EUROPEAN
COMMISSION

Brussels, 16.9.2022
COM(2022) 463 final

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

on the application of Regulation (EC) No 850/2004 on persistent organic pollutants

{SWD(2022) 291 final}

Table of contents

Tables

Figures

1. 1. Introduction

Persistent Organic Pollutants (POPs) are chemicals of global concern due to their persistent, bioaccumulative and toxic (PBT) properties and their potential to undergo long range transport, which leads to their deposition and accumulation far from the point of production and use. Two international treaties address POPs and aim at protecting human health and the environment from their adverse impacts by eliminating or reducing their production, use and releases in the environment. The Aarhus Protocol on Persistent Organic Pollutants was adopted in 1998 as part of the UNECE Convention on Long-range Transboundary Air Pollution (CLRTAP) and the Stockholm Convention on Persistent Organic Pollutants (the "Convention") was adopted in 2001 and entered into force in 2004.

The European Union (the "Union") is a Party to the Aarhus Protocol and to the Convention and adopted Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC (POPs Regulation) in order to implement the Convention. Regulation (EC) No 850/2004 has been repealed and replaced by Regulation (EU) 2019/1021 on persistent organic pollutants as of 15 July 2019 (entry into force of Regulation (EU) 2019/1021).

It should be noted that Regulation (EC) No 850/2004 contains a Commission specific reporting obligation under Article 12(6), which does not exist anymore, as there is no corresponding provision in Regulation (EU) 2019/1021. However, the Commission nonetheless considers appropriate to adopt a report covering the period 2013-2015 based on the Member States reporting in accordance with Regulation (EC) No 850/2004 since such report serves the objectives of Regulation (EU) 2019/1021 as regards the monitoring of the progress made in eliminating the use and releases of POPs.

The POPs Regulation was regularly updated to implement amendments to the Convention and Protocol (largely addition of new substances to the respective annexes) in the Union legislation and places specific obligations on operators in all EU Member States. These obligations include details regarding the production, placing on the market, and use of listed POPs covered by three Annexes (Annex I – banned, Annex II – restricted, Annex III – unintentionally released). It also covers the management of those substances within stockpiles, environmental releases and monitoring of environmental concentrations, as well as containing provisions for waste management. As part of the POPs Regulation it is also a requirement for Member States to draw up national implementation plans and action plans to identify and manage sources of POPs within their own territories.

The reporting requirements for Member States and the European Commission under Regulation (EC) No 850/2004 were described in Article 12. Member States were required to report annually on statistical data for the production and placing on the market of Annex I and Annex II substances. Member States were also required to report to the Commission every three years on the implementation of the provisions of the POPs Regulation. The Commission had the obligation to draw up a synthesis report every three years summarising the information provided by the Member States as well as supporting information provided through the European Pollutant Release and Transfer Register (E-PRTR) and CORINAIR emission inventories under EMEP (Cooperative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe). The Commission was also required to forward a summary of that synthesis to the European Parliament and to the Council.

To date three synthesis reports were published covering the activities of the Union and its Member States under Regulation (EC) No 850/2004. The first synthesis report covers the period from the entry into force of the POPs Regulation in 2004 until 2006 and was published in 2009. The second synthesis report, published in 2011, covers the period 2007 – 2009. The third synthesis report was published in 2021 and covers the period 2010-2013. The fourth Union synthesis report covers the period from 2013 to 2015 and this summary intends to provide an abridged version of the main report providing the key findings. The full report should be consulted for further detailed analysis of the findings presented.

2. 2. Management and Control Measures

2.1 2.1 Overview

The management of POPs covers multiple elements of the life cycle of a substance. This includes the production, placing on the market, and use of chemicals, as well as the stockpiles of obsolete goods, waste management issues and enforcement of the regulation itself.

2.2 2.2 Production, placing on the market, use and enforcement

Based on the information provided by the Member States on production and placing on the market of substances listed in Annexes I and II, only one POP substance was produced in the period 2013-2015, namely perfluorooctane sulfonic acid (PFOS), noting that there were exemptions in place for PFOS (the main use was as mist suppressant in chromium plating). Additionally, two Annex I and II substances were imported (in line with the exemptions) namely, hexabromocyclododecane (HBCDD) and short chain-chlorinated paraffins (SCCPs).

Based on the information provided, the following details can be captured:

- The import of HBCDD was reported by two Member States (DK, FI). Denmark reported imports for the year 2014 only, at a quantity of 1.4 tonnes; while Finland noted imports had occurred but were declining.
- The import of SCCPs was reported by Denmark (15 tonnes in 2013, and 5 tonnes in 2014) and Sweden (2.8 tonnes annually).
- The production of PFOS within the Union took place in only one Member State, Germany. The production declined from 9 tonnes per annum in 2013 to 2.4 tonnes in 2015. Approximately 50% of the PFOS produced was exported or shipped to EU Member States (mainly BE, DK, NL, AT, FI, SE). The remaining quantity of PFOS produced was used in Germany, primarily as a mist-suppressant for chrome metal plating.

A small number of Member States also made use of the Article 4 provisions for use of POPs in research or analysis. Five Member States (BE, ES, FR, AT, PL) stated that small quantities of POPs were exported for research or analysis purposes. These exports were predominantly to African and Asian countries and covered the POP pesticides and PCBs.

Four Member States (BE, BG, NL, SE) have started enforcment proceedings concerning the illegal sale of POPs within the Union. Additionally, Spain reported on a long running set of legal proceedings (commenced in 1989) regarding contamination of land by lindane.

Details of enforcement proceedings include:

- Belgium reported enforcement proceedings launched in 2013 over the detection of hexachlorobenzene (HCB) in fireworks. Further to this, SCCPs were detected in spot samples of Christmas lights, but no enforcement proceedings were brought about in this case.
- Bulgaria commented that enforcement proceedings had been launched, but without providing further details.
- The Netherlands commented that in 2012 enforcement proceedings had been launched against two companies, regarding PFOS in firefighting foams, which exceeded the concentration limits set under the Regulation for substances or

mixtures[1]. Enforcement activities were also initiated regarding the detection of HCB in fireworks.

- Sweden indicated that enforcement proceedings had been undertaken in 2013 regarding the presence of SCCPs in toys. Furthermore, in 2014 and 2015, HCB and SCCPs were detected in a range of household items imported into the Union.

2.3 2.3 Stockpiles

Stockpiles of POPs substances reported for the period 2013-2015 typically related to three types of goods, namely PCBs or PCB-contaminated di-electric equipment; obsolete pesticides; and remaining stockpiles of substances, mixtures or articles containing POPs recently added to the Convention and the Regulation. Many Member States had already taken significant steps to identify and remove PCB-containing equipment from service.

In a survey carried out in 2017, Member States provided estimates of the scale of the remaining stocks of PCBs in use for 2015 against a 1990 baseline. Thirteen Member States provided responses, with estimates ranging from 0.3% to 49%. Eleven Member States (BE, CZ, DK, DE, IE, LT, NL, PT, FI, SE, UK) provided estimates of remaining stocks in 2015 as below 10% compared to 1990, with significant efforts ongoing towards final removal and destruction. The remaining two Member States (HR, RO) quoted remaining stockpiles as 30% and 49% of the 1990 baseline, respectively.

For obsolete pesticide POPs, a number of Member States reported that they either never made or used these substances or began early phase-out, meaning that stocks no longer existed within the country by 2013.

For stockpiles of substances, mixtures or articles containing POPs added to the Regulation after 2009, the primary stockpiles relate to PFOS. Four Member States (DE, ES, LU, UK) reported existing stockpiles of PFOS, primarily relating to fire-fighting foams, which were subject to further management.

2.4 2.4 Waste Management and Storage

While a good proportion of Member States have enacted programmes to gather and destroy obsolete pesticides, they also highlighted the issue of contaminated land, particularly land close to sites of former manufacture of those substances. Data from the Netherlands and Finland highlighted the potentially high number of sites that may be contaminated, while Spain also reflected upon contaminated land related to the former manufacture of lindane, and waste hexachlorocyclohexane by-products. The typical remediation steps involve excavation, which in turn generates large quantities of contaminated soil that has to be treated as hazardous waste.

[1] Annex I, Part A of the POPs Regulation sets critical thresholds for PFOS which (must not be exceeded) of 10 mg/kg where present in substances or in mixtures. Furthermore, for articles or parts thereof, the concentration of PFOS must be lower than 0.1% by weight.

3. 3. Environmental Releases and Environmental Concentrations

Article 6(1) of Regulation (EC) No 850/2004 required Member States to develop inventories of emissions to air, land and water for substances listed in Annex III within 2 years after entry into force. Emission inventories form a key resource to inform policy makers during the development of national implementation plans. In particular, they help to identify key sources to target for emissions reduction, or areas of uncertainty where further research is needed to help characterise a source.

Twenty-one Member States (out of 28) provided emission estimate data in their reports. The data varied in completeness, including air only estimates (14 MS), air and water emission estimates (3 MS), and air, water, and land emission estimates (4 MS). These variations highlight major gaps within the available data set provided. Data from the EMEP emissions database (WebDab)[2] was also used to build up a more complete picture. The database provides reported emissions for the period 2013–2015 including information on the data submitted to the UNECE as part of the Aarhus Protocol (air emissions). Comparison was also made against data from the E-PRTR website and with environmental monitoring data from EMEP MSC-E and the Arctic Monitoring and Assessment Programme (AMAP) to corroborate emission trends.

Twenty-seven out of 28 Member States have developed and reported estimates of emissions for dioxins and furans, PCBs, and HCB, while all 28 reported estimates of emissions for PAHs. It is important to note that the UNECE data only covers air emissions and the Article 12 reporting was largely dominated by emissions to air. Estimates of emissions to water and land were provided by far fewer Member States (7 out of 28).

Using the UNECE data covering Annex III substances[3], a summary of key emission sources was developed for each POP substance for emissions to air, illustrated in Figure 1.

Dioxins and Furans

Dioxins and Furans are not commercially produced and are typically associated with either incomplete combustion processes such as open burning, or with metallurgy. The major source sector identified for the Union in Figure 1 was the energy generation sector (including petroleum refinery operations), accounting for 27% of all emissions. This was only marginally larger (proportionately) than residential use of solid fuels, which accounted for 23% of all emissions. While the power generation sector consumes large quantities of solid fossil fuels, the high operating temperature and advanced levels of abatement required under Union industrial emissions policy means that the emission per tonne of coal is much lower than that from residential sources. Aside from residential use of fuels, the other major sources of emissions were waste incineration (energy from waste) (19%), other fossil fuel combustion by industry (10%) and metal manufacture (9%). Comparison against data from E-PRTR corroborates the conclusion, with 82% of point source emissions linked to power stations, and a further 10% to metal manufacturing facilities.

In cases where estimates for vectors other than air have been provided by Member States, there was general agreement that emissions to air were broadly matched by emissions to

[2] http://www.ceip.at/

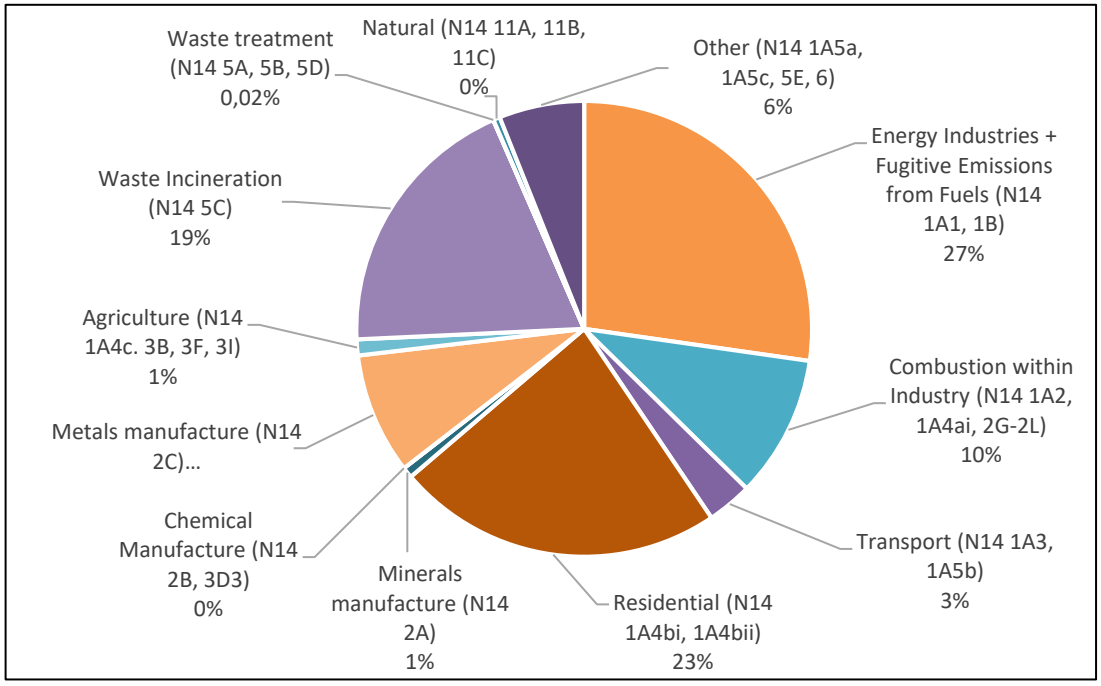
[3] Note that pentachlorobenzene estimates for emissions to air were unavailable from the EMEP webdab database at the time of writing.

residue[4]. Air emissions abatement and process design has improved since the advent of the Waste Incineration Directive (WID) (2000/76/EC)[5], and emissions of dioxins and furans to air from industry have dropped significantly between 1990 and 2015.

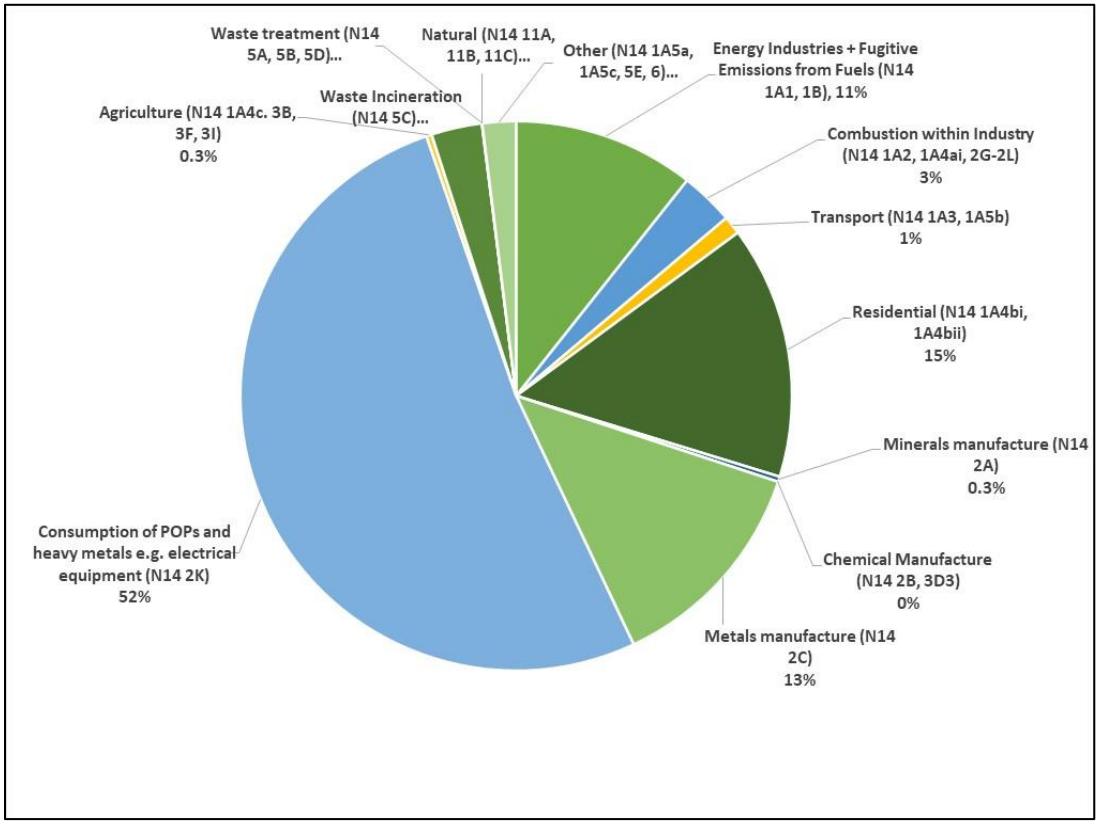
[4] Under the Stockholm Convention 'residue' is assumed to constitute a waste contaminated by POPs which is disposed of in a controlled manner; this differs from 'land' which is a direct uncontrolled release of material to land.
[5] Note that WID was later replaced by the Industrial Emissions Directive. However, the advent of WID contributed directly to significantly improves in process control and abatement for incinerator plant.

Figure 1: Summary of major sources for the substances subject to release reduction provisions (Annex III), based on UNECE data 2013-2015 (air emissions)

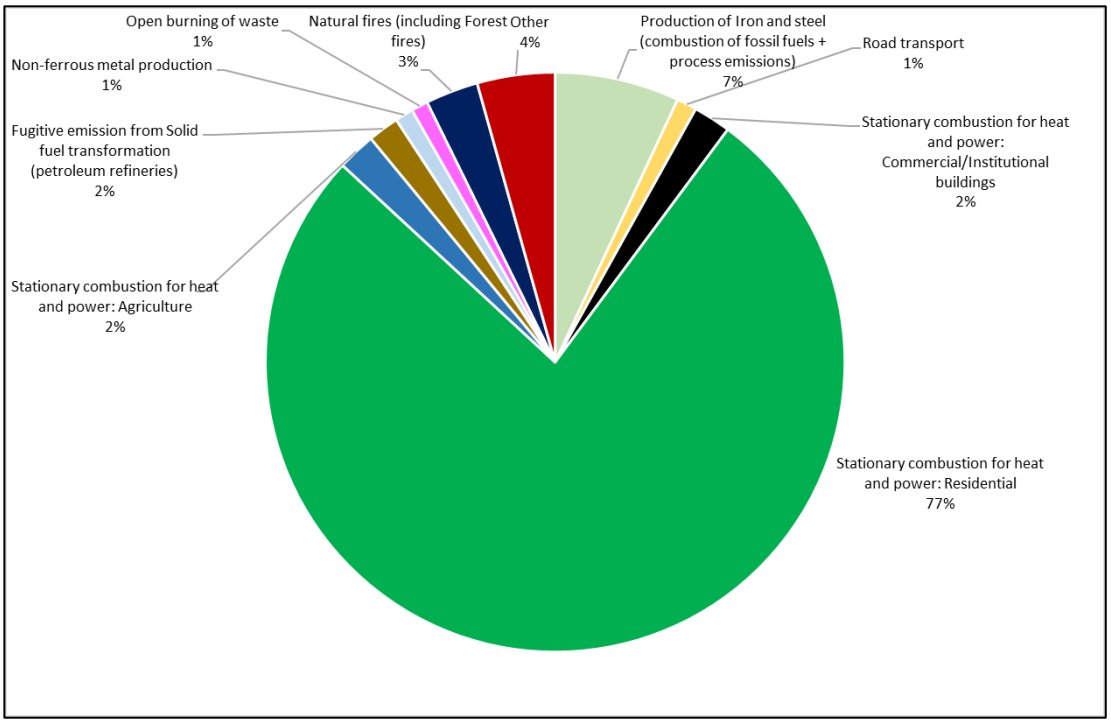
Dioxins and Furans



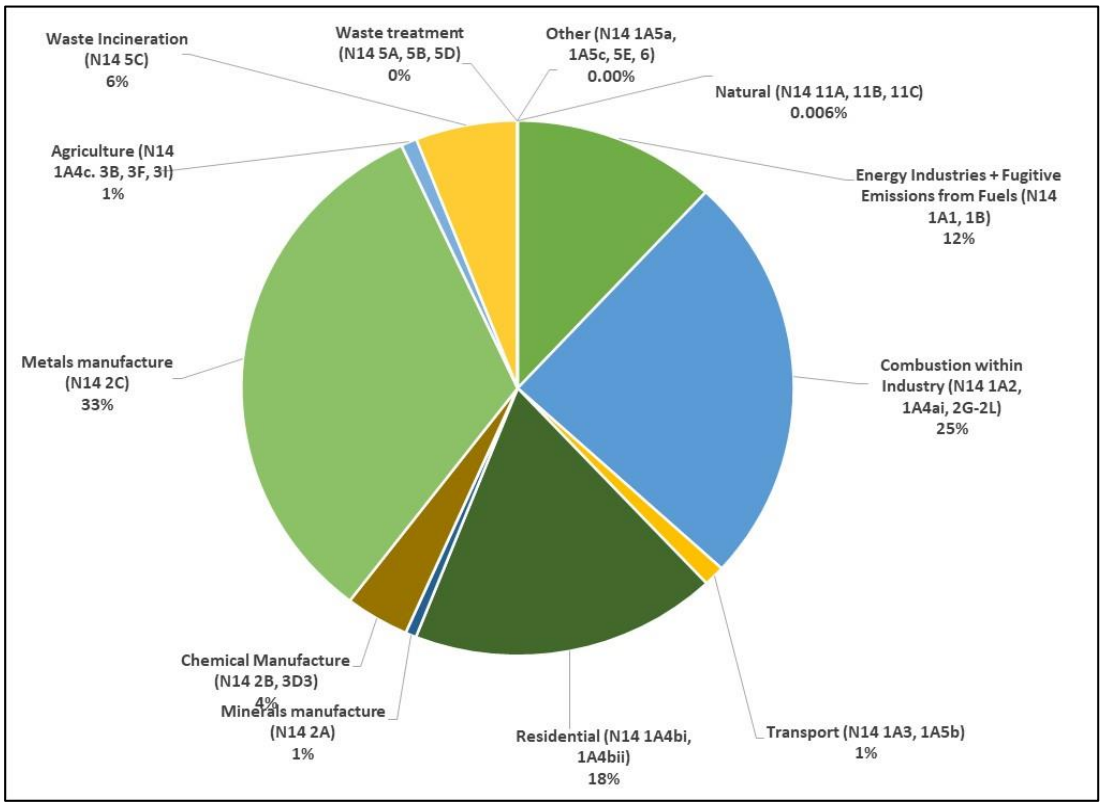
Polychlorinated Biphenyls



Polycyclic aromatic Hydrocarbons (PAHs)



Hexachlorobenzene (HCB)



However, this leads to the generation of air pollution control residues, sometimes called fly ash, which can be heavily contaminated with pollutants such as dioxins and furans. Care is required with interpretation of the data, as emissions to air, land and water are direct releases lost to the environment in an uncontrolled fashion, while "residue" refers to the contaminated solid waste generated, which is typically disposed of in a controlled fashion and does not necessarily constitute a total loss to the environment.

Polychlorinated biphenyls (PCBs)

PCBs had commercial use within a variety of applications but particularly in di-electric equipment. Their high chemical stability and persistence made them ideal heat-transfer fluids for this application. PCBs can also be produced through unintentional pathways, particularly combustion. Figure 1 indicates that the main source of emissions was from dielectric equipment, contributing 52% of all emissions to air. This represents a much higher contribution than reported in the previous (2010-2012) reporting period (32%).

Closer review of the temporal and sectoral trends in PCB emissions, reported in the EMEP WebDab dataset, suggest that one of the most important PCB emission sources in Europe in 2000 was iron and steel production (2,285 kg: 33% of total). The total and percentage contribution of this source has since declined substantially, contributing 428 kg (12%) in 2015. This suggests that, over the past 20 years, PCB emissions from industrial sources have declined with the introduction of more efficient combustion and abatement processes, while the emissions from electrical equipment and wastes have declined a lot more slowly, leading to an increasing relative contribution from this source to the Union total.

Other major sources of PCB emissions to air in the current reporting period include residential combustion of fuel (particularly solid fuels like coal and waste wood) (15%), and also metals manufacture (13%). Table 1 provides a summary of reported emissions in 2015.

Figure 2 provides maps of the available ambient monitoring data from EMEP/MSC-E in both 1990 and in 2014, as a means of comparison to the inventory estimates. Both the EMEP data for Europe in Figure 2 and Arctic monitoring by AMAP indicate a clear decline in ambient atmospheric concentrations and emissions since 1990.

Limited data is available regarding the emission of PCBs to vectors other than air. Based on the Article 12 reports for eight Member States that provided estimates for other vectors (BE, CZ, IE, ES, FR, NL, SE, UK), no clear pattern was evident. Different Member States highlighted the importance of water, land and waste residue to different extents.

Polycyclic aromatic hydrocarbons (PAHs)

PAHs are a family of chemicals that can form naturally in the environment from the combustion of vegetation such as forest fires, but which also have anthropogenic sources, particularly linked to the combustion of fossil fuels. The data presented in Figure 1 highlight the dominant source of PAH emissions as use of domestic fuels, particularly coal, making up 77% of all emissions in the period 2013-2015.

Other major sources of PAH emissions to air were iron and steel production (including use of fossil fuels) (7%), natural fires (3%) and other forms of fossil fuel combustion, including road transport which makes up 1% of total air emissions. The average annual emissions were estimated to have declined by over 90% between 1990 and 2015 (based on EMEP reported data). This reduction is broadly similar to dioxins and furans and PCBs, although a small number of Member States have witnessed increasing emissions since 1990. The monitoring data from EMEP indicates a 40% decline in airborne PAH concentrations since 1990 by 2015, compared to declines of 60% for PCBs and 85% for dioxins and furans.

Table 1: Emissions reduction for polychlorinated biphenyls (PCBs) based on data reported under the UNECE POP Protocol (a negative percentage shows an increase)

Member State	Emission to air 1990 kg	Emission to air 2015 kg	Reduction in annual emissions 1990:2015 as a percentage
Belgium	107.1	3.1	97%
Bulgaria	13.8	3.0	78%
Czechia	3.7	1.8	52%
Denmark	110.5	41.5	62%
Germany	1,735.6	229.0	87%
Estonia	8.4	4.2	49%
Ireland	40.5	14.5	64%
Greece	9.2	29.1	-216%
Spain	25.8	26.9	-4%
France	176.8	41.6	76%
Croatia	483.1	425.1	12%
Italy	288.8	194.8	33%
Cyprus	0.0	0.0	-9%
Latvia	4.3	0.2	94%
Lithuania	6.2	1.3	79%
Luxembourg	39.9	3.1	92%
Hungary	25.9	10.8	59%
Malta		0.0	
Netherlands	0.09 g	0.09 g	0%
Austria	47.2	35.7	24%
Poland	760.6	627.3	18%
Portugal	2,305.7	85.9	96%
Romania	134.7	20.2	85%
Slovenia	416.9	38.9	91%
Slovakia	66.2	18.4	72%
Finland	33.4	35.7	-7%
Sweden	9.0	9.1	-2%
United Kingdom	6,744.5	608.5	91%

Limited data is available for other vectors beyond air for PAHs. However, based on the four Member States that provided data (CZ, ES, NL, UK), water and residue are also key emission vectors for PAHs. Comparison to the E-PRTR suggested that the key source of PAH emissions to water was petroleum refinery processes, while combustion wastes, metallurgic wastes and auto repair waste were all important sources for residue.

Chlorobenzenes (hexachlorobenzene and pentachlorobenzene)

Hexachlorobenzene (HCB) was identified as an Annex III substance in 2004 and in 2010 pentachlorobenzene (PeCB) was added to Annex I and III of the Regulation following its addition to the Stockholm Convention. Both HCB and PeCB had previous commercial use as pesticides but are also created as a by-product of other industrial processes, particularly the manufacture of chloro-organic solvents. PeCB was also used to reduce the viscosity of PCBs in dielectric equipment. Both HCB and PeCB can also be produced as a product of combustion of solid fossil fuels, waste oils and waste material.

Estimates for PeCB are very limited with only five Member States providing estimates (CZ, ES, NL, AT, UK). The reported estimates vary from less than 0.01 kg to 50 kg, again showing wide variances across Member States.

The HCB data submitted for air in Figure 1 illustrate that 33% of all emissions to air come from metallurgy as the main source. However, beyond manufacturer of metals, combustion of fossil fuels (particularly coal) dominates heavily, with industrial combustion of fossil fuels (25%), domestic combustion (18%) power stations (12%) and agricultural combustion of fuels (1%) combined making up more than half of all emissions to air (56% of all emissions).

Figure 2: EMEP Monitoring Maps for Europe. Diagram “a” presents 1990 air concentrations, and diagram “b” presents 2014 air concentrations

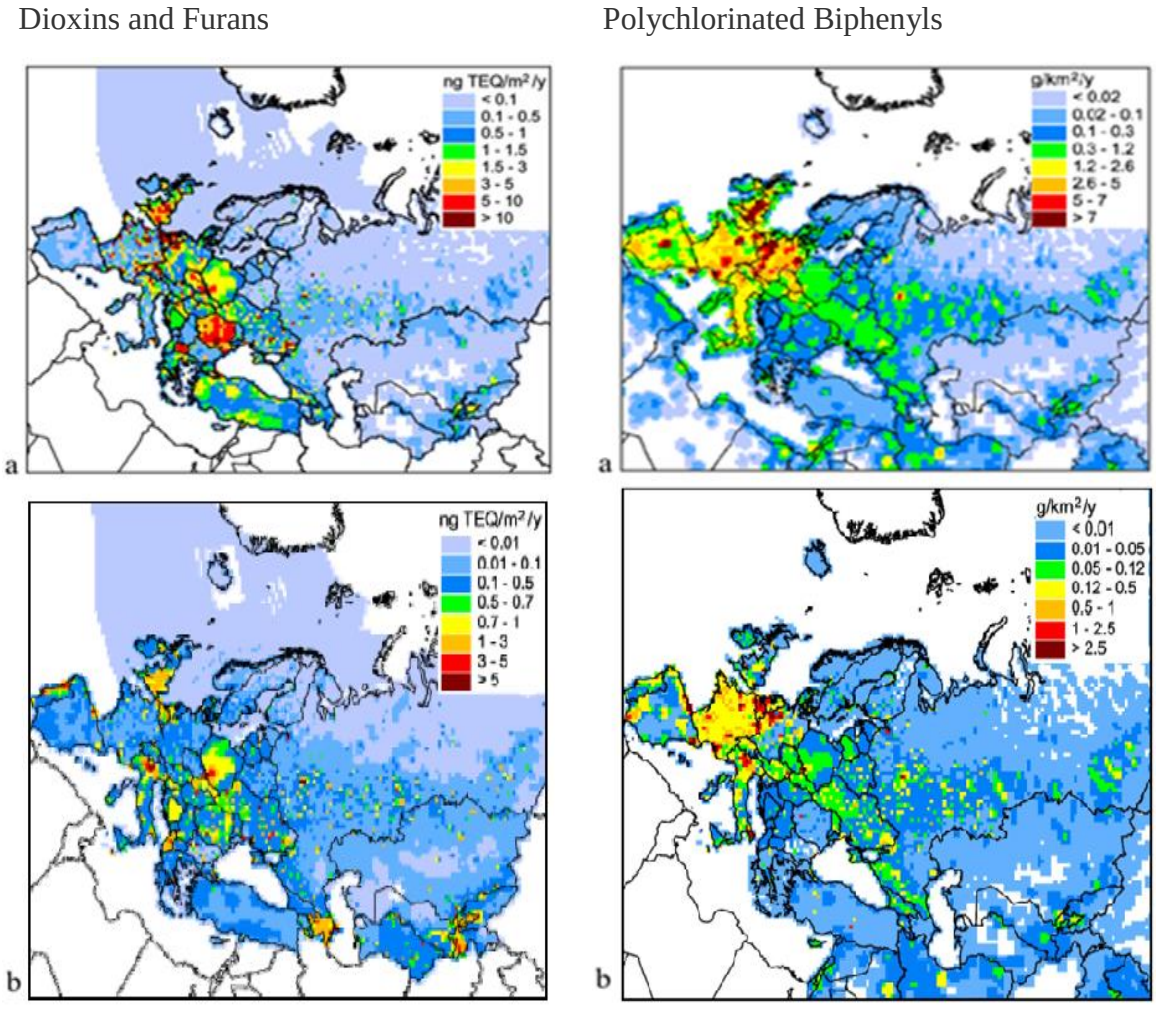
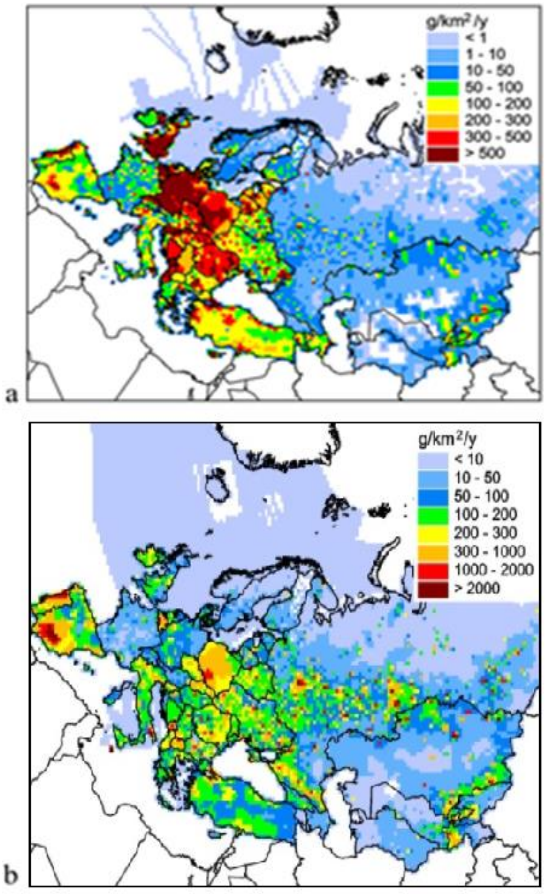
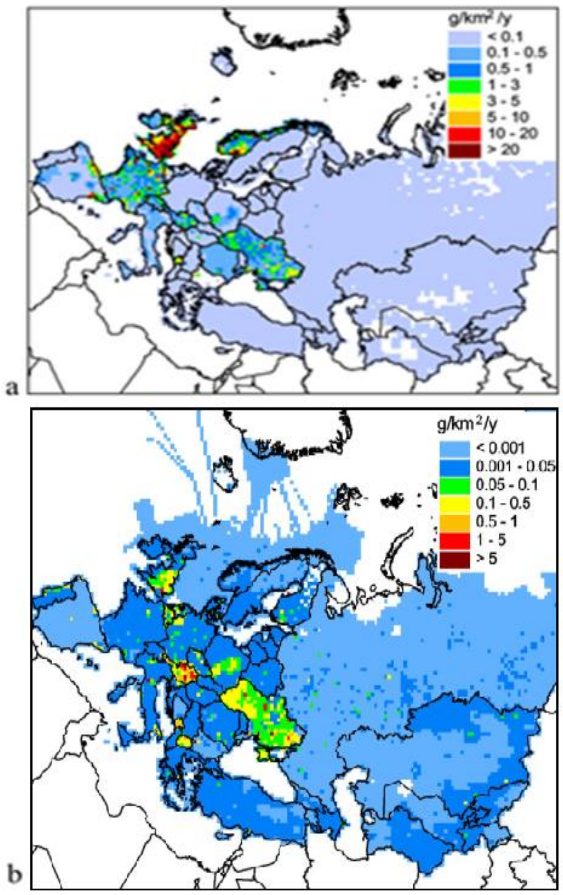


Figure 3: EMEP Monitoring Maps for Europe. Diagram “a” presents 1990 air concentrations, and Diagram “b” presents 2014 air concentrations

Polyaromatic Hydrocarbons



Hexachlorobenzene



EMEP monitoring indicated significant falls in airborne concentrations of HCB, which had dropped by 85% since 1990 by 2015. AMAP monitoring of Arctic air however presented a different picture with only a very minor decline in airborne concentrations of HCB over the Arctic area.

Very limited data is available for estimates of emissions to non-air vectors, with only eight Member States (BE, CZ, IE, ES, FR, NL, SE, UK) providing such information in their Article 12 reporting for HCB. Additionally, Czechia, Spain, Austria and the United Kingdom provided estimates of PeCB emissions to other vectors. Based on those data, water and residue are the second most significant emission vectors after air for HCB, with water and land being of high importance for PeCB.

4. 4. Activities to promote knowledge exchange

Eighteen Member States (BE, BG, CY, CZ, DK, DE, EE, IE, LV, LU, NL, AT, PL, PT, RO, SI, SE, UK) have provided full triennial reports as part of the Article 12 reporting. Four Member States (EL, IT, HU, MT) did not provide any annual or triennial report. This has made it difficult to comment on the activities of certain Member States concerning knowledge exchange, public involvement, and awareness.

The available reports indicated that systems have been put in place to allow knowledge exchange and dissemination of information. Nine Member States (BG, CZ, DE, FR, NL, PL, SI, RO, UK) commented that they made use of their knowledge exchange networks to fully engage with stakeholders in the development of national implementation plans to ensure that industry, academia, non-government organisations and the general public were involved and had the opportunity to voice opinion in the work completed.

Fifteen Member States (BE, CZ, DK, DE, IE, ES, FR, LV, LU, NL, PL, SI, SK, FI, SE) have also provided either financial or technical support during the 2013-2015 period. This has largely been through organised schemes such as the Global Environment Fund (GEF) or the Strategic Approach to International Chemicals Management (SAICM).

Alongside support to global schemes, many Member States also commented on national initiatives which had been carried out and which included:

- hosting workshops and conferences for international experts;
- funding of research programmes for work on waste POPs in Africa;
- funding of Arctic monitoring research programmes;
- bi-lateral communication and knowledge-building with non-EU countries; and
- research programmes on the presence of POPs in former Soviet Union states.

Member States also commented on work to build awareness within the general public and engagement with the general public. Activities to promote awareness of the issues surrounding POPs had been put in place using a number of initiatives such as:

- production of information to be disseminated to the general public;
- workshops and seminars for stakeholder organisations;
- public awareness campaigns and questionnaires to seek feedback from the general public.

5. 5. Conclusions

The fourth synthesis report covers all aspects required by the POPs Regulation and its implementation in the Union and at Member State level. This short section draws some conclusions about the work done and the progress made to eliminate POPs in the Union.

Production, placing on the market, and use of chemicals

Production of POPs was limited to only PFOS, and the production volume for PFOS in the 2013-2015 period was declining steeply (down from 9 tonnes per annum to 2.4 tonnes). Additionally, a small number of Member States were still importing HBCDD and SCCPs. Some Member States made use of the derogation for import/export of POPs for the purposes of research or analysis.

Enforcement activities identified potential issues with HCB in fireworks in three Member States, associated with import of fireworks. This primarily related to fireworks manufactured in Asia, in particular in China. Other enforcement cases identified possible issues with SCCPs in toys and other articles (particularly Christmas lights). PFOS was also identified in remaining 'in-use' stocks of fire-fighting foams.

Waste Management and contaminated sites

The majority of Member States have made good progress at the final removal and elimination of PCBs from di-electric equipment. Eleven out of 13 Member States estimated remaining stocks to be lower than 10% against a 1990 baseline. Two other Member States commented that more significant stockpiles may exist (30% and 49% against 1990 levels, respectively).

The majority of Member States had mechanisms to identify, collect, and destroy obsolete pesticides that may contain POPs. No stockpiles of obsolete pesticides were reported. However, four Member States identified stockpiles of PFOS (largely relating to fire-fighting foams), which were properly managed for final destruction.

Some Member States have also highlighted the challenges with contaminated land and POPs that require active management for many years after the initial contamination has taken place.

Environmental Releases and Environmental Concentrations

The data on the emission of Annex III substances show a strong decline since 1990, with the monitoring data for ambient air concentrations (see Figure 3) demonstrating a clear improvement.

Key sources of POPs emissions vary by substance, but as a common theme combustion of solid fuels and wastes (in both industrial and domestic settings) is important, as is manufacture of metals. A more select set of sources is important for specific POPs e.g. leak from di-electric equipment is key for PCBs.

Emission data is readily available for emissions to air, while data for other vectors is far more limited. In particular, emission estimate data for water and land was reported by only seven and four Member States, respectively, with no clear trends allowing a comparative analysis. Additionally, the underlying data used in such reports should be produced in a harmonised format so that it can easily be incorporated into IPCHeM.

Knowledge exchange and financial and technical assistance

Only 18 of 28 Member States provided full reporting needed to fully assess this specific topic. However, for those that did report, all have put in place communication networks for

POPs to facilitate discussion between policy makers, industry, academics and the wider public. The majority have put in place systems to seek public engagement as part of the continued development of national implementation plans.

The Union and the Member States substantially supported the work under the Convention through the payment of their mandatory contribution as a Party and through contributions to the Special Voluntary Trust Fund. Fifteen Member States stated that they have supported the international work on POPs either financially or technically, with funding to the Global Environment Fund as a primary pathway to provide their support.