, and then scale this figure based on the share of OECD GDP for Europe, this gives a total European consumption figure of between 4200 and 8400 metric tonnes[119].

However, $CF_3I$ and potentially other VSLS under development may have larger market potentials as refrigerants and in other markets. The market potential of these future uses and the effects of the option depend on the assumptions involved. Given the limited availability and confidentiality of data on future market potential and projected sales, these costs must be seen as rough estimates only. To help decision-makers and stakeholders address the uncertainties, the project team has developed four scenarios for possible impacts.

The key question will be the impact of these requirements on the *market potential* for new, low-ODP substances. New substances currently on the market – ethyl bromide and n-propyl bromide – are believed to have only a relatively limited potential.[120] However, new substances that have yet to be introduced – $CF_3I$ and other possible new substances – may have a much larger potential as replacements for HFCs, which have high global warming impact.

This analysis focuses on what is believed to be the most important potential market, refrigerants. Here, ODS have largely been replaced by HFCs, in particular for commercial uses, and by hydrocarbons, HCs, for domestic refrigerators and freezers. HFCs, however, have high global warming potentials. The hydrocarbons are flammable. Thus, new substances that have both low-GWPs and low flammability can have significant market potential. The total markets for refrigerant related products is estimated now to be at approximately 200 000 tonnes per year in Europe, including the EC, EFTA and SE Europe.

Estimating market value is difficult. Producers have been reluctant to provide current prices for HCFCs and HFCs. The World Bank reported several years ago the price of HFC 134a, commonly used as a refrigerant, as approximately €2.70 per kg.[121] If we assume that this substance accounts for 70% of the market for refrigerant related products, this would yield a total market value of approximately €380 million per annum in the EU alone. Clearly the global market will be considerably larger. An effective and price-competitive alternative could have considerable market potential.

One very low-ODP substance, $CF_3I$, is under development for use as a component of a refrigerant preparation. Other new substances with low ODPs may be developed in coming years. While some may be used alone, many may be combined with other substances in preparations.

New substances may also have potential in other markets where ODS are now or once were used, such as solvents and feedstocks. Some new substances may be used as aerosol propellants, a major market once dominated by CFCs: roughly 1 million tonnes of propellants are used each year in Europe. Many of these are flammable substances, such as propane, and non-flammable alternatives could thus have a large market potential.[122] These markets have not been considered in the analysis, as the potential use of new substances is believed to be further from the market.

[119] Based on GDP (2006) data from OECD statistics, http://www.oecd.org/dataoecd/48/4/37867909.pdf

[120] Although n-propyl bromide is a specialist cleaning solvent currently actively marketed in the EU as an alternative to 1,1,1-trichloroethane and Perchloroethylene.

[121] World Bank (2002) Production Sector Presentation, Washington, 28th March 2002. Price estimated for HFC 134a at $3.5 – $4.0 per kg. It seems unlikely that these prices have fallen. The same presentation notes that HFC 134a is "dominant" in the refrigerant market. No data is presented. However, we have assumed a figure of 70% for the purposes of calculation.

[122] Tim Vink, Honeywell: personal communication (November 2007).

***Impact on market potentials***

The key question is whether a listing on Annex II.B would influence the market potentials of new substances with very low ODPs.

One manufacturer has stated that any listing of a substance on Annex II.B would effectively end its market potential, as downstream users (*i.e.*, producers of products and equipment containing the substance) would not use any substance that may face a risk of regulatory restrictions – including a listing on a possible Annex II.B. The industry position might claim a basis on actual market knowledge rather than a theoretical approach.

On the other hand, a recent analysis showed that *ex ante* industry estimates of the costs of new regulation are almost invariably high.[123] The industry position appears notably pessimistic in this case: the proposal for Annex II.B includes only reporting requirements and contains no restrictions. Moreover, there is the precedent of HCFCs, which industry knowingly developed and introduced as an interim alternative to CFCs. HCFC-22, a widely used refrigerant, has an ODP of 0.055 (according to the Montreal Protocol). The newly reported values for two of the substances are several times lower than this. Though the last meeting of the Parties agreed to a phase-out schedule for all HCFCs, the market for HCFCs lasted over two decades in Europe and longer in the rest of the world. This precedent suggests that the market potential for new substances could be significant in the coming decade.

An alternative analysis suggests that the proposal may provide an incentive for EU industry to pay attention to production levels of very low ODP substances. This analysis is shown graphically in the diagram below.

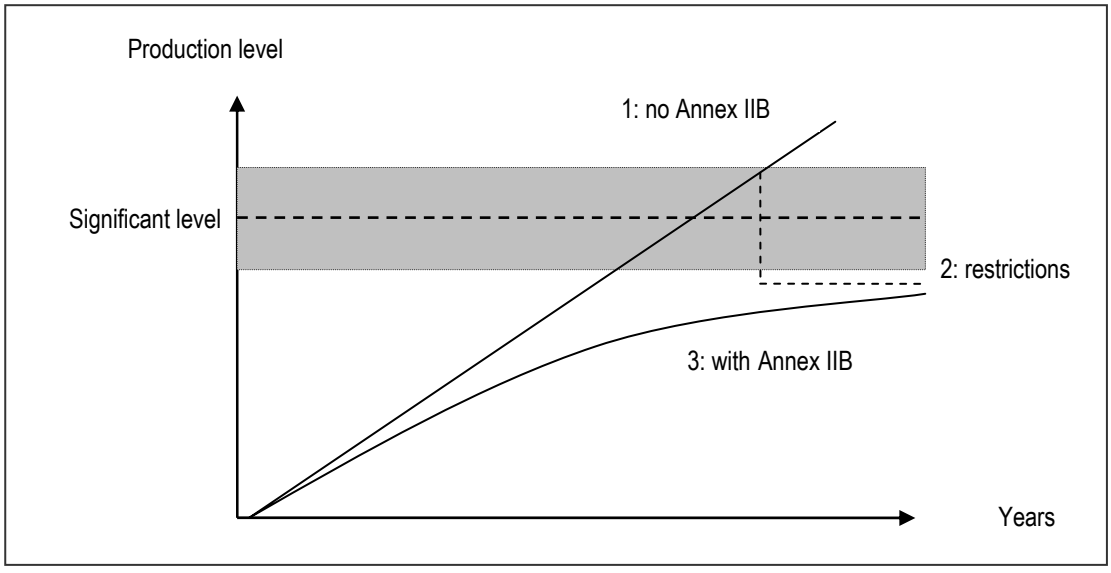



**Figure 9.1. Potential impact of a reporting requirement on production of new substances**

[123] Two recent studies have made *ex post* reviews that demonstrate the tendency for *ex-ante* impact assessments to over-estimate costs to industry of regulatory changes: Institute for Environmental Studies (IVM), Free University of Amsterdam, 2006, *Ex-post estimates of costs to business of EU environmental legislation* (report prepared for DG Environment, edited by Frans Oosterhuis); and Policy Study Institute, 2006, *Ex-post estimates of costs to business of EU environmental policies: A case study looking at Ozone Depleting Substances* (report prepared for DG Environment, reviewed by Professor Paul Ekins).

Without the proposal, the level of production of the new substances would rise along line 1. However, if total production exceeds a level that policy makers – on the basis of further scientific knowledge – feel is significant, then they will introduce regulatory restrictions (as shown by line 2). This may be done at EU level or globally, via the Montreal Protocol. The "significant" level can not be clearly defined at this point: it depends on future scientific knowledge and policy judgement. On this graph it is represented here by a broad area: not only are there uncertainties in the ODP of such substances, but also in the level that policy makers would consider significant.

With the reporting requirements, producers and downstream users would be encouraged to strive for the substitution of other alternatives in order to ensure production remains below the significant level.[124] For substances with very low ODPs, this substitution effect will be important mainly if production reaches high level. This is modelled in line C.

In this analysis, the "no change" option leaves open the uncertainty of future regulation. In contrast, the reporting requirement may reduce the market potential for new substances, in particular at high levels of production.

***Four scenarios***

The best way to address these differing interpretations of the potential impacts is to develop separate scenarios. Four are proposed:

1. No change to the Regulation – and no future restrictions on new substances above the "significant level" of production
2. No change to the Regulation – and future restrictions on new substances are introduced
3. Creation of Annex IIB – with a smooth effect on market potential (curve C in the graph above)
4. Creation of Annex IIB – with severe reductions in market potential (industry warning)

It should be noted that the scenario we feel most likely is 4, where Annex IIB does not have a significant negative impact on market potentials.

For all the scenarios, an assumption of the "significant level" needs to be made. As noted in the figure, this is not a single figure but a range. Here, we assume that the lower bounds of this range will be equivalent to about 1500 ODP tonnes. An equivalent consumption of very low-ODP new substances might be considered significant. If these substances have an average ODP of 0.01.,[125] it would be at least 150 000 tonnes.

These estimates look at discussions in the EU market independently and consider only EC action, not international action under the Montreal Protocol. Estimates are based on the following assumptions:

- That the "significant" level (in the diagram above) is equal to 1500 ODP tonnes.
- The ODP of new substances in question is on average 0.01 – meaning that the level of EC production which would "trigger" a regulatory response is equivalent to 150,000 tonnes. This may be a pessimistic value *(i.e.*, a high ODP), considering recent research.
- New substances are expected to be used as part of a blend rather than alone; the new substances are assumed to correspond to approximately 30% of the total refrigerant product. Such blends are

[124] Such a result is supported (although in differing circumstances) by a recent study into the "announcement effect" of listing of substances under REACH: Okopol (2007), *Techno-economic support on REACH – Case study on "announcement effect"*. This suggests that substance lists can promote risk-based substitution and "might be an incentive for producers and users of these substances to strive for the substitution goal pro-actively".

[125] This is clearly an estimated average ODP, and may be a high estimate – a "worst case" scenario. This is considered useful in assessing potential impacts and implications.

assumed to takeover the entire refrigerant market. This assumption appears optimistic, as other substances, notably HCs, are currently widely used.

- The value of the new substances is assumed to be 20% higher than the current price for HFC-134a (the latter is priced at about €2.70 per kg estimated for HFC-134a).
- For scenarios 1, 2 and 3, new substances are assumed to take 20% of the full market in year 1 (corresponding to 2010).
    - In scenarios 1 and 2, production is assumed to rise by 17% per annum until it reaches 200,000 tonnes in EU.
    - In scenario 3, production is assumed to rise at 15% per annum and then slow as it nears 800,000 tonnes.
- It is assumed that the EU market is 22% of the global market[126] until it reaches maximum EU production, which as already noted, is estimated at 200,000 tonnes.
- Factors other than the impact of potential regulatory changes are not accounted for.
- Based on information from the industry, we assume that the cost of research to develop a new substance is €5 million.

These necessary assumptions mean the figures presented here must be seen as a guide only. The results are presented in Figure 9.2. Each scenario is described briefly in the text that follows.

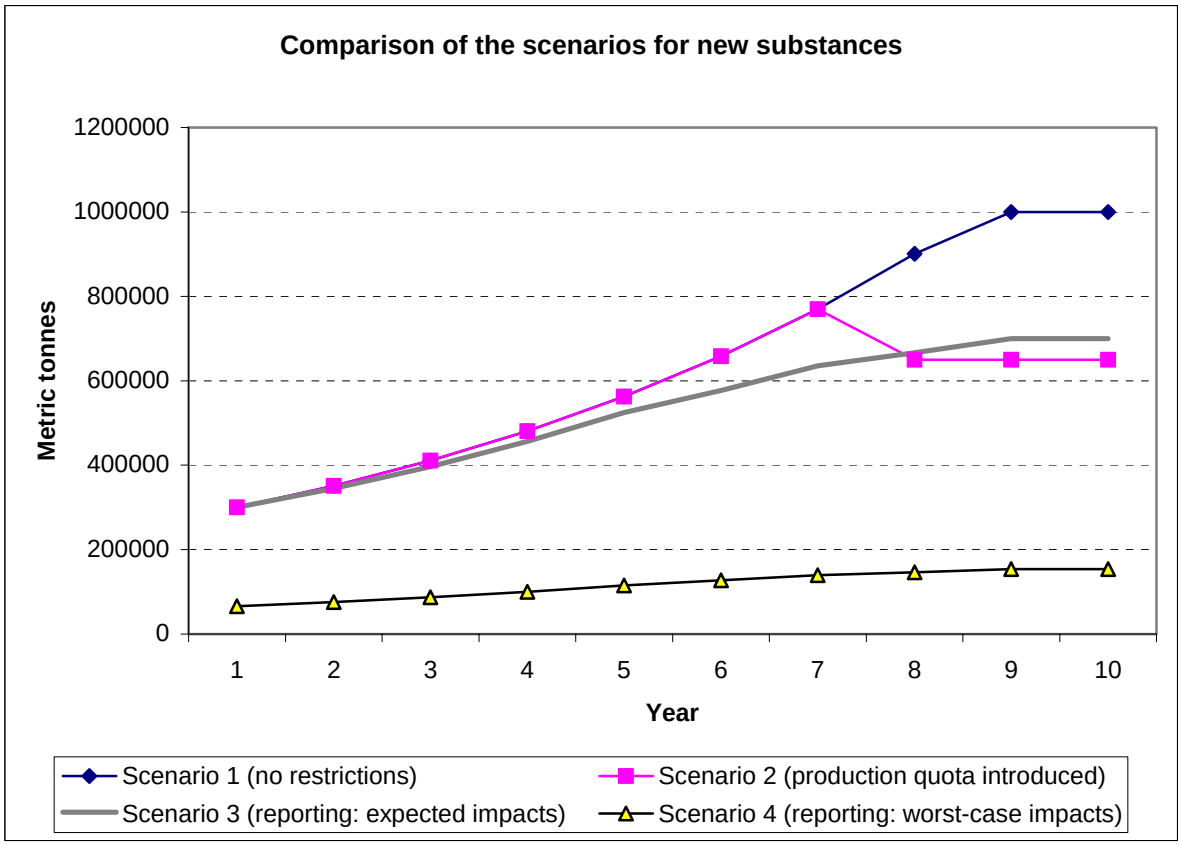



**Figure 2.2. Comparison of global production of new substances under the four scenarios**

[126] This is an approximation based on the ratio of EU GDP to global GDP, based on World Bank data for 2006. http://siteresources.worldbank.org/DATASTATISTICS/Resources/GDP.pdf (accessed 11/12/07)

***No EU action: market potential of new substances***

*Scenario 1: No change to the Regulation – and no future restrictions on new substances above the "significant level" of production*

Under this scenario the market will rise to its full value and no future restrictions are assumed (within the time frame examined). The total potential EU market value per annum could equal €650 million,[127] once total market potential is realised (in our model this would occur in year 8 – 2018). The assumptions yield potential global market values over the 10 years being assessed of:

| Total ODP tonnes * | Average annualised market value (global) | Total global market value (2010 NPV) | Total EU market value (2010 NPV) |
|---|---|---|---|
| 20 622 | €2.2 billion | €17 billion | €3.7 billion |

* Calculated assuming ODP of 0.01

**Table 9.2. Results of Scenario 1**

This would be offset by a one off research and development cost, which as noted in our assumptions is estimated at €5 million.

The total global market value for 10 years expressed as Net Present Value is therefore equal to €17 billion. The NPV of the market in the EU (assuming that the total market possible is 200,000 tonnes) would equal €3.7 billion.

*Scenario 2: No change to the Regulation – and future restrictions on new substances are introduced*

Under this, the expected scenario, production of new substances rises to meet market demand in an unrestricted manner. However as production reaches a critical level, mechanisms beyond the EU ODS Regulation restrict their production. If we assume that restrictions are enforced when production equals an OPD of 1500 tonnes, then the market would be restricted from Year 5, as a restriction brought into force due to production equalling 1554 tonnes in Year 4. This is shown in the figure above.

This would not only restrict the market, but also lead to regulatory uncertainty. If producers have been planning (and investing) based on market predictions without regulatory intervention, there may be a significant equity and lost investment value when unexpected restrictions limit a planned market expansion.

| Total ODP tonnes * | Average annualised market value (global) | Total global market value (2010 NPV) | Total EU market value (2010 NPV) |
|---|---|---|---|
| 13 830 | €1.5 billion | €12 billion | €3.1 billion |

* Calculated assuming ODP of 0.01

**Table 9.3 Results of Scenario 2**

[127] Based on EU market reaching its maximum production of 200,000 tonnes, and price equal to €3.25 per kg.

For Scenario 2, the total global market value for 10 years expressed as Net Present Value is therefore equal to €12 billion. The NPV of the market in the EU would equal €2.6 billion. However, as noted, there may be significant costs imposed due to investment and market expansion planning due to regulatory uncertainty.

***Proposed option: impact of future market values***

*Scenario 3 Creation of Annex IIB – with a smooth affect on market potential (curve C in figure 8.1)*

Under this scenario, the creation of a new Annex IIB does not severely impact the market, other than slowing down the growth in the global market due to a degree of cautious awareness of the potential that these substances may have to trigger regulatory response should production pass a certain level.

As noted in our assumptions, the market is predicted to grow globally at 5% under this scenario. This is shown in the figure above by a controlled and gradually increasing level of production, towards the significant level.

| Total ODP tonnes * | Average annualised market value (global) | Total global market value (2010 NPV) | Total EU market value (2010 NPV) |
|---|---|---|---|
| 11,320 | €1.2 billion | €9.8 billion | €3.0 billion |

* Calculated assuming ODP of 0.01

**Table 9.4 Results of Scenario 3**

For Scenario 3 the total global market value for 10 years expressed as Net Present Value is therefore equal to €9.8 billion (NPV of above income stream – bringing to market costs). The NPV of the market in the EU is estimated at 2.1 billion. However in this case investment and market expansion planning will be carried out in the knowledge that these substances are being monitored, and a more prudent market expansion can be achieved.

*Scenario 4: Creation of Annex II.B – with severe reductions in market potential (industry warning)*

Under this "worst-case" scenario, the creation of Annex II.B has severe impacts on the market potential for new substances (as per industry warnings). Assuming that the new substances are indeed a good substitute for other existing uses, it is still assumed that they have some market value. However, we assume this is restricted to 10% of total potential both in the EU and globally.

For Scenario 3 the total global market value for 10 years expressed as Net Present Value is therefore equal to €1.7 billion (NPV of above income stream – bringing to market costs). The NPV of the market in the EU is valued at €0.05 billion.

| Total ODP tonnes * | Average annualised market value (global) | Total global market value (2010 NPV) | Total EU market value (2010 NPV) |
|---|---|---|---|
| 2 062 | €0.2 billion | €1.7 billion | €0.4 billion |

* Calculated assuming ODP of 0.01

**Table 9.5 Results of Scenario 4**

***Other impacts: administrative costs***

As this is an entirely new proposal (as opposed to an amendment or clarification of existing provisions) there is no current cost associated with new substances (as defined here) and the ODS Regulation.

The proposal would require producers to report every few years on their levels of production of new low-ODP substances. For the purposes of this impact assessment we assume that reporting is required every two years, though less frequent reporting may be sufficient.

The new substances are expected to have a restricted set of producers, due to patent protection and proprietary research and information. On this basis, we assume that there will be 10 producers and importers who will be affected by this reporting requirement. The preparation of the reports will not require extensive time on the part of producers and importers, who are assumed to keep records of this essential business activity. There will also be a minor administrative cost to the Commission, in reviewing these reports and entering data into a monitoring database.

Industry representatives have raised one important issue related to the reporting. First, a requirement for producers and importers alone would not capture the amounts of such new substances in imported products and equipment.[128]

To adequately monitor the levels of new substances consumed in the EC, the Commission, in cooperation with the European Chemicals Agency, should launch separate, periodic studies to estimate the amounts of such substances contained in imported products and equipment. Here, the Commission may receive advance warning if significant levels are expected: EU producers reporting on their new substances would wish to alert the Commission and Member States if they are aware of significant levels of new substances in imported products and equipment. These studies might be launched every four years, and may cost four or more staff work months.

***Comparison of the scenarios***

*Economic impact*

The analysis demonstrates that the assumptions made have a significant effect on the impact predicted. Over the 10 years assessed, global market value and total OPD production range from €17 billion and 20,622 ODP tonnes in Scenario 1 to €1.7 billion and 2,062 OPD tonnes in Scenario 3. The value of the EU market is assumed to vary between €3.7 billion in Scenario 1 and €0.4 billion in Scenario 4.

It is important to note that the potential "lost" EU and global market potential is not a dead-weight loss to the European economy. It does have an impact on producers of those substances affected (due to research, development and bringing to market costs). However, the "lost" market value will be taken up by other substances (*e.g.* HCs or HFCs), and these may also be produced in the EU. Equally, as discussed above, a reporting requirement may lead to the pro-active development of zero ODP alternatives, thus encouraging further research and development within the EU.

One important economic effect should be noted from figure 8.2. Scenario 2 – which assumes no EU action followed by regulation as production levels of new substances rise – leads to a disruptive change in market levels. In contrast, scenario 3 – which proposes a new reporting requirement – yields lower growth but a smooth development of production levels.

[128] For existing ODS, the Montreal Protocol requires production and consumption information from all Parties: the global data gathering should capture any ODS produced which are subsequently incorporated in exported products and equipment.

*Environmental impact*

Under the four proposed scenarios, the estimated total level of ODP for 10 years is compared below:

| | | **Total estimated ODP tonnes**[129] |
|---|---|---|
| **No EU action** | Scenario 1 (no regulation) | 20,622 |
| | Scenario 2 (cap on production) | 16,444 |
| **Proposed option** | Scenario 3 (smooth trend) | 15,904 |
| | Scenario 3A (severe impact on market potential) | 2,062 |

**Table 9.6 Comparison of the scenarios: ODP tonnes**

As noted, we consider scenario 2 to the most likely under "no EU action", and scenario 3 to be the most likely for the proposed option. This implies a potential reduction of about over 500 ODP tonnes over the 10 years. No assumptions are made concerning $CO_2$ equivalents of the new substances; thus, the global warming impact of the different scenarios is not estimated.

***Comparison of options***

The expected "cost" of this option is the difference in market potential between no EU action in scenario 2 and the proposed option in scenario 3. These scenarios are based on numerous assumptions about future market potentials of new substances. For this reason, the overall comparison focuses on their qualitative results.

| | **No EU action** | **New Annex II.B with reporting requirement for new substances** |
|---|---|---|
| **Economic and Social impacts** | | |
| Impact on industry: direct costs | Risk of market disruption from future regulation | Nearly equal revenues; no market disruption |
| Total admin. costs on industry (NPV at 2010, € mio) | 0 | 0.05 |
| Total admin. costs on MS (NPV at 2010, € mio) | 0 | 0 |
| Total admin. costs on COM (NPV at 2010, € mio) | 0 | 0.03 |
| **Other impacts (e.g. social)** | Disruption may impact jobs | No impacts identified |
| **Impact in ODP tonnes** | Depends on ODP of new substances | Slightly lower than under no EU action |
| **Impact in GHG-equivalent tonnes** | Not known | Not known |
| **Other environmental impacts** | No impacts identified | No impacts identified |

**Table 9.7 Comparison of the options**

In sum, the proposed option provides more stable regulatory conditions for industry, with only a small difference in production (and corresponding reduction in emissions). These results reflect the options of the two expected scenarios in the analysis). In contrast, industry representatives have warned of dire results from the proposed option: these impacts are modelled in scenario 4.

[129] Assuming 30% of blend is a low ODP substance with ODP of 0.01.

# 10. Reporting requirements

## 10.1 The problem(s)

Implementation of the ODS Regulation requires effective monitoring and reporting. The Montreal Protocol establishes a series of reporting requirements for Parties. The ODS Regulation sets additional reporting provisions. Reporting presents an administrative cost for Member States and companies in the form of time and effort required to collate information and prepare and submit reports.

In their responses to the survey for this review, a few Member States called for measures to reduce their administrative costs related to reporting. Indeed, the administrative costs associated with reporting appears to be one of the more burdensome aspects of implementing the ODS Regulation requirements for Member States. The legal analysis reviewed different options: these are described in 10.2. Overall, however, because of the need to meet the reporting obligations of the Montreal Protocol and the Commission's need for information on progress in the various phase-outs, opportunities for major cost savings were not identified.

In contrast, responses from business and industry did not cite major concerns with reporting.[1] For both Member State and industry reporting, the legal analysis for this review considered possible areas for synergy with the requirements of other EC legislation.

As a general consideration, it should be highlighted that as phase-outs are completed and exceptions eliminated, reporting obligations will also be reduced.

## 10.2 Member State Reporting

***Options***

The proposed option focuses on reporting requirements for Member States.

- No EU action: no change with respect to reporting requirements.

- Proposed option:
  - Electronic or on-line reporting.
  - Single yearly report and cancelling the reporting requirement of Article 5 for HCFCs replacing halons.
  - Single article on reporting.
  - Reporting by facilities involved in recovery, recycling and destruction or waste producers.
  - Aligning reporting requirements of the ODS Regulation with the F-Gas Regulation.

***Identification of impacts***

Quantitative estimates of impacts are presented here for the different elements of the proposed option

[1] A January 2007 paper by the American Chamber of Commerce to the EU (AmCham) identified the ODS Regulation's reporting requirements as an important area for simplifying EC legislation. The contrast between this paper and the survey results was raised with AmCham; the position has not been confirmed in interviews..

***No EU action (baseline)***

Under this option, reporting requirements would remain unchanged in the revised Regulation. The current requirements are estimated to result in a total annual cost to the 27 Member States of €1.5 million.

***Electronic or online reporting***

Electronic reporting could *reduce administrative costs* associated with reporting for Member States (as many currently send reports via their EC Delegations). It could also *reduce costs for the Commission* related to receiving data, preparation of synthesis reports and dissemination and sharing of information within the Commission.

Electronic reporting (i.e. sending reports in electronic form, e.g. via CIRCA) is not expected to have significant initial costs – indeed, electronic reporting is currently possible; a couple of Member States already use it.

In contrast, on-line reporting (i.e. direct reporting by Member States into an EC database) will require a greater initial cost for the Commission, in order to create the reporting system. On-line reporting may also require the preparation of instructions for Member State officials. In the long-term, on-line reporting may provide a greater reduction in administrative costs, in particular for the Commission's work in preparing reports As this change would take effect in 2012, the Commission and Member States may have advanced in online reporting techniques, also on the basis of the lessons of existing systems such as E-PRTR, thus reducing costs.

***Single yearly report (cancelling the reporting requirement of Article 5(3) for HCFCs replacing halons)***

Member States are currently required to prepare five separate reports each year for the Commission, plus a report to the Montreal Protocol Secretariat. Introducing a single yearly report would *reduce the administration costs* for Member States and the European Commission associated with multiple reporting: for example, the Commission would only prepare a single template for the annual report. Administration costs for the Commission could be further reduced if the single yearly report is integrated with reporting requirements for the Montreal Protocol Secretariat.

In addition, one of the five current reports could be cancelled. At present, nearly all Member States return "nil" Article 5(3) reports to the Commission. Moreover, a separate option (section 4) has proposed ending the provisions of Article 5(3). This option would *reduce administrative costs* for Member States and the Commission. The savings to Member States is estimated at €190,000 annually.

***Single article on reporting***

Reporting requirements for Member States are currently specified in different articles of the ODS Regulation. Under this option, a single article would address Member State reporting. The article could be stated simply, thus clarifying reporting requirements to avoid potential misinterpretations. This option will make it easier to identify reporting requirements, and may thus *slightly reduce administrative costs*. While the reduction in costs would be expected to be minor, as it is assumed that Member States are well-versed in the text of the current Regulation, greater clarity would aid future accession countries (as well as stakeholders and member of the public who may wish to understand this legislation).

***Reporting by facilities involved in recovery, recycling and destruction or waste producers.***

With the aim of simplifying the current reporting requirements, particularly for Member States, an analysis was carried out to identify possible synergies or even duplications of Member State data reporting on the basis of other pieces of EC legislation, and to coordinate these with the reporting requirements in the ODS Regulation. One area for potential simplification was reporting on recovery, recycling, reclamation and destruction.

Various pieces of EC waste legislation require reporting on recovery, recycling, reclamation, disposal and destruction, such as the Waste Framework Directive, the WEEE Directive, the E-PRTR Regulation and the ELV Directive. However, none of their reporting obligations provide the information needed to control the implementation of the phase-outs included in the Regulation. Therefore, administrative costs for Member States will only be reduced if the burden is passed onto waste operators.

***Aligning reporting requirements with the F-Gas Regulation***

The F-Gas Regulation does not explicitly include reporting obligations for Member States. As a result, legal analysis has indicated the synergies between the F-Gas and the ODS Regulation are better obtained in the field of company and user reporting. This option could *increase administrative costs* for the European Commission and Member States without improvement in reporting. After careful examination, the option of harmonisation with the F-Gas Regulation for reporting was also discarded, since its limited requirements do not correspond to the need for information to comply with the Montreal Protocol.

***Comparison of options***

Each of the options (a) to (d) has been proposed as a means of reducing the administrative costs associated with reporting for Member States and the Commission. Options (a) to (c) would achieve this objective, while maintaining an adequate level of reporting for the Regulation. For option (a), a switch to completely electronic reporting should reduce costs; in contrast, the use of on-line reporting may create important start-up costs. Option (d) does not appear to reduce administrative costs, nor would it improve reporting. A comparison of the overall economic impacts of the proposed options to the business as usual option is provided at the end of this section.

## 10.3 Company/user reporting

***Options***

These options (aside the "no action" option) are not mutually exclusive, and could therefore be combined. As previously noted, industry respondents to the survey did not consider that reporting requirements for companies required significant revision.

- No EU action: no change in relation to reporting requirements.

- Proposed option:
  - Harmonising reporting requirements with the F-Gas Regulation.
  - Sanction for non-reporting.
  - Reporting by facilities involved in destruction of ODS
  - Online reporting.

***Identification of impacts***

A summary of impacts is presented in Impact Table 11 in Annex III.

***No EU action***

Under the current Regulations (Article 19) producers, importers, exporters and users of controlled substances are required to report respectively on production, imports, exports and on quantities recycled, reclaimed and destroyed, as well as any stocks of ODS. The current costs to companies/users of fulfilling these reporting requirements are estimated at coming to €410,000 annually.

***Harmonising reporting requirements with the F-Gas Regulation***

As ODS and F-Gases are substitutes, in particular for refrigeration and air-conditioning, some companies will be required to produce reports both for ODS and for F-Gases. However the reporting requirements are different. This option would create a single reporting obligation combining ODS and F-Gas requirements. As this represents a simplification of current reporting requirements, it will *reduce administrative costs* for businesses who currently report under both of these regulations. However, for companies who only report under the ODS Regulation and do not use any F-Gases, this option could increase the reporting requirements; moreover, the change may lead to confusion.

***Sanction for non-reporting***

At present, there is no sanction on companies that do not respect the reporting requirements of the Regulation. This creates a risk that accurate and complete data is not provided. This option proposes a sanction that would withhold the provision of a license or authorisation for companies that have not reported in three or more years.

This provision may *improve compliance monitoring and enforcement*. The overall effects, however, are expected to be minor, however, as the Commission does not believe that non-reporting or inaccurate reporting is widespread.

***Reporting by facilities involved in destruction of ODS***

As discussed above, the option of requiring recovery, recycling and destruction operators to report directly to the Commission was considered. Because of the large number of facilities potentially involved in the recovery and recycling of ODS (e.g., motor vehicle servicing operators, WEEE collectors) and the costs of introducing a direct reporting requirement covering all such facilities, this option was discarded.

However, given the importance of eliminating ODS, particularly the CFCs collected from older products and equipment, the option of requiring facilities that carry out destruction of ODS to report directly to the Commission on the types of ODS and quantities destroyed was looked at more closely. The number of such facilities within the EU is rather limited. It is estimated that requiring these facilities to carry out direct reporting would increase the reporting costs to industry some €150,000 annually.

***Online reporting***

Companies and other users currently report by email, and a contractor to the European Commission compiles these reports. A move to on-line reporting would require an initial set-up cost for the European Commission. The move may also involve a small administrative cost for reporting companies. Once operating, on-line reporting should provide the European Commission and Member States with easier access to data, thus potentially improving enforcement as well as policy discussions.

## 10.4 Overall comparison of options

This section presents the estimated overall costs and benefits for the proposed options concerning both Member State and industry reporting.

As already discussed above, the current reporting requirements are estimated to cost the 27 Member States €1,500,000 a year, while the burden on industry is lower at an estimated €410,000.

The Commission's overall cost of gathering this information and assembling it into reports for the MP Secretariat, etc. is estimated at €560,000. This figure also includes the cost of gathering information directly reported by industry (importers, exporters, producers, users).

The combined economic impact of the recommended changes to the Regulation's reporting requirements is provided in the table above. As shown, they would result in a slightly increased burden on industry (this would occur if destruction facilities were required to directly report to the Commission) but would decrease the administrative costs incurred at present by the Member States.

| | No EU action | Proposed options for MS and industry reporting |
|---|---|---|
| **Economic and Social impacts** | | |
| Total direct costs on industry (NPV at 2010, € mio) | 0 | 0 |
| Total admin. costs on industry (NPV at 2010, € mio) | 0.41 | 0.56 |
| Total admin. costs on MS (NPV at 2010, € mio) | 1.50 | 1.31 |
| Total admin. costs on COM (NPV at 2010, € mio) | 0.56 | 0.62 |
| **Other impacts: health** | na | na |
| **Impact in ODP tonnes, total 2010-2019** | na | na |
| **Impact in GHG-equivalent tonnes** | na | na |

**Table 10.1. Comparison of the options for reporting**

# 11. Monitoring requirements, information to the public, including awareness raising and research

## 11.1 Problem

The current Regulation does not contain provisions on monitoring (for example monitoring the status of the ozone layer), informing the public about dangers related to ozone layer depletion, or supporting research into this issue. In contrast, other EC environmental legislation often contains provisions for public information and for research. Also, Article 9 of the Montreal Protocol requires Parties to cooperate in promoting research, exchange of information and public awareness of the environmental effects of the emission of ODS.

## 11.2 Options for the revision of the Regulation

Two options are considered:

- Inclusion of a provision on awareness raising and information to the public, similar to the approaches in the Directive on ozone in ambient air and the POPs Regulation.
- Requirement for Member States and the Commission to promote and facilitate research on ODS and depletion of the ozone layer, with special attention on the public.

Both options would bring into the Regulation requirements currently in the Montreal Protocol, though the Regulation could provide further details.

Regarding the first option, it appears that most if not all Member States already take measures for raising awareness and providing information to the public. Indeed, all of the Member States who responded to a question on this topic reported that they took such actions. All of these publish a UV-index, either on the website of the national meteorological institute or in other weather forecasts, such as on television.[130]

If any Member States do not publish a UV-index, the cost of introducing this into a weather forecasting should be low.

In addition, the European Commission and the Member States should consider undertaking a further awareness raising initiative to inform the EC public about the success of the Montreal Protocol and the ODS Regulation, about remaining tasks in terms of ODS phase-out and about actions that they can take, such as proper disposal of used refrigerators or air-conditioning. An awareness raising campaign at the EU-level can be done using printed materials, information items on radio and television or in newspapers or magazines. Such a campaign could start in 2012, the year of the 25$^{th}$ anniversary of the Protocol. The campaign would create a *direct cost* for the European Commission and Member States.

[130] These countries that responded include Belgium, Estonia, France, Hungary, Poland, Spain and the Slovak Republic. Moreover, Finland reported that such actions are undertaken by all members of the Nordic Council. In some countries, UV-index are published more frequently during the summer months, when the UV-index and related risks are highest. In one country, the law on ODS requires the authorities to inform the public on the status of the ozone layer and on the values of ultraviolet radiation on a regular basis and free of charge. The national meteorological institute there provides the necessary data to the media.

The second option could specifically involve an article encouraging research and in particular calling for synergies between Member State research and Community initiatives, thereby encouraging the use of European research funding under the 7th Framework programme.

This option would have a positive impact on *innovation and research* on ODS and depletion of the ozone layer and would also strengthen the EU's position in research in this area at the international level.

As a first estimate, this option would not create new costs for Member States or the Commission: rather, it would create synergies between current research and possibly redirect research to ozone layer issues.