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Ozone-depleting substances 2013

Aggregated data reported by companies on the import, export, production, destruction and feedstock and process agent use of ozone-depleting substances in the European Union

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Contents

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Executive summary

Background

The Montreal Protocol on Substances that Deplete the Ozone Layer entered into force in 1989 and aims to protect the stratospheric ozone layer by phasing out more than 200 substances, including chlorofluorocarbons (CFCs), halons, hydrofluorocarbons (HCFCs), hydrobromofluorocarbons (HBFCs), carbon tetrachloride (CTC), trichloroethane (TCA), hydrochloromethane (BCM) and methylbromide (MB). Most known substances with a significant ozone-depleting potential (ODP) are therefore covered by the Montreal Protocol. Within the European Union (EU) these so-called 'controlled substances' are regulated by Regulation (EC) 1005/2009 (ODS Regulation). This regulation stipulates that each company producing, importing into and/or exporting out of the EU, feedstock user, process agent user and destruction facility must annually report transactions of controlled substances.

The ODS Regulation also extents to halon-1202, mehtylchloride (MC), ethylbromide (EB), trifluoroiodomethane (TFIM) and n-propyl bromide (n-PB), which are together referred to as 'new substances'. Producers, importers and exporters of these substances have to report associated transactions. New substances are not controlled under the Montreal Protocol.

This report summarises the data reported under the ODS Regulation for the year 2013 and looks at major trends since 2006. Data submitted by companies are commercially confidential and a number of rigorous measures have been applied to protect that confidentiality.

Results are expressed in both metric tonnes and ODP tonnes ([1]).

Key findings

Imports of ozone-depleting substances

Between 2007 and 2010 imports of ozone-depleting substances (ODS) into the EU have been declining by 53 % to 8 880 metric tonnes (2010). Since 2010 they have been relatively stable with minor variations between years. In 2013 imports amounted to 8 502 metric tonnes. The largest imported quantities in 2013 were HCFCs (41 % in metric tonnes), MB, CFCs and BCM.

Expressed in ODP tonnes, imports of MB and CFCs accounted for 70 % of total imports, while 88 % of the MB import was for quarantine and pre-shipment services (re-export). Only 12 % of the MB (in ODP tonnes) was placed on the European market, predominantly as feedstock.

Controlled substances were imported mainly from USA and China. Except for HCFCs, the types of substances imported were not produced in the EU in 2013.

Exports of ozone-depleting substances

The uninterrupted decline (expressed in metric tonnes) in exports of ODS out of the EU since 2006 was continued in 2013. The total quantity exported in 2013 was 11 623 metric tonnes and therefore 19 % lower than in 2012 and 85 % lower than in 2006. Exports constituted predominantly HCFCs (74 %), MB and CTC.

In ODP tonnes, the decline in exports between 2012 and 2013 was even more pronounced at 43 % year on year. This was the result of exceptionally high exports of CTC in 2012, which, during that year, interrupted the steady decline in exports expressed in ODP tonnes observed since 2006.

([1]) The ozone-depleting potential (ODP) for a specific substance is calculated by multiplying the quantity in metric tonnes with its respective ODP value. The ODP values express the relative amount of degradation to the ozone layer relative to trichlorofluoromethane (CFC-11) which has an ODP of 1.0.

In 2013, controlled substances were exported to a large number of destinations with the largest amounts exported to Mexico, Japan and Saudi Arabia.

Production of ozone-depleting substances

The production of ODS has been declining steadily since 2006 with a pronounced dip in production around the time of the economic crisis in 2009. In 2013, this decline was continued with a year-on-year decrease of 4.5 % in metric tonnes from 2012 down to 163 665 metric tonnes. Production of ODS included most importantly HCFCs (70 % of the production) and CTC (19 %). Only minor quantities of CFCs and HBFCs and no MB or BCM were produced in the EU in 2013.

Production of controlled substances was almost exclusively for feedstock use inside the EU (91 % of the produced quantity in metric tonnes). The remaining production was either the result of unintentional by-production, intended for process agent use or for export as feedstock, foam blowing agent or refrigeration.

Production for feedstock use has been relatively stable since 2006. The overall decline in production is predominantly caused by decreasing production for other intended uses.

Destruction of ozone-depleting substances

In 2013 a total of 5 883 metric tonnes of controlled substances were destroyed, of which 69 % were CTC and 18 % were CFCs. In addition, 391 metric tonnes of ODS mixtures of an unknown composition were destroyed (not included in total above).

Expressed in metric tonnes, destruction was 107 % higher in 2013 compared to 2012.This significant year-on-year increase can, to a large extent, be explained by the unusually high amount of unintentionally produced CTC that was stockpiled in 2012 and then destroyed in 2013. Normally, any unintentional by-production is destroyed during the year of production.

This occurrence also explains the deviation from the overall declining trend in ODS destruction that can be observed since 2008. During the 2012/2013 period a significant dip in destruction appeared. The shift in destruction activity from 2012 to 2013 also explains why the amounts destroyed in 2013 are comparable to those in 2011 and not lower.

Consumption of ozone-depleting substances

Consumption is an aggregated parameter that integrates import, export, production and destruction. Consumption results vary significantly depending on whether they are expressed in metric tonnes or ODP tonnes, because controlled substances with a high ODP (e.g. CFCs and CTC) exhibit a different trend compared to those with a low ODP (e.g. HCFCs).

The consumption of controlled substances reached its lowest level on record in 2013 (expressed in metric tonnes). The trend towards a progressively more negative ([2]) consumption that was interrupted in 2012 has been continued in 2013. The exceptionally low consumption (both in terms of metric tonnes and ODP tonnes) during 2013 and the positive consumption in 2012 are — as explained above — a result of the unusual stockpiling of CTC in 2012, and subsequently elevated destruction during 2013.

The consumption of controlled substances is expected to continue to decline and become increasingly negative in the future.

Feedstock consumption and use

Feedstock consumption varies considerably from year to year between 2000 and 2007. After a dip during 2008 and 2009 (which is most likely a result of declining production during the economic crisis) it remained relatively stagnant. In 2013, feedstock consumption was 157 538 metric tonnes and 7.7 % below the 2010 figure.

Feedstock use is reported separately under the ODS Regulation and can as such be juxtaposed with the aggregated metric feedstock consumption, which integrates data reported on feedstock import/export and production. In theory, both metrics should provide very similar results. In 2013 feedstock consumption was however 2.9 % higher than feedstock use expressed in metric tonnes and even 44 % higher expressed in ODP tonnes.

([2]) Consumption is a parameter that gives an idea of the presence of ozone-depleting substances in the market and tracks the progress in phasing out these chemicals. This parameter can be a negative number in certain conditions. More details are provided in Section 2.1.

The significant difference between the two metrics can, to a large extent, be explained by changes in the stocks of CTC for feedstock uses. In 2013, large amounts of CTC produced for feedstock uses were added to the stock, rather than used as make-up. Production (and therefore feedstock consumption) was therefore higher than the reported make-up and resulting emissions (feedstock use). During 2013, a number of reporters also re-labelled stocks of CTC as intended for destruction (i.e. unintentional by-production) that were — in 2012 — still held for feedstock uses.

Process agent use

In 2013, make-up for process agent use increased by 14 % relative to 2012 to 622 metric tonnes and stayed well below the make-up limits for the EU. Emissions amounted to 15 metric tonnes and stayed below the emissions limit set by the Montreal Protocol. The emissions limit imposed by the ODS Regulation (4.5 metric tonnes) was however breached by a large margin.

New substances

Production of new substances has been increasing between 2009 and 2012. In 2013, however, production seems to have stagnated and reached 1 122 117 metric tonnes, thereby staying slightly below the 2012 amount. Quantities of new substances exported and imported were comparably small and amounted to 0.5 % and 1 % of the production, respectively.

Expressed in metric tonnes the production of new substances was almost seven times higher than the production of controlled substances in 2013. However, due to the lower ODP of new substances, their production contributes approximately 30 % to the combined amount of controlled and new substances produced within the EU expressed in ODP tonnes.

Reporting process

In 2014, companies reported for reporting year 2013, which was the fourth reporting year under the ODS Regulation ([3]). It was also the third for which the European Environment Agency (EEA) has taken over the data management (including collection, compilation, quality control, and analysis of the companies' reports) as well as the responsibility for the provision of support to the reporting companies.

Since the 2012 reporting year companies report their ODS transactions via a multilingual online platform, the Business Data Repository (BDR, https://bdr.eionet.europa.eu). Reporters received support regarding the reporting procedure and technical questions from the EEA in English. A number of manuals and additional guidance documents were also available in all official European languages.

The reported data were subject to automated and manual quality checks and reporters were asked to submit revised reports via BDR where necessary. This process was repeated until submissions passed all quality checks.

According to the ODS Regulation, all companies subject to the regulation have to report their transactions of a given year by 31 March of the following year. Potential reporters were invited to report in February 2014 and reminded of their obligation in mid-March. Invited companies who regarded themselves as not covered by the regulation were asked to confirm these circumstances by submitting a so-called NIL report via BDR.

In total, 177 companies reported ODS activities for 2013 and 72 companies submitted NIL reports.

([3]) Regulation (EC) No 1005/2009 of the European Parliament and of the Council of 16 September 2009 on substances that deplete the ozone layer. Companies had also to report on ODS according the previous EU Regulation on the matter (Regulation (EC) No 2037/2000).

1 Introduction

1.1 Background

In 1989 the Montreal Protocol on Substances that Deplete the Ozone Layer entered into force. It has the objective of protecting the stratospheric ozone layer by phasing out the production of substances that contribute to ozone depletion. The Protocol covers over 200 individual substances with a high ozone-depleting potential, including chlorofluorocarbons (CFCs), halons, carbon tetrachloride (CTC), trichloroethane (TCA), hydrochlorofluorocarbons (HCFCs), hydrobromofluorocarbons (HBFCs), bromochloromethane (BCM) and methylbromide (MB), all of which are referred to as 'controlled substances'.

Within the European Union (EU), the use and trade in controlled substances is governed by Regulation (EC) 1005/2009 (ODS Regulation) (EC, 2009). This regulation stipulates that each company producing, importing and/or exporting into the EU, feedstock user, process agent user and destruction facility must annually report their activities concerning controlled substances. The ODS Regulation also extends to five additional substances that are not covered by the Montreal Protocol but have an ozone-depleting potential (new substances). Producers, importers and exporters have to report their activities for new substances. These new substances are: halon-1202, methylchloride (MC), ethylbromide (EB), trifluoroiodomethane (TFIM) and n-propyl bromide (n-PB).

This report summarises the most recent data (covering the year 2013) reported under the ODS Regulation and looks at trends since 2006 (European Commission (DG Clima), 2010 and 2011; EEA, 2012 and 2013). Data for 2011 and 2012 were also updated based on the reports resubmitted for these years after the respective reporting deadlines. Data tables in Annex 1 provide additional detail. Data submitted by companies are commercially confidential and a number of rigorous measures have been applied to prevent sensitive information from being made available. These measures are explained in detail in Annex 2.

Results are expressed in both metric tonnes and ozone-depleting potential tonnes (ODP tonnes). Depending on the unit used, the observed trends can differ significantly.

1.2 Report structure

This report contains an explanation of the background, institutional arrangements, reporting procedure and key terminology (Chapter 1). The aggregation results as well as the methodology used are summarised in Chapter 2. Results for the following ODS transactions are included: production, import, export, consumption, destruction, feedstock use and process agent use. Production, import and export data of new substances are also presented.

1.3 Institutional arrangements

In 2014, companies reported for reporting year 2013, which was the fourth reporting year under the ODS Regulation ([4]). As of reporting year 2011, the European Environment Agency (EEA) is responsible for collecting, archiving, checking and aggregating information of the companies' reports. The EEA is also responsible for supporting the reporters in fulfilling their obligation.

Since 2012, technical support to the ODS reporting process was provided by the EEA's European Topic Centre on Air pollution and Climate Change Mitigation (ETC/ACM). In previous years, collection, quality control, analysis and support were performed by consultants in the context of service contracts with the European Commission.

([4]) Regulation (EC) No 1005/2009 of the European Parliament and of the Council of 16 September 2009 on substances that deplete the ozone layer.

1.4 Reporting procedure

Since 2012 the reporting on ozone-depleting substances is done via an online platform, the Business Data Repository (BDR) at https://bdr.eionet.europa.eu. This multilingual online platform is a password protected environment that hosts online questionnaires for the different reporting obligations managed by the tool. The use of this submission platform for ODS reporting ensures transparent documentation of the reporting by companies, while providing the required level of security and confidentiality of the reported data. Reporters received support, both regarding the reporting procedure and regarding technical questions, via EEA and ETC/ACM support team, as well as through manuals and additional guidance documents.

Data reported by companies were subject to automated and manual quality checks. The latter were carried out by the ETC/ACM support staff. Reporters also had the option to autonomously run the automated quality checking procedure in order to validate their questionnaire before submission. Where necessary, reporters were contacted to submit a revised report via BDR to assure the transparency of the reporting process. This process was repeated until submissions passed all quality checks.

The ODS Regulation sets the reporting deadline at 31 March of each year. The EEA, on the basis of the information available on companies present on the market of ODS, sent out invitation e-mails in February 2014 reminding companies about the reporting obligations under the ODS Regulation. Additional reminders were sent out in mid-March 2014. Companies who regarded themselves as not covered by the reporting obligation of the ODS Regulation were invited to communicate this using the online questionnaire. They were thus asked to submit a so-called NIL report in which they explicitly indicated why they considered themselves as not covered by the reporting obligation.

In total, 249 companies responded to the invitation to report. Hereof, 72 companies sent in a NIL report and 177 companies submitted an ODS report containing data. Submissions were received starting from 24 February 2014. Most companies submitting an ODS report, were located in the larger Member States notably France, Germany, Italy, Spain and the United Kingdom.

1.5 Terminology

This section presents key terminology and associated assumptions in use throughout the document.

Ozone-depleting substances

Ozone-depleting substances (ODS) are substances, mainly compounds with chlorine and bromine, that reach the stratosphere of the Earth and react with stratospheric ozone reducing its concentration levels in that region of the atmosphere (the so-called ozone layer) and thus the capacity of the atmosphere to filter ultraviolet light. Most known ODS are regulated under the Montreal Protocol.

Controlled substances

Controlled substances are substances that are listed in Annex I of the ODS Regulation and subject to the reporting obligation of Article 7 of the Montreal Protocol.

New substances

'New substances' refers to the additional five substances which are covered by the ODS Regulation and are not included within the scope of the Montreal Protocol: halon-1202, n-propyl bromide (n-PB), ethyl bromide (EB), trifluoroiodomethane (TFIM), methyl chloride (MC). Thus, EU companies are obliged to report production, import and export of these substances according to the higher level of ambition of the ODS Regulation compared to the Montreal Protocol.

Mixtures

Throughout this report the term 'mixtures' refers to gas mixtures that consist of multiple substances, at least one of which is a controlled substance. Mixtures are not included in the data presented in this report. Destruction facilities are required to report the quantities of individual substances destroyed each year. In certain cases, companies were however only able to report the destruction of mixtures of controlled substances with an unknown composition.

By-production

Unintentional by-production of controlled substances usually concerns volumes that are taken off the process cycle and at least temporarily stored (e.g. in a buffer tank) before they are destroyed, used, placed on the market, exported or sent for destruction in a facility outside the production site.

Feedstock

A number of ozone-depleting substances serve as chemical building blocks for the manufacture of other chemicals (i.e. as 'feedstock'). They are used (directly or indirectly) for the manufacture of a diverse range of products, such as refrigerants, foam blowing agents, solvents, polymers, pharmaceuticals and agricultural chemicals.

Process agent use

A process agent is a substance that either facilitated a chemical reaction or inhibits an intended chemical reaction in an industrial process.

Make-up

Make-up is the quantity of virgin, recovered or reclaimed controlled substances that has not been used in the process cycle before and that is fed newly into the process cycle. For feedstock and process agent uses, make-up has to be reported as well as the emissions set free during the respective use.

Ozone-depleting potentials

The ozone-depleting potential of a substance refers to the amount of ozone depletion caused by it. It is the ratio of the impact on ozone of a chemical substance compared to the impact of a similar mass of CFC-11. The potential to deplete the ozone layer of any given reported amount is calculated by multiplying the quantity in metric tonnes with the ozone-depleting potential (ODP) of the respective substances. The ODP of the controlled and new substances is listed in Annex I and Annex II of the ODS Regulation. Some new substances have not one single ODP value but a range. In this report, the highest value of the ODP value range is used.

Quarantine and pre-shipment services (QPS)

Quarantine and pre-shipment applications of methyl bromide (MB) are treatments to prevent the introduction, establishment and/or spread of quarantine pests (including diseases), or to ensure their official control.

1.6 Confidentiality

The data reported under the ODS Regulation are protected by strict confidentiality provisions. Hence, the EEA has applied measures to prevent the deduction of commercially sensitive information. The measures include the aggregation of data for substance groups (where applicable), protection of data that are the result of reports from less than three corporate groups, and additional measures to prevent deduction of sensitive information. A detailed account of the confidentiality measures applied throughout the report is included in Annex 2.

2 Aggregation results

2.1 Methodology

Data covered by this report

All data for 2013 are taken as reported from tables in the online questionnaire. During the current reporting period reports for previous reporting years were resubmitted ([5]). For the reporting years 2011 and 2012 such reports were also taken into account and the respective data presented here may differ from those in previous EEA technical reports. To protect confidential information (see above), the reported data are aggregated for import, export, production, destruction, consumption, feedstock consumption and process agent use. Likewise, data on production, import and exports of new substances are aggregated.

Each of the transactions reported upon is briefly addressed in the following notes.

Import

Companies reported the quantity imported for each combination of substance, use, customs procedure and source country.

Export

Reported exports are presented in an aggregated form for all ODS. Exports to overseas countries and territories were included in the total exports. Where possible from a confidentiality perspective quantities were provided separately for each destination country. No exports to non-Parties were reported for 2013.

Production

Aggregated data on the EU production of controlled substances are provided both as a total as well as for the most important uses. The share of the EU production that is intended for feedstock use over time is presented separately. Note that production data also include data on unintentional by-production.

Destruction

Aggregated data on destruction activities in the EU are presented. The total quantity of ODS destroyed at each company was calculated based on:

- the quantity of waste originating from the reported production, purchase or import destroyed at the companies' own destruction facility;
- the quantity of waste sent for destruction to other destruction facilities.

As mentioned above (see Section 1.5), some companies were only able to report the destruction of mixtures. Such quantities were excluded from this report.

Consumption

Consumption is an aggregated metric and was calculated from the reported data on production, import, export and destruction. Amounts that were not intended for use (i.e. consumption) in the EU during 2013 are not included in this metric. Similarly, quantities intended for feedstock and process agent use, or for QPS, are excluded.

([5]) Companies have the opportunity to resubmit reports for previous reporting cycles. They do so to address inconsistencies that span across multiple years.

The way in which consumption is calculated in this report deviates slightly from the methodology applied by the United Nations Environment Programme (UNEP) Ozone Secretariat under the Montreal Protocol. Box 2.1 compares both methodologies and offers an explanation for why there is a slight deviation.

Consumption is a parameter that gives an idea of the presence of ozone-depleting substances in the market and tracks the progress in phasing out these chemicals. Calculated for each calendar year, it is mainly defined as Production plus Imports minus Exports minus Destruction. As such, its formula can yield a negative number when substances are produced and imported in quantities which do not compensate for the amounts exported or destroyed. This usually happens when exports or destruction affects quantities that were in the EU market in previous years (stocks). If the parameter is calculated in ODP tonnes, since substances have very different ODP values, a negative value is obtained when production/imports affect low-ODP substances and exports/destruction affect high-ODP substances.

Feedstock use

It is only since the present ODS Regulation came into force in 2010 that feedstock users are obliged to report the use, stocks and emissions of each specific feedstock process, starting from reporting year 2009. Before 2009 consumption for feedstock use could only be determined using production, import and export statistics. In this report, both calculation methods have been used to calculate the quantity of controlled substances used as feedstock.

Process agent use

Since reporting year 2001, process agent users in the EU are required to report the consumption and emissions resulting from process agent use. Only the aggregated totals of make-up ([6]) and emission quantities were presented.

Production, import and export of new substances

This report only contains aggregated data on the production, import and export of the five new substances ([6]). The amount of new substances

Box 2.1 Consumption calculation methodology of the UNEP Ozone Secretariat

Consumption calculation methodology of the UNEP Ozone Secretariat

The consumption calculation applied by the UNEP Ozone Secretariat under the Montreal Protocol is as follows:

$$C = (P_{TOTAL} - P_{FDST\text{-}EU} - P_{QPS} - P_{PAU} - D) + (I_{VIRGIN} - I_{FDST} - I_{QPS} - I_{PAU}) - (E_{VIRGIN} - E_{QPS} - E_{PAU} - E_{NON\text{-}PARTIES})$$

where C is consumption; P_{TOTAL} is the total production in the EU for all uses; $P_{FDST\text{-}EU}$ is the production for feedstock use in the EU; P_{QPS} is the production of MB for QPS; P_{PAU} is the production for Process Agent Use (PAU) in the EU; D is destruction of controlled substances; I_{VIRGIN} is the total import of virgin controlled substances; I_{FDST} is the import of virgin substances for feedstock use; I_{QPS} is the import of MB for QPS; I_{PAU} is the import of virgin substances for process agent use; E_{VIRGIN} is the total export of virgin substances outside EU; E_{QPS} is the export of MB for QPS; E_{PAU} is the import of virgin substances for process agent use; and $E_{NON\text{-}PARTIES}$ is the total export to non-Parties.

In line with Decision X/14 on Process Agents (from the 10th Meeting of the Parties to the Montreal Protocol (MOP)) the quantities produced or imported for the purpose of being used as process agents in plants in operation before 1999 should not be taken into account in the calculation of consumption. The decision outlines an additional requirement for non-Article 5 Parties (for the case of the EU) namely the PAU quantities should not be taken into account in the calculations provided that the Party stays within the emission limit imposed by the Montreal Protocol. All European plants which use process agents were in operation before 1 January 1999. In addition, the EU stayed within the imposed emission limit in 2013.

The Ozone Secretariat is not subtracting P_{PAU}, I_{PAU} and E_{PAU} in the consumption calculations for the EU under certain circumstances. In this report these amounts are however subtracted for 2013 according to the rules stated in the previous paragraph.

([6]) See Section 1.5 'Terminology'.

produced in ODP tonnes is compared to the production of controlled substances in ODP tonnes over time.

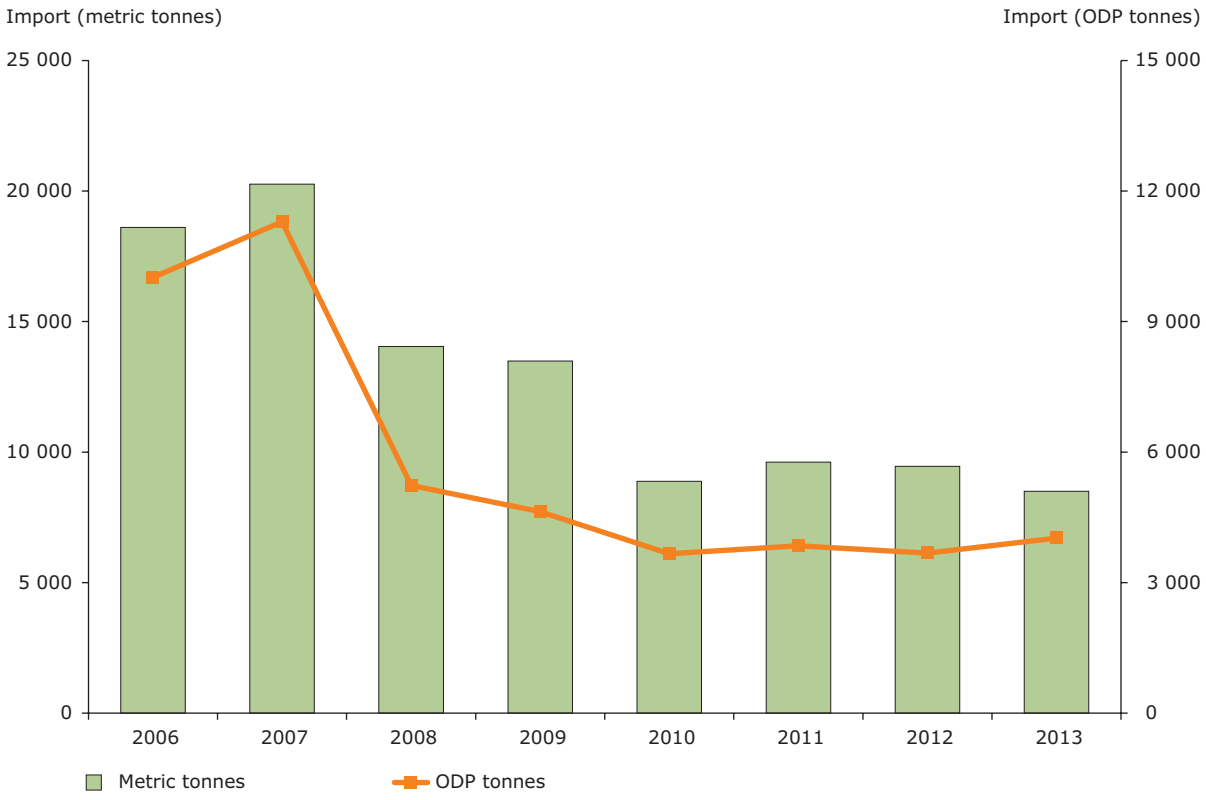
2.2 Imports of ozone-depleting substances

The quantity of controlled substances imported into the EU has declined steadily between 2006 and 2010 from 18 609 to 8 880 metric tonnes (Figure 2.1). Since 2010, the imported quantity of controlled substances has been relatively constant and amounted to 8 502 metric tonnes in 2013. The controlled substances imported in the largest quantities in 2013 were HCFCs (3 476 metric tonnes or 41 %), MB ([7]), CFCs ([7]) and BCM ([7]). In addition, 100 metric tonnes of halons were imported. Except for HCFCs, these imported substances were not produced in the EU and were not available in the European market. The imported quantities were predominantly intended for feedstock use (61 %) and re-export, e.g. for quarantine and pre-shipment services (QPS).

In ODP tonnes, the total import of controlled substances was 4 025 ODP tonnes in 2013. Due to the differences in ozone-depleting potential among the substances, the import of MB and CFCs accounted for 70 % of the total import expressed in ODP tonnes. It is however important to stress that 88 % of the MB import is for re-export for QPS and, to a much lesser extent, feedstock use. Only 12 % is placed on the EU market, almost exclusively for feedstock use.

Imports of controlled substances originated from a limited number of source countries (Figure 2.2): 91 % of the imported controlled substances came from the United States of America and China combined and the remaining 9 % came from 10 different countries (in order of importance: Israel, Saudi Arabia, Japan, Norway, South Korea, India, Switzerland, Bahamas, Panama and Liberia).

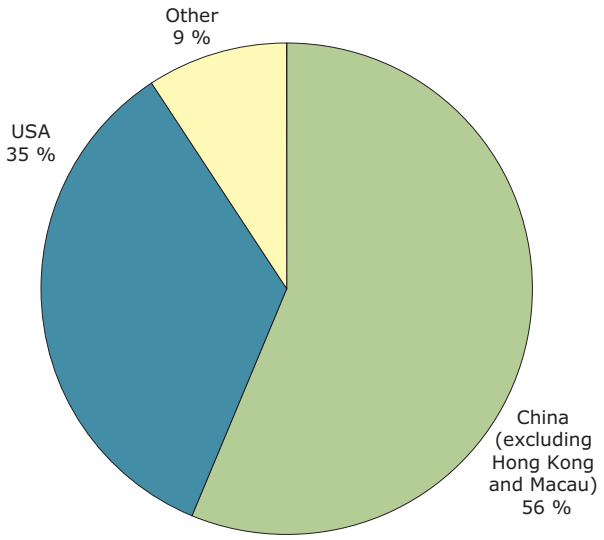
Figure 2.1 Trend in the imports of controlled substances into the EU



Sources: European Commission (DG CLIMA), 2006–2010; and EEA, 2011–2013.

([7]) For confidentiality reasons, data are not included.

Figure 2.2 Quantity of controlled substances imported in 2013 per source country



Note: Percentages expressed based on quantities in metric tonnes.

'Other' covers Bahamas, India, Israel, Japan, Liberia, Norway, Panama, Republic of Korea, Saudi Arabia and Switzerland.

2.3 Export of ozone-depleting substances

In 2013 the quantity of controlled substances exported in metric tonnes (including re-export) from the European Union has continued the decline that can be observed since 2006 (Figure 2.3). The total quantity exported in 2013 was approximately 2 699 metric tonnes lower than in 2012 and amounted to 11 623 metric tonnes. The decline in 2013 is significant (19 % relative to 2012), but somewhat less pronounced than the annual decline in export in the period 2006–2011 for which the average year-on-year decline was 24 %. The most important controlled substances in terms of amounts exported in 2013 were HCFCs (8 609 metric tonnes or 74 %), MB ([8]) and CTC ([8]). In addition, 37 metric tonnes of halons were exported in 2013. Compared to 2012, export of HCFCs (8 923 metric tonnes) was slightly lower. The same is true for exports of MB ([8]) and especially CTC ([8]).

There are two main reasons for the declining exports. For substances produced in the European Union ([9]), the decrease is linked to a decline in production and an increase in the use of this production for internal EU feedstock and process agent use. For substances that are not produced in the EU on the other hand, the decline in exports corresponds with the decline in imports.

When expressing ODS exports in ODP tonnes, the total export amounted to 3 084 ODP tonnes in 2013. This is significantly lower than the export in 2012 (5 384 ODP tonnes) and is caused by the unusually high exports of CTC during the year 2012 which has a relatively high ozone-depleting potential compared to the other controlled substances exported, especially HCFCs.

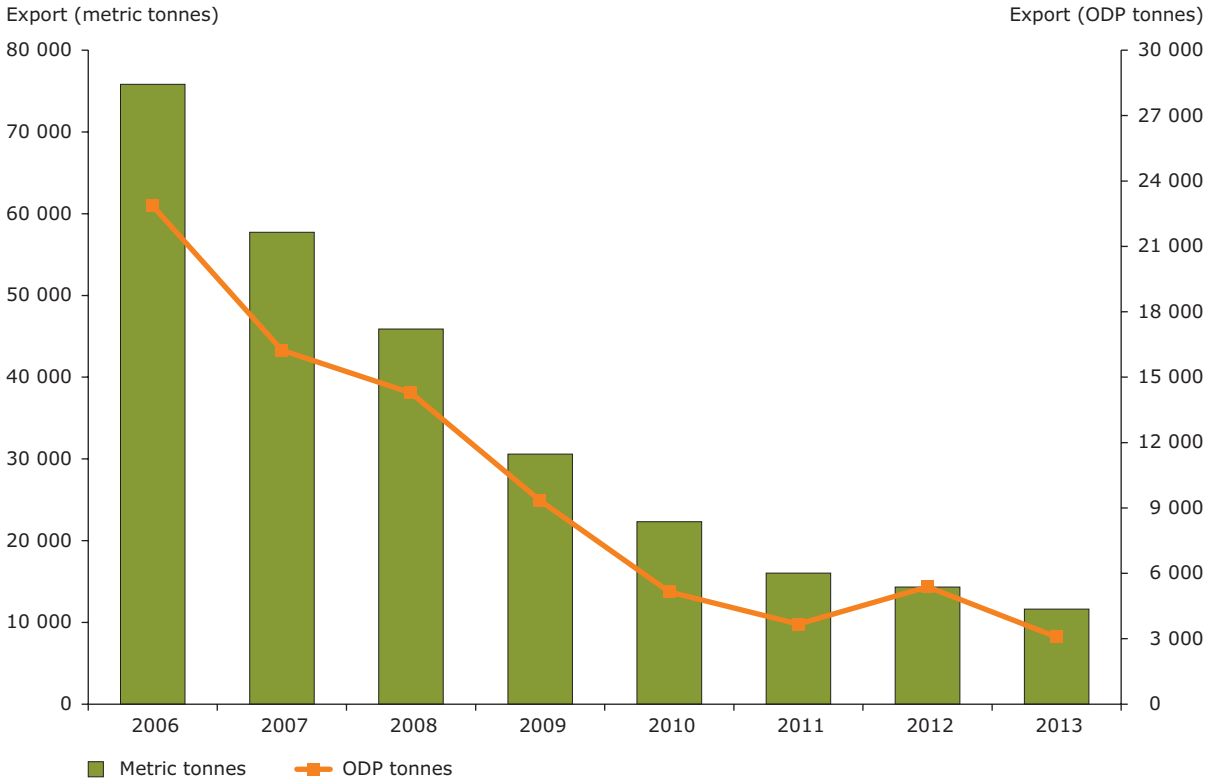
Controlled substances are exported to numerous destination countries (Figure 2.4). The most significant quantities are exported to Mexico, Japan, Saudi Arabia, Brazil and USA. Note that for confidentiality reasons, exports to Mexico, Japan, Saudi Arabia and Brazil are included in the category 'other' in Figure 2.4 ([10]).

([8]) For confidentiality reasons, data are not included.

([9]) Production of ODS in the European Union is limited to CFC-13, CTC, HCFC-22, HCFC-124, HCFC-142b, HCFC-141b, HBFC-21 B2, HBFC-31 B1, TCA, halon-1301 and in small quantities CFC-11. CFC-112, CFC-114, CFC-12, CFC-13, HCFC-142, HCFC-132b, HCFC-133a, HCFC-31 and HBFC-31 B1. All other ODS were not produced in the European Union, this includes BCM and MB.

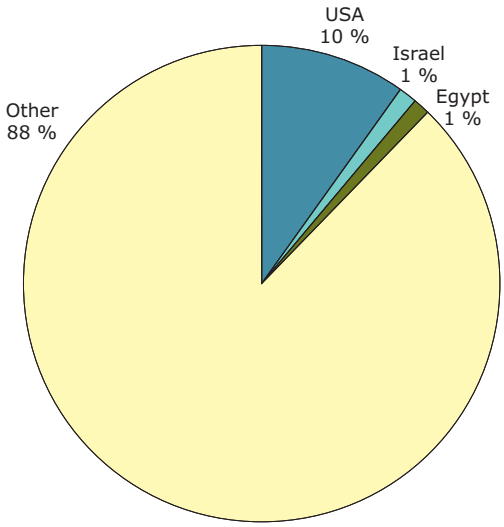
([10]) Next to the export to USA, Israel and Egypt, the category 'other' includes the export to 72 additional countries, including French Polynesia and Greenland, which belong to the overseas countries and territories of the EU.

Figure 2.3 Trend in the exports of controlled substances out of the EU



Sources: European Commission (DG CLIMA), 2006–2010; and EEA, 2011–2013.

Figure 2.4 Quantity of controlled substances exported in 2013 per source country



Note: Percentages expressed based on quantities in metric tonnes.

'Other' includes Algeria, Angola, Antigua and Barbuda, Argentina, Armenia, Australia, Bahamas, Bahrain, Barbados, Belize, Bosnia and Herzegovina, Brazil, Canada, Chile, Colombia, Congo, Democratic Republic of the Congo, Cook Islands, Côte d'Ivoire, Dominican Republic, El Salvador, Faroe Islands, French Polynesia, Gabon, Ghana, Greenland, Guatemala, Guyana, Haiti, Hong Kong, India, Indonesia, Iraq, Japan, Jordan, Republic of Korea, Kuwait, Lebanon, Liberia, Libya, Macao, the former Yugoslav Republic of Macedonia, Malaysia, Marshall Islands, Mexico, Montenegro, Morocco, Myanmar, New Zealand, Nigeria, Norway, Pakistan, Panama, Philippines, Russian Federation, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Saudi Arabia, Senegal, Serbia, Singapore, South Africa, Sri Lanka, Switzerland, Syria, Taiwan, Thailand, Trinidad and Tobago, Tunisia, Turkey, United Arab Emirates, Uzbekistan, Venezuela, Vietnam, Yemen.

2.4 Production of ozone-depleting substances

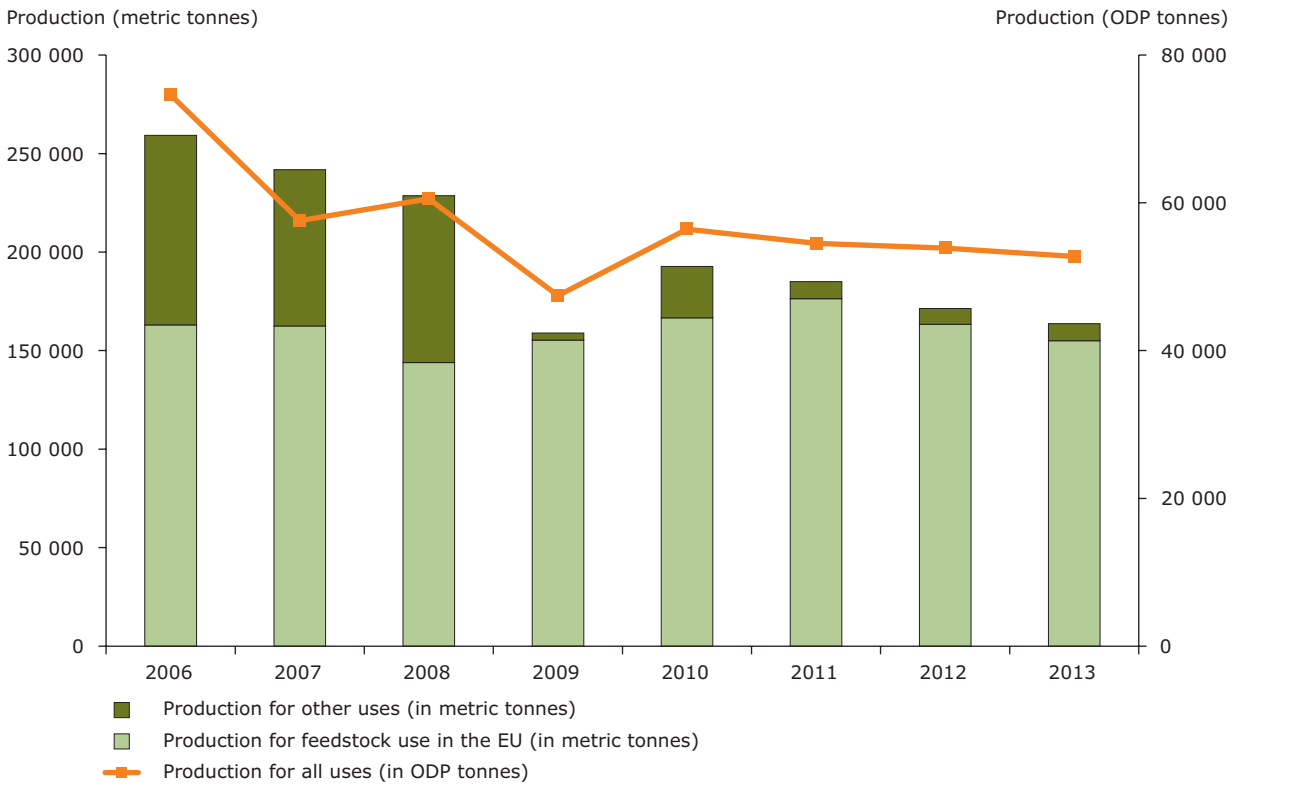
The production of controlled substances has been declining steadily since 2006 (Figure 2.5). A significant dip in production occurred in 2009, most likely linked to the economic downturn in Europe in that year as a result of the economic crisis. In 2013, total production of controlled substances was 163 665 metric tonnes or 52 740 ODP tonnes. Production was thus lower than in 2012 with a year-on-year decrease of 4.5 % in metric tonnes or 2.1 % in ODP tonnes.

The most relevant controlled substances produced in the EU were HCFCs (114 907 metric tonnes) and CTC (30 865 metric tonnes). This translates to 70 % and 19 % of the total production. Only minor quantities of CFCs and HBFCs and no MB or BCM were produced in 2013.

Production of controlled substances in the EU was almost exclusively for feedstock use. In 2013, feedstock use production accounted for 95 % of the total controlled substances production (expressed in metric tonnes). The majority of which was intended for companies located within the European Union (91 % of the total production). The remaining production in the EU in 2013 was the result of unintentional by-production (that was subsequently destroyed) or intended for either process agent use, foam blowing or refrigeration. For the latter two uses, all the produced quantities were exported.

As can be seen in Figure 2.5, the decline in production between 2006 and 2013 is predominantly caused by declining production for other uses (e.g. refrigeration, unintentional by-production and feedstock use outside the EU), while production for feedstock use inside the EU remained very similar throughout this period, ranging between a low point of 143 882 metric tonnes (2008) and a high point of 176 349 metric tonnes (2011).

Figure 2.5 Trend in the production of controlled substances within the EU



Sources: European Commission (DG CLIMA), 2006–2010; and EEA, 2011–2013.

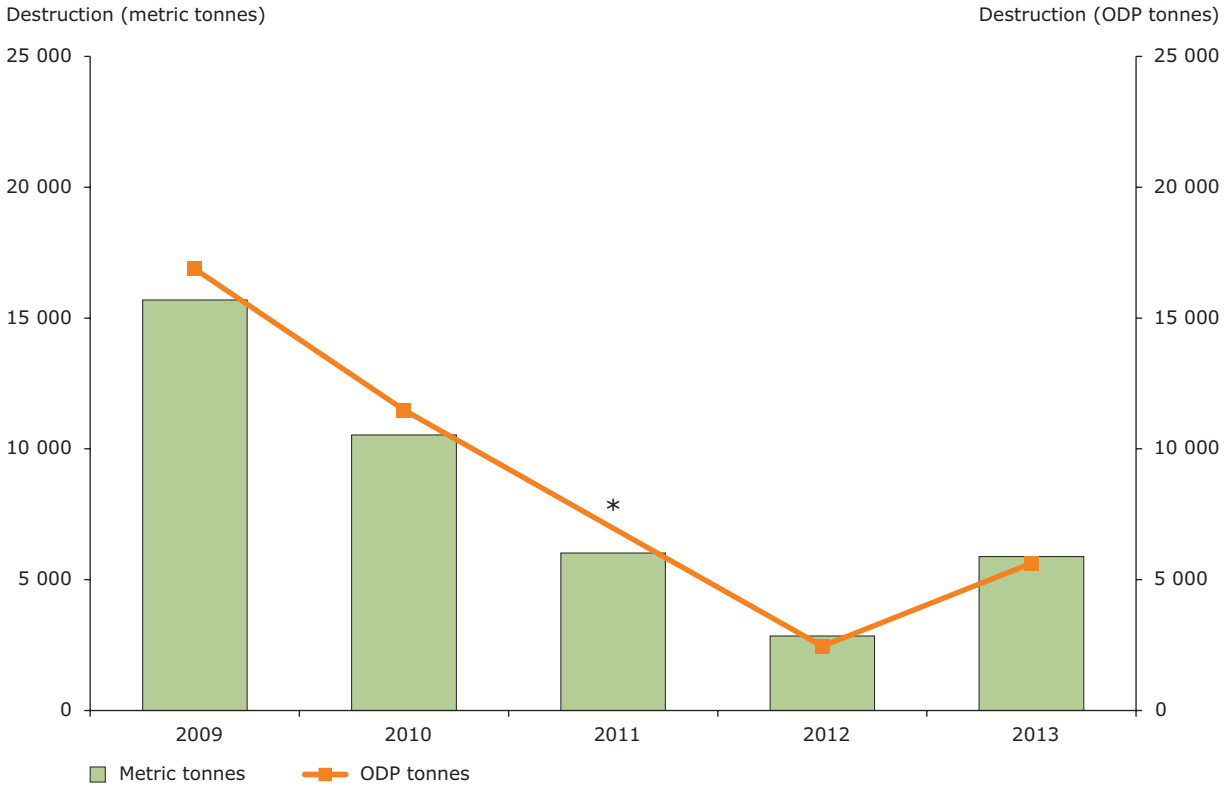
2.5 Destruction of ozone-depleting substances

In 2013, a total of 5 883 metric tonnes of controlled substances were destroyed. The largest quantities destroyed were CTC (4 036 metric tonnes) and CFCs (1 060 metric tonnes). Additionally, 391 metric tonnes of mixtures with an unknown composition were destroyed ([11]).

Excluding quantities of mixtures, destruction in 2013 was 107 % higher than in 2012 (expressed in metric tonnes; Figure 2.6). The difference is explained to a large extent by the very low destruction of unintentionally produced CTC in 2012. Instead, unintentionally produced CTC was stockpiled ([12]) and subsequently destroyed during 2013, giving rise to the overall elevated destruction activity during that year. This is likely the main reason why the declining trend in ODS destruction, that can be observed between 2009 and 2012, did not continue during the 2012/2013 period. Instead, the amount destroyed in 2013 is in a similar range as the amount reported destroyed in 2011 ([13]) and still significantly below the amounts reported destroyed before then (e.g. 9 863 metric tonnes in 2010).

Prior to 2009, destruction facilities did not have to report directly to the European Commission and data collection and aggregation was done differently. Figure 2.6 therefore only contains data reaching back to 2009.

Figure 2.6 Trend in the destruction of controlled substances within the EU



Note: Destructed mixtures of ODS are excluded. Amount for 2011 (marked with *) in ODP tonnes is excluded for confidentiality reasons.

Sources: European Commission (DG CLIMA), 2006–2010; and EEA, 2011–2013.

([11]) Because the composition of the waste is unknown and can consist of both ozone-depleting substances and other substances (e.g. fluorinated greenhouse gases such as hydrofluorocarbons) they are not included in the total. For a definition of mixtures, see Section 1.5.

([12]) Stockpiles are stocks held by producers at the end of the year, resulting from production during the reporting year. Stocks at the end of the year resulting from imports, purchases or production in previous years are not included.

([13]) For confidentiality reasons, data are not included.

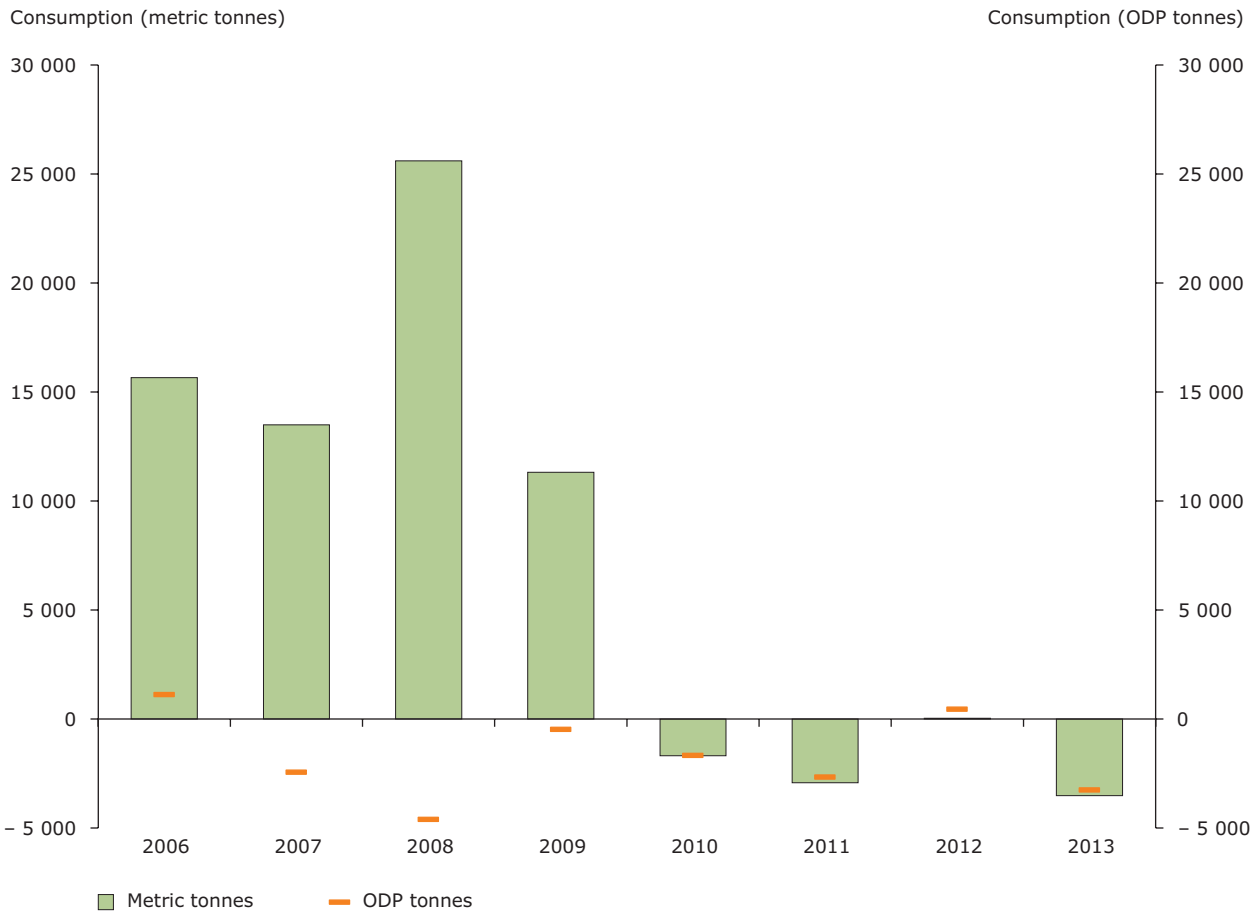
2.6 Consumption of ozone-depleting substances

Consumption integrates the statistics on import, export, production and destruction into one single indicator. The trend of consumption in the EU is distinctly different when expressed in metric tonnes or ODP tonnes, especially in the period 2006–2009 (Figure 2.7).This is due to controlled substances with a high ozone-depleting potential having a negative consumption (e.g. CTC and CFCs) and controlled substances with a lower ozone-depleting potential having a positive consumption (e.g. HCFCs).

In 2013, the consumption of controlled substances reached its lowest level on record. The trend towards a progressively more negative consumption ([14]) that was interrupted in 2012 has therefore been continued in 2013. It is however important to note that the exceptionally low consumption during 2013, as well as the positive consumption during 2012, is likely at least in part the result of unusual stockpiling of unintentionally produced CTC during 2012 and the elevated destruction activity during 2013 that resulted from it (see Section 2.5).

The consumption of ODS is expected to continue its decline and stay negative (both in metric tonnes and ODP tonnes) in the future.

Figure 2.7 Trend in the consumption of controlled substances within the EU



Sources: European Commission (DG CLIMA), 2006–2010; and EEA, 2011–2013.

([14]) Consumption is a parameter that gives an idea of the presence of ozone-depleting substances in the market and tracks the progress in phasing out these chemicals. This parameter can be a negative number in certain conditions. More details are provided in Section 2.1.

2.7 Feedstock consumption and use

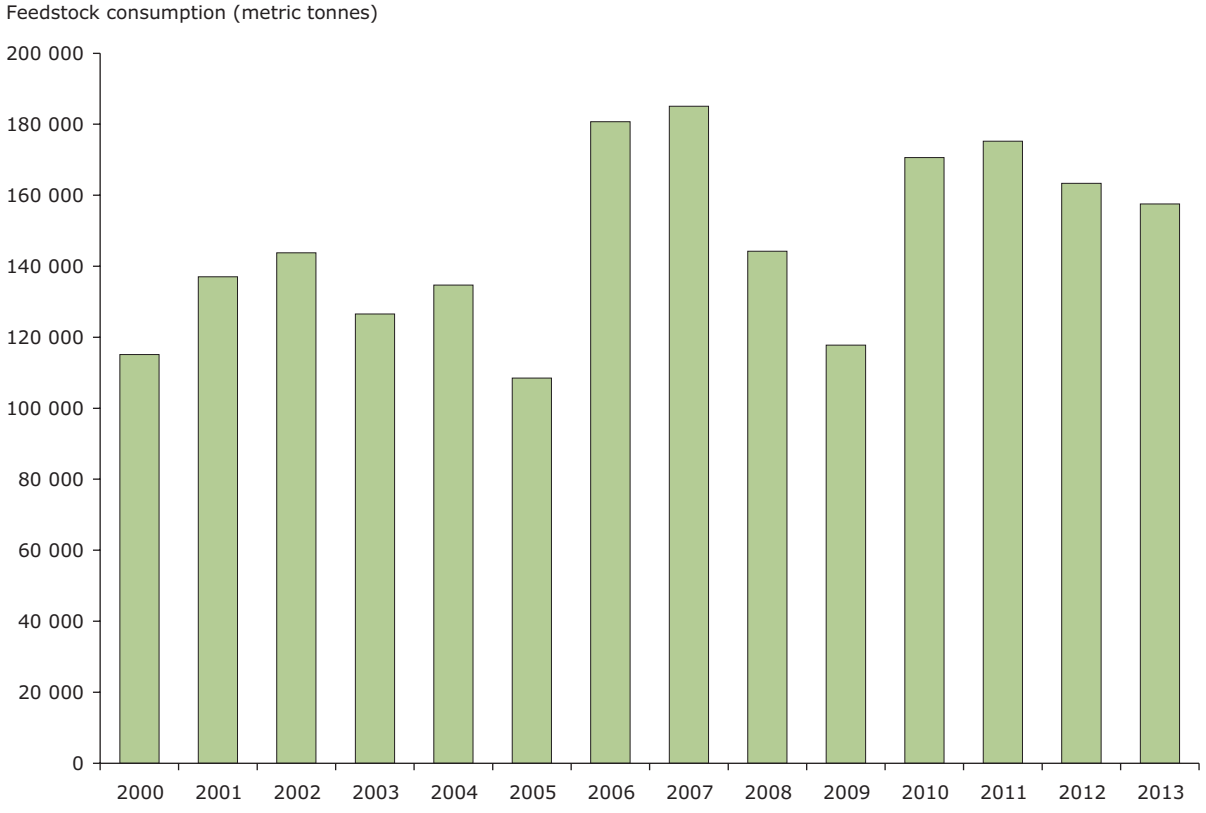
The reporting obligation of the ODS Regulation allows for a direct assessment of the use of controlled substances as feedstock agents. Feedstock use can be calculated directly as the reported make-up minus quantities send for destruction by feedstock users. Feedstock consumption on the other hand, is calculated using data on production, import and export of controlled substances for feedstock uses. Although the methodologies are different, in principle, both should provide very similar results.

In 2013, feedstock consumption was approximately 4 488 metric tonnes higher than feedstock use in that year, i.e. a difference of 2.9 % (relative to feedstock use). Expressed in ODP tonnes the difference was even larger (15 526 ODP tonnes or 44 %). In 2011, for example, the relationship between these two metrics was different. That year, feedstock consumption was actually lower than feedstock use.

The annual differences between feedstock consumption and feedstock use can be explained by changes in the stocks for feedstock uses. In 2013, the stocks specifically held for feedstock uses in the European Union increased, particularly for CTC. This resulted in higher production of controlled substances compared to make-up for and emissions from feedstock uses. Amounts intended for feedstock uses may also be re-labelled as unintentional by-products for destruction and vice versa, depending on market fluctuations. This occurred in 2013 and further increased feedstock consumption relative to feedstock use.

When looking at the feedstock consumption trend in the period 2000–2013, it becomes clear that the consumption varies considerably between years. Feedstock consumption before 2006 was markedly lower than from 2006 onwards. Feedstock consumption of controlled substances then peaked in 2007. After the dip in consumption in 2008–2009 (most likely linked to lower rates of activity as a result of the economic crisis), feedstock consumption increased again but not to the same level as before. In 2013 it was over 13 000 metric tonnes lower than in 2010, which is a decrease of 7.7 % (Figure 2.8).

Figure 2.8 Trend in the feedstock consumption of controlled substances within the European Union



Sources: European Commission (DG CLIMA), 2000–2010; and EEA, 2011–2013.

2.8 Process agent use

The use of controlled substances as process agents is limited to a specific set of processes by the Montreal Protocol. Moreover, the European Union imposes restrictions on the make-up and emissions for each registered process agent user.

In 2013, the total make-up of controlled substances (in effect only CTC, CFC-12 and CFC-113) was 75 metric tonnes higher than in 2012, due to an increase in make-up of CTC in three of the four allowed processes. In total, 622 metric tonnes of controlled substances were newly introduced as process agents into the process cycle.

The make-up of controlled substances in 2013 in the EU, nonetheless, stayed well below the EU restrictions. Emissions were 16 metric tonnes and therefore remained within the limit imposed for the EU by the Montreal Protocol (17 metric tonnes). The limit imposed by the ODS Regulation (4.5 metric tonnes) was, however, exceeded by a significant margin.

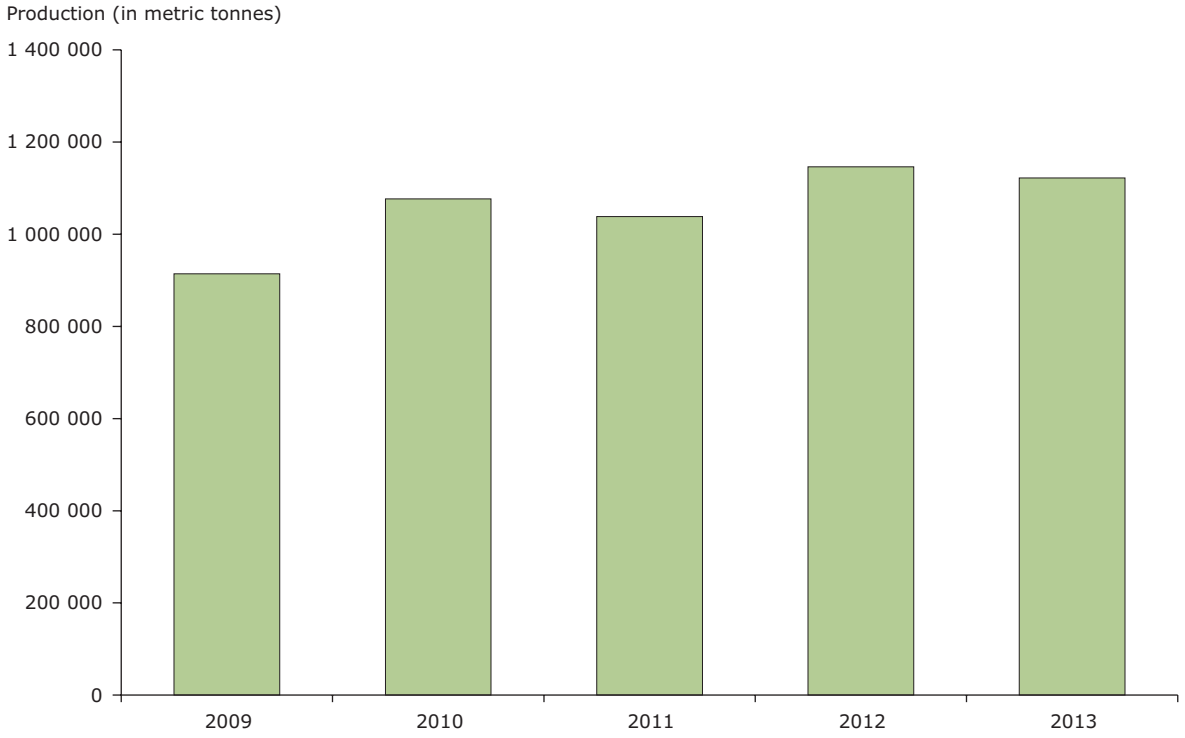
2.9 New substances

Producers, importers and exporters of new substances have to report information on these substances. The production of new substances seems to have stagnated (Figure 2.9) and, in 2013, is lower than in 2012 with 1 122 117 metric tonnes or 23 ODP tonnes. Production was therefore 2.1 % lower than production in 2012 (in metric tonnes). Production of new substances was almost exclusively for feedstock use (99.7 % when expressed in metric tonnes).

Quantities imported (11 188 metric tonnes) and exported (5 899 metric tonnes) during 2013 are — like in previous years — small compared to the quantities produced in the EU. Exports of new substances have been decreasing slightly in 2013 down by 9 % (relative to 2012).

In 2013, production of new substances (expressed in metric tonnes) was (like in 2011) almost seven times higher than production of controlled substances. However, due to the lower ODP of

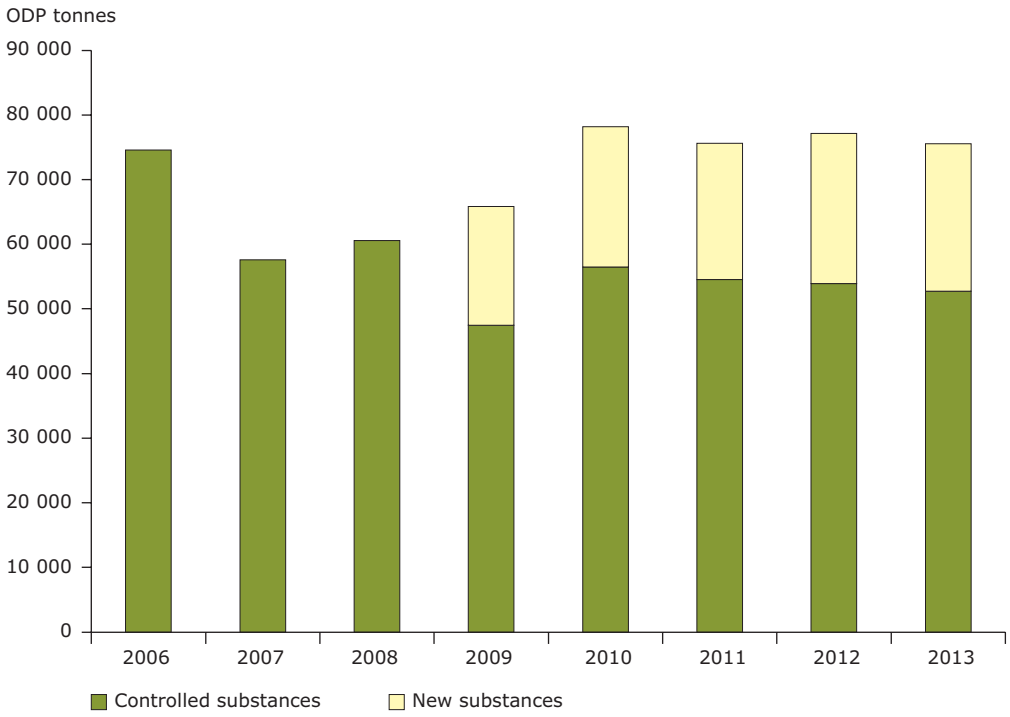
Figure 2.9 Trend in the production of new substances within the EU



Sources: European Commission (DG CLIMA), 2006–2010; and EEA, 2011–2013.

new substances ([15]), the picture is different when production quantities are expressed in ODP tonnes (Figure 2.10). Nevertheless, the production of new substances still accounts for 30 % of the total production of substances with an ozone-depleting potential in 2013 (when expressed in ODP tonnes).

Figure 2.10 Comparison of the production of aggregated new and controlled substances within the European Union between 2006 and 2013



Sources: European Commission (DG CLIMA), 2006–2010; and EEA, 2011–2013.

([15]) For some new substances, the ozone-depleting potential is expressed as a range in the ODS Regulation. In this case, the highest value was used for conversion from metric tonnes to ODP tonnes.

List of abbreviations

BCM	Bromochloromethane
BDR	Business Data Repository
CFC	Chlorofluorocarbon
CTC	Tetrachloromethane (carbon tetrachloride)
EB	Ethyl bromide, bromoethane
EEA	European Environment Agency
ETC/ACM	European Topic Centre for Air Pollution and Climate Change Mitigation
EU	European Union
HBFC	Hydrobromofluorocarbon
HCFC	Hydrochlorofluorocarbon
HFC	Hydrofluorocarbon
MB	Methyl bromide, bromomethane
MC	Methyl chloride, chloromethane
MS	EU Member States
n-PB	n-Propyl bromide, 1-Bromopropane
ODP	Ozone-depleting potential
ODS	Ozone-depleting substances
QC	Quality Control
QPS	Quarantine and Pre-Shipment Services
TCA	1,1,1-Trichloroethane (methylchloroform)
TFIM	Trifluoroiodomethane, trifluoromethyl iodide

References

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EEA, 2013, *Aggregated data reported by companies on the production, import, export, destruction and use of ozone-depleting substances in the European Union*, Technical report No 13/2013, European Environment Agency.

Annex 1 Data tables

Table A.1.1 Production, import, export and destruction of controlled and new substances, EU, 2013 (metric tonnes)

	Production	Import	Export	Destruction *
CFCs	C	C	C	1 059.688
Halons	C	100.293	36.703	14.243
Other CFCs	C	-	-	C
CTC	30 864.753	C	C	4 035.835
TCA	C	C	C	C
HCFCs	114 907.366	3 475.734	8 608.541	737.916
HBFCs	C	C	C	-
BCM	-	C	-	-
MB	-	C	C	C
Total controlled substances	163 664.494	8 501.483	11 622.477	5 883.409
Halon-1202	-	C	0.003	-
MC	C	10 121.971	C	-
EB	C	C	C	-
TFIM	-	C	C	-
n-PB	C	1 014.324	C	-
Total new substances	1 122 116.609	11 187.680	5 898.488	-

Note: Additionally, mixtures of CFC, HCFC and HFC were destroyed in 2013, but are not included in the data.

* Destruction of new substances is not subject to reporting obligations under ODS Regulation (Regulation (EC) No 1005/2009)

C: For confidentiality reasons, data are not included.

Table A.1.2 Production, import, export and destruction of controlled and new substances, EU, 2013 (ODP tonnes)

	Production	Import	Export	Destruction *
CFCs	C	C	C	1 048.754
Halons	C	1 002.926	366.630	64.436
Other CFCs	C	-	-	C
CTC	33 951.228	C	C	4 439.419
TCA	C	C	C	C
HCFCs	6 797.581	104.483	C	35.233
HBFCs	C	C	C	-
BCM	-	C	-	-
MB	-	C	C	C
Total controlled substances	52 739.483	4 024.957	3 083.512	5 623.573
Halon-1202	-	C	0.004	-
MC	C	202.439	C	-
EB	C	9.873	C	-
TFIM	-	C	C	-
n-PB	C	101.432	C	-
Total new substances	22 798.421	313.796	304.429	-

Note: Mixtures of CFC, HCFC and HFC have also been destroyed in 2013, but are not included in the data.

* Destruction of new substances is not subject to reporting obligations under ODS Regulation (EC Regulation No 1005/2009).

C: For confidentiality reasons, data are not included.

Table A.1.3 Import of controlled substances in the European Union in 2013 (metric tonnes and ODP tonnes)

Source country	Import in metric tonnes	Import in ODP tonnes
China (excluding Hong Kong and Macao)	4 786.316	2 032.113
United States of America (USA)	2 928.057	1 527.458
Other ([a])	787.110	465.381

Note: ([a]): 'Other' covers Israel, Saudi Arabia, Japan, Republic of Korea, India, Switzerland, Bahamas, Panama, Liberia, Marshall Islands, Norway and Singapore.

Table A.1.4 Export of controlled substances in the European Union in 2013 (metric tonnes)

Destination country	Export in metric tonnes	Export in ODP tonnes
USA	1 148.373	C
Turkey	74.926	C
Tunisia	35.070	8.500
Switzerland	10.676	6.142
Russian Federation	31.515	3.356
Morocco	44.927	6.868
Israel	142.893	143.855
Egypt	133.756	C
Other ([a])	10 000.341	2 361.075

Note: C: For confidentiality reasons, data are not included.

([a]) 'Other' covers 67 countries including Mexico, Japan, Saudi Arabia, Brazil, India and Vietnam.

Table A.1.5 Production, import, export and destruction of controlled substances as well as their consumption in the European Union in 2008–2013 (metric tonnes)

	2008	2009	2010	2011	2012	2013
Production	228 679.988	158 964.698	192 701.432	185 012.855	171 421.433	163 664.494
For feedstock use in EU	143 882.204	155 279.160	166 676.115	176 348.903	163 305.811	155 041.750
For other uses	84 797.784	3 685.538	26 025.317	8 663.952	8 115.622	8 622.744
Import	14 047.129	13 488.668	8 879.960	9 615.495	9 455.048	8 501.483
Export	45 889.870	30 584.610	22 306.714	16 025.203	14 321.337	11 622.477
Destruction	20 965.473	15 696.544	10 537.109	6 015.862	2 844.209	5 883.409
Consumption	25 603.340	11 314.252	– 1 680.472	– 2 918.315	32.509	– 3 513.702

Table A.1.6 Production, import, export and destruction of controlled substances as well as their consumption in the European Union in 2008–2013 (ODP tonnes)

	2008	2009	2010	2011	2012	2013
Production	60 551.900	47 462.519	56 447.059	54 508.282	53 878.464	52 739.483
For feedstock use in EU	37 713.153	28 212.383	44 293.910	50 496.325	50 186.405	49 323.909
For other uses	22 838.748	19 250.137	12 153.149	4 011.958	3 692.059	3 415.574
Import	5 235.212	4 632.050	3 665.348	3 848.783	3 681.756	4 024.957
Export	14 276.324	9 333.493	5 151.469	3 671.381	5 383.456	3 083.512
Destruction	23 014.584	16 875.156	11 479.037	C	2 452.402	5 623.573
Consumption	– 4 597.269	– 467.606	– 1 664.604	– 2 652.163	460.846	– 3 251.414

Note: C: For confidentiality reasons, data are not included.

Table A.1.7 Feedstock consumption of controlled substances in the European Union in 2000–2013 (metric tonnes)

	Feedstock consumption
2000	115 156.500
2001	137 016.000
2002	143 813.500
2003	126 576.030
2004	134 713.000
2005	108 489.300
2006	180 716.000
2007	185 085.000
2008	144 249.000
2009	117 795.300
2010	170 630.105
2011	175 232.074
2012	163 361.958
2013	157 538.021

Table A.1.8 Production, import and export of new substances in the European Union in 2009–2013 (metric and ODP tonnes)

	2009	2010	2011	2012	2013
In metric tonnes					
Production	914 278.240	1 076 512.405	1 038 156.509	1 146 200.284	1 122 116.609
Import	1 160.250	1 534.603	1 987.147	1 546.164	11 187.680
Export	5 752.211	6 105.532	6 333.642	6 472.302	5 898.488
In ODP tonnes					
Production	18 404.893	21 722.106	21 138.180	23 258.487	22 798.421
Import	54.047	87.933	150.198	115.753	313.796
Export	178.120	226.414	256.839	260.457	304.429

Annex 2 Measures to protect confidential data

Article 27 (8) of the ODS Regulation states that appropriate steps need to be taken to protect the confidentiality of the information submitted according to this piece of EU law. Hence, the EEA, in agreement with the European Commission, has applied measures to prevent the deduction of commercially sensitive information. These measures apply to production, import, export, destruction and consumption of ODS and (where applicable) new substances, as well as to quarantine and pre-shipment services, process agent and feedstock uses.

The measures include:

1. Application of the so-called '3-company group rule', where the data presented in the report must be the result of reporting by at least three company groups (i.e. corporate groups).

2. Application of a '5 % significance rule', where company groups whose reported data add up to less than 5 % of the total amount reported for any data point represented in the report, are ignored for counting under the '3-company group rule'.

3. Application of additional measures to prevent the deduction of sensitive information.

All measures apply both for amounts reported in metric tonnes and ODP tonnes. Each of the measures is explained in more depth below.

A.2.1 '3-company group rule'

This measure concerns the treatment of data reported by different legal entities across the EU but belonging to the same company group. For that purpose company groups are defined as 'one or more companies legally belonging to the same corporate group'. The agreed principle is that companies belonging to the same corporate group need to be seen as a single entity when it comes to confidentiality rules. The companies' relationships among each other are not reported nor publicly known. The approach applied in 2014 was therefore to identify so-called 'obvious cases' based on the information on company names and contact details as reported during the registration process. Once company groups were thus determined, at least three of them must contribute to each reported value. This measure replaces the old '3-company rule' as applied by EEA in previous public ODS reports, which did not take into account possible corporate relationships.

A.2.2 '5 % significance rule'

As a second measure, company groups were only included in the above count if they contributed significantly to the reported value. That means that the smallest contributors up to an accumulated share of 5 % were not considered when applying the '3-company group rule' above. This ensures that at least three corporate entities contributed significantly to each reported transaction value.

A.2.3 Preventing deduction of sensitive data

Additional measures were applied to prevent deduction of confidential data.

All transactions

Deduction might be possible in cases were transaction data for certain substances or substance groups (i.e. CFCs, halons, other CFCs, CTC, TCA, HCFCs, HBFCs, BCM or MB) remain confidential, yet data for other substances or substance groups along with a total for the transaction in question were published. Confidential data, which were in danger of such deduction, were protected by hiding additional data as confidential (although these additional values had been identified as non-confidential according to the '3-company group' and '5 % significance rule') so that at least values for three (or none) of the substances or substance groups were confidential in the published data for that transaction.

Box A.2.1 A practical guide to applying the '3-company group rule' and '5 % significance rule' measures to the data

Operationalisation of the combined '3-company group rule' and '5 % significance rule'

Step 1: All values reported by companies of a given company group for a given transaction year were added up for a given transaction and substance or substance group.

$$\sum Xi = X1 + X2 + \cdots Xn$$

Xi = *individual reported value by a single reporting undertaking*

$\sum Xi$ = *sum of individual reported values by reporting undertakings belonging to the same company group*

Step 2: The sum of all absolute contributions ($|\sum Xi|$) across company groups was calculated.

Step 3: The percentage share of (2) in relation to (3) was calculated for each company group.

$$\% = \frac{|\sum Xi|}{\sum |\sum Xi|}$$

Step 4: The company groups were sorted in the ascending order of percentages calculated in step 3.

Step 5: An accumulated percentage share was calculated along the sorted company groups.

Step 6: The number of company groups, for which the accumulated share was larger than 5 % was counted.

In case the count was one or two, the full aggregated value across company groups was hidden as confidential. In case the count was three or more, the full aggregated value across company groups was reported and thus not confidential.

Aggregated transactions

Last but not least, transaction data were hidden in case other confidential transaction data could be implied from their publication. In order to understand this additional measure, it should be remembered that consumption of ODS is a calculated transaction that involves corrected production, import, export and destruction data for each substance or substance group. For the reader, this rather complicated calculation can be simplified as:

Consumption =
Production + Import – Export + Remainder

The 'Remainder' may appear irrelevant, and a confidential value on e.g. production may appear being deductible based on non-confidential information on consumption, import and export. In such cases data were only published in case the 'Remainder' exceeded 5 % of the consumption.

A.2.4 Treatment of historical data

For the present report, the above-mentioned measures were also applied to the reported values for reporting years 2011 and 2012. Data related to earlier reporting years were not subject to these more rigorous measures, since the commercial relevance of data is decreasing over time. Instead it continues to be protected by the '3-company rule' that has been applied in previous EEA reports on ODS.

European Environment Agency

Ozone-depleting substances 2013
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