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# Ozone-depleting substances 2015

## 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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European Environment Agency

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# Acknowledgements

This report was prepared for the European Environment Agency (EEA) by its European Topic Centre for Air Pollution and Climate Change Mitigation (ETC/ACM). The authors are Felix Heydel and Bastian Zeiger (ETC/ACM partner Öko-Recherche GmbH).

The EEA report coordinator is Peder Gabrielsen and the ETC/ACM task manager is Felix Heydel (ÖkoRecherche GmbH). Eva Goossens (EEA) and the European Commission Directorate-General for Climate Action are thanked for their support in finalising the report.

# Executive summary

## Background

Chemicals known to harm the ozone layer have been successfully substituted in most parts of the world since 1989, when the Montreal Protocol on Substances that Deplete the Ozone Layer came into force. Within the European Union (EU), ozone-depleting substances (ODS) are covered by Regulation (EC) No 1005/2009 (known as the ODS Regulation). The ODS Regulation stipulates that each company producing controlled substances, importing them into and/or exporting them out of the EU, as well as feedstock users, process agent users and destruction facilities, must annually report its transactions of controlled substances. The ODS Regulation is more stringent than the rules of the Montreal Protocol and encompasses five additional substances (these are referred to as 'new substances'). Producers, importers and exporters of new substances must also report associated transactions annually.

This report summarises the data reported by undertakings in accordance with the ODS Regulation for 2015 and looks at the major trends since 2006. Data submitted by companies are commercially confidential and a number of rigorous measures have been applied to protect that confidentiality (see Section 1.7).

Results are expressed in both metric tonnes and ozone-depleting potential (ODP) tonnes ([1]).

## Key findings

In 2015, the consumption of controlled substances reached its lowest negative level since 2006 ([2]). The consumption of ODS in the EU has been negative or close to zero since 2010. This means that companies in the EU have been consuming relatively small amounts of ODS under the Montreal Protocol.

***Imports of controlled substances***

- In 2015, imports amounted to 6 046 metric tonnes, a 12 % decrease compared with 2014. The largest imported quantities in 2015 were of hydrochlorofluorocarbons (HCFCs) (52 % when expressed in metric tonnes), methyl bromide (MB), chlorofluorocarbons (CFCs) and bromochloromethane (BCM) ([3]).
- Expressed in ODP tonnes, the largest imported quantities were of virgin carbon tetrachloride (CTC) and virgin CFCs.
- In 2015, no MB was imported into the EU for later re-export for quarantine and pre-shipment services (QPS). This is in compliance with the 2015 ban on MB imports for repackaging and subsequent re-export for QPS, set out in Article 15 of the ODS Regulation.
- Controlled virgin substances were imported mainly from China.

***Exports of controlled substances***

- In 2015, the quantity of controlled virgin substances (expressed in metric tonnes) exported from the EU (including re-export) continued to decline. The total quantity exported in 2015 (9 320 metric tonnes) was 1 927 metric tonnes less than in 2014 (down by 17 %), and was made up predominantly of HCFCs (84 % when expressed in metric tonnes) and CTC ([3]).
- Expressed in ODP tonnes, the total quantity exported in 2015 (2 152 ODP tonnes) was 26 % lower than that in 2014.

([1]) See Section 1.6 for terminology and the definition of ODP.
([2]) Consumption is a parameter that gives an idea of the presence of ODS in the market and tracks the progress made in phasing out these chemicals. This parameter can be a negative number in certain conditions. More details are provided in Section 2.1.
([3]) Percentages for certain substances are not published for reasons of confidentiality.

*Production of controlled substances*

- In 2015, a total of 169 920 metric tonnes or 52 859 ODP tonnes of controlled substances was produced, which is slightly lower than the total produced in 2014 (down by 4 % in both metric tonnes and ODP tonnes).
- Controlled substances produced in the EU were predominantly HCFCs (71 % of the total production in metric tonnes), CTC and trichloroethane (TCA) (See footnote ([3])). Only minor quantities of CFCs and hydrobromofluorocarbons (HBFCs), and no MB or BCM, were produced in the EU in 2015.
- In 2015, controlled substances were produced almost exclusively for feedstock use inside the EU (91 % of the quantity produced, in metric tonnes).
- There has been a decline in production for some uses, e.g. refrigeration, unintentional byproduction, process agent use and feedstock use outside the EU, with the latter particularly evident from 2006 to 2010. Production for feedstock use in the EU, on the other hand, remained constant throughout the entire period of 2006 to 2015.

*Destruction of controlled substances*

- In 2015, a total of 10 107 metric tonnes of controlled substances were destroyed. The largest quantities destroyed were of CTC, HCFCs and CFCs (7 955, 1 142 and 957 metric tonnes, respectively).
- Expressed in metric tonnes, destruction in 2015 was 14 % higher than in 2014. The 2015 surge of destruction can, to a large extent, be explained by the increased destruction of unintentionally produced CTC compared with 2014.

*Consumption of controlled substances*

- Consumption is an aggregated parameter that integrates virgin import, virgin export, and production and destruction of controlled substances. Consumption results vary significantly depending on whether they are expressed in metric tonnes or in ODP tonnes, because controlled substances with a high ODP (e.g. CFCs and CTC) exhibit a different trend in consumption from those with a low ODP (e.g. HCFCs).
- In 2015, the consumption of controlled substances reached the lowest negative level since 2006 (– 3 808 metric tonnes) and was 1 305 metric tonnes less than in 2014.

*Feedstock availability and use of controlled substances*

- In 2015, 160 542 metric tonnes of controlled substances were used as feedstock (down by 4 % relative to 2014), and 158 295 metric tonnes of feedstock were available (again, down by 4 % from 2014). In total there was a difference of – 1.4 % between these two metrics, namely feedstock use and feedstock availability (relative to feedstock use). This difference is below the average difference over the period 2010–2014, and it can be assumed that all large feedstock users reported figures for 2015.
- Emissions of controlled substances from their use as feedstock decreased to an average emissions rate of 0.07 % (calculated as the ratio of total emissions to total quantities used as make-up ([4]), expressed in metric tonnes). The fact that the 2015 average emissions rate was lower than the emissions rate for 2014 (i.e. 0.12 %) appears to suggest that improvements have been made in the control of emissions in industry.

*Process agent use*

- In 2015, the total process agent make-up of controlled substances (CTC, CFC-12 and CFC-113) was lower than in 2014, mainly because of a decrease in the make-up of CTC.
- The total make-up and emissions of controlled substances used as process agents in the EU in 2015 stayed well below restrictions imposed by both the Montreal Protocol and the ODS Regulation.

*New substances*

- In 2015, the production of new substances was slightly lower than in 2014, at 1 107 910 metric tonnes (1.6 % lower) or 22 843 ODP tonnes (1.7 % lower). The production of new substances was almost exclusively for feedstock use. In 2015, the quantities of new substances imported and exported were — as in previous years — comparably small and increased by 6 % and 34 %,

([4]) See Section 1.6 for terminology and a definition of 'make-up'.

respectively, relative to 2014 when expressed in metric tonnes.

- In 2015, the production of new substances (expressed in metric tonnes) was six times higher than the production of controlled substances. However, owing to the lower ODP of new substances, this constitutes approximately 30 % of the combined production of controlled and new substances in the EU expressed in ODP tonnes.

# 1 Introduction

## 1.1 Background

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

Within the European Union (EU), the use of and trade in controlled substances is regulated by Regulation (EC) No 1005/2009 (known as the ODS Regulation) (EC, 2009). This regulation stipulates that each company producing controlled substances, importing them into and/or exporting them out of the EU, as well as feedstock users, process agent users and destruction facilities, must annually report its activities concerning controlled substances. The ODS Regulation also encompasses five additional substances that are not covered by the Montreal Protocol but have an ODP (these are referred to as 'new substances', see Section 1.6). Producers, importers and exporters have to report their activities for new substances. These new substances are halon 1202, methyl chloride (MC), ethyl bromide (EB), trifluoroiodomethane (TFIM) and n-propyl bromide (n-PB).

The data reported on production, import and export are presented to parties of the Montreal Protocol, so that compliance with the Montreal Protocol and progress in phasing out ODS can be monitored. The EU has already achieved its phase-out goals under the Montreal Protocol and is currently mostly reporting exempted, essential and critical uses of ODS.

This document summarises the most recent data (covering 2015) reported by companies under the ODS Regulation and looks at the trends since 2006 (EC, 2010, 2011; EEA, 2012, 2013, 2014, 2015). Data for the period 2012-2014 were also updated, based on the reports resubmitted after the reporting deadlines for these years. Data tables in Annex 1 provide additional details.

Results are expressed in both metric tonnes and ODP tonnes. The observed trends can differ significantly depending on the unit used. Controlled substances with a high ODP (e.g. CFCs and CTC) exhibit a different trend from those with a low ODP (e.g. HCFCs).

## 1.2 Report structure

This report contains background information and information on institutional arrangements, the reporting procedure and key terminology (Chapter 1). The aggregation results and the methodology used are summarised in Chapter 2. Results are included for the following ODS (controlled substances) transactions: 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 2016, companies reported on 2015 activities, which was the sixth reporting year under the ODS Regulation. Since the reporting year 2011, the European Environment Agency (EEA) has been responsible for collecting, archiving, checking and aggregating information contained in the companies' reports. The EEA also supports the undertakings in fulfilling their reporting obligation.

Since 2012, technical support to the ODS reporting process has been 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 under service contracts with the European Commission.

## 1.4 Reporting procedure

Since 2012, reporting on ODS has been performed via an online platform, the Business Data Repository (BDR; see https://bdr.eionet.europa.eu). This multilingual online platform is a password-protected environment that hosts, among other things, an online questionnaire for submission of the company reports under the ODS Regulation. It ensures that reporting by companies is documented transparently, while providing the required level of security and confidentiality of the reported data. Reporters received support both for the reporting procedure and for technical questions from the EEA and the ETC/ACM support team, and via 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 have the option to autonomously run the automated quality-checking procedure, in order to check their questionnaire before submission. Where necessary, reporters were contacted to submit a revised report via the BDR. This process was repeated until submissions passed all quality checks.

The ODS Regulation sets the reporting deadline as 31 March of each year. Based on information available on companies present in the market of ODS, the EEA sent out invitation emails in February 2016, reminding companies of their reporting obligations under the ODS Regulation. Invited companies that consider themselves exempt from the reporting obligation of the ODS Regulation were invited to communicate these circumstances using the online questionnaire. They were thus asked to submit an NIL report ([5]) in which they explicitly indicated why they considered themselves not covered by the reporting obligation.

In total, 262 companies responded to the invitation to report. Of these, 97 companies sent in a NIL report and 165 companies submitted an ODS report containing data. Submissions were received from 15 February 2016. Most companies submitting an ODS report were located in the larger Member States, notably France, Germany, Italy, the Netherlands, Spain and the United Kingdom.

## 1.5 Data used

This report focuses on transactions that occurred during 2015, which were due to be submitted by the reporting deadline of 31 March 2016, while depicting trends and presenting data over the period 2006–2015 ([6]). Data are reported every year and, at the same time as submitting their data, companies have the opportunity to resubmit reports of previous transaction years in order to correct reporting errors.

Data submitted by companies are commercially confidential, and a number of rigorous measures have been applied to prevent sensitive information being made available. These measures are explained in detail in Annex 2.

## 1.6 Terminology

This section presents the key terminology used throughout the document.

### *1.6.1 Ozone-depleting substances (ODS)*

ODS are substances, mainly compounds containing chlorine and bromine, that reach the stratosphere of the Earth and react with stratospheric ozone. This reduces 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.

### *1.6.2 Controlled substances*

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

### *1.6.3 New substances*

The term 'new substances' refers to the five additional substances covered by the ODS Regulation that are not included within the scope of the Montreal Protocol: halon 1202, n-PB, EB, TFIM and MC. Companies in the EU are obliged to report on the production, import and export of these substances in line with the higher level of ambition of the ODS Regulation than the Montreal Protocol.

([5]) See Section 1.6 for an explanation of the term 'NIL report'.
([6]) Production data are available from 2000 onwards, and trends therefore extend back to that year for production.

#### *1.6.4 Mixtures*

Throughout this report, the term 'mixtures' refers to gas mixtures consisting of multiple substances, at least one of which is a controlled substance. Destruction facilities are required to report the quantities of individual substances destroyed each year. In certain cases, however, companies were only able to report on the destruction of mixtures of controlled substances with an unknown composition. Therefore, these mixtures are not included in the data presented in this document and are not reported under the Montreal Protocol.

#### *1.6.5 Virgin substances*

These are substances that have not been previously used.

#### *1.6.6 Non-virgin substances*

These are substances that have been previously used and subsequently recovered from products and equipment, and/or been recycled or reclaimed.

#### *1.6.7 By-production*

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

#### *1.6.8 Feedstock*

A number of ODS 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 including refrigerants, foam blowing agents, solvents, polymers, pharmaceuticals and agricultural chemicals.

#### *1.6.9 Process agent*

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

#### *1.6.10 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 of controlled substances, make-up has to be reported, including the emissions generated during their use.

#### *1.6.11 NIL report*

Invited companies that consider themselves exempt from the reporting obligation of the ODS Regulation were asked to confirm these circumstances by submitting a 'Not obliged to report' (referred to as a NIL report) via the BDR.

#### *1.6.12 Ozone-depleting potential (ODP)*

The ODP 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 to the impact of a similar mass of CFC-11. The quantity in metric tonnes of a particular controlled substance is multiplied by its ODP to give its overall potential to deplete the ozone layer. The ODPs of controlled and new substances are listed in Annexes I and II of the ODS Regulation. Some new substances have a range, rather than a single ODP value. In this report, the highest value of the ODP value range is used.

#### *1.6.13 Quarantine and pre-shipment services*

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

## 1.7 Confidentiality

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 in this document. The measures include the aggregation of data for substance groups (where applicable), protection of data that are the result of reports from fewer 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

### *2.1.1 Data covered by this report*

All data for 2015 are taken as reported in the tables in the online questionnaire. During the reporting year 2015, reports for previous reporting years were resubmitted ([7]). For the reporting years 2012–2014, resubmissions were also taken into account and, therefore, the data presented here may differ from those in previous reports. To protect confidential information (see Section 1.7), the reported data are aggregated by transaction as follows: import, export, production, destruction, consumption, feedstock availability and process agent use. Likewise, data on the production, import and export of new substances are aggregated.

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

### *2.1.2 Metrics for controlled substances*

***Import***

Companies reported the quantity imported for each combination of substance, use, customs procedure and source country. Where possible from a confidentiality perspective, quantities were provided separately for each country of origin. The consumption calculation takes into account imports of virgin substances only, and the aggregation results presented therefore focus on such imports.

***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. As with imports, the aggregation results focus on exports of virgin substances.

***Production***

Aggregated data on the EU production of controlled substances are provided both as a total and for the most important uses. The proportion 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 provided.

The total quantity of ODS destroyed at each company was calculated based on:

- the quantity of waste originating from the reported amount of controlled substance produced, purchased or imported by the company that was destroyed at the company's own destruction facility;
- the quantity of waste sent to other destruction facilities.

Some companies were only able to report the destruction of mixtures. Such quantities were excluded from this report (see Section 1.6 for terminology and the definition of 'mixtures').

***Consumption***

Consumption of controlled substances is a key metric for the implementation of the Montreal Protocol. It is an aggregated metric, 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 2015 are not included in this metric. Similarly, non-virgin imports and exports, as well as substances intended for feedstock and process agent use, are excluded. This approach for calculating consumption is in line with that applied by

([7]) Companies have the opportunity to resubmit reports for previous reporting cycles to address inconsistencies that span multiple years.

the United Nations Environment Programme (UNEP) Ozone Secretariat ([8]).

Consumption is a parameter that gives an idea of the presence of ODS in the market and tracks progress that has been made in phasing out these chemicals. It is calculated for each calendar year, and is mainly defined as:

Consumption =
production + imports – exports – destruction

The result of this formula can be a negative number when substances are produced and imported in quantities that do not compensate for the amounts that are exported or destroyed. This usually happens when exports or destruction affect quantities that were in the market in previous years (stocks). If the parameter is calculated in ODP tonnes — note that 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 and availability***

The reporting obligation of the ODS Regulation (which came into force in 2010) allows for a direct calculation of the amount of controlled substances used as feedstock agents. Therefore, based on the data reported, this aggregated value, called *feedstock use*, is available only from 2010 onwards. Prior to that, it was only possible to infer *feedstock availability*, calculated as the production for feedstock use in the EU plus the imports for feedstock use. While feedstock use sheds light on the amounts of controlled substances used by feedstock users in the EU, feedstock availability highlights the amounts of feedstock available on the EU market. A comparison of both metrics allows for an assessment of how complete the reporting for feedstock uses is.

It is only since the present ODS Regulation came into force in 2010 (reporting year 2009) that feedstock users have been obliged to report the use of, stocks of and emissions from each specific feedstock process. Since then it has been possible to calculate the use of controlled substances as feedstock directly, as companies have to report the make-up and quantities destroyed or sent for destruction. Feedstock use in the EU ($U_{FDST}$) is thus calculated as:

$$U_{FDST} = M_{FDST} + EM_{FDST} + D_{FDST}$$ ([9])

where $M_{FDST}$ is the quantity used as make-up for feedstock, $EM_{FDST}$ is the emissions of controlled substances during their use as feedstock and $D_{FDST}$ is the quantity of ODS intended for feedstock use sent to a destruction facility by feedstock users.

Before 2009, the availability of feedstock in the EU could be determined only by using production, import and export statistics. The availability of controlled substances for feedstock use in the EU ($A_{FDST}$) is calculated as:

$$A_{FDST} = P_{FDST\text{-}EU} + I_{FDST}$$

where $P_{FDST\text{-}EU}$ is the quantity produced for feedstock use inside the EU ([10]) and $I_{FDST}$ is the quantity imported for feedstock use.

In this report, both calculation methods are utilised to check compliance with the reporting obligation by feedstock users.

***Process agent use***

Since the reporting year 2001, process agent users in the EU have been required to report the consumption and emissions of controlled substances resulting from their use as process agents. Only the aggregated totals of make-up ([11]) and quantities of emissions are presented.

### *2.1.3 New substances*

This report contains aggregated data on the production, import and export of the five new substances ([11]). Based on these metrics, the availability of new substances on the EU market ($A_{NEW}$) is calculated as:

$$A_{NEW} = P_{NEW} + I_{NEW} - E_{NEW}$$

where $P_{NEW}$, $I_{NEW}$ and $E_{NEW}$ relate to the quantities of new substances produced, imported and exported, respectively.

([8]) UNEP, 2016, *Handbook for the Montreal Protocol on substances that deplete the ozone layer*, Tenth edition, United Nations Environment Programme, Nairobi, Kenya.
([9]) A similar calculation was carried out in the four previous annual summary reports, although, in the previous reports, $U_{FDST}$ was calculated as $M_{FDST} - E_{FDST} - D_{FDST}$.
([10]) Producers report amounts produced for feedstock in the EU and outside the EU separately.
([11]) See Section 1.6 for terminology and the definitions of 'make-up' and 'new substances'.

## 2.2 Imports of controlled substances

### *2.2.1 Imports of controlled virgin substances*

The quantity of controlled virgin substances imported into the EU has declined, from 18 566 metric tonnes in 2006 to 8 790 metric tonnes in 2010 (Figure 2.1). Since 2010, the imported quantity of controlled substances has been relatively constant, with a gradual but steady decline since 2012. In 2015, imports amounted to 6 046 metric tonnes, a 12 % decrease compared with 2014. The controlled substances imported in the largest quantities in 2015 were HCFCs (3 170 metric tonnes, being 52 % of the total imports), MB ([12]), CFCs ([12]) and BCM ([12]). The imported quantities were predominantly intended for feedstock use (91 % when expressed in metric tonnes) and re-export for refrigeration.

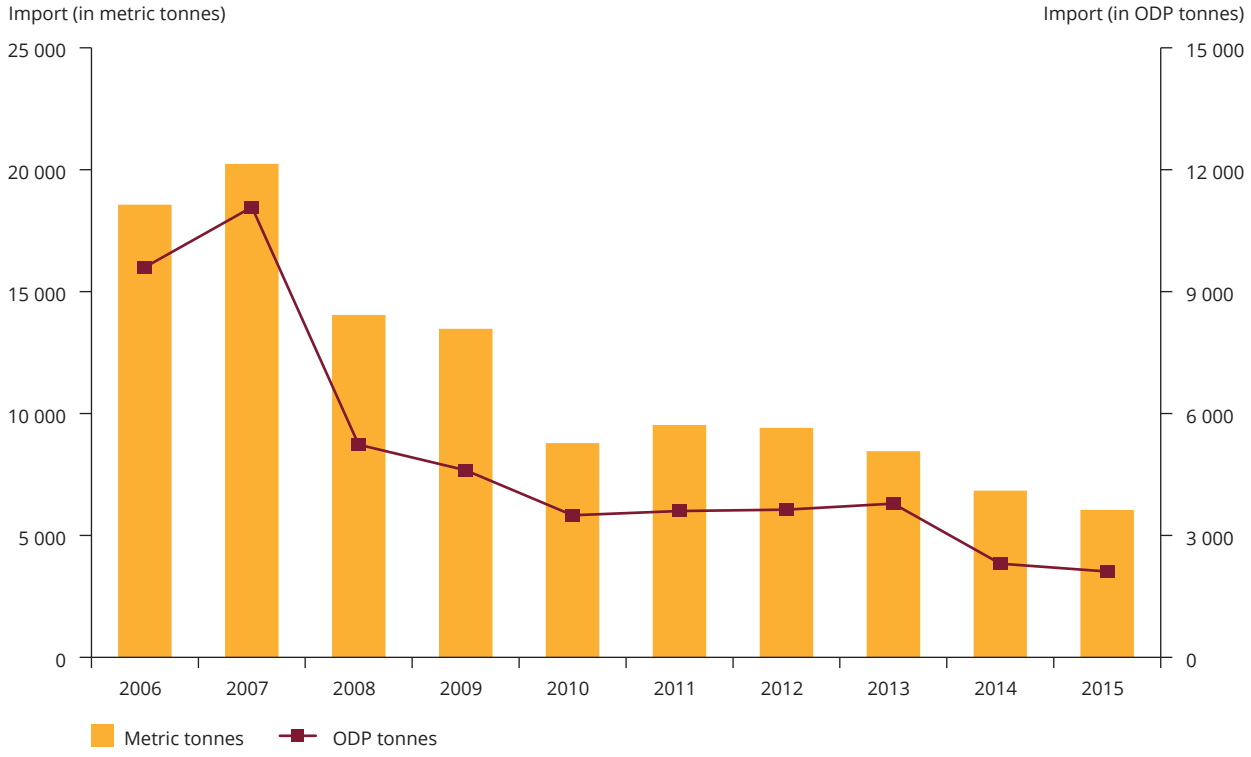
The total quantity of imported controlled virgin substances was 2 113 ODP tonnes in 2015. The import of CTC and CFCs accounted for the largest part of this. The majority of imported virgin MB was placed on the EU market for feedstock use. In 2015, no MB was imported for later re-export for QPS. This is in compliance with the 2015 ban on MB imports for repackaging and subsequent re-export for QPS set out in Article 15 of the ODS Regulation.

Imports of controlled virgin substances originated from nine source countries (Figure 2.2). When expressed in metric tonnes, imported controlled substances mostly originated from China (62 %). The remaining 38 % came from the United States, Israel, India, Saudi Arabia, the United Arab Emirates, Japan, Switzerland and Mexico, given in their order of importance.

### *2.2.2 Imports of controlled non-virgin substances*

Controlled non-virgin substances were imported into the EU to a much lesser extent than controlled virgin substances, and amounted to 0.27 % of total imports when expressed in metric tonnes. In 2015, non-virgin imports were limited to halons ([12]), HCFCs ([12]) and CFCs ([12]). Imports of non-virgin substances decreased by 43 metric tonnes, that is, by 72 %, in 2015.

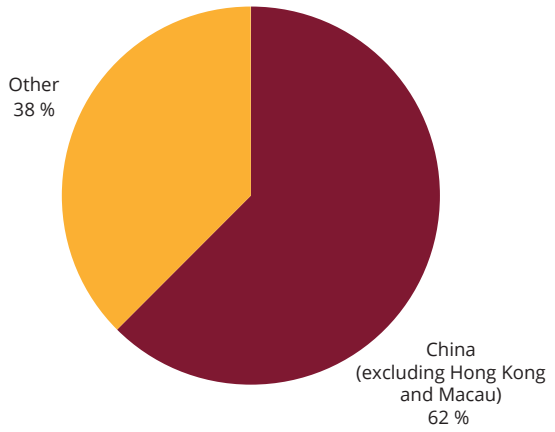
**Figure 2.1 Trend in imports of controlled virgin substances into the EU (expressed in metric tonnes and ODP tonnes)**




**Source:** EC, 2010, 2011; EEA, 2012, 2013, 2014, 2015.

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

**Figure 2.2** **Quantity of controlled substances imported in 2015 per source country (percentages expressed based on quantities in metric tonnes)**




**Note:** 'Other' refers to India, Israel, Japan, Mexico, Saudi Arabia, Switzerland, United Arab Emirates and United States.

**Source:** EEA, 2015.

## 2.3 Exports of controlled substances

### *2.3.1 Exports of controlled virgin substances*

In 2015, the quantity of controlled virgin substances exported from the EU in metric tonnes (including re-export) continued to decline. The decline started in 2006 (Figure 2.3). The total quantity of controlled virgin substances exported in 2015 amounted to 9 320 metric tonnes (1 927 metric tonnes lower than in 2014). The decline in 2015 was significant (17 % relative to 2014), but was much less pronounced than the annual decline in exports in the period from 2006 to 2011, when the average year-on-year decline was 27 %. The overall decline of exports can largely be explained by the fact that MB re-exports for QPS dropped from 1 557 metric tonnes in 2014 to zero in 2015 (see Section 2.2). The most important controlled virgin substances in terms of amounts exported in 2015 were HCFCs (7 857 metric tonnes) and CTC ([13]). Compared with 2014, exports of HCFCs decreased slightly. CTC exports showed a slight increase compared with 2014. For substances produced in the EU ([14]), the decrease in exports is linked to relatively stable production combined with an increase in the use of the substances produced for internal EU feedstock and process agents.

When expressing exports of controlled virgin substances in ODP tonnes, total exports amounted to 2 152 ODP tonnes in 2015. This is 26 % lower than exports in 2014 (2 888 ODP tonnes). The greater decline in exports expressed in ODP tonnes than in metric tonnes is mainly due to two factors: MB showed the strongest year-on-year decrease in exports compared with other substance groups and, in addition, has a significantly higher ODP than HCFCs.

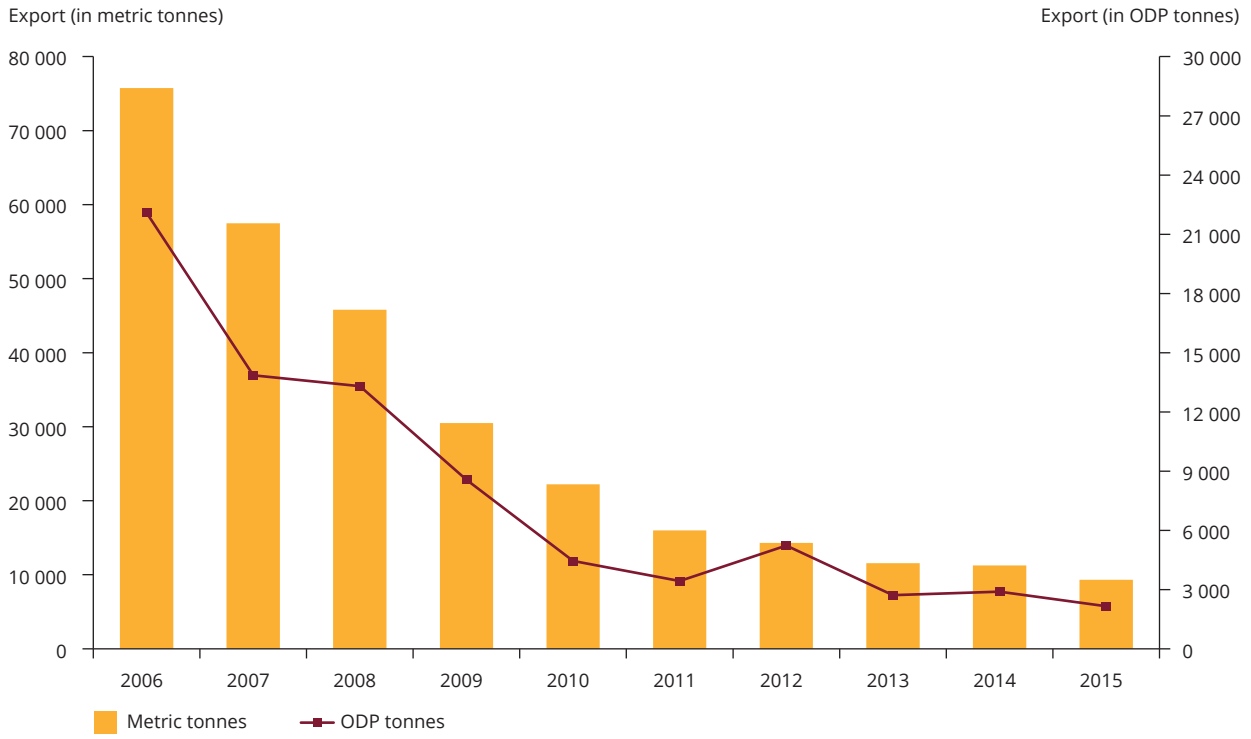
Controlled substances were exported to 47 destination countries (Figure 2.4). The most significant quantities were exported to Japan, Brazil, Mexico, India and Saudi Arabia (in order of importance). Note that, for confidentiality reasons, exports to all of these countries are included in the category 'other' in Figure 2.4.

### *2.3.2 Exports of controlled non-virgin substances*

As with imports, controlled non-virgin substances were exported out of the EU to a much lesser extent than controlled virgin substances, amounting to 6.2 % of total exports when expressed in metric tonnes. In both 2014 and 2015, non-virgin imports were limited to halons ([15]) and HCFCs (562 metric tonnes). In 2015, exports of non-virgin substances increased by 325 metric tonnes, i.e. they more than doubled. This significant increase of non-virgin HCFC exports can be explained by a prohibition set out in Article 13 of the ODS Regulation, entering into force in 2015, in which the placing on the market and use of non-virgin HCFCs for the maintenance or servicing of existing refrigeration, air-conditioning and heat pump equipment are prohibited in the EU. It is therefore likely that surplus amounts were exported out of the EU as a result.

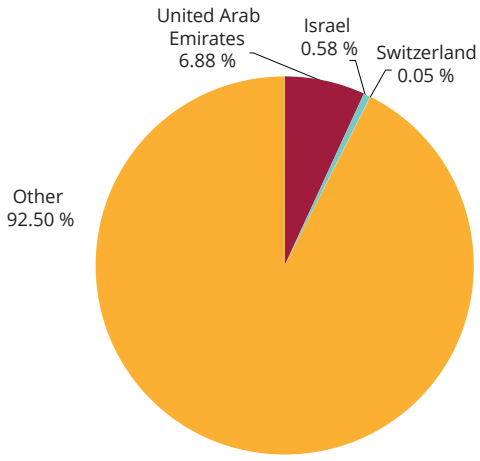
([13]) For reasons of confidentiality, data are not included.
([14]) Production of ODS in the EU is limited to CFC-113, CFC-13, CTC, TCA, halon-1301, HCFC-22, HCFC-124, HCFC141b, HCFC-142b, HCFC-226cb, HBFC-21 B2 and HBFC-31 B1. All other ODS were not produced in the EU; this includes BCM and MB.
([15]) For reasons of confidentiality, data are not included.

**Figure 2.3** **Trend in exports of controlled virgin substances out of the EU (expressed in metric tonnes and ODP tonnes)**




**Source:** EC, 2010, 2011; EEA, 2012, 2013, 2014 and 2015.

**Figure 2.4** **Quantity of controlled substances exported in 2015 per source country (percentages expressed based on quantities in metric tonnes)**




**Note:** 'Other' refers to Algeria, Angola, Antigua and Barbuda, Armenia, Bahamas, Barbados, Belize, Brazil, Congo, Cook Islands, Côte d'Ivoire, Democratic Republic of the Congo, Egypt, French Polynesia, Ghana, Haiti, India, Iraq, Japan, Jordan, Lebanon, Liberia, Marshall Islands, Mexico, Morocco, Nigeria, Pakistan, Panama, Qatar, Russia, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Saudi Arabia, Senegal, Singapore, South Africa, South Korea, Suriname, Tanzania, Trinidad and Tobago, Tunisia, Turkey, United States and Uzbekistan.

**Source:** EEA, 2015.

## 2.4 Production of controlled substances

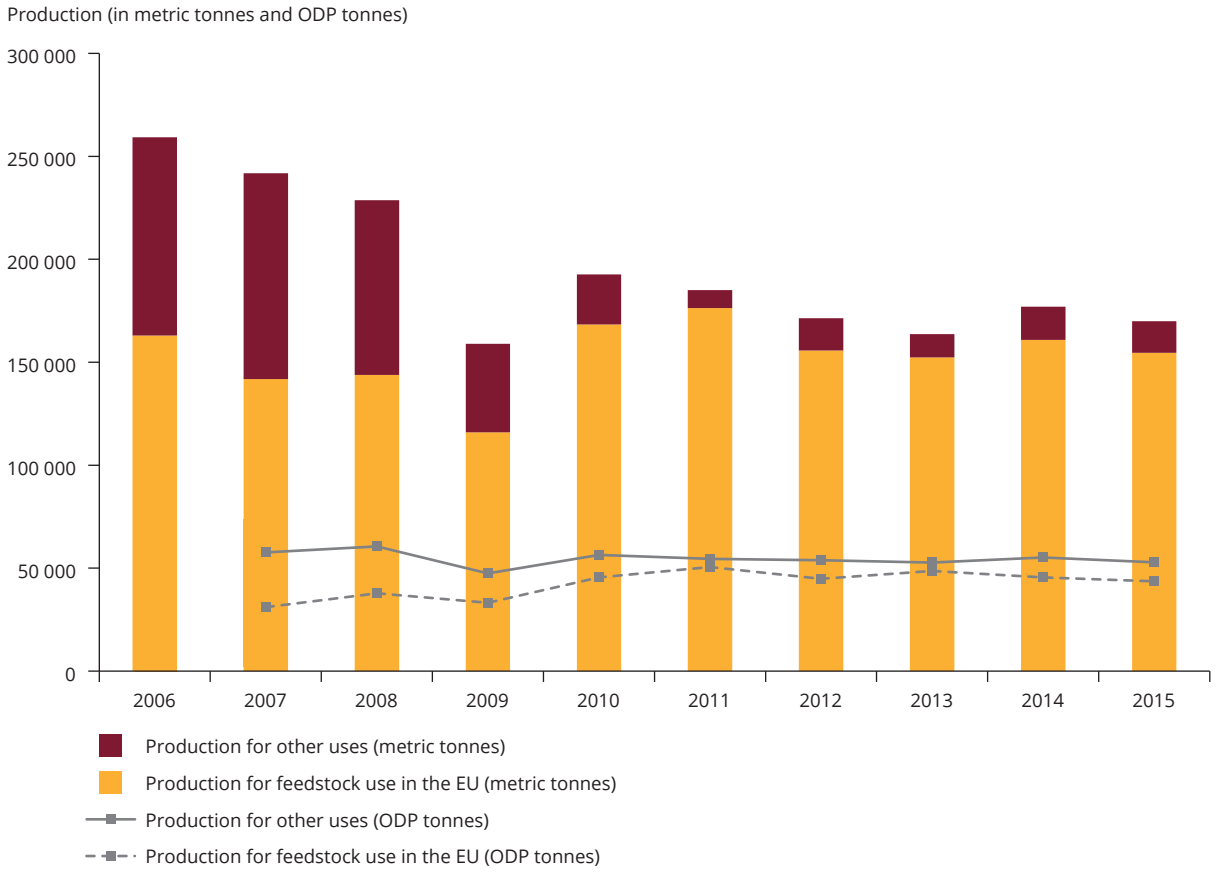
The production of controlled substances has been declining steadily since 2006 (Figure 2.5). A significant dip in production occurred in 2009, most likely linked to the economic downturn in Europe in that year as a result of the economic crisis. In 2015, a total of 169 920 metric tonnes or 52 859 ODP tonnes of controlled substances was produced. Production was thus slightly lower than in 2014, with a year-on-year decrease of 4 % in both metric tonnes and ODP tonnes. Note that produced controlled substances are, by definition, virgin.

The most relevant controlled substances produced in the EU were HCFCs (119 920 metric tonnes), CTC (37 144 metric tonnes) and TCA ([16]). For HCFCs and CTC, this translates to 71 % and 22 % of the total production when expressed in metric tonnes, respectively. Decreases in the production of TCA ([16]) and HCFCs ([16]) relative to 2014 are the main reason for the decrease in total production. Only minor quantities of CFCs and HBFCs, and no MB or BCM, were produced in 2015.

Production of controlled substances in the EU was almost exclusively for feedstock use. In 2015, production for feedstock use accounted for 93 % of the total production in metric tonnes (or 85 % of the total production in ODP tonnes). Most of the production for feedstock use was intended for companies located within the EU (91 % of total production in metric tonnes or 82 % in ODP tonnes). The remaining production in the EU in 2015 was the result of unintentional by-production (which was subsequently destroyed) or was intended for process agent use, solvents, lab use, foam blowing or refrigeration. For foam blowing and refrigeration, all the produced quantities were exported.

As can be seen in Figure 2.5, the decline in production between 2006 and 2015 was 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 constant throughout this period.

**Figure 2.5 Trend in the production of controlled substances within the EU (expressed in metric tonnes and ODP tonnes)**




**Note:** Production data (in ODP tonnes) are available from 2007 onwards.

**Source:** EC, 2010, 2011; EEA, 2012, 2013, 2014, 2015.

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

## 2.5 Destruction of ozone-depleting substances

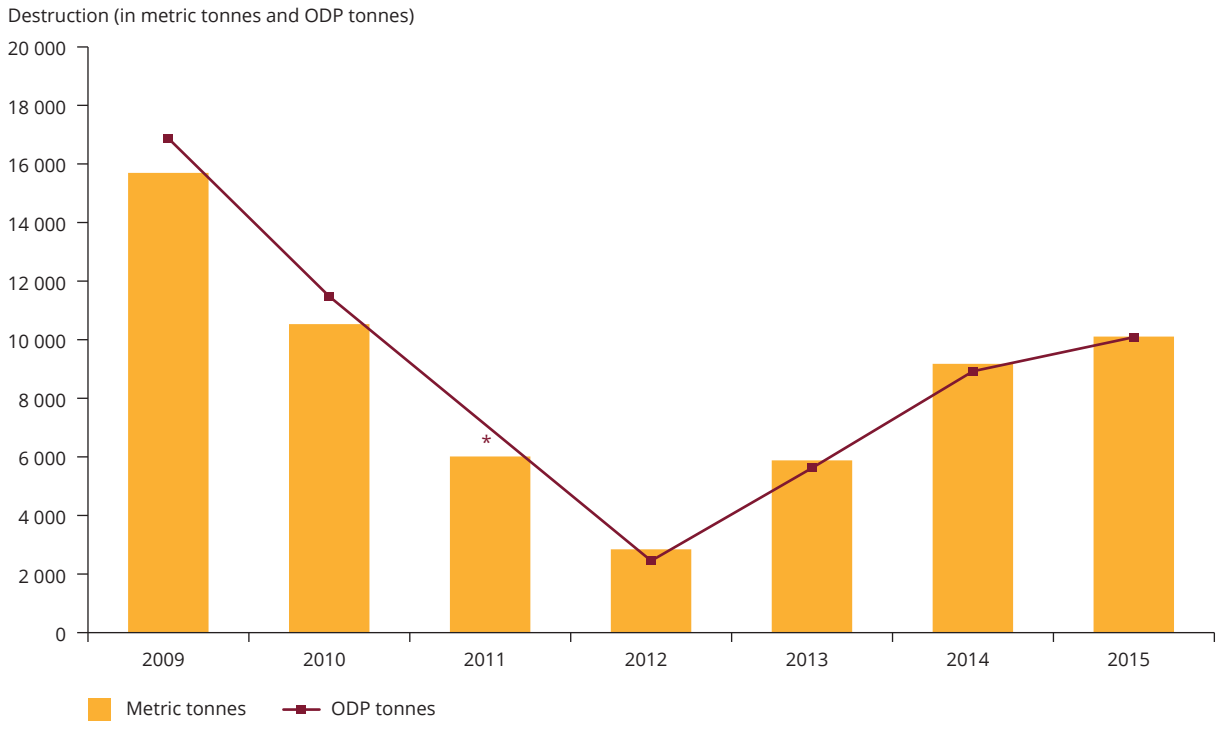
In 2015, a total of 10 107 metric tonnes of controlled substances were destroyed. The largest quantities destroyed were of CTC (7 955 metric tonnes), HCFCs (1 142 metric tonnes) and CFCs (957 metric tonnes). In addition, 755 metric tonnes of mixtures with an unknown composition were destroyed ([17]).

Excluding quantities of mixtures, destruction in 2015 was 14 % higher than in 2014 (expressed in metric tonnes; Figure 2.6). The 2015 increase in destruction can, to a large extent, be explained by the increased destruction of unintentionally produced CTC compared with the amount destroyed in 2014.

For the period between 2009 and 2012, the declining trend in destruction of controlled substances was mainly the result of unintentionally produced CTC that was stockpiled ([18]) and subsequently destroyed during 2013. This stockpiling was not continued after 2012. Instead, since 2012, the amount of ODS destruction has been increasing continuously.

Prior to 2009, destruction facilities did not have to report to the European Commission; data collection and aggregation were carried out differently.

**Figure 2.6 Trend in the destruction of controlled substances within the EU (expressed in metric tonnes and ODP tonnes)**




**Note:** Destroyed mixtures of controlled substances are excluded. The amount for 2011 in ODP tonnes (marked with *) is excluded for reasons of confidentiality.

**Source:** EC, 2010, 2011; EEA, 2012, 2013, 2014, 2015.

([17]) Because the composition of the waste is unknown and can consist of both ODS and other substances (e.g. fluorinated greenhouse gases, such as hydrofluorocarbons), they are not included in the total destruction. For a definition of 'mixtures', see Section 1.6 on terminology.

([18]) 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.

## 2.6 Consumption of controlled substances

Consumption integrates the statistics on virgin import, virgin export, production and destruction into one single indicator. The consumption trend in the EU is different when expressed in metric tonnes from when it is expressed in ODP tonnes, especially in the period 2006-2009 (Figure 2.7). This is because controlled substances with a high ODP have a negative consumption (e.g. CTC and CFCs) and controlled substances with a lower ODP have a positive consumption (e.g. HCFCs).

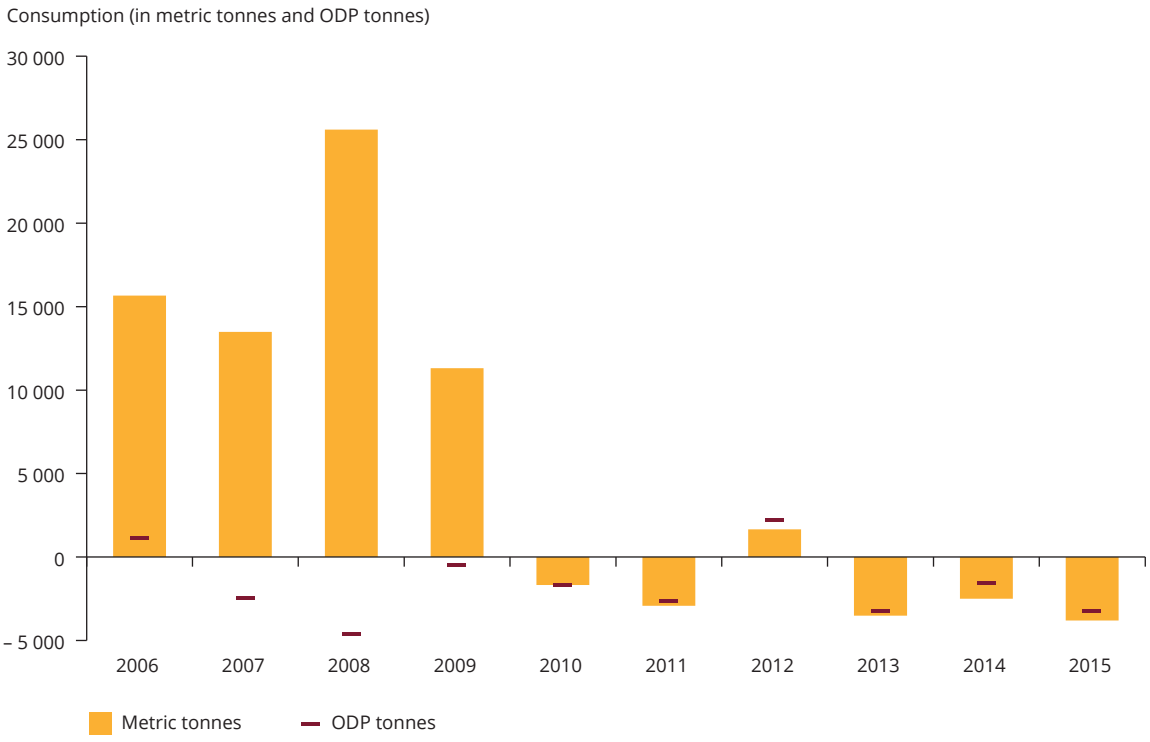
In 2015, the consumption of controlled substances in the EU reached the lowest negative level since 2006 (– 3 808 metric tonnes) and was 1 305 metric tonnes lower than in 2014. In general, consumption of controlled substances has been negative or close to zero since 2010 expressed in both metric and ODP tonnes.

In recent years, this metric has largely been driven by CTC, HCFC and CFC consumption (expressed in metric tonnes), although HCFCs were less of a driver when expressed in ODP tonnes.

The relationship between stockpiling and destruction of unintentionally produced CTC largely determines CTC consumption and can have an effect on the overall consumption of controlled substances. In 2012, for example, the negative consumption trend was broken owing to a rather high level of stockpiling of unintentionally produced CTC. In that year, more CTC was unintentionally produced than destroyed by the end of the year. Destruction of this surplus CTC then ensued in 2013, thereby lowering consumption in that year (see Section 2.5).

In terms of the consumption of controlled substances, 2008 was an exceptional year. Consumption was at its highest in metric tonnes, while it was at its lowest since 2006 in ODP tonnes. This can be explained by a very high consumption of HCFCs (36 999 metric tonnes or 8 140 ODP tonnes) combined with a very low consumption of CTC (– 11 105 metric tonnes or – 12 216 ODP tonnes).

**Figure 2.7 Trend in the consumption of controlled substances within the EU (expressed in metric tonnes and ODP tonnes)**




**Source:** EC, 2010, 2011; EEA, 2012, 2013, 2014 and 2015.

## 2.7 Feedstock use of controlled substances

### *2.7.1 Feedstock use*

The reporting obligation of the ODS Regulation allows for a direct calculation of the amount of controlled virgin substances used as feedstock agents. *Feedstock use* can be calculated directly as the reported make-up plus quantities sent for destruction by feedstock users. *Feedstock availability*, on the other hand, is calculated using data on the production for feedstock use inside the EU and imports for feedstock use. Although the methodologies are different, both should, in principle, provide very similar results.

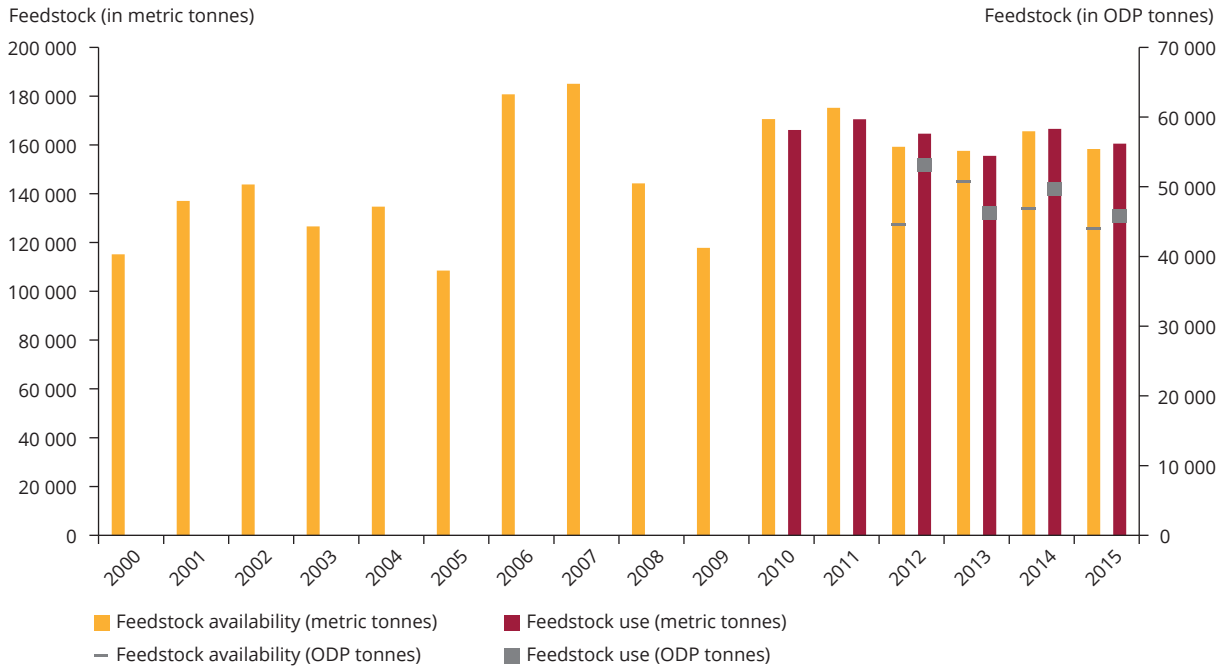
The amount of controlled substances used for feedstock was 160 542 metric tonnes in 2015 (down by 4 % relative to 2014). Feedstock availability was 158 295 metric tonnes in 2015 (again, down by 4 % from 2014). In total, there was a difference of − 1.4 % between these two metrics, namely feedstock use and feedstock availability (relative to feedstock use). This difference is below the average difference over the period from 2010 to 2014, and it can be assumed that all large feedstock users reported figures for 2015. When expressed in ODP tonnes, the difference between the two metrics was 16 % in 2012 ([19]) and, since then, this difference has continuously declined to 4 % in 2015 (or to 2 ODP tonnes). This indicates that there has been increasing consistency of reporting by companies over the years.

A look at the *feedstock availability* trend in the period from 2000 to 2015 reveals that feedstock availability varies considerably across years (Figure 2.8). Before 2006, it was significantly lower than in the period from 2006 onwards and it peaked in 2007. After the dip in feedstock availability in 2008–2009 (most likely linked to lower rates of activity as a result of the economic crisis), it has increased again and levels have more or less been constant since 2010.

### *2.7.2 Emissions from feedstock use*

Emissions of controlled substances from their use as feedstock decreased from 190 metric tonnes in 2014 to

**Figure 2.8 Trend in the feedstock availability and use of controlled substances within the EU (expressed in metric tonnes and ODP tonnes)**




**Note:** The reporting obligation of the ODS Regulation allows for a direct calculation of feedstock use. Therefore, based on the data reported, this aggregated value is available only from 2010 onwards.

Data on feedstock availability and use (in ODP tonnes) are available from 2012 onwards.

**Source:** EC, 2010, 2011; EEA, 2012, 2013, 2014, 2015.

([19]) The year 2012 was the first year for which feedstock could be calculated in ODP tonnes, as a result of the revised reporting format.

116 metric tonnes in 2015. This resulted in an average emissions rate of 0.07 % (calculated as the ratio of the total ODS emissions to the quantities used as make-up), which was lower than the average emissions rate in 2014 (i.e. 0.12 %). The year-on-year decrease of the emissions rate appears to suggest that improvements have been made in the control of emissions in industry. Another interpretation might be that emissions were under-reported in 2015. Regardless, the feedstock emissions rate remains much lower than the emissions rate for process agent use (1.67 % in 2015).

## 2.8 Use of controlled substances as process agents

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

In 2015, the total make-up of controlled substances (in effect only CTC, CFC-12 and CFC-113) was lower than in 2014, mainly because of a decrease in the make-up of CTC ([20]).

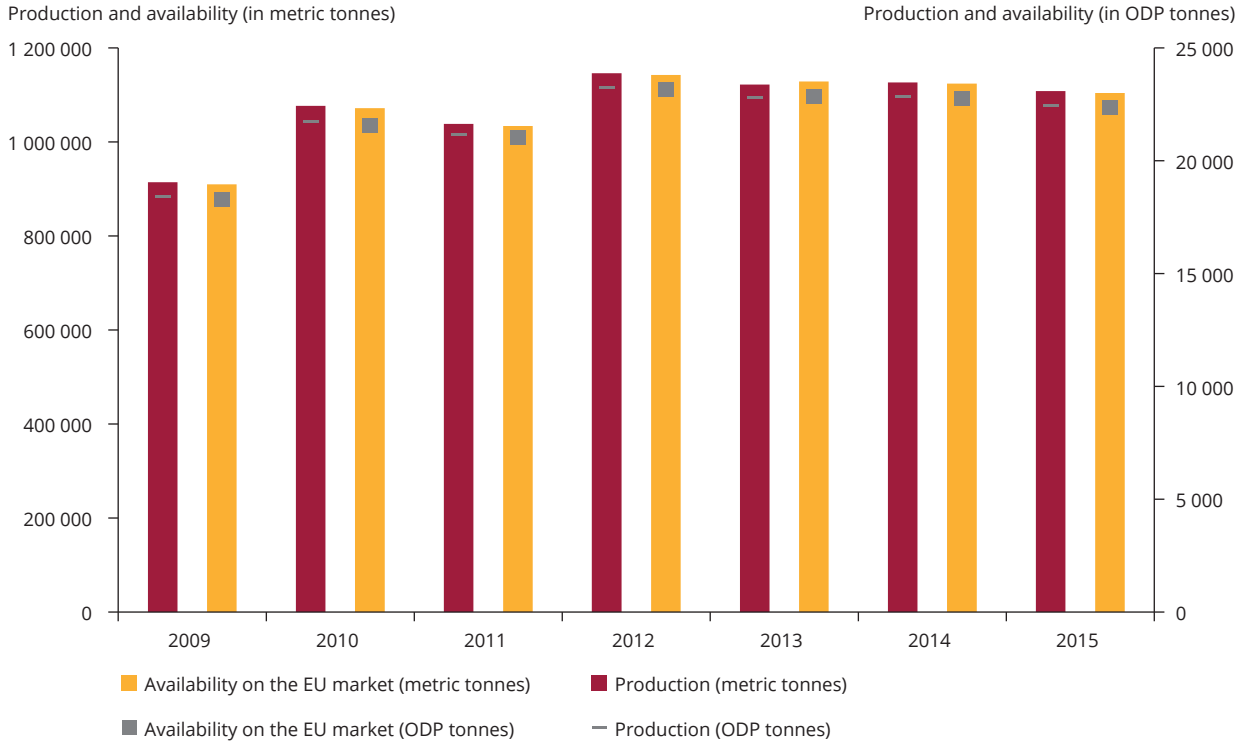
The make-up of controlled substances in the EU stayed well below EU restrictions in 2015. Emissions of controlled substances from their use as process agents also remained within the limit imposed for the EU by the Montreal Protocol (i.e. 17 metric tonnes). Likewise, the limit imposed by the ODS Regulation (16.1 metric tonnes) was not exceeded.

## 2.9 New substances

According to the ODS Regulation, producers, importers and exporters of new substances have to report information on these substances. These substances are not included in the Montreal Protocol.

The production of new substances has been rather constant since 2012 (Figure 2.9). In 2015, it was 1.6 % lower than in 2014, at 1 107 910 metric tonnes or 22 463 ODP tonnes. Although imports and exports of new substances increased in 2015 — i.e. by 6 % and

**Figure 2.9 Trend in the production and availability of new substances within the EU (expressed in metric tonnes and ODP tonnes)**



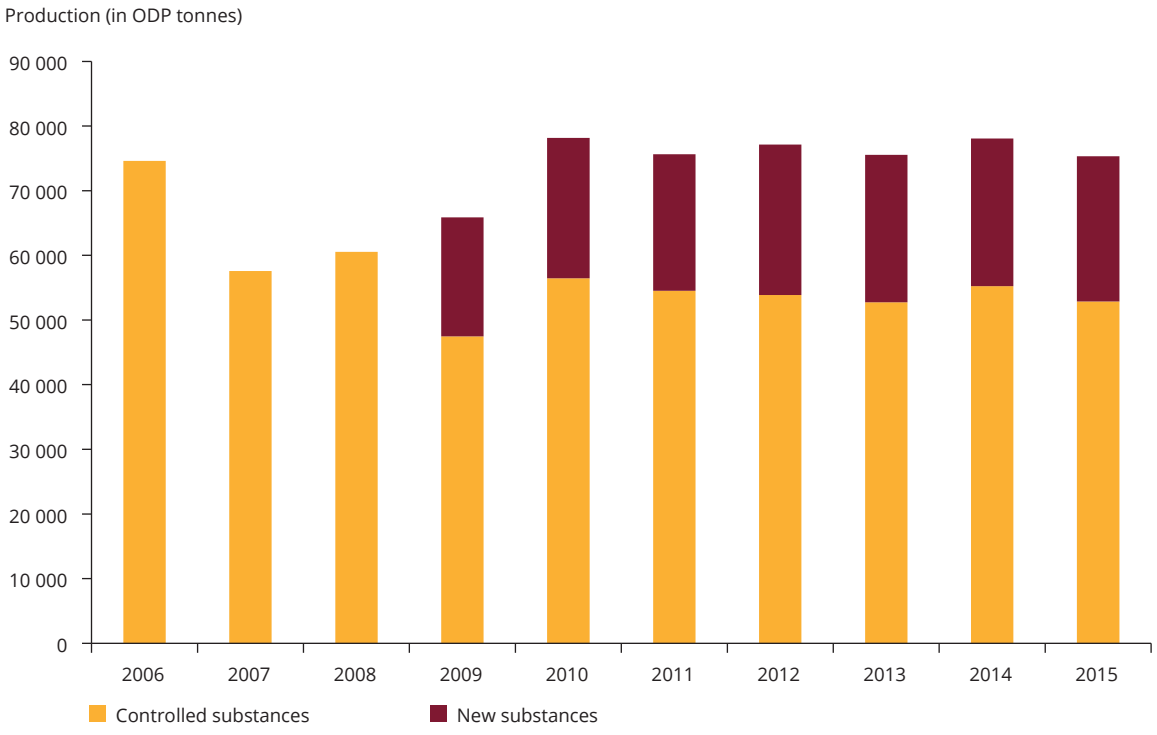

**Source:** EC, 2010, 2011; EEA, 2012, 2013, 2014 and 2015.

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

34 %, respectively (relative to 2014) — the quantities produced in the EU were significantly higher than the quantities imported (1 943 metric tonnes) and exported (5 842 metric tonnes) ([21]), as has been the case in previous years. Therefore, the availability of new substances is almost equal to their production in the EU expressed in both metric and ODP tonnes (see Figure 2.9).

In 2015, the production of new substances (expressed in metric tonnes) was six times higher than the production of controlled substances (similar to 2013 and 2014). Because the production of new substances was almost exclusively for feedstock use (99.7 % when expressed in metric tonnes), the quantity of new substances available for feedstock on the EU market was almost seven times higher than the quantity of controlled substances intended for feedstock use. However, owing to the lower ODP of new substances ([22]), the picture is different when production quantities are compared in ODP tonnes (Figure 2.10). Nevertheless, the production of new substances accounted for 30 % of both controlled and new substances in 2015 when expressed in ODP tonnes.

**Figure 2.10 Comparison of the production of new and controlled substances within the EU (expressed in ODP tonnes)**




**Note:** Data for new substances are available from 2009 onwards.

**Source:** EC, 2010, 2011; EEA, 2012, 2013, 2014 and 2015.

([21]) Note that new substances are not covered by the Montreal Protocol and no consumption is calculated. A differentiation of imports and exports into virgin and non-virgin substances has therefore been omitted.

([22]) For some new substances, the ODP is expressed as a range in the ODS Regulation. In these cases, the highest value was used for conversion from metric tonnes to ODP tonnes.

# List of abbreviations

| | |
|---|---|
| $A_{FDST}$ | Feedstock availability in the EU |
| $A_{NEW}$ | Availability of new substances in the EU |
| BCM | Bromochloromethane |
| BDR | Business Data Repository |
| CFC | Chlorofluorocarbon |
| CTC | Carbon tetrachloride (tetrachloromethane) |
| $D_{FDST}$ | Destruction of controlled substances originally produced for feedstock use |
| EB | Ethyl bromide (bromoethane) |
| EC | European Commission |
| EEA | European Environment Agency |
| $EM_{FDST}$ | Emissions of controlled substances during their use as feedstock |
| $E_{NEW}$ | Exports of new substances |
| ETC/ACM | European Topic Centre for Air Pollution and Climate Change Mitigation |
| EU | European Union |
| HBFC | Hydrobromofluorocarbon |
| HCFC | Hydrochlorofluorocarbon |
| HFC | Hydrofluorocarbon |
| $I_{FDST}$ | Imports of controlled substances for feedstock use |
| $I_{NEW}$ | Imports of new substances |
| MB | Methyl bromide (bromomethane) |
| MC | Methyl chloride (chloromethane) |
| $M_{FDST}$ | Controlled substances used as make-up for feedstock |
| n-PB | n-propyl bromide, (1-bromopropane) |
| ODP | Ozone-depleting potential |
| ODS | Ozone-depleting substances |
| $P_{FDST-EU}$ | Production of controlled substances for feedstock use in the EU |
| $P_{NEW}$ | Production of new substances |
| QPS | Quarantine and pre-shipment services |
| TCA | 1,1,1-Trichloroethane (methyl chloroform) |
| TFIM | Trifluoroiodomethane (trifluoromethyl iodide) |
| $U_{FDST}$ | Feedstock use in the EU |
| UNEP | United Nations Environment Programme |

# References

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# Annex 1 Data tables

**Table A1.1 Production, import, export and destruction of controlled and new substances in the EU in 2015 (in metric tonnes)**

| | Production | Import (virgin) | Export (virgin) | Destruction (*) |
|---|---|---|---|---|
| CFCs | C | C | C | 957.38 |
| Halons | C | - | C | C |
| Other CFCs | C | - | - | C |
| CTC | 37 143.73 | C | C | 7 955.08 |
| TCA | C | C | - | - |
| HCFCs | 119 920.26 | 3 170.47 | 7 857.40 | 1 142.82 |
| HBFCs | C | C | C | C |
| BCM | - | C | - | - |
| MB | - | C | 4.26 | C |
| **Total controlled substances** | **169 920.28** | **6 045.75** | **9 320.32** | **10 107.41** |
| Halon-1202 | - | C | C | - |
| MC | 1104 316.04 | C | C | - |
| EB | C | C | C | - |
| TFIM | - | C | C | - |
| n-PB | C | 1 783.00 | C | - |
| **Total new substances** | **1107 910.47** | **1 943.02** | **5 842.29** | **-** |

**Note:** (*) The destruction of new substances is not subject to reporting obligations under the ODS Regulation (Regulation (EC) No. 1005/2009).

C: Data are not included for reasons of confidentiality.

Mixtures of CFCs, HCFCs and hydrofluorocarbons (HFCs) were destroyed in 2015, but are not included in the data.

## Table A1.2 Production, import, export and destruction of controlled and new substances in the EU in 2015 (in ODP tonnes)

| | Production | Import (virgin) | Export (virgin) | Destruction (*) |
|---|---|---|---|---|
| CFCs | C | C | C | 951.72 |
| Halons | C | - | C | C |
| Other CFCs | C | - | - | C |
| CTC | 40 858.10 | C | C | 8 750.58 |
| TCA | C | C | - | - |
| HCFCs | 7 005.88 | 97.72 | 545.37 | 61.75 |
| HBFCs | C | C | C | C |
| BCM | - | C | - | - |
| MB | - | C | 2.56 | C |
| **Total controlled substances** | **52 858.60** | **2 112.72** | **2 151.57** | **10 087.22** |
| Halon-1202 | - | C | C | - |
| MC | 22 086.32 | C | C | - |
| EB | C | C | C | - |
| TFIM | - | C | C | - |
| n-PB | C | 178.30 | C | - |
| **Total new substances** | **22.463.48** | **209.52** | **318.48** | **-** |

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

C: Data are not included for reasons of confidentiality.

Mixtures of CFCs, HCFCs and HFCs were destroyed in 2015, but are not included in the data.

## Table A1.3 Import of controlled virgin substances in the EU in 2015 (in metric tonnes and ODP tonnes)

| Source country | Import in metric tonnes | Import in ODP tonnes |
|---|---|---|
| China (excluding Hong Kong and Macau) | 3 777.98 | 708.60 |
| Other (*) | 2 267.77 | 1 404.13 |

**Note:** (*) 'Other' refers to India, Israel, Japan, Mexico, Saudi Arabia, Switzerland, United Arab Emirates and United States.

## Table A1.4 Export of controlled virgin substances in the EU in 2015 (in metric tonnes and ODP tonnes)

| Destination country | Export in metric tonnes | Export in ODP tonnes |
|---|---|---|
| United Arab Emirates | 641.07 | 37.33 |
| Israel | 53.88 | 4.81 |
| Switzerland | 4.27 | 2.56 |
| Other (*) | 8 621.10 | 2 106.87 |

**Note:** (*) 'Other' refers to the following 44 countries: Algeria, Angola, Antigua and Barbuda, Armenia, Bahamas, Barbados, Belize, Brazil, Congo, Cook Islands, Côte d'Ivoire, Democratic Republic of the Congo, Egypt, French Polynesia, Ghana, Haiti, India, Iraq, Japan, Jordan, Lebanon, Liberia, Marshall Islands, Mexico, Morocco, Nigeria, Pakistan, Panama, Qatar, Russia, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Saudi Arabia, Senegal, Singapore, South Africa, South Korea, Suriname, Tanzania, Trinidad and Tobago, Tunisia, Turkey, United States and Uzbekistan.

**Table A1.5 Production, import, export and destruction of controlled substances in the EU in 2008–2015 (in metric tonnes)**

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|
| Production | 228 679.99 | 158 964.70 | 192 701.43 | 185 012.86 | 171 421.38 | 163 664.49 | 177 036.65 | 169 920.28 |
| For feedstock use in EU | 143 884.99 | 115 953.33 | 168 413.89 | 176 348.90 | 155 738.00 | 152 376.40 | 160 846.26 | 154 542.18 |
| For other uses | 84 795.00 | 43 011.37 | 24 287.55 | 8 663.95 | 15 683.38 | 11 288.09 | 16 190.39 | 15 381.77 |
| Import (virgin) | 14 046.61 | 13 471.89 | 8 790.44 | 9 533.52 | 9 410.25 | 8 460.82 | 6 843.15 | 6 045.75 |
| Export (virgin) | 45 787.60 | 30 506.83 | 22 205.29 | 15 995.19 | 14 301.41 | 11 569.20 | 11 247.44 | 9 320.32 |
| Destruction | 20 965.47 | 15 696.54 | 9 863.43 | 6 015.86 | 2 844.58 | 5 883.41 | 9 179.52 | 10 107.41 |
| Consumption | 25 603.34 | 11 314.25 | – 1 680.47 | – 2 918.32 | 1 661.10 | – 3 510.90 | – 2 502.31 | – 3 808.08 |

**Table A1.6 Production, import, export and destruction of controlled substances in the EU in 2008–2015 (in ODP tonnes)**

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|
| Production | 60 551.90 | 47 462.52 | 56 447.06 | 54 508.28 | 53 878.43 | 52 739.48 | 55 205.66 | 52 858.60 |
| For feedstock use in EU | 37 713.15 | 28 212.38 | 44 293.91 | 50 496.32 | 44 833.30 | 48 604.80 | 45 501.44 | 43 563.96 |
| For other uses | 22 838.75 | 19 250.14 | 12 153.15 | 4 011.96 | 9 045.13 | 4 134.69 | 9 704.22 | 9 298.67 |
| Import (virgin) | 5 235.18 | 4 606.11 | 3 495.83 | 3 601.74 | 3 637.36 | 3 785.64 | 2 307.40 | 2 112.72 |
| Export (virgin) | 13 299.17 | 8 555.64 | 4 445.49 | 3 429.41 | 5 233.21 | 2 715.99 | 2 888.20 | 2 151.57 |
| Destruction | 23 014.58 | 16 875.16 | 11 479.04 | 6 052.39 | 2 452.25 | 5 626.13 | 8 923.43 | 10 087.22 |
| Consumption | – 4 597.27 | – 467.61 | – 1 664.60 | – 2 652.16 | 2 252.16 | – 3 252.19 | – 1 579.96 | – 3 248.98 |

**Table A1.7 Feedstock availability of controlled substances in the EU in 2000–2015 (in metric tonnes)**

| | Feedstock availability |
|---|---|
| 2000 | 115 156.50 |
| 2001 | 137 016.00 |
| 2002 | 143 813.50 |
| 2003 | 126 576.03 |
| 2004 | 134 713.00 |
| 2005 | 108 489.30 |
| 2006 | 180 716.00 |
| 2007 | 185 085.00 |
| 2008 | 144 249.00 |
| 2009 | 117 795.30 |
| 2010 | 170 630.11 |
| 2011 | 175 232.07 |
| 2012 | 159 228.54 |
| 2013 | 157 538.02 |
| 2014 | 165 583.90 |
| 2015 | 158 294.62 |

**Table A1.8 Production, import and export of new substances in the EU in 2009–2015 (in metric tonnes and ODP tonnes)**

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|
| **In metric tonnes** | | | | | | | |
| Production | 914 278.24 | 1 076 512.41 | 1 038 156.51 | 1 146 200.28 | 1 122 116.61 | 1 126 402.41 | 1 107 910.47 |
| Import | 1 160.25 | 1 534.60 | 1 987.15 | 2 746.46 | 12 362.44 | 1 838.97 | 1 943.02 |
| Export | 5 752.21 | 6 105.53 | 6 333.64 | 6 472.40 | 5 898.49 | 4 361.58 | 5 842.29 |
| **In ODP tonnes** | | | | | | | |
| Production | 18 404.89 | 21 722.11 | 21 138.18 | 23 258.49 | 22 798.42 | 22 842.85 | 22 463.48 |
| Import | 54.05 | 87.93 | 150.20 | 147.73 | 374.11 | 121.80 | 209.52 |
| Export | 178.12 | 226.41 | 259.84 | 260.47 | 304.43 | 212.80 | 318.48 |

# 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 the production, import, export, destruction and consumption of ODS and (where applicable) new substances, as well as to QPS, process agent and feedstock uses.

The measures include:

1. application of the '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 the '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 for amounts reported in both metric tonnes and ODP tonnes. Each of the measures is explained in more depth below.

## A2.1 The '3-company group rule'

This measure concerns the treatment of data reported by different legal entities across the EU that belong 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. Once such company groups are determined, at least three must contribute to each reported value. This measure replaces the old '3-company rule' as applied by the EEA in previous public ODS reports, which did not take into account possible corporate relationships.

## A2.2 The '5 % significance rule'

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

## A2.3 Preventing deduction of sensitive data

Additional measures were applied to prevent the deduction of confidential data.

### *A2.3.1 All transactions*

Deduction might have been possible in cases where transaction data for certain substances or substance groups (i.e. CFCs, halons, other CFCs, CTC, TCA, HCFCs, HBFCs, BCM or MB) remained confidential, yet data for other substances or substance groups, along with a total for the transaction in question, were published. Confidential data that were at risk 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 values for at least three (or none) of the substances or substance groups were confidential in the published data for that transaction.

### *A2.3.2 Aggregated transactions*

Finally, transaction data were hidden because other confidential transaction data could be deduced from their publication. In order to understand this additional measure, it should be remembered that the consumption of ODS is a calculated transaction that involves corrected production, import, export and destruction data for each substance or substance group.

**Box A2.1 A practical guide to applying the '3-company group rule' and '5 % significance rule' measures to 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 of step 2 in relation to step 3 was calculated for each company group.

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

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

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

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

If the number of company groups counted in step 6 was one or two, the full aggregated value across company groups was hidden as confidential. If the number was three or more, the full aggregated value across company groups was reported and was thus not confidential.

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 of production, for instance, could be deduced based on non-confidential information on consumption, import and export. In such cases, data are published only in cases where the 'remainder' exceeds 5 % of the consumption.

## A3.3 Treatment of historical data

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

European Environment Agency

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