Ministry of Environment of the Republic of Lithuania

UPDATED NATIONAL IMPLEMENTATION PLAN ON PERSISTENT ORGANIC POLLUTANTS

LITHUANIA

Vilnius, 2017

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ABBREVIATIONS

BAT – best available techniques/ technology
BEF – Baltic Environmental Forum
CAS – Chemical Abstracts Service
CLRTAP - Convention on Long-Range Transboundary Air Pollution
COP - Conference of the Parties to the Stockholm Convention
DDT – dichloro-diphenyl-trichloroethane
EEE – electrical and electronic equipment
EPS – expandable polystyrene
EU – the European Union
GDP – Gross Domestic product
HBCDD – hexabromocyclododecane
HCB – hexachlorobenzene
HCH – hexachlorocyclohexane
IPPC – integrated pollution prevention and control
IS AIVIKS – Integrated Computerised Information System for Environmental Management
IUPAC – chemicals nomenclature under International Union of Pure and applied Chemistry
MAC – maximum allowable concentration
NGO – Non-Governmental Organzation
NIP – National Implementation Plan
PCBs – polychlorinated biphenyls
PCDD – dioxins
PCDF – furans
PeCB – pentachlorobenzene
PFOS – perfluorooctane sulfonic acid and its derivatives
PFOS-F – perfluorooctanesulfonyl fluoride
POPs – persistent organic pollutants
POPs-BDEs – polybrominated diphenyl ethers
REACH –Regulation (EC) No 1907/2006 of the European Parliament and Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals
XPS – extruded polystyrene foam

Tables

Summary

The Stockholm Convention

The Stockholm Convention on Persistent Organic Pollutants was adopted in May 2001 and entered into force in May 2004. The objective of this Convention is to protect human health and the environment from persistent organic pollutants. In pursuance thereof, Parties to the Convention are required to take measures to eliminate or minimise the release of persistent organic pollutants into the environment. The obligations of the Stockholm Convention are transposed into the European Union law by the Regulation (EC) No 850/2004 of the European Parliament and the Council on Persistent Organic Pollutants. In Lithuania, as a Member State of the European Union, Regulation (EC) No850/2004 is applicable directly.

The first Lithuanian National Implementation Plan was developed in 2006 and submitted to the Stockholm Convention Secretariat on 6 April 2007. It describes the situation of the management of the 12 initial persistent organic pollutants regulated under Stockholm Convention and Regulation (EC) No 850/2004 in Lithuania. It also provides measures to reduce the release of persistent organic pollutants through all of their life cycle.

To assure Lithuania fulfils the international obligations assumed upon ratification of the Stockholm Convention and properly implements Regulation (EC) No 850/2004, it should update the National Implementation Plan in line with decisions adopted by the Conference of the Parties of the Stockholm Convention. The Updated National Implementation Plan provides measures for the management of 23 persistent organic pollutants regulated under Stockholm Convention and Regulation (EC) No 850/ 2004(including 11 new POPs listed in the Stockholm Convention by Decisions of the Conference of the Parties adopted in 2009, 2011 and 2013).

European Union and national legislation

The main legal act regulating persistent organic pollutants management – Regulation (EC) No 850/2004, which sets the requirements for persistent organic pollutants production, placing on the market, use restrictions and prohibitions, emissions control, persistent organic pollutants monitoring and waste containing these pollutants management.

Persistent organic pollutants management is also regulated by the directly applicable general chemicals legislation (Regulations) of the European Union, national legislation and sectoral legislation concerning the control of persistent organic pollutant emissions and releases into the environment (air, water, soil), management of waste containing persistent organic pollutants and contaminated territories polluted by persistent organic pollutants or waste containing them .

With the aim of ensuring the implementation of Regulation (EC) No 850/2004 in Lithuania the Resolution of the Government of the Republic of Lithuania No 239 of 3 March 2005 ‘On Implementation of 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’ was adopted (as last amended on 4 July 2018). The Environmental Protection Agency is appointed (by the Resolution of the Government

of the Republic of Lithuania No 1076[1] of 3 October 2014) as the Competent Authority to perform the tasks allotted to the national Competent Authorities under Regulation (EC) No 850/2004. This Governmental Resolution sets obligations for other state institutions to carry out certain tasks within their competence when implementing the Stockholm Convention and Regulation (EC) No 850/2004 provisions, among them – to ensure proper implementation of persistent organic pollutants management requirements by conducting the state control of entities.

Overview of persistent organic pollutants in Lithuania

In Lithuania persistent organic pollutants are managed integrally, their management, monitoring in the environment and human body is being performed by implementing the requirements of legal acts of the European Union and the Republic of Lithuania. In order to achieve more efficient persistent organic pollutant management through the whole their life cycle and appropriate implementation of European Union and national legislation, there is a need to raise the competence of the state officials and officers of controlling (enforcement) institutions acting in chemical substances management area and to raise awareness of industrial companies' employees on issues related to proper disposal of persistent organic pollutants.

It should be noted, that the Stockholm Convention requirements related to new persistent organic pollutants are being implemented by directly applicable the European Union and relevant national legal acts. Due to the implementation of legislation on prohibition and restriction of production, marketing and use of persistent organic substances, the quantities of persistent organic pollutants in articles used are declining. The bulk of articles containing persistent organic pollutants in the past have already have become (or are becoming) waste. However, data that are needed for the effectiveness evaluation of the implementation of the legislation on the new persistent organic pollutants containing articles and their waste management in Lithuania there are still scare. Therefore due to the lack of representative data on distribution of such chemicals as PFOS, POPs-BDE, HBCDD in articles (in accordance with the exemptions provided for in the Stockholm Convention and Regulation (EC) No 850/2004), their waste and waste streams containing them – a more detailed analysis of the quantity of those chemicals (persistent organic pollutants) in waste should be carried out (in particular in domestic and (or) construction waste).

The detailed information about persistent organic substances in Lithuania and their amounts is provided in Section 2.3 of this document.

The Action Programme of the National Implementation Plan on Persistent Organic Pollutants (POPs) for 2017-2025 is provided in Section 3.3.8 of this document.

[1] Resolution of the Government of the Republic of Lithuania No 1076 of 3 October 2014 'On the Amendment of the Resolution of Government of the Republic of Lithuania No 239 of 3 March 2005 'On Implementation of 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'.

1. Introduction

1.1. Updated National Implementation Plan on persistent organic pollutants

1.1.1. Objective of the National Implementation Plan

The Stockholm Convention on Persistent Organic Pollutants (hereinafter – the Stockholm Convention, the Convention) was adopted on 22 May 2001 and entered into force on 17 May 2004. The objective of the Convention is to protect human health and the environment from persistent organic pollutants (hereinafter – POPs, POP substances). In pursuance thereof, Parties to the Convention are required to take measures to eliminate or minimise the releases of POPs into the environment. The obligations of the Stockholm Convention are transposed into the European Union law by the Regulation (EC) No 850/2004 of the European Parliament and of the Council on persistent organic pollutants and amending Directive 79/117/EEC (OJ L 15, 2004, p. 465), as last amended by the Commission Regulation (EU) 2016/460, amending Annex IV and V to Regulation (EC) No 850/2004 of the European Parliament and of the Council on persistent organic pollutants (OJ L 80, 2016 p.17) (hereinafter – Regulation (EC) No 850/2004). Regulation (EC) No 850/2004 is directly applicable in Lithuania.

Lithuania ratified the Stockholm Convention on 10 October 2006 by the Law on Ratification of the Stockholm Convention on Persistent Organic Pollutants (POPs) (No X-842 adopted by the Parliament of the Republic of Lithuania on 10 October 2006).

The Stockholm Convention initially listed 12 POPs (hereinafter – the initial POPs, initial POP substances). Within international cooperation, new chemical substances meeting the criteria of persistent organic pollutants are identified and gradually added to the lists of controlled POPs (Annexes to the Stockholm Convention) by decision of the Conference of the Parties to the Convention (hereinafter – the COP). At the 4th, 5th, 6th, 7th and 8th meetings of the COP (in 2009, 2011, 2013, 2015 and 2017), there were decisions adopted to list 17 new chemical substances (hereinafter – the new POPs, new POP substances) as POPs. The list of chemicals regulated by the Stockholm Convention currently includes 29 persistent organic chemicals and chemical groups.

The first Lithuanian National Implementation Plan (hereinafter – NIP) was developed in 2006 (approved by Resolution No 970 of the Government of the Republic of Lithuania on 4 October 2006) and submitted to the Secretariat of the Stockholm Convention on 6 April 2007. Pursuing the general Resolution of the Government of the Republic of Lithuania in 2010, the NIP was re-adopted by Order of the Minister of Environment of 23 December 2010 No D1-1034 and titled as Programme of Management of Persistent Organic Pollutants for 2010–2015' (hereinafter – NIP for 2010–2015).

The first NIP describes the situation of the management of 12 initial POPs regulated under the Stockholm Convention and Regulation (EC) No 850/2004 in Lithuania, provides for the measures to reduce POPs releases into the environment covering whole their life cycle.

To assure that Lithuania fulfils international obligations assumed upon ratification of the Stockholm Convention and properly implements Regulation (EC) No 850/2004, it should update the National Implementation Plan (hereinafter – the

updated NIP) in line with decisions adopted by the COPs. With this purpose, this document has been prepared. The scope of updated NIP is 23 POPs regulated under Stockholm Convention and Regulation (EC) No 850/2004 (including new POPs substances listed in the Stockholm Convention by Decisions of the COP adopted in 2009, 2011, and 2013) through whole their life cycle.

1.1.2. Structure of the National Implementation Plan

The updated NIP consists of an introduction, analysis of the current situation, POPs management strategy, and the Action Programme. The Introduction briefly presents the legal background of the NIP and its' objectives. The Section analysing the current situation provides brief information about Lithuania and describes the present situation regarding POPs: an analysis of the results of primary inventory of POP substances. The third Section provides the POPs management strategy and recommendations on measures necessary to implement it.

1.2. The Stockholm Convention

The Stockholm Convention on POPs is a global treaty to protect human health and the environment from POPs. The POPs have highly harmful impact to human health or on the environment since these chemical substances are persistent (degrade in the environment for long periods), accumulate in the fatty tissue of living organisms, and become widely distributed geographically. Since POPs "migrate" long distances from the original source of pollution, elimination of these substances from the environment requires countries to act together and apply equivalent safeguard measures. In view of this global problem, on 22 May 2001 the United Nations Environment Programme (UNEP) Governing Council initiated the adoption and signing of the Stockholm Convention in Stockholm. Up to date, 181 countries have ratified, accepted, approved the Stockholm Convention or acceded to this Convention.

The objective of the Stockholm Convention is to protect human health and the environment from POPs. In pursuance thereof, Parties to the Convention are required to take measures to prohibit/restrict the production, use, import and export of POPs and to eliminate or minimise the release of POPs into the environment. The Stockholm Convention also defines measures for POPs disposal in environmentally sound manner.

The Stockholm Convention also assists the Parties in shifting to safer alternative chemical substances and encourages cooperation for a safer future.

The POPs that are regulated by the Stockholm Convention are listed in the following three annexes:

Annex A – list of substances for which the production and use shall be prohibited;

The import and export of chemicals listed in Annex A can take place under specific restrictive conditions, as set out in paragraph 2 of Article 3 of the Stockholm Convention.

Annex B – list of substances that are subject to restrictions on their production and use;

The import and export of chemicals listed in Annex B can take place under specific restrictive conditions, as set out in paragraph 2 of Article 3 of the Stockholm Convention.

Annex C – list of substances released from anthropogenic sources (unintentional production), the quantity of which is subject to continuous minimization and, where feasible, complete elimination.

The production and use of chemical substances listed in Annexes to the Stockholm Convention is prohibited, but specific exemptions are provided in some cases. The use and production of POPs substances listed in Annexes A and B is allowed, provided that they are subject to specific exemptions and/or Acceptable uses/acceptable purposes and that the Parties to the Stockholm Convention have registered this use or production in the Register of Specific Exemptions or the Register of Acceptable Purposes) of the Stockholm Convention. All registrations of specific exemptions expire five years after the date of entry into force of the Stockholm Convention with respect to a particular chemical substance and may be extended for a next period of 5 years; when there are no longer any Parties that have registered a particular type of specific exemption, no new registrations may be made with respect to it.

The list of substances regulated by the Stockholm Convention (as listed in the Annexes by the COP-7 in 2015) and their description, as well as applicable specific exemptions and acceptable purposes are described in Table 1.

Table 1. Description of persistent organic chemical substances listed in the Stockholm Convention (as listed in the Annexes by the COP-7 in 2015)

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
Annex A - ELIMINATION[2]									
1.	Aldrin			309-00-2	Pesticide	Insecticide	Aldrin is a broad-spectrum insecticide and was mostly used to kill pests of cereal crops. In plants and animal organisms, aldrin rapidly converts into dieldrin, therefore, is rarely detected in animals and plants. Aldrin may enter the human body through the respiratory tract, skin, or with contaminated food.	None	None

[2] The production and use of POPs listed in Annex A is prohibited except cases when certain specific exemptions and/or Acceptable uses/acceptable purposes are set and the Parties to the Stockholm Convention have registered this use or production in the Register of Specific Exemptions or the Register of Acceptable Purposes of the Stockholm Convention. All registrations of specific exemptions expire five years after the date of entry into force of the Stockholm Convention with respect to a particular chemical substance and may be extended for a next period of 5 years; when there are no longer any Parties that have registered a particular type of specific exemption, no new registrations may be made with respect to it.

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
2.	Chlordane			57-74-9	Pesticide	Insecticide	Chlordane is an insecticide used to control ants and termites. It was widely used as termiticide in construction and road building activities. Chlordane is characterized with teratogenic impact on mammals and is classified as possible human carcinogen. Chlordane is a pathogen causing bronchitis and migraine.	None	None
3.	Chlordecone		Kepone®, GC-1189	143-50-0	Pesticide	Pesticide	Chlordecone is a synthetic chlorinated organic compound, which was mainly used as an agricultural pesticide. It was first produced in 1951 and introduced commercially in 1958. It is classified as a possible human carcinogen and is very toxic to aquatic organisms.	None	None

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
4.	Dieldrin			60-57-1	Pesticide	Insecticide	Dieldrin is a stereoisomer of endrin. Pure dieldrin is in the form of white powder and it is odourless or has a slight smell. Dieldrin is slightly soluble in water. It was widely used in 1950-1970 to kill cereal and cotton pest. Dieldrin was also used in veterinary preparations, chemical wood and wool treatment. Dieldrin is associated with cancer, central nervous system disorders.	None	None
5.	Endosulfan		Technical endosulfan (CAS No 115-29-7) is a mixture of alpha endosulfan and beta endosulfan along with small amounts of impurities	115-29-7	Pesticide	Insecticide	Endosulfan is an insecticide that has been used since the 1950s to control crop pests, tsetse flies and ectoparasites of cattle and as a wood preservative. As a broad-spectrum insecticide, endosulfan is currently used to control a wide range of pests on a variety of crops including coffee, cotton, rice, sorghum and soy. Endosulfan is persistent in the atmosphere, sediments, and water. Endosulfan bioaccumulates and has the potential for long-range transport. It has been detected in air, sediments, water and in living	By Decision of the COP to the Stockholm Convention SC-5/3, the production is allowed for the Parties listed in the Register of Specific Exemptions and/or for use on crop-pest complexes as listed in accordance with the provisions of Part VI of Annex A.	None
	Alpha endosulfan			959-98-8					
	Beta endosulfan			33213-65-9					

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
							organisms in remote areas, such as the Arctic, that are distant from areas of intensive use. Endosulfan is toxic to humans and has been shown to have adverse effects on a wide range of aquatic and terrestrial organisms. Exposure to endosulfan has been linked to congenital physical disorders, mental retardations and deaths in farm workers and villagers in developing countries in Africa, Asia and Latin America.		
6.	Endrin			72-20-8	Pesticide	Insecticide	Endrin was used as an insecticide to control grain crop and cotton pest. Animal tests have shown that endrin adversely affects the nervous system, causes birth defects. High doses of this substance can cause convulsions and death within few minutes or hours. Symptoms of endrin intoxication are these: headache, dizziness, nausea, and convulsions. Endrin is extremely toxic to fish.	None	None

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
7.	Hexachloroben-zene	HCB		118-74-1	Pesticide	Fungicide	HCB, as a pesticide, was widely used until 1965. HCB was used as an intermediate in processes of industrial production. This substance was also used in the production of rubber, aluminium, dyes, other pesticides and wood preservatives. HCB is also produced unintentionally and is emitted to the environment as a product of incomplete combustion of organic materials. When people ate HCB-treated seed grain, they developed a variety of symptoms, including photosensitive skin lesions, colic, and debilitation. Mothers also passed HCB to their infants through the placenta and through breast milk. In high doses, HCB is lethal to some animals and, at lower levels, adversely affects their reproductive system. HCB has been found in different types of food.	None	None
					Industrial chemical	Intermediate in the production processes		None	None

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
8.	Alpha hexachlorocyclohexane	α-HCH		319-84-6	Pesticide	Insecticide	α-HCH was used as an insecticide. This chemical is highly persistent in water in colder regions and may bioaccumulate and biomagnify in biota and arctic food webs. It is subject to long-range transport. Is classified as potentially carcinogenic to humans.	None	None
9.	Beta hexachlorocyclohexane	β-HCH		319-85-7	Pesticide	Insecticide	β-HCH was used as an insecticide. This chemical is highly persistent in water in colder regions and may bioaccumulate and biomagnify in biota and arctic food webs. It is subject to long-range transport, is classified as potentially carcinogenic to humans.	None	None

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
10.	Heptachlor			76-44-8	Pesticide	Insecticide	Heptachlor was used to control termites and other pests. Heptachlor causes hyperactivity and affects the liver. This chemical also has teratogenic effect on mammals and is classified as a possible human carcinogen.	None	None
11.	Lindane			58-89-9	Pesticide	Insecticide	Lindane is the common name for the gamma isomer of HCH. Lindane has been used as a broad-spectrum insecticide for seed and soil treatment, foliar applications, tree and wood treatment and as a protection against ectoparasites in both veterinary and human applications. Lindane is persistent, bioaccumulates easily in the food chain and bioconcentrates rapidly. There is evidence for long-range transport and toxic effects (immunotoxic, reproductive and developmental effects) in laboratory animals and aquatic organisms.	By Decision of the COP SC-4/15, lindane is allowed as an alternative human health pharmaceutical to control head lice and scabies.	

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
12.	Mirex			2385-85-5	Pesticide	Insecticide	It was used to combat ants and other pests. Animal tests have shown that mirex may negatively affect the development of the foetus in the organism, as well as the liver and the immune system.	None	None
13.	Pentachlorobenzene	PeCB		608-93-5	Pesticide	Fungicide	PeCB was used in PCB products, in dyestuff carriers, as a fungicide, as a flame retardant and as a chemical intermediate, e. g. previously used for the production of quintozene. PeCB might still be used as an intermediate. PeCB is also present as impurities in products such as solvents or pesticides. PeCB is persistent in the environment, highly bioaccumulative and has a potential for long-range environmental transport. PeCB is moderately toxic to humans and very toxic to aquatic organisms.	None	None
					Industrial chemical	Flame retardant, intermediate, dye carrier			
14.	Toxaphene			8001-35-2	Pesticide	Insecticide	Toxaphene is used for crop protection against locusts, larvae and pet protection against small parasites. Toxaphene is listed as teratogenic to mammals and possible human carcinogen.	None	None

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
16.	Hexabromocyclododecane	HBCDD	Main HBCDD diastereomers	25637-99-4	Industrial chemical	Flame retardant	The chemical is used as flame retardant additive, providing fire protection to vehicles, buildings or articles. The main uses of the substance globally are in expanded polystyrene (EPS) and extruded polystyrene (XPS) foam insulation while the use in textile applications and electric/electronic appliances is smaller. HBCDD has a strong potential to bioaccumulate and magnify. It is persistent in the environment, and has a potential for long-range environmental transport. It is very toxic to aquatic organisms. Though information on the human toxicity of HBCD is to a great extent lacking, vulnerable groups could be at risk – there are the observed adverse effects on the endocrine system, the nervous system and developmental toxicity.	By Decision of the COP SC-6/13, production is allowed by the Parties listed in the Register of Specific Exemptions; the use only of EPS and XPS polystyrene in buildings in accordance with the provisions of part VII of Annex A and by ensuring that Parties will take the measures that HBCDD will be easily identifiable by labelling or other means throughout its life cycle.	None
	1,2,5,6,9,10-hexabromocyclododecane	HBCDD		3194-55-6					
	alpha hexabromocyclododecane	α-HBCDD		134237-50-6					
	beta hexabromocyclododecane	β-HBCDD		134237-51-7					
	gamma hexabromocyclododecane	γ-HBCDD		134237-52-8					
17.	Polychlorinated biphenyls	PCB		1336-36-3	Industrial chemical	Dielectric and heat exchange fluids in closed, semi-closed and open systems.	PCB is a group of synthetic chlorinated carbohydrates, which consists of 209 related compounds. PCBs are used in open (immersion oil of microscopes, brake system, cutting, lubricating oil; protective	In accordance with Part II of Annex A of the Stockholm Convention each Party shall take actions with regard to	None

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
							surface coatings: paints), closed (electrical transformers; electric capacitors: electric motors, electromagnets), and semi-closed (inorganic and organic chemistry, plastics, synthetic materials and oil treatment industry and others) applications. PCBs are highly soluble in organic solvents and fats, so, once in the human or animal body, it accumulates in the fat tissue. Concentrations of PCB contaminants in the food chain may increase several hundred times. PCBs are toxic to fish, killing them at higher doses and causing spawning failures at lower doses. Research also links PCBs to reproductive failure and suppression of the immune system in various wild animals. Of the 209 different types of PCBs, 13 exhibit a dioxin-like toxicity. Their persistence in the environment corresponds to the degree of chlorination, and half-lives can vary from 10 days to one-and-a-	the elimination of the use of PCB in equipment (e.g. transformers, capacitors or other receptacles containing liquid stocks) by 2025; promote the measures to reduce exposures and risk to control the use of PCB; make determined efforts designed to lead to environmentally sound waste management of liquids containing PCB and equipment contaminated with PCB having a PCB content above 0.005%, as soon as possible but no later than 2028.	

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
							half years. Due to persistency PCBs negatively affect unborn children. PCBs also suppress the human immune system and are listed as probable human carcinogens.		
18.	Hexabromobiphenyl		FireMaster BP-6, FireMaster FF-1	36355-01-8	Industrial chemical	Flame retardant	Hexabrombiphenyl was mainly used as flame retardant in machine housings constructing business and in industrial (e.g. motor housing), and electrical (e. g. radio and TV parts) products: as a fire retardant in coatings and lacquers, and in polyurethane foam for auto upholstery. Hexabromobiphenyl is highly persistent in the environment, highly bioaccumulative and has a strong possibility for long-range environmental transport. The chemical compound is classified as a possible human carcinogen and has other chronic toxic effects.	None	None
19.	2,2',4,4',5,5' hexabromodiphenyl ether	BDE-153, hexa-BDE	Octabromodiphenyl ether compound (octa-BDE)	68631-49-2	Industrial chemical	Flame retardant	Hexa-BDE and hepta-BDE are the main components of commercial octa-BDE. Commercial mixture of	In accordance with Decision of the COP SC-4/14 and Part IV	None

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
	2,2',4,4',5,6'-hexabromodiphenyl ether	BDE-154, hexa-BDE		207122-15-4	Industrial chemical		octa-BDE is highly persistent, has a high potential for bioaccumulation and food-web biomagnification, as well as for long-range transport. 70% of octa-BDE is used in acrylonitrile-butadiene-styrene polymer plastic products. Small amounts are added to high-impact polystyrene, polybutene terephthalate, and polyamide plastics.	of Annex A a Party may allow recycling of articles that contain or may contain hexa-BDE and hepta-BDE, and the use and final disposal of articles manufactured from recycled materials that contain or may contain these substances.	
	2,2',3,3',4,5',6 heptabromodiphenyl ether	BDE-175, hepta-BDE		446255-22-7	Industrial chemical				
	2,2',3,4,4',5',6 heptabromodiphenyl ether	BDE-183, hepta-BDE		207122-16-5	Industrial chemical				
20.	Tetrabromodiphenyl ether	BDE-47, tetra-BDE	Commercial mixture of penta-BDE	5436-43-1	Industrial chemical	Flame retardant	Tetra-BDE and penta-BDE form the commercial mixture of penta-BDE which is highly persistent in the environment, highly bioaccumulative and has a high potential for long-range environmental transport. Chemicals have been detected in humans in all regions. There is evidence of its potential for toxic effects in wildlife, including mammals.	In accordance with Decision of the COP SC-4/14 and Part IV of Annex A a Party may allow recycling of articles that contain or may contain tetra-BDE and penta-BDE, and the use and final disposal of articles manufactured from recycled materials that contain or may contain these substances.	None
	Pentabromodiphenyl ether	BDE-99, penta-BDE		60348-60-9	Industrial chemical	Flame retardant			

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
Annex B - RESTRICTION[3]									
21.	Dichlorodiphenyl trichloroethane	DDT		50-29-3	Pesticide	Insecticide	DDT is the first synthetic insecticide. This substance was often used in fighting mosquitoes and other insects – carriers of malaria. DDT is highly persistent, tends to accumulate in the environment. DDT may negatively affect the human nervous system, is associated with cardiac and vascular diseases, liver cancer. DDT weakens the immune system and increases the risk of breast cancer. DDT is associated with reproductive disorders in fish and birds.	None	For disease vector control in tropical regions, as stated in Part II of Annex B of the Stockholm Convention for for Parties that have notified the Secretariat of their intention to produce and/or use it.

[3] The use and production of POPs listed in the Annex B are restricted except specific exemptions and/or acceptable purposes are set and the Parties to the Stockholm Convention have registered in the Register of Specific Exemptions or the Register of Acceptable Purposes of the Stockholm Convention. All registrations of specific exemptions expire five years after the date of entry into force of the Stockholm Convention with respect to a particular chemical and may be extended for a next period of 5 years; when there are no longer any Parties registered for a particular type of specific exemption, no new registrations may be made with respect to it.

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
22.	Perfluorooctane sulfonic acid and its salts	PFOS		1763-23-1	Industrial chemical		PFOS is both intentionally produced and an unintended degradation product of related anthropogenic chemicals. The current intentional use of PFOS is widespread and includes: electric and electronic parts, firefighting foam, photo imaging, hydraulic fluids and textiles. PFOS is still produced in several countries. PFOS is extremely persistent and has a substantial potential for bioaccumulating and biomagnifying properties, although it does not follow the classic pattern of other POPs by partitioning into fatty tissues but instead it binds to proteins in the blood and the liver. PFOS has a capacity to undergo long-range transport and also fulfills the toxicity criteria of the Stockholm Convention.	In accordance with Decision of the COP SC-4/17, the production and/or use is allowed for Parties as listed in the Register of Specific Exemptions and/or for the certain specific uses.	By Decision of the COP SC-4/17, Parties may produce or use PFOSs for acceptable purposes in accordance with Part III of Annex B.
	Perfluorooctane sulfonyl fluoride	PFOS-F		307-35-7					

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
Annex C - UNINTENTIONAL PRODUCTION[4]									
23.	Polychlorinated dibenzofurans and dibenzo-p-dioxins	PCDD/PCDF			-	-	PCDD/PCDF are are by-products of industrial or combustion processes. Favourable conditions for formation of dioxins/furans are presence of free chlorine and organic carbon in combusted materials, incomplete combustion, and ultraviolet rays. PCDDs/PCDFs have been associated with a number of adverse effects in humans, including immune and enzyme disorders and chloracne, and they are classified as possible human carcinogens and having teratogenic effects (birth defects are possible), adverse effect to reproductive system.	Not applicable	Not applicable
24.	Pentachlorobenzene	PeCB		608-93-5	–	–	PeCB is produced unintentionally during combustion, thermal and industrial processes. PeCB is persistent in the environment,	Not applicable	Not applicable

[4] Annex C of the Stockholm Convention lists chemicals produced and released unintentionally from anthropogenic sources. The quantity of the chemicals listed in Annex C is subject to reduction and, where feasible, ultimate elimination.

No	Name of POPs according to IUPAC	Abbreviation	Industrial name of substance	CAS No.	Area of POP use	POPs function	POPs description	Specific exemption	Acceptable purpose
							highly bioaccumulative and has a potential for long-range environmental transport. It is moderately toxic to humans and very toxic to aquatic organisms. Information on use and properties of PeCB is provided in Row No 13 of this table.		
25.	Hexachlorobenzene	HCB		118-74-1	–	–	HCB is produced unintentionally and emitted to the environment as a product of incomplete combustion of organic materials and binding with chlorine during thermal processes. Information on use and properties of HCB is provided in Row No 7 of this table.	Not applicable	Not applicable
26.	Polychlorinated biphenyls	PCB		1336-36-3	–	–	PCB is a group of synthetic chlorinated carbohydrates, which consists of 209 related compounds. Information on use and the impact to environment and human health of PCBs is provided in Row No 17 of this table.	Not applicable	Not applicable

1.3. POPs Regulated by the Stockholm Convention, Protocol of the Convention on Long-range Transboundary Air Pollution, and Regulation (EC) No 850/2004

Obligations under the Stockholm Convention are transposed into the European Union law by the Regulation (EC) No 850/2004. **Regulation (EC) No 850/2004** lists the controlled POPs in the following Annexes:

Annex I – list of substances subject to prohibitions on production, placing on the market and use;

Annex II – list of substances subject to restrictions on production, placing on the market and use;

Annex III – list of substances subject to release reduction provisions.

Handling of POPs that are treated as long-range air pollutants is also regulated by the Convention of Long-Range Transboundary Air Pollution, which was signed in 1979 (hereinafter – the CLRTAP). Lithuania has been a party to the Convention of Long-range Transboundary Air Pollution (CLRTAP) since 1993, and its 1998 Protocol on Long-range Transboundary Air Pollution on Persistent Organic Pollutants since 2004.

Requirements of the CLRTAP and its supplementing protocols (including Protocol on POPs) have also been transposed to the legal framework of the European Union (EU) by Regulation (EC) No 850/2004.

CLRTAP POPs Protocol lists controlled chemicals in the following three annexes:

Annex I – substances scheduled for elimination of production and use;

Annex II – substances scheduled for restrictions on use;

Annex III – substances whose emissions should be minimized by using best available techniques (hereinafter - BAT).

Part of the POPs referred above is regulated by the CLRTAP and Regulation (EC) No 850/2004, but are not covered by Annexes of the Stockholm Convention. Information on the requirements for POPs under mentioned legislation is summarised in Table 2.

Table 2. The list of POPs controlled by the Stockholm Convention, CLRTAP and Regulation (EC) No 850/2004

Title of POPs according to IUPAC	POP's CAS number	Annex of the Stockholm Convention	Annex of the CLRTAP	Annex of the Regulation (EC) No 850/2004
Initial POPs				
Aldrin	309-00-2	A	I	I
Chlordane	57-74-9	A	I	I
DDT	50-29-3	B	I, II	I
Dieldrin	60-57-1	A	I	I
Endrin	72-20-8	A	I	I
Heptachlor	76-44-8	A	I	I
Mirex	2385-85-5	A	I	I
Toxaphene	8001-35-2	A	I	I
Polychlorinated biphenyls (PCB)	1336-36-3 etc.	A, C	I, II, III	I, III
Hexachlorobenzene (HCB)	118-74-1	A, C	I, III	I,III
Polychlorinated dibenzo-p-dioxins	-	C	III	III

Title of POPs according to IUPAC	POP's CAS number	Annex of the Stockholm Convention	Annex of the CLRTAP	Annex of the Regulation (EC) No 850/2004
(PCDD)				
Polychlorinated dibenzofurans (PCDF)	-	C	III	III
New POPs				
Chlordecone	143-50-0	A	I	-
Endosulfan and its related isomers	115-29-7; 959-98-8; 33213-65-9	A	-	I
Alpha hexachlorocyclohexane	319-84-6	A	I	I
Beta hexachlorocyclohexane	319-85-7	A	I	I
Lindane	58-89-9	A	I	I
Hexabromobiphenyl	36355-01-8	A	I	I
Hexabromodiphenyl ether and heptabromodiphenyl ether	68631-49-2; 207122-15-4; 446255-22-7; 207122-16-5 etc.	A	I	I
Pentachlorobenzene (PeCB)	608-93-5	A, C	-	-
Perfluorooctane sulfonic acid, its salts (PFOS) and perfluorooctane sulfonyl fluoride (PFOS-F)	1763-23-1; 307-35-7 etc.	B	I,II	I (PFOS and its salts only)
Tetrabromodiphenyl ether and pentabromodiphenyl ether	5436-43-1; 60348-60-9 etc.	A	I	I
Hexabromcyclododecane (HBCDD)	25637-99-4 etc.	A	-	I
Short-chain chlorinated paraffins	85535-84-8 etc	A	I, II	I
Hexachlorobutadiene	87-68-3	A	I	I
Pentachlorophenol, its salts and esters	87-86-5, 131-52-2, 27735-64-4, 3772-94-9, 1825-21-4	A	-	-
Decabromodiphenyl ether (BDE-209) present in commercial decabromodiphenyl ether	1163-19-5	A	-	-
Polychlorinated naphthalenes	70776-03-3 etc.	A,C	I	I
Polyaromatic hydrocarbons (PAH)	-	-	III	III

1.3.1. The initial POPs

Upon the adoption of the Stockholm Convention in 2001, its scope of application included 12 POPs, most of them – pesticides:

- ***Aldrin*** is a broad-spectrum insecticide and was mostly used to kill pests of cereal crops. In plants and animal organisms, aldrin rapidly converts into dieldrin, therefore, it is rarely detected in animals and plants. Aldrin may enter the human body through the respiratory tract, skin, or with contaminated food.
- ***Chlordane*** is an insecticide used to control ants and termites. It was widely used as termiticide in construction and road building activities. Chlordane is characterized with teratogenic impact on mammals and is classified as possible human carcinogen. Chlordane is a pathogen causing bronchitis and migraine.

- ***Dieldrin*** is a stereoisomer of endrin. Pure dieldrin is in the form of white powder and it is odourless or has a slight smell. Dieldrin is slightly soluble in water. It was widely used in 1950-1970 to kill cereal and cotton pest. Dieldrin was also used in veterinary preparations, chemical wood and wool treatment. Dieldrin is associated with cancers, central nervous system disorders.
- ***Endrin*** was used as an insecticide to control grain crop and cotton pest. Animal tests have shown that endrin adversely affects the nervous system, causes birth defects. High doses of this substance can cause convulsions and death within few minutes or hours. Symptoms of endrin intoxication are these: headache, dizziness, nausea,and convulsions. Endrin is extremely toxic to fish.
- ***Heptachlor*** was used to control termites and other pests. Heptachlor causes hyperactivity and affects the liver This chemical also has teratogenic effect on mammals and is classified as a possible human carcinogen. Heptachlor, formed as a UV metabolite, is much more harmful than heptachlor itself.
- ***Mirex*** was used to combat ants and other pests. Animal tests have shown that mirex may negatively affect the development of the foetus in the organism, as well as the liver and the immune system.
- ***Dichlorodiphenyltrichloroethane*** (hereinafter **– *DDT***) is the first synthetic insecticide. This substance was often used in fighting mosquitoes and other insects – carriers of malaria. DDT is highly persistent, tends to accumulate in the environment. DDT may negatively affect the human nervous system, is associated with cardiac and vascular diseases, liver cancer. DDT weakens the immune system and increases the risk of breast cancer. DDT is associated with reproductive disorders in fish and birds.
- ***Toxaphene*** is used for crop protection against locusts, larvae and pet protection against small parasites. Toxaphene is listed as teratogenic to mammals and possible human carcinogen.
- ***Polychlorinated biphenyls*** (hereinafter - **PCB**) belong to a group of synthetic chlorinated carbohydrates, which consists of 209 related compounds. PCB is highly soluble in organic solvents and fats, so, once in the human or animal body, it accumulates in the fat tissue. Concentrations of PCB contaminants in the food chain may increase several hundred times. PCBs impact is related with human body weight decline, nausea, sickness, icterus, stomach ache, headache, dizziness and oedema. Individuals with higher doses of PCBs detected in their organisms often ailed with liver cirrhosis. PCBs also suppress the human immune system and are listed as probable human carcinogens. PCBs were used in open (e.g., paints), closed (e.g., electric transformers) and semi-closed applications (e.g., a heat carrying fluid system).
- ***Hexachlorobenzene*** (hereinafter – **HCB),** as a pesticide, was widely used until 1965. HCB was used as an intermediate in processes of industrial production. This substance was also used in the production of rubber, aluminium, dyes, other pesticides and wood preservatives. HCB is also produced unintentionally and is emitted to the environment as a product of incomplete combustion of organic materials and binding with chlorine during thermal processes.
- ***Dioxins and furans*** (hereinafter - **PCDD/PCDF**) are by-products of industrial or combustion processes. Favourable conditions for formation of dioxins/furans are presence of free chlorine and organic carbon in combusted materials, incomplete combustion, and ultraviolet rays. PCDDs/PCDFs have been associated with a number of adverse effects in humans, including immune and enzyme disorders and chloracne, and they are classified as possible human carcinogens and having teratogenic effects (birth defects are possible), adverse effect to reproductive system .

1.3.2. The new POPs, listed in the Annexes to the Stockholm Convention in 2009, 2011 and 2013

At its fourth meeting held in 2009, the COP added 9 new chemicals to the lists of POPs regulated by the Stockholm Convention:

- ***Chlordecone*** is a synthetic chlorinated organic compound, which was mainly used as an agricultural pesticide. It was first produced in 1951 and commercially introduced in 1958. It is classified as a possible human carcinogen and it is very toxic to aquatic organisms.
- ***Alpha hexachlorocyclohexane*** (hereinafter – ***alpha HCH***) was used as an insecticide to kill pest. This chemical is highly persistent in water in colder regions and may bioaccumulate and biomagnify in biota and arctic food webs. It is subject to long-range transport, is classified as potentially carcinogenic to humans.
- ***Beta hexachlorocyclohexane*** (hereinafter – ***beta HCH***) was used as an insecticide to kill pest. This chemical is highly persistent in water in colder regions and may bioaccumulate and biomagnify in biota and arctic food webs. It is subject to long-range transport, is classified as potentially carcinogenic to humans.
- ***Lindane*** is the common name for the gamma isomer of hexachlorocyclohexane (hereinafter – ***HCH***). Technical HCH is an isomeric mixture that contains mainly five forms, namely alpha-, beta-, gamma-, delta- and epsilon-HCH. Lindane has been used as a broad-spectrum insecticide for seed and soil treatment, foliar applications, tree and wood treatment and as a protection against ectoparasites in both veterinary and human applications. The production of lindane has decreased rapidly in the last few years and only few countries are still known to produce lindane. Lindane is persistent, bioaccumulates easily in the food chain and bioconcentrates rapidly. There is evidence for long-range transport and toxic effects (immunotoxic, reproductive and developmental effects) in laboratory animals and aquatic organisms.
- ***Pentachlorobenzene*** (hereinafter – ***PeCB***) belongs to a group of chlorobenzenes that are characterized by a benzene ring in which the hydrogen atoms are substituted by one or more chlorines. PeCB was used in PCB products, in dyestuff carriers, as a fungicide, a flame retardant and as a chemical intermediate, e.g., previously for the production of quintozene. PeCB might still be used as an intermediate. PeCB is also produced unintentionally during combustion, thermal and industrial processes. It is also present as impurity in products such as solvents or pesticides. PeCB is persistent in the environment, highly bioaccumulative and has a potential for long-range environmental transport. PeCB is moderately toxic to humans and very toxic to aquatic organisms.
- ***Hexabromobiphenyl*** is an industrial chemical that has been used as a flame retardant, mainly in the 1970s. Hexabromobiphenyl is highly persistent in the environment, has a high potential for bioaccumulation and food-web biomagnification, as well as for long-range environmental transport. The chemical compound is classified as a possible human carcinogen and has other chronic toxic effects.
- ***Hexabromodiphenyl ether*** (thereinafter – ***hexa-BDE***) and ***heptabromodiphenyl ether*** (hereinafter – ***hepta-BDE***) are the main components of commercial octabromodiphenyl ether (hereinafter –***octa-BDE***). Commercial mixture of octa-BDE is highly persistent, has a high potential for bioaccumulation and food-web biomagnification, as well as for long-range transport. 70% of octaBDE is used in ABS (acrylonitrile-butadiene-styrene polymer) plastic products. Small amounts are

added to HIPS (high-impact polystyrene), PBT (polybutene terephthalate), and polyamide plastics.

- ***Tetrabromodiphenyl ether*** (hereinafter – ***tetra-BDE***) and ***pentabromodiphenyl ether*** (thereinafter – ***penta-BDE***) form the commercial mixture of penta-BDE which is highly persistent in the environment, bioaccumulative and has a high potential for long-range environmental transport. These chemicals have been detected in humans in all regions. There is evidence of its potential for toxic effects in wildlife, including mammals.
- ***Perfluorooctane sulfonic acid, its salts/derrivatives*** (***PFOS***) and ***perfluorooctane sulfonyl fluoride*** (***PFOS-F***) (here collectively designated ***PFOS***) are extremely persistent and has a substantial potential for bioaccumulation and biomagnifying properties, although it does not follow the classic pattern of other POPs by partitioning into fatty tissues but instead it binds to proteins in the blood and the liver. PFOS has a capacity to undergo long-range transport and also fulfills the toxicity criteria of the Stockholm Convention. PFOS is both intentionally produced and an unintended degradation product of related anthropogenic chemicals. The current intentional use of PFOS is widespread and includes: electric and electronic parts, firefighting foam, photo imaging, hydraulic fluids and textiles. PFOS is still produced in several countries.

At its 5th meeting held in 2011, the COP listed ***endosulfan*** in the Annex A of the Stockholm Convention. Endosulfan is an insecticide that has been used since the 1950s to control crop pests, tsetse flies and ectoparasites of cattle and as a wood preservative. As a broad-spectrum insecticide, endosulfan is currently used to control a wide range of pests on a variety of crops including coffee, cotton, rice, sorghum and soy. Endosulfan is persistent in the atmosphere, sediments, and water. Endosulfan bioaccumulates and has the potential for long-range transport. It has been detected in air, sediments, water and in living organisms in remote areas, such as the Arctic, that are distant from areas of intensive use. Endosulfan is toxic to humans and has been shown to have adverse effects on a wide range of aquatic and terrestrial organisms. Exposure to endosulfan has been linked to congenital physical disorders, mental retardations and deaths in farm workers and villagers in developing countries in Africa, Asia and Latin America.

At its 6th meeting held in 2013, the COP has listed ***hexabromocyclododecane*** (thereinafter – ***HBCDD***) in the Annex A to the Stockholm Convention. This chemical is used a flame retardant additive, providing fire protection during the service life of vehicles, buildings or articles, as well as protection while stored. The main uses of the substance globally are in expanded and extruded polystyrene foam insulation while the use in textile applications and electric and electronic appliances is smaller. HBCDD has a strong potential to bioaccumulate and magnify. It is persistent in the environment, and has a potential for long-range environmental transport. It is very toxic to aquatic organisms. Though information on the human toxicity of HBCDD is to a great extent lacking, vulnerable groups could be at risk – there are the observed adverse effects on the endocrine system, the nervous system and developmental toxicity.

2. Analysis of the Current Situation

2.1. General information about Lithuania

2.1.1. Geographical location and population

Lithuania is a small country, situated in Central Europe, by the Baltic Sea, and often is called the land of plains, lakes, and rivers. Lithuania covers an area of 65 302 km^2. The country borders with five neighbouring countries (Latvia, Belarus, Poland, and Russia). The Lithuania‘s economic zone in the Baltic Sea reaches the waters of Sweden. The capital of the country is Vilnius.

The territory of Lithuania is divided into 60 municipalities, which consist of over 564 elderships. The five largest cities of Lithuania – Vilnius, Kaunas, Klaipėda, Šiauliai, and Panevežys.

According to the Lithuanian Department of Statistics (hereinafter – Statistics Lithuania), as of January 2015, the country’s population was 2 921 262, with the density – 44,7 persons per square kilometre. Lithuanians comprise 84,2% of population, the Poles – 6,6 %, Russians – 5,8 %, Belarusians – 1,2 %, and other ethnic groups – 2,2 %. In total, representatives of 154 ethnic groups live in Lithuania.

Lithuania is the land of plains. They account for 75 % of its area. Lithuania has no mountains, and the maximum elevation is just 293,8 m above the sea level. More than a third of our country's area is covered by forests. There are over 22000 rivers and streams, and nearly 3000 lakes.

The country’s climate ranges between maritime and continental. Average temperature in July is +19°C, and in January – -3°C.

2.1.2. Political Structure

Lithuania is an independent democratic multi-party parliamentary republic. Legislative authority in the country is executed by the Parliament (Seimas), executive authority – by the Government. Lithuanian foreign policy is carried out by the President, jointly with the Government.

The Seimas consists of one chamber – 141 members, who are elected by the country's population directly and by secret ballot for four–year term of office. The Government consists of the governing Prime Minister and the cabinet of fourteen ministers. They compose the country's executive power.

Lithuania is a multi-party republic. The most popular parties in Lithuania are considered Social Democratic and the Homeland Union – Lithuanian Christian Democrats.

Lithuania is NATO member since 29 March 2004. On 1 May 2004 Lithuania became a full member of the European Union, and shares its legal framework. Details are provided in Section 2.2.4.

2.1.3. Economic Situation

Lithuania’s economic development is described in more detail in the first NIP of 2005. According to Statistics Lithuania, the country's gross domestic product (GDP) in 2014 amounted to 36 270,8 mln EUR at that time prices. Compared to 2013, the actual GDP growth, exclusive of seasonal and working days’ number influence, amounted to 2,9 percent. In the fourth quarter of 2014, GDP amounted to 9 242,6 mln EUR and, compared to the same period in 2013, grew by 2,4 percent. In 2014, the

GDP growth was mostly influenced by construction, manufacturing, wholesale and retail trade sectors. The gross value added growth rate in construction was the highest of all sectors of the economy.

In 2014, industrial products were sold for 19,53 billion EUR at that time prices. In comparison to 2013, comparative prices of industrial products remained the same, exclusive of the influence of working days' number – increased by 0,2%. On foreign markets, the share of manufacturers' sales accounted for 63,3 %. The most rapid growth was in manufacture of basic medicine and pharmaceutical preparations – by 37,1%, manufacture of motor vehicles and equipment – 25,2%, manufacture of textiles – 16,3%, manufacture of furniture – 16,2%, manufacture of metal articles, except for machinery and equipment – 15,%. Industrial output has dropped in manufacture of base metals – 46,8 %, manufacture of other vehicles and equipment – 28,8 %.

In 2014, the exports of goods (shipment to other countries, including the EU) amounted to 24,4 billion EUR, imports (importation from other countries, including the EU) – 26,5 billion EUR. In comparison to 2013, exports dropped by 0,8 %, while imports increased by 1%. The foreign trade deficit amounted to 2,1 billion EUR. During 2014, Lithuania mainly exported to Russia, Latvia, Poland, and Germany. Goods of Lithuanian origin were exported mostly to the EU countries (almost 70 % of the total exports of Lithuanian origin); the key partners in exports of Lithuanian origin goods were Germany, Latvia, the Netherlands, and Poland. The highest share of exported Lithuanian origin goods was made up by petroleum products, the exports of which fell by 28,8 %, however, there was a growth in exports of furniture made in Lithuania (15,6 %), wood and wood products (6,9 %), dairy products (0,9 %.), and cereal (1,5 %). Exports of agricultural and food products of Lithuanian origin increased by 0,8 %, to Russia – dropped by 26,3 %. Most of the imported goods to Lithuania came from Russia, Germany, Poland, and Latvia. Value of goods imported from the EU countries increased by 7,2 % and amounted to 63,8 % of the total Lithuania's imports, from CIS (Commonwealth of Independent States) countries – dropped by 14,8 % and amounted to 27,6 % of the total Lithuanian imports.

2.1.4. Environmental Situation in Lithuania

Over the last two decades, the current environmental policy and responsible authorities have achieved major improvements in the country's environmental remediation sector, so, currently Lithuanian environment can be argued to be better than in many other countries around the world. The recent high assessment of Lithuanian environmental welfare was mostly determined by a number of factors, for example, Lithuania is leading the world in terms of air quality improvement and increase of forest area. Lithuania is one of the few in Europe and worldwide, where population consumes only groundwater for their own needs. Greenhouse gas emissions over the last decade decreased, while the economy grew. It has been observed that environmental enhancement is determined by a targeted application of environmental protection measures and improvement of the environmental protection system.

Air pollution in Lithuanian cities is in general lower than in neighbouring countries, major cities, and other European towns. This is preconditioned by several factors – the country has no multimillion cities with concentrated industries, population density and traffic flows are much lower than in major European cities, and geographic location determines variable weather, which scatters pollutants.

Levels of unintentionally produced POPs (PCDD, PCDF, PCB and etc.) in the air have dropped in Lithuania several times over the decade.

Tests of chemical contamination of water and soil are becoming more and more in-depth; priority hazardous chemicals and potential sources of pollution are established in Lithuania. Measures to supervise, control, and prevent activities of economic operators are being intensively performed, in order to maximise the elimination of chemical contamination from industry.

2.2. Environmental Law and Responsible Authorities

2.2.1. Environmental Policy

Environmental protection is considered to be one of the priority areas under the Lithuanian National Long-Term Development Strategy, approved by the Resolution No IX-1187 of 12 November, 2002 of the Parliament of the Republic of Lithuania. The Environmental Policy Action Plan under the Long-Term Development Strategy provides for measures which are necessary to ensure the balanced and sustainable development of Lithuania (sustainable development), consistent with the scheduled goals for protection of air, water, biodiversity, the Baltic Sea and the Curonian Lagoon, waste management, international commitments and the EU standards, as well as with the country's economic potential. Lithuania is implementing a harmonised system of economic, administrative, and legal environmental leverages. The environmental protection sector aims to harmonise the development of all branches of the economy with preservation of a clean and healthy environment. Besides, a high emphasis is placed on environmental protection against hazardous chemicals such as pesticides, hazardous waste, including POPs.

The National Progress Strategy under the title ‘Strategy for the Progress of Lithuania ‘Lithuania 2030’approved by Resolution No XI-2015 of the Parliament of the Republic of Lithuania on May 15 2012 provides that Lithuanian economic development would be based on the principles of sustainable development and the concept of ‘green’ growth, thus, without causing any negative impact on the environment and human health.

The National Environmental Protection Strategy approved by Resolution No XII-1626 of the Parliament of Republic of Lithuania on April 16 2015 defines the country’s environmental vision until 2050 and the goals and the priority directions for policy implementation by 2030. The strategic objective is to attain a healthy, clean and safe environment in Lithuania that would address the needs of society, environmental protection and the economy in a sustainable way. The Strategy, *inter alia*, sets the key implementing directions of the chemicals management policy: 1) Reduction of the risk posed by chemical substances to human health and the environment, 2) Improvement of the safety of products and articles containing chemicals, 3) Promotion of the substitution of chemicals hazardous to human health and the environment with safer substances or alternative technologies, 4) Promotion of the prevention of chemical pollution, 5) More efficient implementation of the chemicals management policy. As mentioned above, one of the priorities is aimed, under close and active cooperation with economic operators, national and the EU institutions, to encourage the assessment and introduction of less hazardous alternative chemicals.

The Republic of Lithuania is increasingly paying attention at the political level on environmental protection, which is consistent with economic growth. ‘Clean production’ and pollution prevention are seen as one of the most rational EU warrant

of growth and competitiveness in various sectors of the economy. Funds are allocated not only to address environmental issues, but also to prevent them.

2.2.2. Responsible Public Authorities

The state institutions of the Republic of Lithuania responsible for the legal regulation of POPs management and enforcement are defined in the Resolution of the Government of the Republic of Lithuania No 239 of 3 March 2005 'On Implementation of 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' (as last amended on 4 July 2018). The authorities involved in implementation of this Regulation are: the Ministry of Environment, the Environmental Protection Agency, Lithuanian Geological Survey under the Ministry of Environment, the Ministry of Health, the State Plant Service under the Ministry of Agriculture, State Consumer Rights Protection Authority, the Customs Department under the Ministry of Finance, the State Food and Veterinary Service, the Environmental Protection Department under the Ministry of Environment (formerly (until 1 July 2018) – Vilnius Regional Environmental Protection Department under the Ministry of Environment, Regional Environmental Protection Departments under the Ministry of Environment). The Municipal administrations also are indirectly involved in the implementation of certain legal acts related with POPs management: by implementing Order No D1-436 of the Minister of the Environment of 16 August, 2004 "On General Municipal Environmental Monitoring Regulations" (as last amended on 30 November 2015); by implementing Order No D1-790 of the Minister of Environment of the Republic of Lithuania of 27 September 2012 "On the Approval of the Contaminated Sites Management Plan for 2013-2023" (as last amended on 7 May 2018) and city Council decisions.

Ministry of Environment of the Republic of Lithuania

The Ministry of Environment is entitled to represent the Republic of Lithuania in meetings of the Conference of the Parties of the Stockholm Convention (COPs), in working groups of European Union Council, in the Committee for General Affairs and in the Committee for Waste Affairs in all issues related to Regulation (EC) No 850/2004. Within the area of its competence, the Ministry of Environment cooperates with the European Commission, national competent authorities of the Member States of the European Union and third parties, the Secretariat of the Stockholm Convention, provides reports and information to the European Commission, the Secretariat of the Stockholm Convention and other countries following the procedures set out in Regulation (EC) No 850/2004 and the Stockholm Convention. Furthermore, the Ministry of Environment coordinates the activities of the Ministries and other authorities of the Republic of Lithuania in the implementation of provisions under Regulation (EC) No 850/2004 and the Stockholm Convention, coordinates and develops programmes and plans, drafts national legislation on management of POPs for the implementation of Regulation (EC) No 850/2004 and the Stockholm Convention. The Ministry of the Environment until October 2014 performed the tasks of the national competent authority for implementation of Regulation (EC) No 850/2004.

Environmental Protection Agency

The Environmental Protection Agency is appointed as the Competent Authority (since October 2014) to perform the tasks assigned to the competent national authorities by Regulation (EC) No 850/2004 and represents the Republic of

Lithuania in meetings of the Competent Authorities implementing Regulation (EC) No 850/2004. Within the area of its competence, the Environmental Protection Agency cooperates with the European Commission, national competent authorities of the Member States of the European Union, submits information to the European Commission and other institutions following the procedures set out in the Rules of Procedure for the meetings of competent authorities and the procedures laid down in Regulation (EC) No 850/2004. The Environmental Protection Agency collects, processes, and submits data to the Stockholm Convention Secretariat, the Persistent Organic Pollutants Review Committee and other technical subsidiary bodies of the Stockholm Convention on the production, use and placing on the market of POPs (substances), mixtures and articles containing POPs, sources of pollution from POPs, stockpiles and waste containing POPs, their management and disposal, areas contaminated with POPs (pollution of surface water, groundwater, soil and subsoil) and their sound management, monitoring data on POPs in the environmental compartments. Besides, the Environmental Protection Agency performs the environmental risk assessment of POPs.

The Environmental Protection Agency, together with the Lithuanian Geological Survey under the Ministry of the Environment, participates in the technical expert meetings on POPs management and, within area of its competence, carries out POPs monitoring and manages databases of POPs.

The Environmental Protection Agency issues, modifies, reviews (updates), and revokes the pollution permits, also integrated pollution prevention and control permits (hereinafter – IPPC), monitors the development of BAT, collects information on new or updated BAT conclusions, distributes such information to the stakeholders in concern; following the guidelines that are laid down by the European Commission, takes measures to promote the development and application of new techniques, particularly those identified in BAT reference documents; defines BATs for specific economic activities or manufacturing processes.

The Environmental Protection Department under the Ministry of Environment of the Republic of Lithuania (formerly (until 1 July 2018) – the Vilnius Regional Environmental Protection Department under the Ministry of Environment, Regional Environmental Protection Departments under the Ministry of Environment) is responsible for organisation and carrying out state control (enforcement) of placing on the market and use of POPs (substances), POPs containing mixtures and articles, emissions and releases of POPs, management of POPs waste, sites contaminated by POPs and by waste containing POPs.

Lithuanian Geological Survey under the Ministry of the Environment of the Republic of Lithuania

Lithuanian Geological Survey under the Ministry of the Environment of the Republic of Lithuania, jointly with the Environmental Protection Agency, participates in the technical expert meetings on POPs management and, within its competence, carries out POPs monitoring, manages POPs databases. The Lithuanian Geological Survey under the Ministry of the Environment, within its competence area, prepares conclusions of on eco–geological investigation of contaminated areas (including those contaminated with POPs pesticides), conducts, coordinates, and controls soil monitoring throughout the territory of the Republic of Lithuania.

Ministry of Health of the Republic of Lithuania

The Ministry of Health of the Republic of Lithuania and its authorised institution provide proposals to the Environmental Protection Agency on restrictions of use and placing on the market of POPs (substances), mixtures and articles

containing them, conduct the assessment of risks of POPs to human health and the expertise of public health safety, takes part in the national, regional and international programmes and projects on investigating effects of POPs to human health, in particular, to the most vulnerable groups.

State Consumer Rights protection Authority

The State Consumer Rights Protection Authority performs the market surveillance of non-food products that are used for personal or household needs, supervises whether the non-food products that are placed on the market meet mandatory labelling and safety requirements set out in the corresponding legal acts, monitors the withdrawal from the market of non-food products, carries out tests of non-food products safety and quality, makes risks assessments of non-food products hazards. The State Consumer Rights Protection Authority within its competence area carries out the control of placing on the market of POPs (substances), mixtures and articles containing them.

State Food and Veterinary Service

The State Food and Veterinary Service, within the frame of monitoring programmes, collects and processes data on detected POPs in food and animal organisms.

State Plant Service under the Ministry of Agriculture of the Republic of Lithuania

The State Plant Service under the Ministry of Agriculture of the Republic of Lithuania monitors the use and placing on the market of plant protection products containing POPs taking into account the requirements of Regulation (EC) No 850/2004.

Customs Department under the Ministry of Finance of the Republic of Lithuania

The Customs Department under the Ministry of Finance of the Republic of Lithuania performs the control of imports and exports of POPs under Regulation (EC) No 850/2004 and in accordance with the requirements Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 July, 2012 concerning the export and import of hazardous chemicals (OJ L 201, 2012, p. 60) (hereinafter – Regulation (EU) No 649/2012). This institution carries out the control of imports and exports of waste containing POPs and taking into account the requirements of Regulation (EC) No 850/2004 and of Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste (OJ L 190, 2006, p. 1) as last amended by Regulation (EU) No 2015/2002 of the European Parliament and of the Council of 10 November 2013 (OJ L 294, 2015, p. 1).

Municipalities

Municipalities are responsible for drafting and implementation programmes for municipal environmental monitoring, control of their implementation, provide information to the public and state authorities in concern and also responsible for the identification of contaminated sites (including polluted with POPs pesticides) within the areas assigned to them and their clean–up.

2.2.3. International Commitments in the POPs Sector

Lithuania implements not only the Stockholm Convention, but also other international conventions related to chemicals and wastes:

1. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal;

2. The United Nations' Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade;
3. The United Nations' Convention on Long-Range Transboundary Air Pollution (CLRTAP);
4. The United Nations' Framework Convention on Climate Change;
5. The United Nations' The Vienna Convention for the Protection of the Ozone Layer and Montreal Protocol on Substances that Deplete the Ozone Layer;
6. Minamata Convention on Mercury;
7. Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention).

Lithuania has ratified and is a Party of the above mentioned international conventions. Lithuania has ratified the Minamata Convention on Mercury on 10 October 2017.

2.2.4. European Union's and National Legislation on POPs

The main legal act regulating the management of POPs in the European Union is Regulation (EC) No 850/2004. Regulation (EC) No 850/2004 implements the Stockholm Convention and CLRTAP provisions on POPs. This Regulation lays down more stringent requirements than those set in these international environmental agreements. Regulation (EC) No 850/2004 provides for the ban and restrictions of the manufacturing, placing on the market and use of POPs (substances), provisions on monitoring of POP releases into the environment, waste containing POPs management and also sets the requirements for Member States to take measures to prevent and minimize releases of such substances into the environment (air, water, soil). Member States are obliged to draw up release inventories for the substances listed in Annex III (List of substances subject to the provisions on release reduction/unintentionally formed POPs) of Regulation (EC) No 850/2004 and constantly update the data. The Member States are obliged to develop and update their NIP setting out measures to manage and reduce emissions (releases) of POPs listed in Annexes of Regulation (EC) No 850/2004 into the environment.

With the aim to ensure the implementation of Regulation (EC) No 850/2004 in Lithuania the Resolution No 239 of 3 March 2005 of the Government of the Republic of Lithuania 'On Implementation of Regulation 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' was adopted. In accordance with Resolution No 1076 of 3 October 2014[5] of the Government of the Republic of Lithuania the Environmental Protection Agency is appointed, as the Competent Authority to perform the administrative tasks in implementing provisions of Regulation (EC) No 850/2004 (until 2014 the Ministry of the Environment performed functions of the Competent Authority). By this Resolution other state institutions are obliged to carry out tasks within its competence when implementing the Stockholm Convention and Regulation (EC) No 850/2004 provisions, among them – to ensure the compliance with POPs management requirements by conducting the control of economic entities

Lithuania has been implementing the NIP and its Action Programme since 2006. The NIP was drafted aiming at implementation of specific provisions of the Stockholm Convention and Regulation (EC) No 850/2004 that require countries to

[5] Resolution No 1076 of 3 October 2014 of the Government of the Republic of Lithuania „On the amendment of the Resolution No 239 of 3 March 2005 'On the implementation European Parliament and Council Regulation (EC) No 850/2004 on Persistent Organic Pollutants and Amending Directive 79/117/EEC'.

draw up and update NIP, which shall provide measures to determine total releases of POPs, characterise them and minimize and, if feasible, eliminate them as soon as possible. The first NIP and it Action Programme (captures the period 2006–2015) was developed in 2006 and adopted by Resolution of the Government of the Republic of Lithuania No 970 of 4 October 2006. It should be noted that in 2010 the general Decision of the Government of Republic of Lithuania was taken and power for adoption of various national programmes/plans was delegated to the ministries in concern. Therefore the first NIP was re–adopted by Order No D1-1034 of the Minister of Environment of the Republic of Lithuania of 23 December 2010 and titled as the "National Programme on Persistent Organic Pollutants (POPs) Management for 2010-2015". The NIP has been updated removing the measures already implemented, providing that all measures are up to date and in line with competences/responsibilities of concerned.

The European Union obligations relating to export of POPs are implemented by Regulation (EU) No 649/2012. Regulation (EU) No 649/2012 implements the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade.

POPs management is also regulated by the general legislation on chemicals of the European Union (directly applicable in Lithuania), national and sectoral legal acts concerning POPs emissions (releases) into the environment (air, water, soil), management of waste containing POPs and management of sites contaminated with POPs or POP containing waste.

POPs monitoring in the environment in Lithuania is carried out in accordance with the Law on Environmental Monitoring (No VIII-529 adopted by the Parliament of the Republic of Lithuania on 20 November 1997, as last amended on 14 April 2016). The National Environmental Monitoring Programme is being updated and approved every 5 years by the Resolution of the Government of the Republic of Lithuania. The latest National Environmental Monitoring Programme for 2011-2017 has been approved by Resolution of the Government of the Republic of Lithuania No 315 of 2 March 2011. In accordance with the Programme of the Government of the Republic of Lithuania and its Implementation Plan (approved by Resolution No 167 of the Government of the Republic of Lithuania of 13 March 2017) and the Order No D1-320 of the Minister of Environment of the Republic of Lithuania of 18 April 2017 'On Establishment of the Working Group for the Development of National Environmental Monitoring Programme for 2018-2023', the updated draft National Environmental Monitoring Programme for 2018-2023 is prepared.

Maximum allowable concentrations (hereinafter – MAC) of dangerous chemical substances, including POPs, in soil are approved by Order No V-114 of the Minister of Health of the Republic of Lithuania of 8 March 2004 'On Lithuanian Hygienic Regulation HN 60:2015 'Maximum allowable concentrations of dangerous chemicals in soil' (as last amended by on 14 December 2015).

Discharges of wastewater containing POPs, that are included in the priority list of hazardous substances, are regulated by 'The Wastewater Management Regulation', approved by Order No D1-236 of the Minister of Environment of the Republic of Lithuania on 17 May 2006 (as last amended on 19 June 2018) (hereinafter – Wastewater Management Regulation). The Wastewater Management Regulation requires that discharges of priority hazardous substances listed in Annex I[6] into the environment must be stopped by the set deadline.

[6] Hexachlorocyclohexane, hexachlorobenzene, brominated diphenyl ethers, polyaromatic hydrocarbons, pentachlorobenzene releases into the environment must be stopped by 2020; perfluoroctansuphonic acid and its

POPs emissions into the air and water are also regulated by Order No D1-528 of the Minister of the Environment of the Republic of Lithuania of 15 July 2013 'On Approval of the Rules on Granting, Updating and Revocation of Integrated Pollution Prevention and Control Permits' (as last amended on 19 June 2018).

The State Food and Veterinary Service by implementing monitoring programmes, collects and processes data on the POPs detected in foodstuff and animals. Monitoring of contaminants in foodstuff is being carried out in accordance with the following European Union legal acts:

•Regulation (EC) No 396/2005 of the European Parliament and of the Council of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin and amending Council Directive 91/414/EEC (OJ 2005 L 70, p. 1) (hereinafter – Regulation (EC) No. 396 / 2005),

• Commission Regulation (EC) No 1881/2006 of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs (hereinafter – Regulation (EC) No 1881/2006),

• Commission Regulation (EC) No 839/2008 of 31 July 2008 amending Regulation (EC) No 396/2005 of the European Parliament and of the Council as regards Annexes II, III and IV on maximum residue levels of pesticides in or on certain products (hereinafter – Regulation (EC) No 839/2008),

• Commission Regulation (EU) No 915/2010 of 12 October 2010 concerning a coordinated multiannual control programme of the Union for 2011, 2012 and 2013 to ensure compliance with maximum levels of and to assess the consumer exposure to pesticide residues in and on food of plant and animal origin (hereinafter – Regulation (EC) No 915/2010).

Management of areas contaminated with POPs pesticides is implemented in accordance with the Contaminated Sites Management Plan for 2013–2023 (approved by Order No D1-790 of the Minister of Environment of the Republic of Lithuania of 27 September 2012, as last amended on 7 May 2018).

The main legal act regulating the management of PCBs in Lithuania is the Rules for Management of Polychlorinated Biphenyls and Polychlorinated Terphenyls (PCB/PCT) approved by Order No 473 of the Minister of Environment of the Republic of Lithuania on 26 September 2003 (as last amended on 6 June 2018) (hereinafter – Rules on PCBs/PCTs management). Equipment or oils contaminated with PCB, containing PCB levels greater than 50 ppm is classified as hazardous waste. Thus, any legislation that regulates the management of hazardous wastes also is applicable to PCB-containing waste or PCB-contaminated waste. These legal acts are aimed at assuring that used PCBs are eliminated as soon as possible, and equipment, containing PCBs, is properly decontaminated and disposed.

The Rules on PCBs/PCTs management provides for requirements on inventory, storage, labelling, operation, decontamination and disposal of PCBs, used PCBs, or equipment containing PCBs. These Rules oblige holders of equipment with PCB volumes of more than 5 dm^3 and of equipment which contain fluids carrying between 0,05% and 0,005% by weight of PCBs to submit reports on inventory of equipment containing PCBs to the Environmental Protection Agency by 31 January of each year. The reports shall specify: the names and addresses of the holders, the locations and descriptions of the equipment, the quantity of PCBs contained in the equipment, decontaminated or disposed, used PCBs, or equipment containing PCBs decontaminated and disposed over the past year.

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derivatives (PFOS), dioxins and dioxin-like compounds, hexabromocyclododecane (HBCDD) releases into the environment has to be stopped until 2033.

One of the major differences between provisions of Rules on PCBs/PCTs management and of the Stockholm Convention is that these Rules require the equipment containing oil contaminated by with PCBs in volumes of more than 5 dm^3 of PCBs was to be decontaminated and (or) disposed by 31 December 2010. The above Rules on PCBs/PCTs management provide for the exemption allowing transformers containing PCBs from 0,05% to 0,005% by weight of the fluid to be decontaminated or disposed at the end of their useful life.

The emissions (releases) into the environment of unintentionally produced POPs are being regulated and reduced by issuing IPPC permits for economic operators. IPPC permitting is performed following Order of the Minister of Environment of the Republic of Lithuania No D1-528 of 15 July 2013 "On Approval of the Rules for Issuance, Modification and Revocation of Integrated Pollution Prevention and Control Permits" (as last amended on 19 June 2018). The Environmental Protection Agency is responsible for the issuance of IPPC permits. The IPPC permit sets the operating conditions based on the application of Best Available Techniques (BAT), in particular, limit values for PCDD, PCDF emissions to air, water and soil.

Environmental Requirements for Waste Incineration are approved by Order of the Minister of Environment of the Republic of Lithuania No 699 of 31 December 2002 (as last amended on 18 June, 2018) and oblige economic operators, who incinerate waste at incineration facilities or co-incineration plants, to carry out (mandatory) at least two measurements of heavy metals, dioxins, and furans per year. During the first 12 months of operation of incineration or co-incineration facilities, the measurements should be carried out at least every 3 months. The set limit value for emissions of PCDD/PCDF in the ambient air is 0,1 ng I-TEQ/Nm^3.

The Order of the Minister of Environment of the Republic of Lithuania No D1-264 of 6 March 2014 'On Submission of Information and Reporting in Accordance with Regulation (EC) No 166/2006 of the European Parliament and of the Council of 18 January 2006 Concerning the Establishment of a European Pollutant Release and Transfer Register and Amending Council Directives 91/689/EEC and 96/61/EC' obliges economic operators who carry out the activities listed in Annex I of Regulation (EC) No 166/2006 (the activities include the energy sector, production and processing of metals, mineral industry, chemical industry, waste and wastewater management, paper and wood production and processing, intensive livestock production and aquaculture, animal and vegetable products from the food and beverage sector, etc.) to provide information to the Environmental Protection Agency on PCDD and PCDF generated from the economic activities.

2.3. Assessment of the situation of POPs in Lithuania

2.3.1. POPs pesticides

Pesticides that meet the criteria of POPs that are regulated by the Stockholm Convention are considered and called as POPs pesticides (hereinafter – POPs pesticides). In Lithuania (like in all the European Union) it is prohibited to manufacture, place on the market and use plant protection products containing POPs listed in the Stockholm Convention. The use of pesticides in Lithuania started before the World War II. Historical use of POPs pesticides was comprehensively described in the first NIP.

Unused pesticides have been stored for many years, thus problem of their safe storage and pollution of the territories around the storage depots emerged. The storage

depots were found throughout Lithuania on former sites of collective farms next to lakes and rivers, in vulnerable places from the environmental pollution point of view. Such places were identified as potential sources of pollution that may cause danger for human health and the environment. In order to protect the environment and human health from potential dangers, thorough eco-geological (soil and groundwater) investigations were performed in sites likely to be contaminated by pesticides and the pollutants (aldrin, chlordane, DDT, dieldrin, HCB, heptachor, HCH) were identified in the investigated sites. On the bases of the results of these investigations the corresponding measures for the cleaning up the territories contaminated by pesticides are taken.

During the period of 2002-2005 while implementing the Governmental Pesticide Waste Management Programme of the Republic of Lithuania for 2002–2005 (approved by Resolution No 310 of the Government of the Republic of Lithuania on 5 March 2002), nearly 3200 t of pesticide waste, including POPs pesticides, were disposed of in various regions of Lithuania. In the period of 2008–2009 while implementing the project 'Dangerous Waste Management in Lithuania', funded by European Union Cohesion Fund and the State Budget of the Republic of Lithuania, 29 warehouses were cleaned, 2079 t of pesticide waste and 5626,55 m^3 of soil contaminated with pesticide waste was disposed.

The Lithuanian Geological Survey under the Ministry of Environment of the Republic of Lithuania have inventoried 1379 former pesticides or pesticide waste storage sites during the implementation of the National Programme for 2007-2013 'Management of Former Pesticide Storages and Territories Contaminated by Pesticides' (approved by the Resolution No 350 of the Government of the Republic of Lithuania on 4 April 2007).

Through the period of 2008-2014 utilising the municipal and other funding resources the preliminary and/or detailed investigations of the soil and groundwater contamination in 133 former pesticides warehouse sites have been carried out. Buildings or their remains within the former pesticides storage sites are usually contaminated by pesticides, among which POPs prevailing. The soil and groundwater within the territories of the former pesticides warehouses are mostly contaminated with POPs pesticides (such as DDT, HCB, and HCH) in large concentrations).

During the implementation the National Implementation Plan on Persistent Organic Pollutants and its Action Programme for 2010-2015 and the Contaminated Sites Management Plan for 2013-2020 (approved by Order No D1-790 of the Minister of Environment of the Republic of Lithuania on 27 September 2012, as last amended on 7 May 2018) the Lithuanian municipalities have disposed 3,8 t of old pesticide waste and 10767,4 m^3 of soil contaminated by pesticide waste by using local funds and funds provided by the European Union Financial Support. According to the results of the survey conducted in 2015 (during preparation of the second NIP) and information provided by the municipalities, the amount of old pesticides has been decreasing annually (see Fig. 1). According to the information of the Ministry of the Environment, all identified obsolete pesticides warehouse and stockpiles have been disposed.

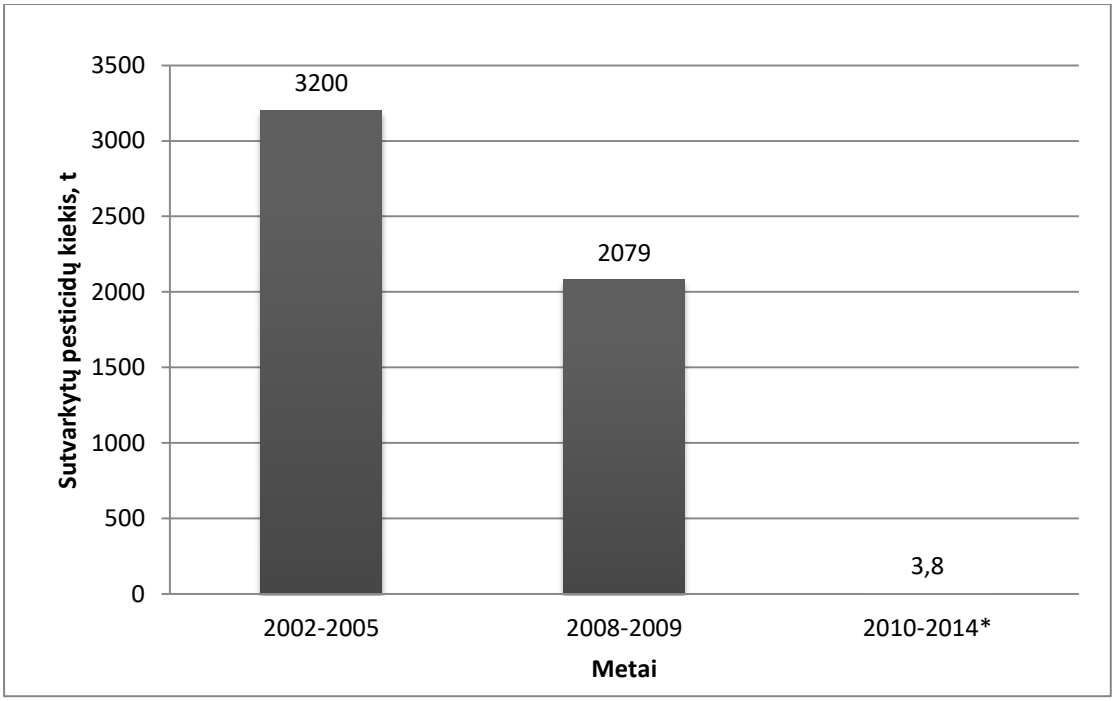

Figure 1. Amount of old pesticides disposed in 2002-2014 (*according to the data gathered from municipalities' survey)

In Lithuania some single cases occur (one of them in Utena in 2014), when stockpiles of hazardous chemicals, including POPs are found in private territories. As mentioned above, these cases are unique and therefore not predictable. The clean-up of such territories is held by the personal funds of the owners of territories.

The database established by State Plant Service under the Ministry of Agriculture of the Republic of Lithuania does not contain the data on registered plant protection products containing POPs as active ingredient. Non-registered plant protection products cannot be placed on the Lithuanian market.

POPs pesticides in the environment

The monitoring of POPs pesticides in Lithuanian environmental compartments is being carried out in accordance with the Law on the Environmental Monitoring and the National Environmental Monitoring Programme that is approved for certain time period (the last one is the Programme is for 2011-2017 and recently has been revised and updated for the period 2018–2023 pending approval).

Several POPs pesticides have been detected in the certain compartments of the Lithuanian environment during the implementation of the National Environmental Monitoring Programme for 2008-2014. In 2014, beta endosulfan (with concentration 2,2 μg/kg) was detected in bottom sediments of the river Nevėžis (from Raudondvaris upwards). In 2013, hexachlorobenzene was detected in Nemunas river (from Druskininkai city upwards) with concentration 0,204 μg/l, and in 2014 – in Nevėžis river, section alongside Raudondvaris, HCB concentration reached nearly 0,007 μg/l. In Venta river, section below Mežeikiai town, alfa-HCH and beta-HCH were detected with concentrations reaching 6,7 μg/l and 6,1 μg/l respectively. In 2008, 4,4-DDT with concentration of 5,7 ng/l was found in one sample of Baltic Sea water. In 2013, 4,4'-DDE was detected with concentration of 0,21 μg/l in waters of Kaunas Lagoon and in the bottom sediments with concentration of 4,4 μg/kg of the same reservoir. In 2014, 4,4-DDT was determined in the waters of the Baltic sea (with concentration of

5,7 ng/l) and of Neris river, alongside Buivydžiai (with concentration of 0,036 μg/l); 2,4'-DDT and 4,4'- DDT (with concentrations of 1,7 μg/kg and 3 μg/kg respectively) were detected in the bottom sediments of samples taken from Nevėžis river, alongside Raudondvaris. In 2014, 4,4'-DDT with concentration of 1,7 μg/kg was detected in bottom sediments of Venta river (section below Mažeikiai town) whereas 4,4'-DDT and 4,4'-DDE with concentrations of 2,2 μg/kg and 2,9 μg/kg respectively were detected in the bottom sediments of Kaunas Lagoon.

As data provided by the National Environmental Monitoring indicate certain amounts of POPs pesticides are still being detected in the environmental compartments, thus it is imperative to continue environmental monitoring with regard POPs pesticides pollution.

In 2008-2014, while carrying out the National Environmental Monitoring, the following POPs pesticides have been monitored, but not detected in water and bottom sediments of the Curonian Lagoon, Baltic Sea, lakes and rivers: aldrin, chlordane, endrin, heptachlor, mirex, pentachlorobenzene and toxaphene. However, many of these chemical substances or their metabolites have been detected in the biological mediums of Lithuanian residents (e. g. breast milk of mothers). Within the frame of the surveys on POPs in human breast milk implemented in 2013–2014 by the Health Education and Disease Prevention Centre under the Ministry of Health of the Republic of Lithuania (in cooperation with the World Health Organisation and the United Nations Environment Programme) the following POPs pesticides have been detected in the breast milk of the Lithuanian breastfeeding mothers: chlordane, DDT, hexachlorobenzene, hexachlorocyclohexane, heptachlor, mirex and toxaphene.

The State Food and Veterinary Service conducts the programmes for monitoring food contamination and the state control of pesticides, mycotoxin, acrylamide and furan residues in food. The purpose of this monitoring is to assess whether pesticide residues in food products that are placed on the Lithuanian market or imported to Lithuania do not exceed MAC, as set in Regulation (EC) No 396/2005 of the European Parliament and of the Council of 23 February 2005 on Maximum Residue Levels of Pesticides in or on Food and Feed of Plant and Animal Origin. The data provided by the State Food and Veterinary Service reveal that there were not detected any POPs pesticides in food products during 2008-2014.

To sum up the current status of POPs pesticides in Lithuania, it can be concluded that:

1. Lithuania neither produce, nor import or use POPs pesticides. Even though it has been already ten years since Lithuania has ratified the Stockholm Convention (2006), and the use of several types of POPs pesticides was prohibited in 1996, such chemicals are still being detected in Lithuanian environment (surface and ground water, soil, bottom sediments, air) and the biological mediums (breast milk) of population. These facts reconfirm that POPs pesticides are very persistent and remain in the environment for a long time.
2. While carrying out the National Environmental Monitoring Programme for 2005-2010 and 2011-2017, the following POPs pesticides have been monitored, but not detected in the water and bottom sediments of the Curonian Lagoon, Baltic Sea, lakes, and rivers: aldrin, chlordane, endrin, heptachlor, mirex, PeCB and toxaphene. However, the majority of such type of chemicals or their metabolites was detected in biological mediums (breast milk) of Lithuanian residents (breastfeeding mothers). According to results of the survey implemented in 2014, the breast milk of samples

taken from the breastfeeding mothers in Lithuania contained the following POPs: chlordane, DDT, HCB, HCH, heptachlor, mirex, toxaphene.

3. During the implementation of the National Programme for 2007-2013 "Management of Former Pesticide Storage and Territories Contaminated by Pesticides" in 2008-2009, the Lithuanian Geological Survey under the Ministry of Environment of the Republic of Lithuania has carried out the eco-geological investigations of soil and groundwater for POPs contamination. During these investigations there were detected some POPs that were not detected in surface waters and bottom sediments of the Curonian Lagoon, Baltic Sea, lakes and rivers during the monitoring activities conducted under the National Environmental Monitoring Programmes for 2005-2010 and for 2011-2017 (e. g., aldrin, chlordane and others). It is recommended to include the soil monitoring for POPs pesticides into the National Environmental Monitoring Programme.

2.3.2. Polychlorinated Biphenyls (PCBs)

This section provides information on the status of PCBs in products in Lithuania. Unintentional production of PCBs is described in Section 2.3.6.

In Lithuania (like in the all European Union) the production, placing on the market and use of PCBs as such, in preparations and articles are prohibited. PCBs had never been produced in Lithuania. The major part of PCBs and equipment containing PCBs found in Lithuania was produced in the former Soviet Union. The equipment containing PCBs were mostly used by the largest companies that were using, producing and supplying electric power.

According to the data of the first NIP, in late 2004 in Lithuania 374,9 t of insulated heat-transfer fluids containing PCBs were identified. The data provides the information of roughly 70-80 % of equipment (transformers and condensers) containing PCBs, thus it was considered that there may be up to 380–450 t of insulated heat-transfer fluids containing PCBs and 1100–1300 t of equipment containing PCBs. The NIP for 2010–2015 indicates that, according to the data provided by the Environmental Protection Agency, in 2004–2009 1906 units of PCB-containing electric equipment were disposed of or decontaminated (including 240 units of transformers and 1666 units of condensers).

According to the data from the revised inventory of PCB-containing equipment implemented in 2009, at that time 2118 units of electric equipment containing PCBs were left in Lithuanian companies (including 76 units of transformers and 2042 units of condensers).

In 2010, the total number of 875 units of PCB-containing electronic equipment were inventoried.

In 2011, the total number of 61 units of electric equipment containing PCBs were inventoried, 33 t equipment contaminated with PCBs and 19 t of insulated heat-transfer fluids containing PCBs were collected.

According to the data provided by the Environmental Protection Agency part of such waste was exported to other countries for disposal. The other part is stored in long-term storage facility (in 2013 the amount of such wastes stored in long-term storage facility was 181,3 t).

In late 2012 the total number of 8 of PCB-containing transformers (PCBs contaminated <0,05 %) were inventoried and they are still in operation. In 2013 the same 8 pieces of transformers containing PCBs < 0,05 % were in operation.

According to the data provided by the Environmental Protection Agency part of such waste was exported to the other countries for disposal. The other part of such

waste is stored in long-term storage facility in Lithuania. In 2014, 2,1 t of oil containing PCB and 188,5 t of PCB-containing equipment were stored in long-term storage facility.

The Stockholm Convention (Part II of Annex A) defines that each Party shall determine measures to eliminate the use of PCBs in equipment (e. g., transformers, capacitors and other receptacles containing liquid stocks) by 2025. Following further provisions of Part II, Annex A, of the Convention Parties are obliged to ensure that fluids (oil) containing PCBs and equipment contaminated with PCBs (at concentrations above 0,005 %), waste is disposed in an environmentally sound manner as soon as possible but no later than 2028. In Lithuania, as in all the Member States of the EU, stricter PCBs regulation is set. Management of PCBs and PCB containing equipment in Lithuania is regulated by the Rules for the Management of PCBs/PCTs. According to the Rules on PCB/PCT Management, PCB-containing equipment was to be decontaminated and/or disposed by the end of 2010 at the latest. Data provided by Environmental Protection Agency indicates that majority of companies holding PCB-containing equipment managed to comply with this deadline. Other companies have managed to dispose such equipment in 2011.

The Rules on PCB/PCT Management provide for an exemption: transformers the fluids in which contain between 0,05% and 0,005% of PCBs by weight are to be either decontaminated or disposed of at the end of their useful lives. Just 8 transformers of this type which contains about 12 t of fluids containing PCBs are left.

In 2015, PCBs in open and semi-closed applications inventory was performed in Lithuania in accordance with the Guidelines for the Identification of PCBs and Materials Containing PCBs [7]. These Guidelines are prepared by the Secretariat of the Stockholm Convention. Using the methodology provided in the Guidelines it was possible to calculate the amounts of PCBs in open and semi-closed applications.

Presuming that in Soviet Union (and Lithuania as the part of the Union) in the period of 1950–1970 PCBs materials were mostly used for construction of residential and public houses and taking into account studies conducted in other countries it was estimated that the level of PCBs in an apartment house may reach 50-60 kg, whereas PCB level in larger buildings may reach 100 kg. On the bases of these estimations it was calculated that Lithuanian buildings may contain from 3027 to 6055 t of PCBs in total. However, the results of this assessment (which excluded individual houses and auxiliary buildings) regarding the presence of PCBs use in buildings might seem overestimating. Taking into account the balance between PCBs use and emissions, it is quite credible that a total amount of PCBs that have been supplied to Lithuanian market (during 1950–1990) could reach around 1900 t. According to Breivik et. all. (2002), the use of PCBs in open applications comprised 21 % of total amount of PCBs used in the country. Thus, Lithuanian buildings constructed in the period 1950-1970, may contain around 400 t of PCBs.

Waste managing company UAB ‘Toksika’ collects construction and demolition waste containing PCBs from all over the country.

[7] Guidelines for the Identification of PCBs and Materials Containing PCBs. http://chm.pops.int/Implementation/IndustrialPOPs/PCBs/Guidance/tabid/665/ctl/Download/mid/4238/Default.aspx?id=3&ObjID=4427; http://chm.pops.int/Implementation/IndustrialPOPs/PCBs/Guidance/tabid/665/Default.aspx

PCBs in the environment

In Lithuania, the monitoring of PCBs has been carrying out in water bodies, groundwater and bottom sediments since 2004. In order to evaluate the level of PCBs in inland surface waters, PCBs were investigated under the National Environmental Monitoring Programme over several years. According to the data provided by the Environmental Protection Agency, the obtained results show no traces of PCBs in Lithuanian water reservoirs (monitored areas). Therefore, it was decided to perform this type monitoring in only every three years. In 2008-2014 no investigations on PCBs in water were carried out.

Being stable substances, PCBs tend to accumulate not only in the environment, but also in human and animal bodies and in food chain. Due to their stability PCBs tend to accumulate in soil and finally occur in agricultural products and food. The State Food and Veterinary Service has been carrying out monitoring of PCBs in food (fish, eggs) since 2004. The Maximum Allowable Concentration (MAC) of dioxins and dioxin-like PCBs in food is provided for in Commission Regulation (EC) No 1881/2006.

Investigations performed by the State Food and Veterinary Service in 2005 showed that PCBs were detected in eggs with concentration 0,006-0,083 mg/kg. In 2010, PCBs were detected in fish with concentration 36,24 pg/g. Due to the lack of funding, during the period 2006-2009 no such type of investigations were performed.

In 2011, the national residues monitoring plan in live animals and products of animal origin (meat (farmed game and wild game), milk, poultry, eggs, fish and honey was implemented. Within frame of this plan the Klaipeda Department of the State Food and Veterinary Service selected simple salmon samples and sent it for laboratory testing to Hamburg (Germany), to Laboratory for Contaminants and Residues in Food. The laboratory test has shown that dioxin and dioxin–like PCBs (13,31 pg/g) exceeded the maximum allowable level in simple salmon. Detected dioxins and dioxin–like PCBs concentrations exceeded maximum allowable levels in ten marine fish samples throughout the monitoring period in Lithuania (since 1998).

In 2011, the second case occurred when the sum of increased levels of dioxins and dioxin–like PCBs in salmon was detected. Investigations have revealed that pollutants are mostly identified in the liver of cod and the older, larger fish. According to the monitoring data, in 2012–2014 PCBs concentrations in eggs and fish did not exceed the levels defined in the corresponding legal acts. The monitoring studies of other EU Member States show that PCBs concentration in foodstuff samples have been annually decreasing. It is presumed that the upcoming investigations on PCBs concentrations in foodstuff in 2020 should result in zero levels or at least the lowest ever concentrations of such contaminant.

Results of the surveys performed in 2014 revealed the decreased concentrations of PCBs and their isomers in human breast milk compared with the levels detected during surveys performed earlier (1993 and 2009). According to results of the study conducted in 2009, breast milk of breastfeeding mothers living in Lithuania mostly contains isomer PCBs 153. In 2009, the determined level of this isomer in sampled breast milk was 6,80 ± 1,22 pg TEQ/g fat. Within the frame of the surveys on POPs in human breast milk implemented in 2013–2014 by the Health Education and Disease Prevention Centre under the Ministry of Health of the Republic of Lithuania (in cooperation with the World Health Organization and the United Nations Environment Programme) PCBs were detected in breast milk of

Lithuanian mothers. The concentration of various types of isomers belonging to the PCBs group in tested samples of breast milk amounted from 0,003 to 20,2 ng/g.

Summing up the status of the PCBs in Lithuania, it can be concluded that:

1. According to theoretical calculation, in 1950-1990 up to 1900 t of PCBs in products could have reached the Lithuanian market. Theoretical calculation provides the PCB distribution in articles, as follows:
   - In closed applications (systems) 69%: 1310 t of PCBs;
   - In semi-closed applications (systems) 10%: 190 t of PCBs;
   - In open (applications) systems 21%: 400 t of PCBs.
2. The major part of equipment containing PCBs > 0,05 % by weight of the fluids was disposed by 31 December 2010. After application of sanctions for the companies holding PCB-containing equipment remaining part of such equipment was disposed in 2011.
3. Construction materials and construction waste contaminated with PCBs are being collected separately from whole construction waste stream and are being managed by the waste managing company 'Toksika'.
4. The monitoring of PCBs has been carrying out in water bodies, groundwater and bottom sediment since 2004. According to data of the monitoring performed in 2008–2014 by Environmental Protection Agency, there were no traces of PCBs detected in Lithuanian water reservoirs (monitored areas).
5. Following the annual monitoring plans, the State Food and Veterinary Service carries out the monitoring of PCBs in food. According to the data provided by the State Food and Veterinary Service and obtained from the performed state control of food contamination in 2011–2014, the detected concentration of PCBs in food did not exceed allowable concentration levels defined in the corresponding legal acts.
6. In 2014 certain levels of PCBs were observed in breast milk of Lithuanian mothers.

2.3.3. Polybrominated Diphenyl Ethers (POPs - BDEs)

POPs – BDEs are one of the new POPs status of which has not been described in the first NIP.

In the European Union (and Lithuania) production, placing on the market and use of POPs-BDEs is prohibited by Regulation (EC) No 850/2004 (as amended by Commission Regulation (EU) No 757/2010 of 24 August 2010, amending Regulation (EC) No 850/2004 of European Parliament and Council on persistent organic pollutants as regards Annexes I and III) (hereinafter – Regulation (EU) No 757/2010 of the European Commission). However, Regulation (EC) No 850/2004 provides for an exemption and allows the production, placing on the market and use of products (articles) and preparations containing POPs-BDEs in concentration below than 0,1% by weight, if they are produced fully or partially from recycled materials or materials from waste prepared for re-use. Moreover, in accordance with the Rules on Market Surveillance of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (approved by Order No 4-459 of the Minister of Economy of the Republic of Lithuania on 8 October 2008, as last amended by Order No 4-120 on 11 February 2016) the use of POPs-BDEs is allowed in electrical and electronic equipment (hereinafter – EEE) placed on the market if this equipment meets the conditions set in the rules. Finally, use of products already in use before 25 August 2010 and which

have POPs–BDEs as a constituent, are allowed in accordance with Regulation (EC) No 850/2004.

According to the information provided by the Environmental Protection Agency from the database on chemical substances and preparations of the Integrated Computerised Information System for Environmental Management (hereinafter – IS AIVIKS) there are no records on the production, import and use of POPs-BDEs in Lithuania. Nevertheless, it is quite credible that raw materials imported from the third countries (not the EU Member States) and that are used in manufacturing of articles may contain POPs-BDEs. However, there is no precise information on the raw materials containing POPs-BDEs that are used in Lithuania.

Various information sources state that the manufacture of octa-BDE in Europe has stopped in 2004, and penta-BDE – in 1997.

The main branches of the Lithuanian industry in which materials containing POPs-BDEs have been used until the year of 2008 are the following:

- electric and electronic equipment industry;
- transport industry;
- furniture manufacturing industry;
- textile and carpet manufacturing industry;
- construction industry;
- recycling industry.

POPs-BDEs in electric and electronic equipment (EEE) and electric and electronic equipment waste

EEE are one of the biggest sources of commercial octa-BDEs, thus it is important to assess the flows of EEE circulating within the country. According to the available data, until 2010 Lithuanian EEE companies had been producing equipment (television sets) that could contain POPs-BDEs. Currently EEE potentially containing POPs-PBDEs are still used in the country. Following the methodology/Guidance on the inventory of POPs-BDEs developed by the Secretariat of Stockholm Convention[8], calculations conduced resulted in the theoretical indicative total amount of POPs-BDEs in EEE (initial inventory) in the country. Calculations based on the data of 2014 show the indicative amount of POPs-BDEs in articles – 18467,1 kg. This equipment possibly containing POPs-BDEs was manufactured before entry into force of the Regulation No 757/2010 of the European Commission. The calculated amounts are considered presumptive and without additional investigation can't be considered as precise.

Total amount of octa-BDEs (and its homologues) in the EEE and EEE wastes in the country is provided in Table 3.

[8] Revised draft guidance for the inventory of polybrominated diphenyl ethers under the Stockholm Convention: http://chm.pops.int/Implementation/IndustrialPOPs/BDEs/Guidance/tabid/5374/Default.aspx

Table 3. Results of the primary inventory of POPs-BDEs in 2014 based on data provided by Statistics Lithuania.

Homologues	Distribution homologues octa-BDE	POPs-BDEs in import for inventory 2014	POPs-BDEs in stocks in 2014 (kg)	Amount of POPs-BDEs in the EEE entering waste stream in 2014 (kg)	Amount of POPs-BDEs in recycled polymers	Total amount (kg)
Total amount of octa-BDEs		1336	18467,1	2217,55	Not available	**22020,65**
Hexa-BDEs	11 %	146,91	2031,38	243,93	-	**2422,22**
Hepta-BDEs	43 %	574,48	7940,85	953,54	-	**9468,87**
Others		614,56	8494,87	1020,08	-	**10129,56**

The used EEE is being collected by Operators of EEE Waste Management, treated in accordance with The Rules on the Waste of Electrical and Electronic Equipment (approved by Order No D1-481 of the Minister of Environment of the Republic of Lithuania on 10 September 2004, as last amended on 22 June 2015) (hereinafter – the Rules on the Waste of Electrical and Electronic Equipment).

Amount of POPs-PBDEs in the transport industry

According to data of United Nations Environmental Programme (2010), in 1975-–2005 POPs-BDEs were widely used in transport industry. On average, during the processing of one vehicle 160 g of penta-BDEs were used. The Guidance on the inventory of POPs-BDEs developed by the Secretariat of the Stockholm Convention[9] provides methods to be used to calculate the potential amount of penta-BDEs in vehicles. When calculating, it is essential to assess regional adjustment factor – index that shows the percentage of vehicles (manufactured in the period of 1975–2005) potentially processed by penta-BDEs. For Lithuania (likewise entire Europe) 0,05 value of the index is assigned. For vehicles manufactured in USA, such value of index is 0,5, and this supposes that 50% of all vehicles manufactured in USA (in 1975-2004) contains penta-BDEs. 0,05 index of regional factor is also applicable for vehicles manufactured in the Asian countries.

Based on the hypothetical calculations of the amount of POPs-BDEs in transport industry and taking into account the average age of the vehicles in the country, it is presumed that 90% of individual cars and trucks were manufactured in 1975–2004 and 95% of buses were manufactured in 1975–2004. According to the data provided by Statistics Lithuania nearly 3% of first-time registered vehicles in Lithuania are being imported from USA. The details of the quantative calculations of POPs-BDEs in used (old) vehicles in Lithuania are provided in Table 4.

[9] Guidance for the inventory of polybrominated diphenyl ethers (PBDEs) listed under the Stockholm Convention on POPs. http://chm.pops.int/Implementation/NIPs/Guidance/GuidancefortheinventoryofPBDEs/tabid/3171/Default.aspx

Table 4. POPs-BDEs amounts in used vehicles in 2014.

Number of cars/trucks (manufactured in USA) before 2005	Amount of Penta-BDEs per car/truck	Total amount of POPs-BDEs in cars in use (cars manufactured in USA only)
34235	160 g per car	Number of cars and trucks x 0,16 kg x 0,5*= 2738,8 kg
Number of cars/trucks (manufactured in other regions) before 2005	Amount of Penta-BDEs per car/truck	Total amount of POPs-BDEs in cars in use (manufactured in other regions than USA)
110696	160 g per car	Number of cars and trucks x 0,16 kg x 0,05*= 885,6 kg
Number of buses (manufactured in USA before 2005)	Penta-BDEs per bus	Total amount of POPs-BDEs in buses (manufactured in USA)
0	1000 g per bus	Number of buses x 1 kg x 0,5*= 0 kg
Number of buses (manufactured in other regions than USA before 2005)	Amount of Penta-BDEs per bus	Total amount of POPs-BDEs in buses (manufactured in other regions than USA)
6428	1000 g per bus	Number of buses x 1 kg x 0,05*= 321,4 kg
Total amount of penta-BDEs	-	**3945,8 kg**

* regional factor – Factor estimating the share of vehicles impacted by penta-BDEs agents in the region of production (1975-2004): USA – 0,5, other regions – 0,05.

Amount of POPs-BDEs in vehicles imported (incl. from the EU) into the territory of Lithuania

Import of cars, trucks and buses may be an important source of POP-BDEs. Since age of cars in Lithuania averagely reaches 13,8 years, and the country itself does not manufacture passenger cars, the largest number of imported vehicles are older than 10 years, thus they may be assigned to the manufacturing period 1975-2004 (when penta-PBDEs were widely used). The calculations of the amounts of POPs-BDEs in vehicles are provided in Table 5.

Table 5. Amount of POPs-BDEs in imported (icl. from the EU) used vehicles in 2014.

Number of imported cars/trucks (manufactured in USA before 2005)	Amount of Penta-BDEs per car/truck	Total amount of POP-BDEs in imported vehicles (manufactured in USA)
14186	160 g per car	Number of cars x 0,16 kg x 0,5*= 1134,88 kg
Number of imported cars/trucks (manufactured in other regions before 2005)	Amount of Penta-BDEs per passenger car/truck	Total amount of POP-BDEs in running vehicles (vehicles manufactured in other regions than USA)
76814	160 g per car	Number of cars x 0,16 kg x 0,05*= 614,5 kg
Number of imported buses (manufactured in USA until 2005)	Penta-BDEs per bus	Total amount of POP-BDEs in buses (manufactured in USA)

0	1000 g per bus	Number of buses x 1 kg x 0,5*= 0 kg
Number of imported buses (manufactured in other regions than USA before 2005)	Penta-BDE per bus	Total amount of POP-BDEs in buses (manufactured in other regions than USA)
221	1000 g per bus	Number of buses x 1 kg x 0,05*= 11 kg
Total amount of penta-BDEs	**-**	**1760,38 kg**

* regional factor – Factor estimating the share of vehicles processed by penta-BDEs agents in the region of production (1975-2004): USA–0,5, other regions – 0,05.

Amount of POP-PBDEs in end of life vehicles

Number of end of life vehicles contributes to the calculations of amounts of POPs-BDEs in the country. The available information shows the number of end of life vehicles in certain years in Lithuania; however, to reveal the origin of such vehicles is nearly impossible. Thus it can be presumed that 3 % of end of life vehicles is imported from USA. Table 6 provides the amount of POP-PBDEs in end of life vehicles. It is presumed that 90 % of vehicles were manufactured before 2005.

Table 6. Amount of POP-PBDEs in end-of- life vehicles in 2012[10].

Number of end of life vehicles (manufactured in USA before 2005)	Amount of Penta-BDEs per vehicle	Total amount of POPs-BDEs in end of life vehicles (manufactured in USA)
829	160 g per vehicle	**Number of vehicles x 0,16 kg x 0,5*= 66,3 kg**
Number of end of life vehicles (manufactured in other regions than USA before 2005)	Amount of Penta-BDEs per vehicle	Total amount of POPs-BDEs in end of life vehicles (manufactured in other regions than USA)
26822	160 g per vehicle	**Number of vehicles x 0,16 kg x 0,05*= 214,57 kg**
Total amount of penta-BDEs	-	**280,9 kg**

*regional factor – Factor estimating the share of vehicles processed by penta-BDEs agents in the region of production (1975–2004): USA – 0,5, other regions – 0,05.

POPs-BDEs in the environment

The monitoring POPs-PBDEs in the environmental compartments is being conducted in accordance with the National Environmental Monitoring Programme. By implementing the monitoring activities defined in the above Monitoring Programme POPs-BDEs were not found in surface water and in bottom sediments of transitional waters (Curonian Lagoon) and the Baltic Sea during 2008-2014.

In 2011, during the implementation of the project ‘Baltic Actions for the Reduction of Pollution of the Baltic Sea from Priority Hazardous Substances LIFE/07/ENV/EE/000122’ financed by the the LIFE+ financial instrument of the

[10] The given data of 2012 is the most up to date.

European Community (hereinafter – BaltActHaz)[11], POPs-BDEs were detected in samples of waste water taken from cellulose and paper manufacturing companies, leather processing companies, plastic material manufacturing and recycling companies, construction materials manufacturing companies, shopping malls, companies conducting the treatment of end-of-life vehicles, shipyard effluents, filtrates from landfills and sewage water from residential areas. During the project the sources as possibly most likely emitters of POPs-BDEs in Lithuania were identified (see Table 7).

Table 7. POPs-BDEs sources in Lithuania.

Source of pollution	Relevance of the pollution source	Comments
Industry	Relevant	Even though the use of POPs-PBDEs is prohibited, in 2011 these substances were detected in sewage water from 10 different types of industries.
Agriculture	Relevant, if sewage sludge contaminated by POPs-PBDEs is further used for soil fertilization.	According to the provisions of the Lithuanian Normative Environmental Protection Document LAND 20-2005 'Requirements of Sewage Sludge Use for Fertilization' (approved by Order No 349 of the Minister of Environment on 29June 2001 (as last amended on 28 July 2016), POPs-BDEs are not included into the list of sludge quality parameters subject to measurement.
Products/Articles	Relevant	Old (second hand) articles, articles for recycling and imported from other countries may contain POPs-PBDEs. Results of the investigation (testing) performed in 2011 indicated that these chemicals were detected in sewage water from residential areas.
Landfills	Relevant	POPs-BDEs were found in filtrates from landfills.

In 2012-2015, the project 'Baltic Info Campaign on Hazardous Substance LIFE10INF/EE/108' (hereinafter – BaltInfoHaz), funded by the LIFE+ financial instrument of the European Community in Lithuania was implemented. Within the frame of this Project in 2013, the testing of the blood of 10 volunteers and 7 samples of household dust taken from the living premises of those volunteers was performed. 7 POPs-BDEs (BDE-17, BDE-28, BDE-47, BDE-49, BDE-99, BDE-100, BDE-153) were detected in volunteers' blood samples and the same POPs-PBDEs were detected in household dust samples[12].

Analysis of data on import (including from the EU Member States), use and export (including to the EU Member States) of articles containing POPs-BDEs serves as the biggest source of information on the amount of POPs-BDEs in Lithuania. However, it is impossible to estimate amounts of POPs-BDEs in used raw materials in Lithuanian textile industry since textile manufacturers do not have information on flame retardants present in raw materials for textile articles.

[11] "Baltic Actions for the Reduction of Pollution of the Baltic Sea from Priority Hazardous Substances (BaltActHaz)". Recommendations for Minimization of Hazardous Material in Lithuania, 2011. Access from: http://gamta.lt/files/Rekomendacijos%20LT.pdf

[12] „Pagalvok, kai perki". Access: http://www.pagalvok.lt/wp-content/uploads/2013/11/dulkiu-tyrimo-rezultatai.pdf

Summarizing the status of POPs-BDEs in Lithuania, it can be concluded that:

1. In Lithuania POPs-BDEs were not produced, imported or used as chemical substances in 2008-2014. Within the frame of the National Environmental Monitoring Programmes for 2005-2010 and for 2011-2017, POPs-BDEs were not detected in the surface water and bottom sediments in tested samples. However, these chemical substances were detected in samples from Lithuanian industrial companies' waste water and sewage water from residential areas during single testing within the activities of projects funded by European Union funding mechanisms LIFE+. In 2014, POPs-BDEs were detected in breast milk of mothers living in Lithuania.

2. In Lithuania, the main articles possibly containing POPs-BDEs are electric and electronic equipment (television set with cathode ray tubes, monitors) and vehicles manufactured before 2005.

3. According to calculations made in 2015, articles (manufactured before 2005) used in Lithuania could contain more than 47 t of POPs-BDEs. According to the data of 2013, waste of EEE and end of life vehicles could contain around 4 t of POPs-BDEs (see Table 8).

Table 8. Data of the POP-PBDEs inventory performed in Lithuania in 2015.

	Amount in imported articles, manufactured before 2005, t	**Stocks/use in articles manufactured before 2005, t**	**Amount in waste, in 2013, t**
octa-BDEs	3,096	32,421	2,498
tetra-BDEs	0,580	1,302	0,092
penta-BDEs	1,021	2,288	0,162
hexa-BDEs	0,286	2,346	0,265
hepta-BDEs	0,583	7,959	0,956

The estimated (calculated) amounts of POPs-BDEs provided above are theoretical and may not correspond the real situation within a country. For more detailed data, qualitative analysis of the composition of EEE and its waste, vehicles and end of life vehicle is required.

4. EEE waste in Lithuania is appropriately collected and recycled; however there is no demand for reuse of raw materials. In order to evaluate the POPs-BDEs concentration in EEE plastic waste that are used after recycling, laboratory testing is required.

2.3.4 Hexabromocyclododecane (HBCDD)

HBCDD are one of the new POPs which status in Lithuania was not assessed in the first NIP.

In the European Union (and in Lithuania) production, placing on the market and use of HBCDD is prohibited by Regulation (EC) No 850/2004 (as amended by Commission Regulation (EU) 2016/293 of 1 March 2016 amending Regulation (EC) No 850/2004 of European Parliament and Council on persistent organic pollutants as regards Annex I). However, Regulation (EC) No 850/2004 provides for an exemption: the use of HBCDD (whether on its own or preparations) in the production of expanded polystyrene (EPS) articles and the production and placing on the market of HBCDD to be used in buildings is allowed with condition that such use is authorized in accordance with Regulation (EC) No 1907/2006 of the European Parliament and Council concerning the registration, evaluation, authorization and restrictions

(hereinafter – REACH Regulation)[13]. The specific exemption registered by the European Union in the Register of Specific Exemptions expired on 21 August 2017 after REACH granted authorization expired (in accordance with the EU withdrawal notification). Articles that contain HBCDD and which were in use before or on 22 March, 2016 may continue to be used and further placed on the market.

According to the IS AIVIKS and other available information HBCDD (as chemical substance itself) was not produced, exported, imported or supplied to Lithuania 2007–2013. During development of the primary inventory of HBCDD in 2015, data of the year 2014 were not available yet; however its registration in Lithuanian IS AIVIKS is unlikely to happen. According to the available data, HBCDD is not used in Lithuanian industrial processes. The possibility of using textile coated HBCDD is not excluded.

HBCDD in manufacturing of insulating materials for the buildings

At the time of the development of the primary inventory of HBCDD, in Lithuania major part of raw materials (foam billets) used in EPS production was imported from the European Union Member States (basically from Poland and Germany). The analysis of information provided by EPS manufacturers and of a survey that collected information from representatives of the Lithuanian Expanded Polystyrene Association (LEPA) (production of its members comprises 90 % of EPS sold in Lithuania and major part of their products are used for building insulation) allows to make assumption that all EPS production until 2013 (inclusively) contained HBCDD, and since 2013 it no longer contains HBCDD.

Potential amount of HBCDD used for production of EPS until 2013 was calculated in accordance with 'Guidance for the Inventory, Identification and Substitution of Hexabromocyclododecane[14]' prepared by the Secretariat of the Stockholm Convention. The amount of HBCDD used in Lithuania for production of polystyrene products is provided in Table 9.

Table 9. Amount of HBCDD used in EPS and XPS raw materials for production of polystyrene boards in Lithuania.

Year	Amount of EPS and XPS used (kg)	Amount of HBCDD (kg), concentration of 0,5%	Amount of HBCDD (kg), concentration of 2,5%
2005	7578863	3789	189471,57
2006	10281071	5141	257026,77
2007	14087914	7044	352197,8
2008	11569711	5785	289242,77
2009	7352762	3676	183819
2010	8613726	4307	215343,1
2011	10322633	5161	258065,82
2012	8354170	4177	208854,2
2013	16469300	8235	411732,5

[13] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC (OJ 2006 L396, p. 1).

[14] Guidance For the Inventory, Identification And Substitution of Hexabromocyclododecane (HBCDD) http://chm.pops.int/Portals/0/download.aspx?d=UNEP-POPS-NIP-GUID-GuidanceForInventoryAndSubstitution.pdf

In comparison with the report prepared by the European Chemicals Agency which assess the use of HBCDD in 2007 in the entire European Union, the amount of HBCDD used in Lithuania comprises 0,06-3,2 % of amount of HBCDD used in the European Union (11 000 t of HBCDD was used in in 2007)[15].

It is likely that in 2014 the major part of EPS foam used in Lithuania did not contain HBCDD. According to data provided by Statistics Lithuania, in 2014, 76 % of EPS foam articles were introduced into Lithuania from Poland, 6 % from Latvia and the same amount from Sweden and Germany. Import from the third countries (Russia, Ukraine, Thailand, Turkey and the Republic of Korea) amounted 3,6 % of all articles. From the latter mentioned exporting countries only Turkey is registered in the Register of Specific Exemptions of Stockholm Convention for HBCDD use in production of EPS and EXP. In 2014, 7458 kg of EPS potentially containing from 37 to 186 kg of HBCDD was imported from Turkey. According to information provided by the Lithuanian Expanded Polystyrene Industry Association (LEPA), polystyrene foam and its materials imported to Lithuania (including introduction from the EU Member States) in 2014 did not contain HBCDD. However, it is impossible to elaborate which part of imported articles containing HBCDD from Turkey is left in Lithuania and which part was exported or transferred to the Member States of the European Union.

The EPS use for building insulation started in 1970–1980 s, the major amounts were used in 1990–2005. The duration of EPS use is long (30–50 years), thus it is likely that the largest amounts of this EPS with possibly containing HBCDD in construction waste will accumulate in around the years of 2020-2050 (potential amounts accumulated should correspond the used amounts).

HBCDD in manufacturing of polystyrene packaging

According to results of investigations conducted in Japan, HBCDDs were detected in the packaging of electric and electronic products. There are no studies conducted in the European Union examining which part of such packaging contains HBCDD and the quantities of such packaging manufactured and recycled worldwide and [16] in individual countries; besides, there are no data on the quantities of packaging containing HBCDD in Lithuania. Theoretically, recycled EPS may contain HBCDD residues, thus it is not recommended to use this type material for the manufacture of packaging, especially for food packaging.

Lithuanian polystyrene packaging's manufacturers use material purchased from the EU Member States, i. e. not containing HBCDD. The representative of polystyrene packaging's manufacturers (company UAB 'Baltijos polistirenas'), during interview assured that newly produced EPS packaging does not contain HBCDD as fire retardant.

HBCDD in manufacturing of textile

Lithuanian textile industry companies state that HBCDD and raw materials containing HBCDD have not been used in the manufacturing processes in recent years; there is no information about use of such materials in the past. Textile industry

[15] European Chemical Agency. Data on manufacture, import, export, uses and releases of HBCDD as well as information on potential alternatives to its use. IOM Consulting, 2008. Access from: http://echa.europa.eu/documents/10162/13640/tech_rep_hbcdd_en.pdf

[16] Consortium Expert Team to Support Waste Implementation (ESWI). Study on waste related issues of newly listed POPs and candidate POPs. 2011. Access from: http://ec.europa.eu/environment/waste/studies/pdf/POP_Waste_2010.pdf

representatives do not reveal the alternatives for HBCDD they are using while treating this type of information as a commercial secret; however they assured that the data on the use of chemical substances and preparations are provided to the IS AIVIKS according to the corresponding the legal. Alternative materials are being purchased from the EU manufacturers or imported from non-EU countries.

HBCDD in the environment

HBCDD was not included into the National Environmental Monitoring Programme for 2005-2010 and 2011-2017. In 2009, a single test of bottom sediments in Baltic Sea on alfa-HBCDD was performed. Alfa-HBCDD was not detected in the bottom sediment in the sample from the Baltic Sea.

When demolishing old buildings which were insulated with polystyrene foams containing HBCDD, only small amount of HBCDD is emitted into the air. Currently, the majority of old buildings in Lithuania are not being demolished, but they are being renovated by covering the buildings with heat insulating material boards that likely do not contain HBCDD; therefore it can be stated that no emissions to the environment are likely to occur. Nonetheless, it is quite credible that after 20-50 years such buildings will be demolished, thus it is important to set the rules for demolition waste containing HBCDD management and preventive measures of the HBCDD emission to the environment.

According to data provided by HELCOM, the concentrations of HBCDD in the Baltic Sea are low. Single measurements of HBCDD in water and bottom sediments of Klaipėda Port area of the Baltic Sea performed in Lithuania indicated concentrations of HBCDD lower than limit of quantification (LOQ)[17].

During the implementation of the project BaltActHaz in 2011, HBCDD was monitored in waste water from industrial companies. According to the results of the testing, HBCDD was detected in waste water of company producing plastics (0,76μg/l), shipyard (0,018 μg/l), company producing construction materials (0,26 μg/l) and shopping malls (0,14 μg/l ir 0,29 μg/l). HBCDD was not detected in samples taken from wastewater treatment plant sewages, surface water and filtrates from landfills.

In 2012-2015, within the frame of the BaltInfoHaz project the blood of 10 volunteers was tested – HBCDD was not detected in samples taken.

According to data of the surveys on POPs in human breast milk in Lithuania performed by the Health Education and Disease Prevention Centre under the Ministry of Health (in cooperation with the World Health Organization and the United Nations Environment Programme) in 2014, HBCDD was detected in the breast milk of Lithuanian mothers. HBCDD concentrations determined in samples taken were as follows: HBCDD – 3,7 ng/g, alfa-HBCDD – 3,4 ng/g, beta-HBCDD – 0,3 ng/g, gamma-HBCDD – not detected

Summing up the status of HBCDD in Lithuania, it can be concluded that:

1. HBCDD (as substance itself) in Lithuania was not produced, exported, imported or placed on the market in 2007–2013. At the time of development of the primary inventory of HBCDD in 2015, data for 2014 were not finalized, but it is unlikely that it would be registered in the IS AIVIKS.

[17] Consortium of Maritime Research. Arrangement of documents for Management of Environment Protection in Lithuanian Coast of the Baltic Sea. V interim report. Access from: http://www.ku.lt/jmtc/files/2014/02/Atnaujinta-j%C5%ABrin%C4%97-steb%C4%97senos-programa.pdf

2. According to the available information HBCDD is not used in the industrial (manufacturing) processes in Lithuania. Before 2014, only EPS foam billets (raw materials) containing HBCDD were used for production of heat insulation materials (boards) or packaging. The possibility of use of textile coated HBCDD before 2005 is not excluded.

3. Within frame of the initial inventory the theoretically calculated HBCDD amount, which covers the introduction (from the EU Member States) and import into Lithuania of polystyrene foam (EPS and XPS) in 2013 can be from 8235 kg (assuming that HBCDD content in article is 0,5% of ingredients) to 411 732,5 kg (assuming that HBCDD content in article is 2,5%). The total amount of used HBCDD in polystyrene foam in Lithuania comprises 0,06 to 3,2% of total EU consumption (2007).

2.3.5. Perfluorooctane sulfonic acid (PFOS) and its derivatives/ perfluorooctane sulfonyl fluoride (PFOS-F)

Perfluorooctane sulfonic acid, its derivatives (PFOS) and PFOS-F (here collectively designated PFOS) are attributed to the new POPs substances, thus the status of such substances has not been analysed in the first NIP.

PFOS in articles

According to the data from IS AIVIKS and information provided by the Environmental Protection Agency, in 2007-2013 PFOS (as separate chemical substances) were not produced, exported, imported or supplied in Lithuania. At the time of development of the primary inventory of PFOS in 2015, data for 2014 were not finalized; however the registration of such substances in database of IS AIVIKS is unlikely to happen. Moreover, Lithuanian manufacturers and importers of chemical substances – on their own or in preparations (import from non-EU countries) have not registered PFOS in the database of European Chemical Agency (in accordance with REACH Regulation provisions).

According to the available information, PFOS (as a chemical substances itself) are not used in industrial processes in Lithuania. Production and use of PFOS is prohibited for all parties (Lithuania as well) of the Stockholm Convention except for acceptable purposes and specific exemptions as provided for by Part I of Annex B of the Stockholm Convention. In the European Union (and in Lithuania) the list of exemptions is referred only to acceptable purposes, i. e. exceptions in prohibitions of the production, placing on the market and use of PFOS are laid down in Regulation (EC) No 850/2004 and its scope is much narrower than those provided for in the Stockholm Convention. This means that in the European Union (and Lithuania) PFOS are allowed to be produced and placed on the market for the following specific uses subject to reporting to the European Commission every four years on the progress made to eliminate PFOS:

- photoresists or anti reflective coatings for photolithography processes of;
- photographic coatings applied to films, papers or printing plates;
- mists suppressants for non-decorative hard chromium (VI) plating in closed loop systems;
- hydraulic fluids for aviation.

It is likely that in Lithuania PFOS may be used for hard chrome plating (using chromium VI), since in there are no suitable alternatives. However, preparations containing PFOS substances are not registered in the IS AIVIKS, thus, it is not

possible to accurately estimate the amount of PFOS that are used in this industry. In this case further analysis is required.

As regards photography sector, it is quite credible that preparations containing PFOS are used in non-digital photography by professionals. This sector comprises less than 1% of all photo-studios in Lithuania. The possible use of those chemicals is treated as insignificant.

According to the data provided by the Semiconductor Physics Institute, it can be presumed that the amount of PFOS currently in use in Lithuania could be less than 1kg.

According to the Statistics Lithuania, it is impossible to distinguish the amount of used aviation hydraulic fluids containing PFOS from all aviation hydraulic fluids; however the survey of representatives of the companies servicing aircraft maintenance has shown that such fluids are used. A thorough survey of users/importers of aviation hydraulic fluids concerning the composition of such hydraulic fluids is needed.

The information provided by the Lithuanian Apparel and Textile Industry Association (hereinafter – LATIA), indicates that PFOS are not used in Lithuanian textile industry. It is quite credible that other companies that are not LATIA members also do not use such chemical substances. The prevailing trend shows that fabrics are not being processed in Lithuania, i. e. imported fabrics are already dyed or otherwise processed.

There is no mass carpet production in Lithuania, since the companies that manufactured carpets in the past have requalified their activities to import and sales of finished carpets for consumers. Synthetic carpet manufacturers do not use PFOS in their industrial processes as well.

PFOS in the environment

These chemical substances were monitored in 2014 only in surface waters (Nemunas, Neris, Nevėžis and other rivers) within the frame of the National Environmental Programme. During the monitoring determined concentrations of PFOS reached 0,001-0,005μg/l, and PFOS-F – 0,0012-0,035 μg/l.

In 2011, during implementation of the project BaltActHaz, industrial waste water was monitored for PFOS levels: PFOS were detected in the waste water of company producing plastics (0,014 μg/l), vehicles decommissioning company (0,058 μg/l) and in filtrates of landfills (0,019 μg/l and 0,039 μg/l). Meanwhile these substances were not detected in the sewage of wastewater treatment plants and surface waters.

In 2013, during the implementation of the project BaltActHaz, the blood of 10 volunteers was tested for PFOS and PFOS was detected in all 10 samples in concentration of 0,4-6,4 ng/g. Within the frame of this project the performed testing of household dust (7 samples from different households), revealed that PFOS was present in 2 samples with concentration of 2,2-2,6 μg/kg.

Summing up the status of PFOS in Lithuania, it can be concluded that:

1. Majority of industries in Lithuania (e. g. textile, fire extinguishing sector) have substituted PFOS with alternatives.
2. Small amounts of preparations containing PFOS are used in photography and semiconductor manufacturing.

3. It is likely that larger amounts of such substances are used in aviation hydraulic fluids and chromium plating processes. However, in order to estimate precise amount of PFOS, an in-depth inventory of possible PFOS users is needed.

2.3.6. Unintentionally produced POPs

The Annex C of the Stockholm Convention lists chemical substances that are emitted from anthropogenic sources (unintentionally produced POPs) whose emission quantities are subject to continuing minimization, and, where feasible, ultimate elimination. Such substances are as follows: PCDF and PCDD, HCB, PeCB, PCB. The Parts II and III of the Annex C of the Stockholm Convention lists source categories of unintentional production, among which several sources of particular relevance to Lithuania may be mentioned: uncontrolled open burning of waste, including uncontrolled burning of landfill sites, residential combustion sources, fossil fuel–fired utilities and industrial boilers, firing installations for wood and other biomass fuels, etc.

2.3.6.1. Dioxins and furans

During the drafting the first NIP in 2005 it was estimated that annual emissions to the environment are from 38 to 48g of I-TEQ PCDD/PCDF in Lithuania.

Within process of preparation of the updated NIP (in 2015) following the methodology on identification and evaluation of dioxin and furan (PCDD/PCDF) emissions, prepared by the United Nations Environment Programme[18], PCDD/PCDF emissions to air, water and soil in 2012 were evaluated (as data of 2012 were available by that time). The sources of PCDD/PCDF emissions in Lithuania in 2012 were estimated on the basis of sources selected as potentially significant or insignificant. After the assessment of all activities and excluding such activities that are not relevant to Lithuania, the list of activities (see Table 10) with calculations of emissions to air, water and other environmental elements was prepared accordingly.

Table 10. Source Groups and Associated Source Categories whose PCDD/PCDF emissions in Lithuania were evaluated.

Waste incineration			
Municipal waste incineration	Medical waste incineration	Hazardous waste incineration	Animal bones incineration (destruction of animal carcasses)
Ferrous and non-ferrous metal production			
Aluminium production	Copper production	Iron and Steel production and foundries	
Brass and bronze production	Lead production	Zinc production	
Power generation and heating			
Fossil-fuel power plants	Biomass power plants	Landfill, biogas combustion	Biomass combustion for household heating and cooking
Fossil fuel combustion for household heating and cooking			
Production of mineral products			
Cement production	Lime production	Ceramics production	Glass production
Asphalt mixing			

[18] United Nations Environment Programme and Stockholm Convention. Toolkit for Identification and Quantification of Dioxins, Furans and Other Unintentional POPs. http://chm.pops.int/Portals/0/download.aspx?d=UNEP-POPS-TOOLKIT-TOOLK-PCDD-PCDF-2012.En.pdf

Transport		
Uncontrolled burning processes		
Biomass burning	Waste burning and accidental fires	
Production and use of chemicals and consumer goods		
Wood-pulp and paper production	Leather refining	Textile production
Oil (petroleum) refining		
Miscellaneous		
Crematoria	Meat smokehouses	
Tobacco product use (tobacco smoking)		
Disposal and Landfill		
Sewage/sewage treatment	Waste oil treatment (non–thermal)	
Hot spots		

Results of the exercised calculations of emissions of dioxins and furans in Lithuania from all of the identified potential sources are provided in the Table 11. When assessing general situation in Lithuania it was estimated that the major part of pollutants are emitted into the air and that such pollutants comprise 51,9 % of all released dioxins and furans. Besides, it was estimated that the most significant sector/source category within the country that emits the majority of dioxins and furans is 'Power generation and heating'.

Table 11. Emissions of dioxins and furans in Lithuania in 2012.

No.	Source group	Annual emissions (g TEQ/year)				
		Air	**Water**	**Land**	**Production**	**Waste**
1	Waste combustion	0,144?				0,080
2	Ferrous and non-ferrous metal production	0,274?	0,0001?			2,834?
3	Power generation and heating	3,664?				0,247
4	Production of mineral products	0,067?				0,002?
5	Transport	0,118?				
6	Uncontrolled burning processes	0,225?		0,193?		
7	Production and use of chemicals substances and consumer goods	0,006			0,300?	
8	Miscellaneous	0,105?				0,352?
9	Disposal and landfill		0,225			0,034
10	Hot spots					
1-10	**Total amounts**	**4,603?**	**0,225?**	**0,193?**	**0,300?**	**3,547?**
	Total			**8,868?**		

* Blank box indicates insignificant amount of pollutants emitted.
"?" indicates the amount of emitted pollutants could be considered as significant though emission factors have not yet been estimated.
"?" sign following the figure indicates that figure might be corrected if a detailed quantitative assessment of all groups of categories would be provided

Total amount of PCDD/PCDF released to the environment in 2012 reaches nearly 9g I-TEQ. In comparison with the results of the 2005 inventory (38g I-TEQ), it can be concluded that levels of PCDD/PCDF emissions to the environment decreased more than 4 times in Lithuania. However, it should be noted that due to a lack of data significant part of sources generating emissions have still not been evaluated properly,

thus it can be presumed that the total amount of emissions could reach 10-12g I-TEQ/y.

The calculated decreased amount of PCDD/PCDF emissions is considered as quite realistic in correspondence with the fact that Lithuania has closed nearly 800 of old landfilling sites (only 11 are left) soon after joining the European Union, and this results in the decreased probability of emissions caused by landfills' fires. Besides, the extended waste collection system contributes to a reduction in potential waste incineration in households. The Programme of Medical Waste Management in Health Service has contributed to the improved management of such waste. Thus, to summarize, it can be stated that following the presentation of the first NIP, the country has introduced effective measures aimed at reducing the unintentional production of POPs.

Dioxins and furans in the environment

During the implementation of the National Environmental Monitoring Programme in 2005-2010 and 2011-2017 emissions of dioxin and furan into the air were measured in the period of 2008-2012. Dioxin and furan emissions during the monitoring period did not change much (see Fig. 2).

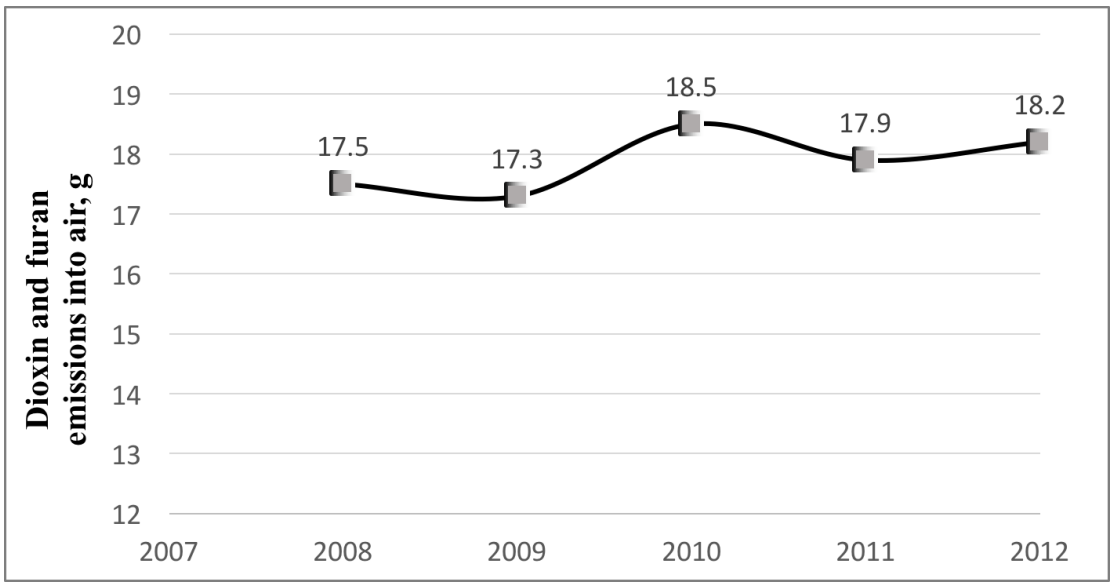

Figure 2 Dioxin and furan emissions to air in 2008-2012 (no monitoring in 2013-2014).

The National Food and Veterinary Risk Assessment Institute performs the monitoring of dioxin, furan and dioxin-type PCB pollutants in farmed fish and fishery products that are intended to be used as food or feed. The MAC for dioxin and dioxin-type PCBs in foodstuffs is set in Regulation (EC) No 1881/2006, and for the feedstuffs – Directive 2002/32/EC of the European Parliament and of the Council of 7 of May 2002 on undesirable substances in animal feed. According to the data provided by the National Food and Veterinary Risk Assessment Institute in 2008-2011 the testing of these pollutants has shown results as follows: in 13 samples of Baltic herring there were 3 cases when the level of dioxins was higher than MAC (in 2008 – 2 samples, in 2009 – 1 sample), the sum of dioxins and dioxin-type PCBs MAC exceeded the norms 2 times (both in 2008), meanwhile in 14 samples of sprat the level of dioxins did not exceed the MAC level. Within the same period, analysis of 7 samples of Baltic salmon resulted in exceedance the MAC dioxins in 2 samples

(in 2008 and 2011), meanwhile the concentration of dioxins and dioxin-type PCB was exceeded once (in 2011). Tests of cod liver were performed for 7 samples, including 2 samples of processed products that were taken from retail malls, and as results have shown, the amount of dioxin and dioxin-type PCB were above the MAC level.

In accordance with the annual plan for feedstuffs monitoring, in 2011 7 samples were tested for dioxins and dioxin–like PCBs, and all of them were found to be in compliance with the established norms.

According to the data provided by the State Food and Veterinary Service, the possibility that fat fish, caught in Lithuanian shores of Baltic Sea could contain concentrations of dioxins, furans and PCBs exceeding the MAC provided for in the Regulation (EC) No 1881/2006 is around 8-10%. Thus it follows that in the shores of Baltic Sea about 900-1200 t of fish contaminated by dioxins, furans and PCBs could be caught yearly, about 30-40 t of which expected to be unloaded in Lithuania.

The State Food and Veterinary Service implements the national residues monitoring programme in live animals and products of animal origin. Analyses cover animal meat, milk, eggs, fish and honey. Each year around 30 samples from different Lithuanian sites are taken for testing. According to the data obtained from the monitoring of harmful residues in samples of live animals and food products of animal origin performed in 2005-2012 in Lithuania, PCDD and dioxin-like PCBs concentrations in fish samples exceeded the MAC for cod liver by 2,2 times and in the Baltic herring and salmon muscles – by 1,7 times on average. In 2009, it was detected exceedance of MAC for dioxins in two fish samples: in one of the cases cod liver contained 80,3 pg/g of dioxin (MAC – 25pg/g); in the other case – the sum of dioxins, furans and dioxin-like PCBs was detected in Baltic herring at level of 16,4 pg/g (MAC of the sum of dioxins, furans and dioxin-like PCBs in fish muscle – 8pg/g). In 2010 the sum of dioxins, furans and dioxin-like PCBs in 2 fish samples exceeded the MAC: in the first case, the detected sum of dioxins, furans and dioxin-like PCBs in cod liver was 36,24pg/g (MAC for the fish liver – 25 pg/g); in the other case, the sum of dioxins, furans and dioxin-like PCBs was detected in Baltic herring at level of 4,62pg/g (MAC in fish muscle – 4pg/g).

The World Health Organisation together with the United Nations Environment Programme conducted the global survey on POPs in human breast milk. Lithuania participated in the survey in 1992–1993, 2008–2009 and 2013–2014. When analysing the levels of PCDD and PCDF and their isomers' concentrations in breast milk (in 1993, 2009, 2014), the decreasing trend was noticed (see Table 12). However, the fact that these chemical substances are still present in the main infant food, raises concerns and encourages to take further effective preventative measures for minimization of such substances' concentration in breast milk.

Table 12. PCDD and PCDF and their isomers' concentrations in breast milk in 1993, 2009 and 2014.

Chemical substance	Concentration pg/g fat Vilnius 2014	Concentration pg/g fat Vilnius 2009	Concentration pg/g fat Vilnius 1993	Chemical substance	Concentration pg/g fat Vilnius 2014	Concentration pg/g fat Vilnius 2009	Concentration pg/g fat Vilnius 1993
2,3,7,8-TCDF		0,635	1,3	OCDF		0,244	0,8
1,2,3,7,8-PeCDF	1,03	0,221	0,9	2,3,7,8-TCDD	1,05	1,3	5,4
2,3,4,7,8-PeCDF		4,87	9,1	1,2,3,7,8-PeCDD		1,24	2,8
1,2,3,4,7,8-HxCDF	0,52	1,25	4	1,2,3,4,7,8-HxCDD		0,884	1,8

Chemical substance	Concentration pg/g fat Vilnius 2014	Concentration pg/g fat Vilnius 2009	Concentration pg/g fat Vilnius 1993	Chemical substance	Concentration pg/g fat Vilnius 2014	Concentration pg/g fat Vilnius 2009	Concentration pg/g fat Vilnius 1993
1,2,3,6,7,8-HxCDF	1,69	1,11	3	1,2,3,6,7,8-HxCDD		2,19	4,7
2,3,4,6,7,8-HxCDF		0,497	1,8	1,2,3,7,8,9-HxCDD		1,21	1,5
1,2,3,7,8,9-HxCDF	0,44	< 0,022	-	1,2,3,4,6,7,8-HpCDD		5,84	7,2
1,2,3,4,6,7,8-HpCDF	2,45	1,42	3,8	OCDD	16,7	26,5	39,5
1,2,3,4,7,8,9-HpCDF		< 0,013	0,5				

2.3.6.2. Hexachlorobenzene (HCB) and Pentachlorobenzene (PeCB)

Theoretical calculations of the amounts of the unintentionally produced HCB and PeCB emissions to the environment are based on the amounts of burned fuel during various industrial processes. Taking into account the data on the amounts of used fuel within the country that were provided by Statistics Lithuania, theoretical amount of HCB and PeCB emitted to the environment in 2013 was calculated. Data are provided in Table 13 given below.

Table 13. Theoretical amount of HCB and PeCB emitted to the environment during the fuel combustion in 2013.

Type of fuel	Amount (g)	
	HCB	PeCB
Coal	35,54	517
Firewood	4,4	–
Waste	3,7	2300
TOTAL AMOUNT	**43,64**	**2817**

Theoretical amount of HCB and PeCB that was unintentionally produced during the municipal waste and coal combustion processes and emitted to the environment in 2013 was 43,64g and 2,817 kg respectively. In comparison with other Parties to the Stockholm Convention, PeCB and HCB emissions within the country are quite small and should not be a matter of concern.

Monitoring of unintentionally produced PeCB and HCB in the environment

Within frame of the National Environmental Monitoring Programme in 2008–2012 HCB emissions into the air were measured. Throughout the monitored period HCB concentration in the air have increased (see Fig. 3).

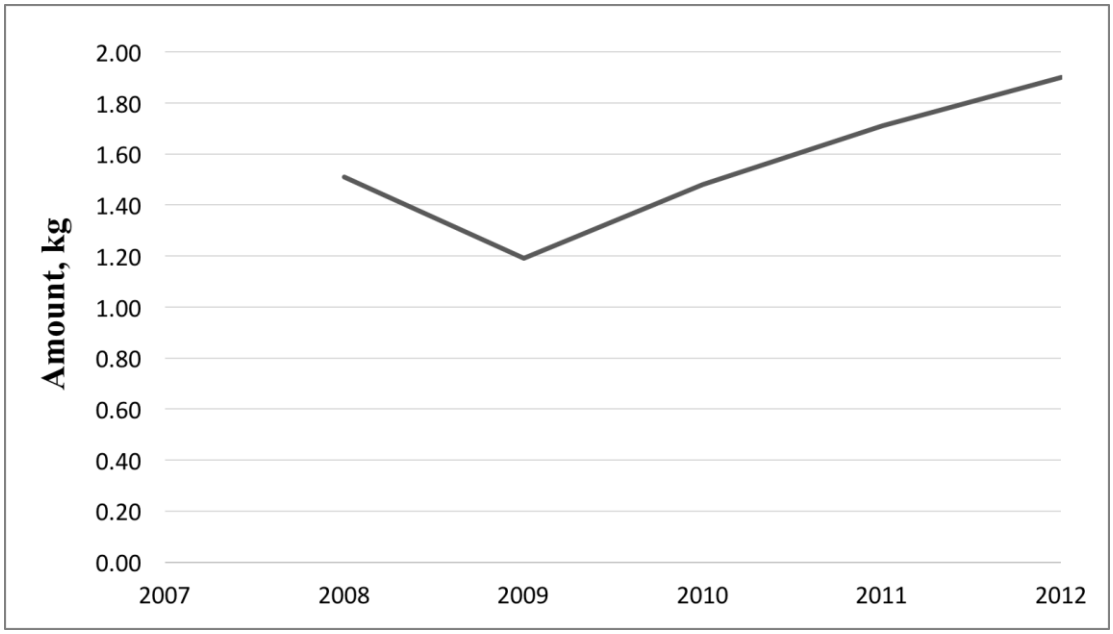

Figure 3. HCB emissions into air in 2008-2012 (not monitored in 2013-2014).

2.3.6.3. Polychlorinated Biphenyls (PCB)

In accordance with the Annual Reports submitted by the Environmental Protection Agency under the CLRTAP, PCBs emissions to the air in 1990–2013 are provided in the Table 14.

Table 14. Predictions of PCB levels in Lithuania in 1990-2013 according the Reports of the Environmental Protection Agency under the CLRTAP.

Year	Amount, kg
1990	373,695
1991	376,930
1992	374,849
1993	369,558
1994	367,942
1995	364,783
1996	361,021
1997	359,011
1998	355,642
1999	353,170
2000	350,542
2001	347,898
2002	344,905
2003	342,13
2004	338,294
2005	332,891
2006	327,730
2007	323,890
2008	320,579
2009	316,964
2010	310,549
2011	304,104
2012	299,663
2013	296,69

Monitoring of the unintentionally produced PCBs in the environment

The monitoring of PCBs has been carrying out in water bodies, groundwater and bottom sediments since 2004. In order to evaluate the level of contamination of inland waters by PCBs, PCBs were monitored under the National Environmental Monitoring Programme. According to the data provided by the Environmental Protection Agency, the obtained results showed no traces of PCBs in Lithuanian water reservoirs (monitored areas); therefore, it was decided to continue this type monitoring in only every three years. In 2008–2014 the monitoring of PCBs in Lithuanian water bodies was not carried out.

Within the frame of the National Environmental Monitoring programme in 2008–2012 PCB emissions to the air were monitored. During the monitoring, since 2010 PCB emissions have been increasing. Data obtained from the National Monitoring activities are provided in Table 15.

Table 15. Environmental monitoring of PCB in Lithuania in 2008-2014.

	2008	2009	2010	2011	2012	2013	2014
Water							
Baltic Sea	-	-	-	-	-	-	-
Kaunas Lagoon	-	-	-	-	-	-	-
Curonian Lagoon	-	-	-	-	-	-	-
Lakes	-	-	-	-	-	-	-
Rivers	-	-	-	-	-	-	-
Bottom sediments							
Baltic Sea	-	-	-	-	-	-	-
Kaunas Lagoon	-	-	-	-	-	-	-
Curonian Lagoon	-	-	-	-	-	-	-
Lakes	-	-	-	-	-	-	-
Rivers	-	-	-	-	-	-	-
Air (emissions)	1,50 kg	1,20 kg	1,48 kg	1,71 kg	1,90 kg	-	-
Biota	-	-	-	-	-	-	-

x- tested (not found, below the limit of detection); - not tested

Summing up the analyses and status of unintentionally produced POPs in Lithuania, it can be concluded that:

1. In 2005, when preparing the first NIP it was estimated that in Lithuania the amount of dioxins/furans emitted to the air annually reaches 38 g I-TEQ. During drafting the updated NIP the performed theoretical calculations of dioxins/furans (PCDD/PCDF) emissions to the air show that the emissions were nearly 9 g I-TEQ in 2012 (on the bases of data from 2012). Comparing the results of 2005 and 2012, PCDD/PCDF emissions to the environment have decreased by 4 times. However, it should be noted that due to the lack of data significant part of sources that generate emissions have not yet been evaluated, thus it can be presumed that the total amount of emissions could reach 10-12g I-TEQ/y.
2. Fundamental issues related to PCDD/PCDF emissions to the air are continuing to be the same as indicated in the first NIP – not allowable and irresponsible incineration processes in households, uncontrolled burning processes (fires) and power generation and heating using biomass and fossil fuel in power plants and households. Other sources of unintentional production of POPs indicated in Annex C (Part II and III) of the Stockholm Convention are not actual for Lithuania.

2.3.7. Information on stockpiles of POPs, contaminated sites and waste

Until the late 2014, 1379 warehouses of old pesticide or contaminated sites containing POPs pesticides were identified within the country. It is likely that the soil and the ground water in these territories are contaminated with POPs.

Theoretical calculations show that in buildings built in 1950-1970 there may be accumulated around 400 t of PCBs. When demolishing such buildings after 20-50 years the construction waste containing PCB will be generated.

According to theoretical calculations based on data of 2013, the amount of HBCDD in imported (from EU and non–EU countries) into Lithuania in EPS and XPS which has been used for thermal insulation of buildings was from 8235 kg (assuming that HBCDD in article is 0,5% of ingredients) to 411 732,5 kg (assuming that HBCDD in article is 2,5%). Renovation or demolition of buildings (after 20-50 years) that were insulated with EPS (containing HBCDD) will generate construction waste containing HBCDD.

2.3.8. Acceptable purposes of POPs in the future, registration of specific exemptions

On acceding to the Stockholm Convention, Lithuania did not register for specific exemptions regarding production and use of the initial POPs for which exemption provisions exist.

In Lithuania alternatives for POPs in many industrial processes are successfully used. In accordance with the provisions on the acceptable purposes of the Stockholm Convention, in Lithuania it is allowed to use the following POPs substances: PFOS, its derivatives and PFOS-F and also articles containing POPs-BDEs to be recycled. These uses are allowed in Lithuania as in the Member State of the European Union while the European Union has registered these POPs substances in the registers of acceptable purposes and specific exemptions. Lithuania has no intentions to apply for exemptions regarding production and use of the new POPs substances (listed in the Annexes of Stockholm Conventions by COP–4, COP–5, COP–6 Decisions).

2.3.9. Monitoring and testing of POPs substances

Environmental monitoring in Lithuania is performed in accordance with the Law on Environmental Monitoring (No VIII-529 adopted by the Parliament of the Republic of Lithuania on 20 November 1997, as last amended on 14 April 2016) and the National Environmental Monitoring Programme which is being prepared for 5 years period. The POPs monitoring in the Curonian Lagoon, the Baltic Sea and inland waters is being carrying out since 1993, air monitoring of POPs started in 2008.

The latest National Environmental Monitoring Programme implemented was for the period of 2011-2017 (recently has been revised and updated for the period of 2018–2023, approval pending). This Programme sets the system for national environmental monitoring corresponding to requirements of European Union Directives and Regulations related to the quantative and quality of environmental state assessments and satisfying the most important demands for national information on the state of environment. The National Environmental Monitoring Programme defines environmental goals and tasks, the implementation of which requires the national monitoring of the state of the natural environment and elements thereof, indicates assessment criteria for the implementation of such goals and tasks, meanings of these criteria and institutions responsible for implementation. With the aim of

implementation of the requirements of the Stockholm Convention on POPs and Regulation No 850/2004, the National Environmental Monitoring Programme for 2011-2017 provided for the continuation of POPs monitoring in water, bottom sediments and biota (this type monitoring is being carried out since 1993). Due to the limited financial resources, the Programme foresees the monitoring of only certain POPs pesticides in the Curonian lagoon, Baltic Sea, lakes and rivers, as well as PCBs in lakes and rivers (every three years; if concentration exceeds the MAC – once a year). Pesticides, attributed to POPs, are monitored in waters of the Curonian Lagoon, Baltic Sea, lakes and rivers, in river bottom sediments and fish. While Regulation No 850/2004 obliges EU Member States to submit the environmental monitoring data for PCDF, PCDD and PCBs to the European Commission, the National Environmental Monitoring Programme for 2011-2017 foresees the monitoring of PCDF, PCDD and, when adequate financial resources are available, – other POP substance levels in the air.

Lithuania is involved in the monitoring network of ambient air by passive sampling, MONET Europe (formerly MONET CEE, embracing only the Eastern and Central region at the beginning), since 2006. This programme involves more than 30 countries. The Environmental Protection Agency is responsible for taking and submission of samples from certain monitoring stations in Lithuania. Within the frame of MONET Europe aiming at the development of the monitoring network for POPs in the air Lithuania participated in the Pilot study on the presence of POPs in the ambient air: "Application of passive sampler for monitoring of POPs in ambient air"(Part II: Pilot study for the development of the monitoring network in the Central and Eastern Europe (MONET_CEEC, 2006)). In consideration of the latter study The POPs Monitoring in Ambient Air Programme 2006-2012 has been established (subject to periodical update). Objective of this programme was to control POPs concentrations on background level in Lithuania. During implementation of this programme 2, POPs passive sampling was carried out in several places in Lithuania: Rugšteliškis, Vilnius and Plateliai. Later, due to the lack of funds, monitoring was performed only in Plateliai monitoring station. The future plan in the framework of MONET programme is to monitor only Plateliai, because observations suggest that some POPs reveal a declining trend. POPs samples are taken all the year round (4 samples per year, every 3 months).

The State Food and Veterinary Service performs the monitoring of chemical substance residues (including POPs) in food. In order to estimate whether food quality satisfies the requirements of legal acts and does not pose risk for human health, the monitoring is being implemented in accordance with the annual monitoring plans. The State Food and Veterinary Service is performing the monitoring of Baltic Sea fish, intended for consumer consumption, for PCDDs and dioxin-type PCBs annually since 2004.

Under the survey coordinated by the World Health Organization (WHO) POPs substances are being monitored in Lithuania mother's breast milk. The first sampling was carried out in Lithuania in 1992-1993. Later Lithuania participated in the survey in 2008-2009 and 2013-2014. The World Health Organization, together with the United Nations Environment Programme (UNEP), conducted the latter two surveys by implementing the Global Monitoring Plan for POPs under the Stockholm Convention.

In order to make the proper decisions on POPs damage to the environment and human health, there is a need to further improve the monitoring of POPs and to obtain complete information about the distribution of POPs in the environmental

compartments, biota, food, human body and tissues. Therefore it is necessary to permanently update the National Environmental Monitoring Programme, taking into account the newly listed POPs. It is also important to take into account the existing testing methods for POPs, and where possible, to apply the most sensitive.

2.3.10. Information dissemination and public awareness

The information on POPs substances was widely communicated to the society in 2005–2015. The various publications developed in 2005–2010 and dedicated for different interested groups (for the public, potential possessors of equipment polluted with PCB, enterprises that may potentially emit dioxins and furans into the environment, specialists of enforcement/control institutions) have been distributed on different events (seminars, workshops, etc.).

Such publications contain easily understandable information on properties of POPs, environmental and on human health impact of POPs, POPs detection in the environment, possible methods to identify equipment contaminated with PCB, preventive and other POPs management measures, control of dioxin and furan emissions into the environment, solution of related problems in Lithuania, the European Union and internationally.

In 2009–2012 during the implementation of the project BaltActHaz, there were prepared publications regarding hazardous chemical substances, including POPs, and legal regulation of such substances, requirements for POPs management and requirements for waste containing POPs management. Besides, the publication with information on new POPs substances – POP-BDEs and PFOS, and environmental and human health related risks that are associated with the use of articles containing such substances was released. These publications can be accessed from the website: http://www.baltacthaz.bef.ee/index.php?id=121&lang=1.

In 2011–2015, during the implementation of the project BaltInfoHaz publications were prepared and educational activities for the society were implemented by drawing the particular attention to students, teachers, young families; educational and awareness raising activities covered topics on hazardous chemical substances, including POPs, contained in articles and existing in the household environment, appropriate waste management. The key information from the above project can be accessed from the website: www.pagalvok.lt. Over 500 seminars and educational lectures with over 2000 participants were organized in various regions of Lithuania. 10 000 pieces of 6 types of publications were released and disseminated. Over 300 articles were released in the press and over 200 publications posted on the Internet.

The press and various websites constantly provide the information on POPs risks to human health, disasters related to the improper use POP substances and the release into the environment and global management of consequences of such accidents. In 2010–2015 over 4 000 publications in Lithuanian have been posted in the various internet portals.

Actual information concerning POPs properties, formation of such substances and preventative measures against formulation, sites contaminated with POPs is regularly published and updated on the websites of responsible state institutions.

2.3.11. POPs-related NGOs activities

There are more than 20 environmental NGOs in Lithuania, however the most active NGO in POPs field is the Baltic Environmental Forum Lithuania (hereinafter – BEF LT).

BEF–LT promotes the investigation of distribution of dangerous chemical substances, the potential negative impact on environment and human health, the reduction of the use of such substances and substitution with safer alternatives. This organization aims at efficient regulation of chemical management on state level and conducts awareness raising activities for public on responsible and safe consumption.

BEF–LT implemented the following environmental projects related to POPs:

– Screening of Hazardous Substances in the Aquatic Environment of Lithuania (12/2005–12/2006);

– Development of Knowledge on REACH (11/2006–03/2008);

– Control of Hazardous Substances in the Baltic Sea Region (COHIBA) (2009–2011);

– Baltic Actions for Reduction of Pollution of the Baltic Sea from Priority Hazardous Substances (BaltActHaz) (01/2009–12/2011);

– Baltic Info Campaign on Hazardous Substances (BaltInfoHaz) (2011/10–2015/03).

2.3.12. Technical infrastructure for assessment, analysis and testing of POPs

The Environment Research Department and the Marine Research Department of the Environmental Protection Agency perform environmental quality research, covering the environmental compartments such as air, water, bottom sediments, natural ecosystems, conduct the state laboratory control of pollutants emitted to the environment and perform the tests of environmental contamination in case of emergency and accidents as a part of the National Environmental Monitoring Programme. Analysis is carried out using up-to-date the European and international standards, and nationally recognized research methods.

In Lithuania over 100 laboratories have the permit to measure and test sources of pollution, pollutant emissions and the level of pollutants in environmental compartments. However only two of those 100 laboratories possess accredited testing methods allowing to test certain POPs substances (mainly POPs pesticides) in surface water, groundwater and soil. The list of laboratories can be found in the website of the Environmental Protection Agency: www.gamta.lt.

As it was mentioned above, Lithuanian laboratories that currently have a permit to carry out measurements and testing of environmental pollutants emitted by certain pollution sources and levels of pollutants in environmental compartments, do not have a permission to test certain hazardous, priority hazardous substances, complex organic compounds in the environmental compartments and pollutant emissions into the environment. The latter tests are an integral part of the environmental monitoring of business entities.

According to paragraph 2.2 of the Order of the Minister of Environment of the Republic of Lithuania No D1-711 of 30 December 2004 On the Regulations on the Issuance the Permits to Perform Measurements and Tests of Pollutants Emitted into the Environment and Pollutants in Environmental Components (as amended by on 10 June 2014), accredited laboratories of the European Union are permitted to provide economic operators with services for determination of specific parameters (analytes)

in environmental compartments and in emissions to the environment. Information on accredited laboratories and accredited areas is published on the website of the institution which made the accreditation of the laboratory. More information: http://www.european-accreditation.org/ea-members.

2.3.13. POPs impact on society and environment, risk assessment and socioeconomic impact

In Lithuania there is no specific region or population group that would be particularly exposed to POPs. However, it should be noted that pregnant women, infants, children and elders are the most vulnerable groups of the society in relation to POPs pollution. There are no thorough and reliable surveys performed in Lithuania that would prove a direct POPs' impact on health of people living in a certain specific region or change of the environmental status.

2.3.14. Reports pursuant Article 15 of the Stockholm Convention on measures taken to implement the provisions of the Convention

Every 4-years Lithuania prepares the report (based on the format as established by the COP at its first meeting) on the measures it has taken to implement the provisions of the Stockholm Convention and the effectiveness of these measures in meeting the objectives of the Convention. These reports are submitted to the Secretariat of the Convention.

3. Strategy of the National Implementation Plan (NIP) and elements of the Action Programme

3.1. Political commitment

Environmental protection is considered as one of the priority directions of the National Long-term Development Strategy of the Republic of Lithuania, approved by Resolution No IX-1187 of the Parliament of the Republic of Lithuania on 12 November 2002. These directions aspire to ensure harmonious and sustainable development of Lithuania, which is harmonised with the programming goals of air, water, biological diversity, Baltic Sea and Curonian Lagoon protection, waste management, international commitments and the European Union standards, and finally, with the financial capabilities of the country. Lithuania implements the harmonised environment protection system with economic, administrative and legal levers. In the area of environmental protection, the aim is to ensure development of all industries is compatible with the preservation of a clean and healthy environment. The considerable attention is attributed to the protection of the environment from hazardous chemicals (including POPs), such as pesticides, pollutants from incineration equipment and hazardous waste.

The State's Progress Strategy "Lithuania's Progress Strategy "Lithuania 2030" (approved by Resolution No XI-2015 of the Parliament of the Republic of Lithuania on 15 May 2012) indicates that Lithuania will implement the economic development based on the principles of sustainable development and concept of green growth; thus, it would not negatively impact on environment and human health.

The National Environmental Protection Strategy (approved by Resolution No XII-1626 of the Parliament of the Republic of Lithuania on 16 April 2015) defines the

country's environmental vision until 2050 and the goals and the priority directions for policy implementation by 2030. The strategic objective is to attain a healthy, clean and safe environment in Lithuania that would address the needs of society, environmental protection and the economy in a sustainable way. The Strategy, *inter alia*, sets the key implementing directions of the chemicals management policy: reduction of the risk posed by chemical substances to human health and the environment; improvement of the safety of products and articles containing chemicals; substitution of hazardous chemicals with safer alternatives; promotion of the prevention of chemical pollution; more efficient implementation of the chemicals management policy. It is worth to reiterate that the Strategy encourages promoting the substitution of chemicals hazardous to human health and the environment with safer substances or alternative technologies, including non-chemical alternatives. In close and active cooperation with economic operators, national and European Union institutions, the assessment and implementation of less hazardous substances could be achieved.

Although the strategies mentioned above do not specifically emphasize the minimization of amount of POPs and their impact, nor identify the sources of POPs, it should be pointed out that the POPs legislation (as part of chemicals legislation) is guided by the main objectives of those strategies (see Section 2.2.2.4).

3.2. NIP Implementation Strategy

The Republic of Lithuanian undertakes all legal measures in order to reduce amounts of POPs in the environment and potential negative impact of such chemical substances for the environment and the population. Due to favourable circumstances, fairly small territory of the country and population, absence of heavy chemical industry, POPs, as separate chemical substances, were used and produced only in small quantities if ever produced and used at all. However, comparatively low levels of such substances are still being detected in the environment and human body. Certain new POPs substances raise concern today due to the active use of articles that were manufactured widely using these substances until their listing in the Stockholm Convention. Furthermore this concern is related also to the not completely resolved issues of separation from waste stream and management of POPs containing waste.

POPs are managed in Lithuania in an integrated manner, i. e. their management and handling, monitoring in the environment and human body are carried out in accordance with the requirements of the legal acts of the European Union and the Republic of Lithuania. Aiming at better implementation and enforcement of the national and the European Union legal acts regulating POPs throughout the entire life cycle, there is a need for further improvement of the qualification of state officials and enforcement officers acting in the chemicals management area and for the education of the employees of the industrial companies on POPs disposal issues.

It should be emphasized that the requirements of the Stockholm Convention related to the new POPs, are being implemented through the direct application of the European Union Regulations and relevant national legal acts. It is important to note that the major part of the articles containing POPs which are placed on the market and used have become or are becoming waste. However, it is problematic to evaluate the effectiveness of the legislation on management of new POPs containing articles ant its waste applied in Lithuania due to the insufficient real data. Therefore more detailed analysis of presence of such substances as PFOS, POP-BDEs, HBCDD in articles and waste would be beneficial.

3.3. Activities, strategies and action plans

3.3.1. POPs monitoring in environment, biota and food

POPs monitoring which is being carried out in Lithuania is in line with the requirements of the Stockholm Convention and Regulation (EC) No 850/2004. This monitoring is being implemented following the financial and technical capabilities. However the data gathered from the monitoring conducted until now only partly ensures the desired availability of information on POPs presence in the environment, biota and food.

Within the limits of allocated financial resources and following the National Environment Monitoring Programme for 2011–2017, only most actual POPs in Lithuania were monitored in air, water and bottom sediments of Curonian Lagoon, Baltic Sea, rivers and lakes and in fish. The following POPs were monitored and not detected in water and/or sediments of Curonian Lagoon, Baltic Sea and inland surface waters (lakes and rivers) in 2011-2014: aldrin, endrin, heptachlor, PeCB, toxaphen, POP-BDE, PCB. During the same period, the following POPs were monitored and detected in water and/or bottom sediments of surface water: DDT, endosulfane, HCB, HCH, PFOS, PFOS-F.

Regulation (EC) No 850/2004 obliges EU Member States to submit the environmental monitoring data for dioxins, furans and PCBs to the European Commission. The National Environmental Monitoring Programme for 2011–2017 foresees the monitoring of dioxins, furans and, when adequate financial resources are available, – other POPs (such as DDT, HCH) in the air. This type of monitoring was performed until 2012 and terminated due to the limited technical capabilities.

POPs monitoring **in food** is being carried out by the State Food and Veterinary Service following the annual monitoring plans. The State Food and Veterinary Service has been annually performing the monitoring of dioxins and dioxin-like PCBs in fish caught in the Baltic Sea and intended to be consumed as food since 2004.

In order to take the well-founded decisions on reduction of POPs damage to the environment and human health, there is a need to obtain the detailed information about the presence of POPs in the environmental compartments, biota, food and biological media of residents. Therefore it is necessary to continuously update the National Environmental Monitoring Programme in the light of newly identified POPs. Taking into account the requirements of the Stockholm Convention and Regulation (EC) No 850/2004, results of the monitoring carried out previously, conclusions derived from the initial POP inventory compiled in 2015 following the methodologies developed by the Secretariat of the Stockholm Convention, it is needed to perform the monitoring of dioxins, furans and PCBs in the environment, and when adequate financial and technical resources are available,– the monitoring of other POPs regulated under Regulation (EC) No 850/2004 and the Stockholm Convention (giving priority to PFOS, POP-BDE, HBCDD) in the environmental compartments and human biological media.

3.3.2. POPs Pesticides

In countries that are Parties to the Stockholm Convention **itis prohibited to produce and use these POPs pesticides: aldrin, chlordane, chlordecone, DDT, dieldrin, endosulfan, endrin, heptachlor, HCB, HCH, lindane, mirex, PeCB and toxaphene**. The import and export of those pesticides (as chemicals listed in Annex A

and Annex B (only DDT)) can take place under specific restrictive conditions, as set out in paragraph 2 of Article 3 of the Stockholm Convention.

Lithuania implements directly applicable EU Regulation (EC) No 850/2004 which bans the production, placing on the market and use of all POPs pesticides. The export of all POPs pesticides is banned by Regulation (EU) No 649/212.

POPs pesticides are neither produced in, used in, imported into nor exported from Lithuania. The use of some pesticides have been banned in Lithuania since 1996; however these chemical substances can be found in the environment of Lithuania (in surface water and groundwater, soil and bottom sediments), as well as in the biological mediums of residents (human breast milk).

In 2008–2014, while implementing the National Environmental Monitoring Programme the following POPs pesticides have been monitored, but not detected in surface waters and bottom sediments of the Curonian Lagoon, the Baltic Sea, lakes and rivers: aldrin, chlordane, endrin, heptachlor, mirex, PeCB and toxaphene. However, many of these chemicals (pesticides) or their metabolites have been detected in the biological mediums (mothers' breast milk) of Lithuanian residents. Within the frame of the surveys on POPs in human breast milk implemented in 2013–2014 by the Health Education and Disease Prevention Centre under the Ministry of Health of the Republic of Lithuania (in cooperation with the World Health Organisation and the United Nations Environment Programme) the following POPs pesticides have been detected in the breast milk of Lithuanian breastfeeding mothers: chlordane, DDT, HCB, HCH, heptachlor, mirex and toxaphene.

The Lithuanian Geological Service under the Ministry of the Environment, performed the eco-geological soil and groundwater investigations in 2008–2015 and detected POPs pesticides that were not detected during the monitoring activities within the frame of the National Environmental Monitoring Programme (e. g. aldrin, chlordane, etc.). According to the National Environmental Monitoring Programme POPs pesticides should be monitored not only in groundwater, but also in the soil, but due to the lack of funds such monitoring was not conducted in 2011–2017. By implementing the National Programme for 2007–2013 "Management of Former Pesticide Storages and Territories Contaminated by Pesticides", the Lithuanian Geological Survey inventoried 1379 former pesticides or pesticides waste storage sites in the country. In 2008–2014 with the funding of municipalities and other resources a preliminary and (or) detailed soil and groundwater pollution investigations in 133 former pesticide storages have been carried out. Buildings or their remains within the pesticides storage sites were usually contaminated by pesticides, among which POP's prevailing. The soil and groundwater within the territories of the former pesticides warehouses were mostly contaminated with POPs pesticides such as DDT, HCB, HCH.

During the implementation of the National Implementation Plan on Persistent Organic Pollutants and its Action Programme for 2010–2015 and Contaminated Sites Management Plan for 2013–2023 (approved by Order No D1-790 of the Minister of Environment of the Republic of Lithuania on 27 September 2012, as last amended on 7 May 2018), the Lithuanian municipalities utilising their own funds and funds from the European Union Financial Support instrument VP3-1,4-AM-06-R "Management of Former Contaminated Sites" have disposed 3,8 t of old pesticide waste and 10767,4 m^3 of soil contaminated by the pesticide waste.

In order to reduce environmental pollution by POPs pesticides, it is necessary to continue the clean-up of contaminated sites. Unfortunately, the handling of

pesticide waste storage sites and sites contaminated by pesticides are difficult and expensive process.

3.3.3. Polychlorinated biphenyls (PCBs) in articles

In Lithuania (like in the all European Union), the production, placing on the market and use of PCBs – on their own, in preparations or in articles – are prohibited. The export of PCBs is banned in line with Regulation (EU) No 649/212.

Lithuania has never produced PCBs. The major part of PCBs and equipment containing PCBs found in Lithuania was manufactured in the former Soviet Union. The PCBs containing equipment was mainly used by the largest companies that were using, producing and supplying electric power.

According to the Rules for the Management of Polychlorinated Biphenyls and Polychlorinated Terphenyls (PCBs/PCTs) (approved by Order No 473 of the Minister of Environment of the Republic of Lithuania on 26 September 2003, as last amended on 6 June 2018), equipment containing the level of PCBs >0,05% of fluid weight, was to be disposed until 31 December 2010. According to data provided by the Environmental Protection Agency, majority of companies that used such type of equipment disposed it on time. Other companies have managed to dispose such equipment in 2011.

In 2014, 2,1 t of oil containing PCB and 188,5 t of PCB-containing equipment are stored in long-term storage facility.

The Rules on PCB/PCT Management provide for an exception: transformers the fluids in which contain between 0,05% and 0,005% of PCBs by weight are to be either decontaminated or disposed after their useful lives. Just **8 of this type** transformers are left in Lithuania and will be disposed of at the end of their useful lives.

The use of PCB in open systems raises a concern. **In Lithuania, in the buildings that have been built during 1950-1970 there may be an accumulation of about 400 t of PCBs.**

The construction and demolition waste, which contain PCBs, in Lithuania are collected by waste managing company UAB “Toksika”.

In order to protect human health and the environment from the adverse effects of PCBs, it is necessary to: properly handle and dispose equipment containing PCBs <0,05% of fluid weight, continue the control of proper disposal of the equipment with PCB <0,05% of fluid weight, and oil contaminated with PCBs.

3.3.4. Perfluorooctane sulfonic acid (PFOS) and its derivatives and Perfluorooctane sulfonyl fluoride (PFOS-F)

Perfluorooctane sulfonic acid, its derivatives, (PFOS) and PFOS-F (here collectively designated PFOS) are not used in Lithuania in industrial processes as chemical substances itself. PFOS is listed in Annex B of Stockholm Convention, with the specific exceptions and acceptable uses/acceptable purposes.

In the European Union (and in Lithuania) the list of exemptions is referred only to acceptable purposes, i. e. exemptions in prohibitions of production, placing on the market and use of PFOS are laid down in Regulation (EC) No 850/2004 and its scope is much narrower than those provided for in the Stockholm Convention. This means that in the European Union (and Lithuania) PFOS is allowed to be produced and placed on the market for the following specific uses subject to reporting to the European Commission on the progress made to eliminate PFOS:

– photoresists or anti-reflective coatings for photolithography processes;
– photographic coatings applied to films, papers or printing plates;
– mists suppressants for non-decorative hard chromium (VI) plating in closed loop systems;
– hydraulic fluids for aviation.

The export of PFOS is subject to provision provided for in Regulation (EU) No 649/212.

According to the results of inventory conducted according to the Methodology prepared by the Stockholm Convention Secretariat[19], it is assumed that small amounts of preparations containing PFOS are used in photography and semiconductor manufacturing. It is likely that larger amounts of such substances are used in aviation hydraulic fluids and chromium plating processes.

In order to estimate the extent and relevance of PFOS in Lithuania, it is appropriate:

– to perform an inventory of potentially PFOS contaminated areas (landfills, waste sites);
– to make an an in-depth inventory of possible PFOS use in industrial enterprises (identify potential PFOS users).
– aiming at the prevention of pollution by PFOS there is a need to educate the public and businesses about PFOS effects on human health and the environment, provide information on how to identify these chemicals in articles.

3.3.5 Hexabromocyclododecane (HBCDD)

HBCDD is not produced, imported or placed on the market in Lithuania.

HBCDD was included into Annex A of the Stockholm Convention in 2013 with the specific exemption that allows it to be used only for EPS and XPS foams for buildings or HBCDD itself to be used for production of these purposes.

While implementing the Stockholm Convention and Regulation (EC) No 850/2004 requirements, in Lithuania (as well as in the European Union) the production, placing on the market and use of HBCDD is prohibited; however, Regulation (EC) No 850/2004 provides for an exemption, allowing the use of HBCDD (whether on its own or in preparations) in the production of EPS articles and the production and placing on the market of HBCDD to be used in building (with a certain condition provided for in the REACH Regulation). The applicability of the exemption of Stockholm Convention and Regulation (EC) No 850/2004 for the use of HBCDD in Lithuania is described in Section 2.3.4.

The export of HBCDD is banned in line with Regulation (EU) No 649/212.

According to the available information until 2013 only the EPS billets (raw materials) were used for the manufacture of heat insulation materials (boards) or packaging. Also, there is a possibility that textiles coated with HBCDD may be in use. It is likely that the vast majority of the EPS used Lithuania in 2014 did not have a HBCDD.

The use of EPS for the insulation of buildings in Lithuania started in 1970–1980 and the major amount was used in 1990–2005. The duration time of EPS use is long (30–50 years), so it is possible that the largest amounts of EPS will accumulate at around 2020–2050 as a construction waste. Currently in Lithuania the EPS waste is being collected along with other construction waste and is managed according to the waste management rules.

[19] http://chm.pops.int/Implementation/PFOS/Guidance/tabid/5225/Default.aspx

Aiming at preventing the dispersed pollution of the environment by HBCDD, it would be appropriate:

- to identify sites potentially contaminated with HBCDD (landfills, dumping sites, territories around the buildings, where construction materials with HBCDD were used);
- to strengthen the control of waste holders and operators by applying the sanctions to the economic entities and individuals failing to comply with waste sorting;
- to raise awareness and educate the waste managers about waste with HBCDD identification and proper management.

3.3.6. Polybrominated diphenyl ethers (hexa-BDE, hepta-BDE, tetra-BDE, penta-BDE) (POPs-BDEs)

In accordance with the requirements of the Stockholm Convention and Regulation (EC) No 850/2004 in Lithuania (as in all the European Union) the production, placing on the market and use of POPs-BDEs is prohibited. The Stockholm Convention and Regulation (EC) No 850/2004 set the exemptions for the use of POPs-BDEs. The applicability of these exemptions in Lithuania is described in Section 2.3.3.

The export of POPs-BDEs is banned in line with Regulation (EU) No 649/212.

The **POPs-BDEs** as individual substances **are not produced, imported or used in Lithuania.** In 2011-2017 within the frame of the National of Environmental Monitoring Programme the POPs-BDE were monitored in transitional waters (Curonian Lagoon) and the Baltic Sea in surface waters, sediment and not detected. However, in 2014 POPs-BDEs were detected in the milk of Lithuanian mothers' breast (in samples taken).

The main source of POPs-BDEs in Lithuania are to be considered the articles that may contain POPs-BDEs – electrical and electronic equipment (EEE) and vehicles that have been manufactured before 2005 – and also the waste of these articles.

The EEE waste is being collected by EEE waste managers (operators) and treated in accordance with the Rules on the Waste the Waste of Electrical and Electronic Equipment. According to latter Rules the POPs-BDEs containing plastics should be separated from the waste stream and recycled by hazardous waste operators.

However, it is unknown how much polluted by POPs-BDE plastic from EEE waste goes into the recycled EEE plastic (from the articles manufactured before 2005). There is also a lack of information on how much plastic containing POPs-BDEs is collected from end-of-life vehicles. Aiming at obtaining the more detailed information about the distribution of POPs-BDEs in Lithuania and preventing the dispersed pollution of the environment by POPs-BDEs it would be appropriate:

- to identify territories potentially contaminated by POPs-BDEs;
- to ensure the collection of information on quantity of POPs-BDEs in EEE waste plastics and end of life vehicles (manufactured before 2005) plastics;
- to strengthen the control of waste holders and operators by applying the sanctions to economic entities and individuals failing to comply with the sorting of waste;
- to raise awareness and educate the waste managers about waste with POPs-BDEs identification and proper management.

3.3.7. Unintentionally produced POPs

Unintentionally produced POPs (polychlorinated dibenzo-p-dioxins (PCDD), polychlorinated dibenzofurans (PCDF), polychlorinated biphenyls (PCB), pentachlorobenzene (PeCB), hexachlorobenzene (HCB), hexachlorobutadiene (HCBD), polychlorinated naphthalenes (PCN)) are listed in Annex C of the Stockholm Convention. It should be noted that HCBD and PCN are not covered by the updated NIP as far as at the time of drafting the updated NIP these POPs haven't been subject to the NIP provisions.

During the drafting of the first NIP (in 2005) it was estimated that the annual emissions to the environment are from 38 to 48g of I-TEQ PCDD/PCDF in Lithuania. Within the process of preparation of the updated NIP (in late 2015) the performed theoretical calculations of dioxins/furans (PCDD/PCDF) emissions to the air (on the bases of data from 2012) show that the emissions were nearly 9g I-TEQ. **When comparing the results of the inventory from 2005 and 2012, it can be concluded that levels of PCDD/PCDF emissions to the environment decreased more than 4 times.** However, it should be noted that due to the lack of data, significant part of sources generating emissions have not yet been evaluated properly, thus it can be presumed that total amount of **emissions could reach 10-12g I-TEQ/y**.

On the bases of the conducted estimations and analyses it could be concluded the main sources of unintentional POPs emissions in Lithuania are: not allowable and irresponsible incineration processes in households, uncontrolled burning processes (fires) and power generation and heating using biomass and fossil fuel in power plants and households.

Unintentional formation of POPs and release into the environment is controlled and reduced by issuing the IPPC permits for the industrial operators. The IPPC permit contains conditions based on the application of Best Available Techniques BATs, in particular, limit values for dioxins, furans emissions to air, discharges to water and soil.

In order to reduce the emissions of dioxins, furans and other unintentionally produced POPs into the environment it is needed:

–to raise awareness of the public on the sorting the household waste and on the impact to health and environment of POPs generation during household waste or grass incineration;

–to organize educational seminars for the workers of combustion plants (using biomass and fossil fuel) on the issues related to the BATs and their implementation feasibility;

–to carry out PCDD and PCDF monitoring in the ambient air and on the bases of the monitoring data generated to consider the measures for the reduction of dioxins and furan emissions;

–to strengthen the control of PCDD and PCDF emissions from the waste incinerator facilities.

Aiming at finding out the amount of the unintentionally formed POPs and anticipating the possibilities of their reduction in food and feed it would be reasonable to expand the Residues Monitoring and Control Programme.

3.3.8. The Action Programme of the National Implementation Plan on Persistent Organic Pollutants (POPs) for 2017-2025

Aiming at maximally reducing the threat of POPs to the health of Lithuanian people and to the environment it is planned to continue to carry-out present measures (those included in the first NIP) that reduce the negative effects of POPs and to apply the new relevant measures that are introduced into the updated (the second) NIP. The planned measures, their executors, funds needed, possible financial sources and execution terms are listed in Table 16.

Table 16. Action Programme for Management of Persistent Organic Pollutants.

Tasks	Measures	Responsible institutions	Tentative implementation resources, thousands, Eur	Potential financial sources	Term of implementation
1. To collect information on POPs occurrence in the environment, biota, food, human biological media	1.1. To amend the National Environmental Monitoring Programme by adjusting information on POPs monitoring in the environmental compartments;	Ministry of Environment, Environmental Protection Agency, Lithuanian Geological Survey under the Ministry of Environment	–		2017 and later (subject to update depending on needs)
	1.2. To carry out POPs monitoring in surface water reservoirs and in the air in accordance with the National Environmental Monitoring Programme;	Environmental Protection Agency	–	European Union Structural Funds, State budget of the Republic of Lithuania[1,2]	2017–2025
	1.3. To carry out the POPs monitoring in ground water and soil in accordance with the National Environmental Monitoring Programme;	Lithuanian Geological Survey under the Ministry of Environment	–	European Union Structural Funds, State budget of the Republic of Lithuania[1,2]	2017–2025
	1.4. To prepare the annual plans for food monitoring including POPs listed in the Stockholm Convention and the European Union legal acts;	State Food and Veterinary Service	–	–	2017 and later (subject to update depending on needs)
	1.5. To monitor the contamination of food (including contamination with POPs) according to the prepared annual plans;	State Food and Veterinary Service	–	European Union Structural Funds, State budget of the Republic of Lithuania [3]	2017–2025

Tasks	Measures	Responsible institutions	Tentative implementation resources, thousands, Eur	Potential financial sources	Term of implementation
	1.6. To monitor POPs occurrence in the biological mediums of the Lithuania's residents[4];	State Research Institute Centre for Innovative Medicine, Ministry of Health	–	National Research Programme 'Healthy Aging'. Project 'Air pollution effects in the lungs: indicators for monitoring and control with phytochemicals'[4]	2017–2018
2. To continue the identification of sites contaminated by POPs and their contamination level and to manage such sites	2.1. According to the Contaminated Sites Management Plan for 2013-2023, to manage the sites contaminated by old pesticide waste;	Administrations of Municipalities		European Union Structural Funds, State Budget of the Republic of Lithuania, municipal budget[5, 6]	2017–2023
	2.2. To create legal preconditions and financial mechanism for management of newly identified POPs contaminated sites;	Ministry of Environment, Lithuanian Geological Survey under the Ministry of Environment			2019
	2.3. After the establishment of the legal preconditions and financial mechanism, to manage newly identified POPs contaminated sites;	Ministry of Environment, Lithuanian Geological Survey under the Ministry of Environment, Administrations of Municipalities, Owners of the private territories		European Union Structural Funds, State budget of the Republic of Lithuania, municipal budget, Environmental Protection Support Funds, private funds[7]	2019–2025 (implementation to commence when the new territories are identified)

Tasks	Measures	Responsible institutions	Tentative implementation resources, thousands, Eur	Potential financial sources	Term of implementation
	2.4. To identify sites and objects (buildings) contaminated by the new POPs substances (POP-BDEs, PFOS/PFOS-F, HBCDD)[8];	Environmental Protection Agency, Ministry of Environment, Lithuanian Geological Survey under the Ministry of Environment, Administrations of Municipalities, Non-governmental organisations		European Union LIFE programme, Nordic Council Fund, European Union Structural Funds, Environmental Protection Support Funds[9],[10]	2017–2023
	2.5. To update the Contaminated Sites Management Plan for 2013-2023 by including POPs subject to control and taking into account the results of NIP and its Action Programme for 2017-2025.	Lithuanian Geological Survey under the Ministry of Environment, Ministry of Environment	–	–	2024
3. To reduce the negative impact of POPs currently in use to human health and environment	3.1. In order to obtain comprehensive information about PFOS use in Lithuania, to carry out an inventory of PFOS and mixtures with PFOS used in industry;	Ministry of Environment, Environmental Protection Agency, Non-governmental organizations	5	European Union LIFE programme, Funding from the Ministry of Environment[11]	2017–2018
	3.2. After identification of the needs, to substitute PFOSs with safer alternatives, to provide the proposals on possible substitution of PFOSs for companies in concern;	Ministry of Environment, Environmental Protection Agency, Non-governmental organizations	20	European Union LIFE programme, Funding from the Ministry of Environment[11]	2020

Tasks	Measures	Responsible institutions	Tentative implementation resources, thousands, Eur	Potential financial sources	Term of implementation
	3.3. To develop an information portal that holds systemic information on hazardous substances identification (including POPs), possible alternatives, substitution processes and other information relevant to chemicals management at company's level and to introduce it to business entities (via e-measures, seminars, training);	Environmental Protection Agency, Non-governmental organizations	50	European Union LIFE programme, Funding from the Ministry of Environment[11]	2018–2019
	3.4. To carry out an exploratory laboratory investigation of articles imported from non-European Union countries for the presence of POPs substances (PFOS/PFOS-F, POP-BDEs) aiming at determination of possible illegal import cases, to identify problems, to provide conclusions and recommendations on how to prevent the entrance of such articles into the Lithuanian market;	State Consumer Rights Protection Authority, Non-governmental organizations	100	European Union LIFE programme, Nordic Council Fund, State budget of the Republic of Lithuania[12]	2017–2025
4. To reduce the negative impact of POPs waste to human health and the environment	4.1. To strengthen the control of waste holders and operators by imposing sanctions for both legal entities and private persons that do not sort waste.	Environmental Protection Department under the Ministry of Environment (formerly (until 1 July 2018) – Regional Environmental Protection Departments), Administrations of municipalities	–	–	2017–2025
	4.2. To supplement the Waste Management Specialists Education and Competence Improvement Programmes with information about POPs waste identification and management;	Ministry of Environment	–	–	2018

Tasks	Measures	Responsible institutions	Tentative implementation resources, thousands, Eur	Potential financial sources	Term of implementation
	4.3. To inform and improve waste managers' knowledge on POPs waste identification and appropriate management.	Ministry of Environment, Environmental Protection Agency, Environmental Protection Department under the Ministry of Environment (formerly (until 1 July 2018) – Regional Environmental Protection Departments), Administrations of municipalities	150	European Union Structural Funds, European Union LIFE programme, State budget of the Republic of Lithuania, Municipal assets, Environmental Protection Support Funds, Waste Management Programme[13]	2017–2025
	4.4. To raise awareness and educate the society on the issues related to the appropriate management of waste: prevention of POPs formation from the incineration, appropriate sorting of waste (seminars for public, trainings in community centres, libraries, leaflets, campaigns via mass media).	Administrations of municipalities, Non-governmental organizations	200	European Union Structural Funds, funding from the Ministry of Environment, Municipal Programmes for Education on Environmental Protection[13]	2017–2020

Tasks	Measures	Responsible institutions	Tentative implementation resources, thousands, Eur	Potential financial sources	Term of implementation
5. To disseminate knowledge on POPs, on prevention of their formation, food contamination by POPs, POPs contaminated territories and their management to the public and other stakeholders groups	5.1. To prepare and disseminate information material on the environmental and human health impact of POPs, on food contamination by POPs and danger posed by POPs contaminated sites to human health and the environment; to organize seminars and targeted environmental protection campaigns aimed at preventing the formation of POPs, to improve public's knowledge on the safe use and management of pesticide waste storage sites, territories contaminated by such waste, waste of articles containing POPs and other relevant information;	Ministry of Environment, Ministry of Health, Environmental Protection Agency, Lithuanian Geological Survey under the Ministry of Environment, State Food and Veterinary Service, Environmental Protection Department under the Ministry of Environment (formerly (until 1 July 2018) – Regional environmental protection departments, Health Education and Disease Prevention Centre under the Ministry of Health, Administrations of Municipalities, Non-governmental organizations	250	European Union Structural Funds, European Union LIFE programme, State budget of the Republic of Lithuania, Municipal Assets, Environmental Protection Support Funds[13]	2017–2025
	5.2. To inform industrial companies on POPs alternatives in the industrial processes and encourage POPs substitution by providing information on potential funding sources for "cleaner" production.	Ministry of Environment, Environmental Protection Agency, Non-governmental organizations	20	European Union LIFE programme, Funding from the Ministry of Environment[11]	2017–2019

Tasks	Measures	Responsible institutions	Tentative implementation resources, thousands, Eur	Potential financial sources	Term of implementation
6. To improve the enforcement of implementation of Regulation (EC) No 850/2004 in Lithuania	6.1. To prepare a training material for state authorities carrying out tasks related to the implementation of Regulation (EC) No 850/2004 and enforcement thereof on control of POPs management requirements, human health and the environmental impact of POPs;	Ministry of Environment, Ministry of Health, Environmental Protection Agency, Environmental Protection Department under the Ministry of Environment (formerly (until 1 July 2018) – Vilnius Regional Environmental Protection Department), State Consumer Rights Protection Authority, Non-governmental organizations	14,6	European Union LIFE programme, Funding from the Ministry of Environment[11]	2018
	6.2. Using the prepared training material on control of POPs, impact to human health and environment to organise 4 training sessions for specialists of the state authorities (including authorities performing the enforcement of the implementation of Regulation (EC) No 850/2004)	Ministry of Environment, Ministry of Health, Environmental Protection Agency, State Consumer Protection Authority, Non-governmental organizations	–	State Budget of the Republic of Lithuania, European Union LIFE programme, Funding from the Ministry of Environment[11]	2018–2020
	6.3. To develop the mechanism for execution of enforcement activities related to the control of POPs substances management and POPs releases, waste containing POPs management and annual control plans;	Environmental Protection Department under the Ministry of Environment (formerly (until 1 July 2018) – Vilnius Regional Environmental Protection Department), Environmental Protection Agency, Ministry of Environment	–	–	2018 and later subject to update annually

Tasks	Measures	Responsible institutions	Tentative implementation resources, thousands, Eur	Potential financial sources	Term of implementation
	6.4. On the bases of the annual inspection plans, to carry out 8 complex inspections aimed at checking if economic operators are in compliance with requirements provided for in Regulation (EC) No 850/2004 on restrictions for placing on the market and use of POPs substances, mixtures and articles containing these substances, if waste containing POPs are managed in environmentally sound manner as provided for in the legislation and if the control measures regarding POP emissions to the environment are applied.	Environmental Protection Department under the Ministry of Environment (formerly (until 1 July 2018) – Regional Environmental Protection Departments, Vilnius Regional Environmental Protection Department),	–	–	2018–2025 (one complex inspection per year or in accordance with the needs)

[1] It is difficult to identify funding needs. POPs monitoring in the environmental compartments is to be carried out depending on the availability of proper financial and technical capabilities. The preliminary need for funds for only dioxins' and furans' monitoring in air would be 44 thousand EUR and monitoring of all POPs in the air - 74 thousand EUR.

[2] The National Environmental Monitoring Programme is funded by the State budget of the Republic of Lithuania (Funds of specific programs' managers, funds of the State Investment Programme, funds of the Environmental Protection Support Program), the EU Structural Funds and other funds received based on legislative acts.

[3] No need for additional funds for implementation of this measure of the Action Programme. The State Food and Veterinary Service monitors food contamination (including POPs) by implementing the European Union and Lithuanian legal acts that are attributed to its competence, i. e. the State Food and Veterinary Service does not directly implement Regulation (EC) No 850/2004. The cooperation and information sharing with the Ministry of Environment and the concerned authorities about monitoring results of POPs in food, does not require separate funding for the State Food and Veterinary Service.

[4] The State Research Institute Centre for Innovative Medicine plans to carry out POPs of ambient air origin (polycyclic aromatic hydrocarbons and other pollution elements), exposure biomarker monitoring of urban and rural residents' biological mediums: bronchial washings and biopsies. It is difficult to calculate the specific need for funds. The project requires in total of 140 000 EUR, pollution biomarker research gets a small part of project funds.

[5] It is difficult to estimate funding needs while there is no information about a number of such territories and their contamination level. Each territory should be managed individually.

[6] The European Union Structural Funds (for planning period of 2014–2020) could be used for sound management of the contaminated sites, while providing partial funding from the State Budget of the Republic of Lithuania and the Municipal Budgets.

[7] Funding needs can only be determined when the new POPs contaminated sites are identified. This measure is foreseen for entities and/or state-owned (among them may be old pesticide deposits or areas contaminated with old pesticides and (or) other POPs containing waste).cases where POPs are unexpectedly detected in territories owned by private entities and/or state-owned (among them may be old pesticide deposits or areas contaminated with old pesticides and (or) other POPs containing waste).

[8] Taking into account the experience of the EU Member States within the frame of The European Union's Investment Programme for 2014–2020 it would be reasonable to carry out the identification only of sites contaminated by new POPs. In case the identified territories contaminated by new POPs are considered as problematic for Lithuania, an evaluation of the pollution extent should be performed followed by the development of the proposals for effective cleaning measures. Those measures should be foreseen in the POPs Management Programme for the next period.

[9] It is difficult to estimate the funding need, because it depends on the set of investigations, the methods used and the sources of funding available.

[10] Funding for identification of sites contaminated with new POPs can be obtained by applying for funding to the EU LIFE Programme, the European Union's Structural Funds (planning period for 2014–2020), the Nordic Council Fund and other funding programmes.

[11] The measure could be implemented through the project 'Substitution of hazardous chemicals in small/medium-sized and industrial enterprises of Lithuania, Latvia, and Estonia' LIFE14 ENV/LV/000174 funded by the European Union LIFE Programme (with co-financing from the Ministry of Environment). The project is implemented in Lithuania by non-governmental organisation Baltic Environmental Forum Lithuania. Stakeholders of the project are the Ministry of Environment and the Environmental Protection Agency. Project duration: October 2015 – March 2020.

[12] For products imported from non-EU countries, exploratory studies could be carried out within separate projects. Project funding can be provided from the EU LIFE Programme or the Nordic Council Fund and partial funding from the budget Republic of Lithuania.

[13] Funds for the education of the public could be allocated from the European Union Structural Funds (for projected period of 2014–2020), with partial funding from the State Budget of the Republic of Lithuania and municipal budgets, by implementing a measure 'Society Information about Environment and Recreational Territories Management'. Funding could also be gained from the Environment Protection Support Funds and Waste Management Programme.