

Stockholm Convention National Implementation Plans of the Baltic Sea states and European Commission related to dioxins

The Stockholm Convention (SC) on persistent organic pollutants (POPs) is a global treaty that entered into force in 2004. Measures to reduce or eliminate releases from unintentionally produced POPs (i.e. Annex C, Part I: PCDDs, PCDFs, PCBs, HCB) are the subject of Article 5 of the Stockholm Convention. To reach the objective of mitigation and elimination of unintentionally produced substances, a National Action Plan (NAP) should be produced by each country. Inventories of sources, estimates of releases and release reduction plans should be covered in the NAP. In addition, parties to the Stockholm Convention are required to prepare a National Implementation Plan (NIP) on how to implement the obligations under the Convention and make efforts to put such plan into operation. The European Commission became a Party to the Stockholm Convention in 2005 and developed a Community Implementation Plan on POPs, which complements the national plans of the EU Member States, was in 2007.

Summary of NIPs of the Baltic Sea states

The summary focuses on PCDD/F emissions to air. NIPs have been collected from www.pops.int.

All BS countries have identified dioxins as priority pollutants. The problem formulation as well as source identification and potential measures are fairly consistent between all states. Energy production, including small-scale wood burning, is identified by all countries as their main source of dioxins to the environment (Table 1). Several countries, however, stress the lack of data on emissions which makes reliable source identification difficult and consider research and knowledge exchange between countries highly needed. Public information about small-scale burning is considered a prioritized task for several countries due to the lack of public awareness of the problem with residential burning of solid fuels. Technical and policy solutions, such as the use of Best Available Technique (BAT), eco-labeling of household furnaces, regulating emission requirements and subsidy programmes for stoves are also identified by the Baltic Sea countries as important measures to reduce dioxin emissions on a national level. In addition, poor development of public municipal waste management system in some countries needs to be addressed.

Denmark (2012)

Releases of dioxins (PCDD/PCDF) from incineration plants and industry have decreased to below 5% of the level in the 1990s, therefore, the assessment is that there is no longer a need for new initiatives to limit dioxins from point sources. In 2010, the most significant sources of dioxin releases are burning of biomass in wood-burning stoves and small combustion plants, as well as fires and bonfires. However, such releases have been determined on very uncertain grounds. Unfortunately, initiatives on reducing release of particles and PAH from wood-burning stoves have proven to have no effect on dioxin releases. With the current knowledge there are no simple methods to further reduce releases of dioxin from wood-burning stoves as there are already bans on burning waste in the stoves. The content of dioxins in certain foods of animal origin is still high, and there is a ban on catching certain fish species in some areas of water with too high content of dioxins. Action plan (time frame): 1. Monitor developments in relation to releases of POPs from wood-burning stoves (in progress), 2. Improved emissions inventories (in progress), 3. Further development of technologies for treatment of flue-gas cleaning products (tbd). Denmark has focused on public information through several campaigns. The

campaign material is also distributed at the webpages of stove and fuel dealers, as well as at municipalities.

Table 1: Summary of activities related to dioxins in the National Implementation Plans (NIPs) according to the Stockholm Convention of the Baltic Sea states. Russian NIP not available.

Country (year of submission)	Main sources	National Action Plan	Challenges
Denmark (2012)	Burning of biomass in wood-burning stoves and small combustion plants; fires and bonfires	1. Monitor developments in relation to releases of POPs from wood-burning stoves (in progress), 2. Improved emissions inventories (in progress), 3. Further development of technologies for treatment of flue-gas cleaning products (tbd).	Improving emissions inventories for POPs into air. Cost-effective measures to reduce emissions from wood-burning stoves.
Estonia (summary only 2013)	Energy production; industry; incineration of waste	Applying BAT in industry; public information on residential waste burning and prevention of fires	
Finland (2006, 2012 only in Finnish)	Energy production, incl small-scale burning of wood	Improving source inventories; regulate emission requirements for stoves, furnaces, and boilers to be placed on the market; public awareness raising and possibly inspections on of wood and other biofuels; improve permit process for industries; develop BAT/BEP; permanent monitoring programme for the Kymi River	Need to improve emission inventories and the monitoring data need to be more reliable.
Germany (2012)	Small firing installations	An emission inventory; set limit values ; requirements related to small-scale combustion plants; BAT	Information about the correct handling of small solid fuel firing
Latvia (2005)	Uncontrolled combustion processes, accidental fires at waste disposal sites; biomass power-plants, heating and food processing	Ensure legislative compliance; promote recycling of waste; BAT; Information exchange at national, regional and international level.	Few data on emissions
Lithuania (2007)	Household heating and food preparation using biofuels; waste incineration in households; fires in landfills	Develop the public municipal waste management system training material on POPs; collect, store and/or dispose of PCB containing oil and equipment; public information on incineration of old grass and household waste	Poor development of public municipal waste management system; no uniform data collection
Poland (2011)	Municipal and housing sector, accidental fires	Improve technological processes in metallurgical processes; save energy and reduce emissions by replacing old heat plant construction; introduce "clean" biomass or other renewable energy sources and BAT for energy production	Low public awareness; unreliable emission data; insufficient resources.
Sweden (2012)	Metallurgic and cement industries, thermal waste treatment, power production and domestic incineration	Improved self-monitoring; reduced costs of sample analyses; reduced releases from the metallurgic sector; reduce the formation of PCDD/Fs; public awareness, regulations and enforcement of small-scale burning of wood; prevent land-fill fires; ensure Swedish destruction capacity for	Need for better source data and knowledge concerning the formation, release, dispersion, cycling and long-range transport

POPs waste; identify and remediate contaminated sites

Estonia (only summary 2013, full version 2011 only in Estonian)

The emissions of PCDD/Fs have not been significantly reduced between 1990-2008. 65% of Estonia's dioxin emissions originate in stationary sources – combustion in energy production, industry and industrial incineration of waste. The concentration of total dioxins (PCDD/F) in the breast milk of Estonian women is 12-14 pgTEQ/g fat. Dioxin concentrations in Baltic are below 4 pgTEQ/g, but the average concentration still varies around 3 pgTEQ/g. It is possible to decrease dioxin emissions by improving the efficiency of combustion plants and by applying best available techniques in industry. In order to reduce dioxin emissions it is also important to inform the population of the possibilities to reduce non-industrial emissions, in particular the harmfulness of burning waste in residential combustion sources. It is also necessary to carry out systematic and efficient public awareness activities to prevent fires.

Finland (2006, updated version 2012 only in Finnish)

The most significant problems caused by POPs in Finland today concern unintentionally produced POPs, particularly in sites contaminated by wood processing activities, and exposure to high levels of dioxins in fish from the Baltic Sea. PCDD/F emissions into the air have remained steadily since 1990. Major sources are from energy production processes, of which more than half of the PCDD/F releases are from small-scale burning of wood. Estimates of dioxin and furan releases are mainly based on the use of emission factors, and there are very few relevant measurements. Consequently, these emission estimates are very uncertain. Action has been taken through requiring the industry to apply BAT, to adopt release prevention processes, waste management regulations, and information about good combustion practices and fuel quality. Action plan: Improving the precision and efficiency of source inventories and annual estimates of PCDD/F and PCB; regulating emission requirements for stoves, furnaces, and boilers to be placed on the market; ensure proper combustion by means of instructions and training and possibly inspections; paying special attention to the good management of PCDD/F and PCB releases in the environmental permit process when dealing with industrial processes; develop BAT/BEP; establishing a permanent monitoring programme for sediments in the Kymi River; public awareness raising on the combustion of wood and other biofuels. Need to improve emission inventories and the monitoring data need to be more reliable.

Germany (2012)

Relevant sources of dioxin and furan emissions are small firing installations, and the application of BAT on these small and medium firing installations are of importance. By avoiding the use of impermissible fuels the emissions are likely to be reduced. Information about the correct handling of small solid fuel firing installations is needed. Germany has a Central Dioxins Database which serves as the central instrument for the documentation and evaluation of the results of testing programmes on dioxin loads in the environment, foodstuffs, animal feeds, and humans. The Dioxin Database is structuring the data uniformly, presenting evidence about chronological and spatial trends in the pollution situation.

Latvia (2005)

Air emissions of PCDD/F are given the second priority (after PCB) in Latvia. Partly due to a lack of public awareness, the main source of dioxins and furans is uncontrolled combustion processes. PCDD/F emissions were first assessed in Latvia in 2002 within the framework of the Danish Cooperation for Environment in Eastern Europe (DANCEE) and in 2004 conducted under the UNDP/GEF project. Results were that the main sources are uncontrolled combustion processes, accidents involving fires at waste disposal sites and power production and heating, especially biomass power-plants, heating and food processing. The dioxin control program was developed with the aim to secure information on the dioxin contents of fish products from the Baltic Sea in the export production. A campaign called "STOP POPs!" has been made to raise awareness among the public. Latvia strives to have a close cooperation between the state, the private sector and NGOs. Action plan: Ensure legislative compliance; promote recycling of waste; use of BAT; information exchange at national, regional and international level; conduct comprehensive research on PCB, dioxin and furan concentrations in marine fish and other food stuffs.

Lithuania (2007)

Despite considerable uncertainty in the inventory data for polychlorinated dioxins and furans, the activity categories "Production of energy and heating" (including household heating and food preparation using biofuels) and "Uncontrolled combustion processes" (including waste incineration in households and fires in landfills) are likely to be the principal categories of sources of unintentional POPs pollution in Lithuania. The general public has little information on the generation and release of dioxins and furans into environment from incineration of waste from private households. The reduction of release is slowed down by the economic situation and insufficiently developed public municipal waste management system. Medical waste and incineration of oils polluted with PCBs are among the major sources of dioxins and furans in Lithuania. The country has no pulp production. Newly identified sources include the release from incineration of animal bone waste, and possibly wooden railway sleepers. Action plan: Development of appropriate PCB and unintentional POPs training material; collect, store, decontaminate and/or dispose of PCB containing oil and equipment; develop the public municipal waste management system; disseminate information material on incineration of old grass and household waste, and effects of POPs on human health and the environment.

Poland (2011)

Municipal and housing sector has a dominant share in PCDD/F emissions as the main fuel used in this sector is hard coal. Other significant sources are fires of landfills, buildings, cars, or forests, or smoking cigarettes. The main source of dioxin emissions into the air from fuel combustion processes is the housing sector using individual furnaces and heating boilers fired with coal fuels and biomass and using kitchen furnaces fired with such fuels to prepare meals and drinking water. The problem of PCDD/F emissions from this sources is important not only due to their share in total dioxins and furans emissions in Poland but also due to the generally inadequate waste incineration and co-incineration conditions in furnaces and ovens. Apart from this sector, the largest PCDD/F emissions into the air can be found in metallurgical processes and in secondary aluminum production. Due to low awareness of Polish society of the dangers of POPs, it is necessary to increase it by providing access to reliable and comprehensive information, including the issues of POPs in the educational programs and strengthening the role of NGOs in raising public awareness. Institutional and legal system in Poland is sufficiently developed. Poland has the necessary research potential to allow research in monitoring, control and elimination of POPs, as well as risk assessments of the presence of POPs in the environment for health and agricultural

production. Action plan: actions to reduce low-emission (residential and farms); improve technological processes in metallurgical processes; save energy and reduce emissions by replacing old heat plant construction of low efficiency with new appliances provided with appropriate certificates of compliance with applicable standards; introduce "clean" biomass or other renewable energy sources and best available techniques for energy production; verify indicators of PCDD/F emissions to air from the metallurgic processes, estimated emissions are subject to considerable uncertainty; analysis of the potential to use alternative methods of reduction of PCDD/F emissions in municipal services management. There is a lack of information on levels of substances as POPs in air, soil and waste; limited data on the exposure of humans by the dioxins and PCBs and there are insufficient financial resources for research, monitoring, inventory and liquidation work.

Sweden (2012)

The most acute problem related to "old" POPs in Sweden today is that levels of dioxins and dioxin-like PCBs in fatty fish from the Baltic Sea are unacceptably high and constitute a risk to human health. Major sources are the metallurgic and cement industries, thermal waste treatment, power production and domestic incineration e.g. biomass burning (including small-scale wood incineration and large-scale burning of biomass fuels), backyard burning, accidental landfill fires and the use of fossil fuels. Municipal waste incineration is still an important source of dioxins, although very small amounts are released to air, owing to the widespread introduction of flue-gas cleaning. Instead the dioxins are caught in the fly ash and end up in landfills. Similarly, the primary and secondary steel industry has introduced flue-gas cleaning systems. There is a lack of knowledge on the variations of formation and release of the substances concerned during different phases of industrial processes. Action plan: Improved self-monitoring; reduced costs of analyses and sampling with higher representativeness (e.g. continuous sampling of emissions from waste incineration plants); reduced releases from the metallurgic sector; study how to reduce the formation of PCDD/Fs (flue-gas treatment reduce emissions but move the problem to landfills instead); information and guidance alongside general regulations and their enforcement for small-scale burning of wood; prevent land-fill fires; ensure Swedish destruction capacity for POPs waste; identify and remediate contaminated sites. As releases from primary sources have abated, secondary sources have become more important in relative terms, however very little is known about the quantities, releases, dispersion and cycling from secondary sources. There is a need for better data and knowledge concerning the formation, release, dispersion and cycling PCDD/Fs.

European Community Implementation Plan

The Stockholm Convention is ratified by both the European Community (EC) and by its Member States. The EC became a Party to the Stockholm Convention in 2005. The EU legal instrument for implementing the Stockholm Convention is Regulation (EC) No 850/2004. This Regulation entered into force in 2004 and is directly applicable in all EU Member States. The Regulation contains provisions regarding production, placing on the market and use of chemicals, management of stockpiles and wastes, and measures to reduce unintentional releases of POPs. Furthermore, Member States must set up emission inventories for unintentionally produced POPs, national implementation plans (NIPs) and monitoring and information exchange mechanisms. The EU developed a Community Implementation Plan on POPs, which complements the national plans of the EU Member States, in 2007.

Table 2: Summary of activities related to dioxins in the Community Implementation Plans (CIPs).

Main sources	Community Action Plan	Challenges
Residential combustion, open burning of waste, wood preservation and iron and steel industry	Framework for eco-design requirements for energy using products.	Data comparisons between Member States
	The UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases	Data gaps
	Promote the sharing of information and experience.	Low public awareness about the problem and cause of dioxin emissions.
	Emission monitoring standardization	

The Community shall act on this area only if it “can usefully supplement national action and if it presents an EU added value.” The main sources for emissions of PCDD/F to air are thought to be residential combustion, open burning of waste, wood preservation and iron and steel industry (Table 2). The EC stresses the difficulties with data comparisons and gaps which make the data only useful as an indicator of emission dimension and proportion; hence has been developed by UNEP. Estimations show that the residential sources (residential heating with coal and wood, open burning of waste) may contribute with as much as 45% of total emissions of PCDD/F to air in the EU. The CEN (European Committee for Standardization) has been mandated to decide upon standards on measurement of air emission of dioxin-like PCBs. A grant is intended to be given to CEN during 2007 to enable validation at European scale. This action would then result in a harmonization of measurements and will make measured dioxin-like PCB data better comparable. Furthermore, work has been launched by the Commission to implement the Directive 2005/32/EC66 establishing a framework for the setting of eco-design requirements for energy-using products since small combustion installations have been identified as a priority for product labels and standards. Public awareness is seen as an important tool to address residential source, control measures are not likely to be as effective. The Commission can promote the sharing of information and experiences in the area. As of 2007 (available in 2009) the new register European Pollutant Release and Transfer Register (E-PRTR) will ensure more data on emissions of PCDD/F.

Main legal instruments covering the obligations of the Stockholm Convention in the EU (concerning dioxins):

- Regulation (EC) No 850/2004 of the European Parliament and Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EC.
- Council Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT) aims to completely dispose of PCBs and equipment containing PCBs as soon as possible and equipment with PCB volumes of more than 5 litres before the end of 2010. It also sets requirements for the environmentally sound disposal of PCBs.
- Directive 96/61/EC concerning integrated pollution prevention and control (the IPPC Directive) lays down control measures to reduce emissions of unintentionally produced POPs by covering the major industrial stationary sources of these POPs.
- Directive 2000/76/EC on the incineration of waste covers all waste incineration facilities that are a very important source of POPs by-products. The Directive sets strict limits for emission rates of dioxins /furans in the air.

To contribute to the aim of reducing the total releases of the chemicals listed in Annex C of the Stockholm Convention (dioxins, PCBs and HCB) the European Commission did a study on emissions of Summary produced by the Swedish Environmental Protection Agency to be used as background material for the dioxin policy network meeting in Stockholm 27 May.



dioxins from domestic sources. The study summarised and assessed current knowledge on dioxins emissions from these sources and identified and analysed measures to tackle them. Heating and cooking with solid fuels and waste burning came out as the main domestic sources of dioxins in EU. The study further concluded that the potential for domestic emission reduction is high and even simple measures can sometimes achieve more than an 80% reduction. Awareness raising and education on the potential health and environmental effects of dioxins is a crucial element for all the recommended measures. For this reason, the Commission will work with national and regional authorities.

The Standardised Toolkit for Identification and Quantification of Dioxin and Furan Releases ensures a harmonised framework for the release inventories required under the Stockholm Convention. The European Commission participates in the expert work on improving emission factors