REPUBLIC OF ARMENIA

Minamata Convention Initial Assessment

2019



REPUBLIC OF ARMENIA
MINISTRY OF ENVIRONMENT

GEF

UNIDO

REPUBLIC OF ARMENIA

MINAMATA CONVENTION
INITIAL ASSESSMENT

TABLE OF CONTENTS

	page
ABBREVIATIONS AND ACRONYMS	5
EXECUTIVE SUMMARY	6
Part 1. COUNTRY BASELINE	9
1.1 Country Profile	9
1.1.1 Geography and Population	9
1.1.2 Political and Economic Overview	10
1.1.3 Characteristics of the Economy Branches	12
Part 2. INSTITUTIONAL, POLICY, AND REGULATORY FRAMEWORK	17
2.1 International Commitments and Obligations	17
2.2 International Regulation of Mercury Containing Products and Wastes Handling	20
2.3. The Republic of Armenia Legislation on Chemicals and Wastes Management Relating to Mercury	20
2.4 Assessment of existing legislation and proposed actions on legal reforms in the Republic of Armenia	22
2.5 Competences of State Bodies in Chemicals and Waste Management	27
2.5.1 Competences of the Government of the Republic of Armenia in Chemicals and Wastes Management	27
2.5.2 Competences of Republic of Armenia Ministry of Nature Protection in Chemicals and Wastes Management	28
2.5.3 Competences of Republic of Armenia Ministry of Nature Protection in Chemicals and Wastes Management	28
2.5.4 Competences of Republic of Armenia Ministry of Emergency Situations in chemicals and wastes management	29
2.5.5 Competences of Republic of Armenia Ministry of Transport, Communications and Information Technologies in chemicals and wastes management	29
2.5.6 Competences of Republic of Armenia Ministry of Agriculture in chemicals and wastes management	29
2.5.7 Competences of local self-government bodies in chemicals and wastes management	30
2.5.8 Competences of regional government bodies in chemicals and wastes management	30
Part 3. INVENTORY OF MERCURY EMISSIONS TO THE ENVIRONMENT OF THE REPUBLIC OF ARMENIA	31

3.1 Introduction 31
3.2 Mercury release source types present in the Republic of Armenia 32
3.3 Summary of Mercury Inputs to Society 33
3.4. Data and inventory on energy consumption and fuel production 38
3.4.1 Petroleum Fuels - Production, Refining and Use 38
3.4.2 Natural gas: extraction, refining and use 38
3.5 Data and inventory on domestic production of metals and raw materials 40
3.6 Production of other minerals and materials with mercury impurities 43
3.6.1 Cement production 43
3.7. Data and inventory on waste handling and recycling 44
3.8 Data and inventory on general consumption of mercury in products, as metal mercury and as mercury containing substances 45
3.8.1 Thermometers with Mercury 45
3.8.2 Electrical Switches and Relays with Mercury 46
3.8.3 Light Sources and Batteries with Mercury 46
3.8.4 Cosmetics and Related Products 46
3.9 Data on General Mercury Emissions in the Republic of Armenia 51
3.10 Inventory Level 2: Identification and Quantification of Mercury Releases to Air, Water, Land from Different Categories of Sources 52
Part 4. PROPOSAL FOR FURTHER ACTIVITIES ON IMPLEMENTATION OF MINAMATA CONVENTION IN THE REPUBLIC OF ARMENIA 77
National Action Plan: Summary of the main articles of the Minamata Convention relevant to the Republic of Armenia 77
Annex 1: Publications in proceedings of international conferences and periodicals based on outcomes of GEF/ UNIDO Project "Minamata Convention Initial Assessment of Armenia" 85
Annex 2: Awareness Raising Campaign 86
Mass Media Coverage of Events Awareness raising events 86
References 88

ABBREVIATIONS AND ACRONYMS

a.o.	and others
C	carbon
°C	degree measured on the Celsius scale (centigrade)
CFL	compact fluorescent lamps
CJSC	Closed Joint Stock Company
COWI	Consulting Group
EEU	Eurasian Economic Union
EU	European Union
e.g.	*exempli gratia*; for example
et.	and
et al.	and others
etc.	*et cetera*; and so forth
g	gram
GDP	Gross Domestic Product
GEF	Global Environment Facility
Hg	mercury
INC	Intergovernmental negotiating committee
JSC	Joint Stock Company
kg	kilogram
km	kilometer
LLC	Limited Liability Company
LPG	Liquefied petroleum gas
Ltd.	Limited
m	meter
m^3	cubic meter
Mcg, µg	microgram
mg	milligram
MSW	municipal solid wastes
N/A	not applicable
NAP	National Action Plan
Nm^3	Normal cubic meter
OJSC	Open Joint Stock Company
per	for each/ every
PMA	phenyl mercuric acetate
ppb	part per billion
ppm	part per million
SAICM	Strategic Approach to International Chemicals Management
SST/D	sector specific treatment/disposal
t	ton
ths	thousand
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Program
UNIDO	United Nations Industrial Development Organization
US EPA	United States Environmental Protection Agency
UV	ultra violet
VCM	vinyl chloride monomer
wt	weight
y	year

EXECUTIVE SUMMARY

The Minamata Convention on mercury is a global treaty with main objective to protect human health and the environment from the adverse effects of anthropogenic emissions and releases of mercury and mercury compounds. It was agreed at the fifth session of the Intergovernmental Negotiating Committee on mercury in Geneva, Switzerland on 19 January 2013 and adopted later that year on 10 October 2013 at a Diplomatic Conference held in Kumamoto, Japan. The objective of the Minamata Convention is to protect the human health and the environment. It contains provisions that relate to the entire life cycle of mercury, including controls and reductions across a range of products, processes and industries where mercury is used, released or emitted. The treaty also addresses the direct mining of mercury, its export and import, its safe storage and its disposal once as waste. These include measures to control the supply and trade of mercury, including setting limitations on certain specific sources of mercury such as primary mining, and to control mercury-added products and manufacturing processes in which mercury or mercury compounds are used, as well as artisanal and small scale gold mining.

Mercury is recognized as a substance producing significant adverse neurological and other health effects, with particular concerns expressed about its harmful effects on unborn children and infants. The global transport of mercury in the environment was a key reason for taking the decision that global action to address the problem of mercury pollution was required.

The Minamata Convention has a phased approach to reduce and, where possible, eliminate mercury use in key industrial sectors. Provisions of the Convention include phase out deadlines established for supply sources and trade, mercury added products, and manufacturing processes in which mercury or mercury compounds are used. Based on these targets, the Convention is designed to systematically reduce emissions and releases to land and water, and phase out the use of mercury where alternatives exist.

Intergovernmental Negotiating Committee (INC) developing global legally binding instrument on mercury

In 2009, the Governments agreed to initiate intergovernmental negotiations in order to develop global legally binding instrument on mercury. The first meeting of the intergovernmental negotiating committee to prepare this document took place in Stockholm (Sweden) in June 2010. The aim of negotiations was to reach the accord on new agreement to combat global mercury pollution.

Minamata Convention on Mercury

Harmony was achieved at Diplomatic Conference (Conference of Plenipotentiaries) held in Japan in 2013 and the agreement was named Minamata Convention on Mercury in memory of inhabitants of Minamata town who became victims of acute mercury poisoning. This agreement is a legally binding instrument and requires joint activities of all countries for search of solutions on mercury pollution problems.

Minamata Convention signing, ratification and early implementation issues in the Republic of Armenia

❖ *Signing and Ratification of the Convention*

The Republic of Armenia signed Minamata Convention on Mercury amongst 92 other countries at the Conference of Plenipotentiaries on the Minamata Convention on Mercury (Minamata, Japan, October 10, 2013).
On October 6, 2017 the Convention was ratified by the Law of the Republic of Armenia (Law of the Republic of Armenia 130-N of October 19, 2017).
Article 1 of the Law states: 'To ratify Minamata Convention on Mercury signed in Kumamoto on October 10, 2013 (with the attached Announcement).
Article 2 of the Law states that it enters into force after the day of the official publication.
The Announcement lays down:

- *In accordance with clause 5 of Article 30 "Ratification, acceptance, approval or accession" of Minamata Convention on Mercury the Republic of Armenia announces:*

  Any amendment to the Annexes of the Convention will enter into force in the Republic of Armenia only through ratification only upon the deposit of its instrument of ratification, acceptance, approval or accession with respect thereto.

❖ *Initial Activities*

Steering Committee for implementation of Minamata Convention on Mercury in the Republic of Armenia

The Steering Committee was established according to Order of the Minister of Nature Protection of the Republic of Armenia "On approval of the Steering Committee membership for implementation of Minamata Convention on Mercury in the Republic of Armenia (No. 410-A dated December 25, 2014).

The following main stakeholders were involved in the Steering Committee:

- Ministry of Nature Protection;
- National Security Council;
- National Security Service;
- Ministry of Emergency Situations, Rescue Service;
- Ministry of Foreign Affairs;
- Environmental and Mining Inspectorate;
- Ministry of Energy Infrastructures and Natural Resources;
- Ministry of Economic Development and Investments;
- Ministry of Territorial Administration and Development;
- Ministry of Agriculture;
- Republic of Armenia Police;
- Health and Labor Inspectorate;
- Ministry of Defence;
- State Revenue Committee;
- Ministry of Health;
- National Academy of Science;
- Armenian Women for Health and Healthy Environment NGO.

On December 21, 2015 the Steering Committee meeting_was arranged at the Ministry of Nature Protection of the Republic of Armenia.

As indicated during the Meeting, "to enable ratification of the Convention by the Republic of Armenia, it is necessary to study the problems relevant to mercury in the country, to identify priorities and only then make a decision to ratify the Convention. The efforts of Steering Committee members and all stakeholders' specialists should be addressed to such study and discussion; all of them should be actively involved in decision-making concerning mercury."

Issues relevant to mercury were also discussed on December 25, 2015 at the meeting of the Scientific-Technical Council under the Minister of Nature Protection established according to Order of Minister of Nature Protection No. 186-A of July 15, 2014.

Due to endeavours of the Steering Committee the Republic of Armenia ratified the Minamata Convention on Mercury on October 6, 2017 and undertook obligations to implement the convention.

Part 1. COUNTRY BASELINE

1.1. Country Profile

1.1.1 Geography and Population

The Republic of Armenia (RoA) is situated in the western part of Asia. The country occupies the North-Eastern part of Armenian plateau – between Caucasus and Nearest Asia (the inter-river territory between the middle flows of Kur and Araks rivers).

Geographic Coordinates:

in the South: 38°50' Northern Latitude;
in the North: 41°18' Northern Latitude;
in the West: 43°27' Eastern Longitude;
in the East: 46°37' Eastern Longitude.

Neighboring Countries:

in the North: Georgia; in the East: Azerbaijan; in the South: Iran; in the South-West: Nakhijevan (Azerbaijan); in the West: Turkey.

Territory:

The country's area comprises 29743 square kilometers (km^2), of which 69.0%* make agricultural lands, 11.2%* – forests, 11.2%* – areas of special preservation and 8.6%* – other lands. 36.4% area of RoA are mountains, plateaus and other lands.

The highest elevation of the country is the Peak of Aragats Mountain (4090 m), the earth lowest point – the underflow region of Debed river canyon (375 m). The longest extension from North-West to South-East is 360 km, and from West to East – 200 km.

Armenia is a mountainous country. The 76.5% of the republican territory is on the height of 1000-2500 m above sea level.

Mountain ranges occupy about 14 thousand (ths) km^2 territory or 47% of the country's total surface. Plateaus comprise more than 1/3 (11 ths km^2) of country surface.

The largest lake in the territory of RoA is Lake Sevan (average annual surface for 2012 – 1276.3 km^2), the longest river is Araks – 192 km (total length: 1072 km).

Republican water reserves are limited and annually comprise totally 8.5 billion m^3, of which 6.54 billion m^3 – surface water flow. The rivers of Armenia are mainly mountainous with strongly expressed flows with little water.

There are freshwater lakes and reservoirs in the RoA, with about 40.0 billion m^3 total volumes, about 95% of which comprises one of the world highest mountainous lakes – Lake Sevan, which is situated at the height of 1900.3 m above sea level; in 2012 its water reserves comprised about 37.9 billion m^3.

Armenia has mountainous arid climate, which is specified by its dryness. Armenia is located in the northern latitudes of subtropical zone.

* According to Republic of Armenia Land Balance formed by the State Committee adjunct to the Republic of Armenia Government (as of July 1, 2013)

Ethnic Breakdown: Armenians - 98.1%
Minorities: Russians, Yezidis, Kurds, Assyrians, Greeks, Ukrainians, Jews and others.

1.1.2 Political and Economic Overview

The Republic of Armenia is a sovereign, democratic, social state governed by rule of law (Article 1, Chapter 1, RoA Constitution).

The Declaration on State Sovereignty of Armenia was adopted on August 23, 1990 and the referendum on independence declaration was held on the 21st of September 1991. On December 21 of the same year, RoA became a member of the Commonwealth of Independent States (CIS), on the 2nd of March 1992 – a Member of the United Nations, on January 25, 2001 – a member of the Council of Europe and on the 5th of February 2003 – a member of the World Trade Organization.

In the Republic of Armenia the power belongs to the people (Article 2, Chapter 1, RoA Constitution). The President of the Republic of Armenia is guarantor for the country independence, territorial integrity and security of the Republic of Armenia.

In the Republic of Armenia the legislative power is implemented by the National Assembly.

The people exercise their power through free elections, referendums, as well as through state and local self-governing bodies and public officials (Article 2, Chapter 1, RoA Constitution).

The state power is implemented in conformity with the Constitution and the laws based on the principle of separation and balance of the legislative, executive and judicial powers (Article 5, Chapter 1, RoA Constitution).

The state language of the Republic of Armenia is the Armenian language (Article 12, Chapter 1, RoA Constitution). It forms a separate branch of the Indo-European language family.

The national currency of the country is the Armenia Dram (AMD), which has been circulated since November 1993 (Article 83.3, Chapter 4, RoA Constitution).

The basis of administrative territorial division of RoA are Laws “On RoA administrative territorial division” and «On local self-government in Yerevan City”, according to which the territory of RoA is divided into 10 marzes with 48 urban and 866 rural communities and Yerevan municipal community (with 12 administrative districts).



Figure 1.1.2-1: **Administrative and Territorial Division of the Republic of Armenia (Marzes and Yerevan City)**

Armenia has been always specified by developed industry and agriculture. Here it is possible to find out almost all those rocks that comprise the earth-crust. Large part the territory is covered by stratum of different type volcanic rock and tufa. The lithosphere of RoA is rich with various useful minerals. As a result of volcanic eruptions, a big reserve of natural building materials - tufa, basalt, andesite, perlite and other materials – had been formed and was used in construction. Coal, iron, bauxite, molybdenum, copper, gold, silver, lead, zinc, different precious and semi-precious stones have been extracted in RoA.

During the 2000s sustainable economic growth patterns had been maintained in RoA. However, the global economic crisis hit the Armenian economy as well. Whereas the foundation cornerstones of economic stability, such as the low level of debt, increasing level of savings and prudent fiscal positions safeguarded the economy against the initial influence of the global recession of production and the financial crisis, the effects of the decline in external demand and capital inflows became visible since the fourth quarter of 2008, when the country experienced a 5.9% economic recession and a 6.9% annual Gross Domestic Product (GDP) growth, as opposed to the two-digit growth of GDP at 13.7% back in 2007. Investments decreased at a faster pace, whereas the sector of residential construction was the first and the most affected among those having suffered because of abrupt deterioration of the economic environment. Relevant economic indicators evidenced a deep recession of the economy in 2009. A 14.2% downturn of the GDP in that year was followed by a slow recovery since 2010 (in comparison with the previous year, GDP grew by 2.2% in 2010 and by 4.7% in 2011). There was a rather significant 7.2% growth of GDP in 2012 as well; however, it was not sufficient for achieving the level of 2008. In 2013 it was 3.3%; in 2014 –103.6%.

Nevertheless, before the crisis, due to the registered stable economic growth over the last decade RoA had joined the group of middle income economies. The economic growth

brought about stabilization of employment rates, increases in real wages and consolidated budget spending on social sectors. All of this, combined with a growing inflow of private transfers, contributed to significant reduction of poverty rates in RoA.

Table 1.1.2-1: **Administrative territorial division of RoA by marzes and Yerevan city as of January 1, 2014**

	Number of Communities			Number of residential areas
	total	urban	rural	
Republic of Armenia	**793**	**49**	**744**	**1001**
Yerevan city	1	1	-	1
Aragatsotn	114	3	111	120
Ararat	95	4	91	99
Armavir	97	3	94	98
Gegharkunik	92	5	87	98
Lori	107	8	99	130
Kotayk	67	7	60	69
Shirak	79	3	76	131
Syunik	72	7	65	134
Vayotz Dzor	29	3	26	55
Tavush	40	5	45	66

1.1.3 Characteristics of Economy Branches

The Republic of Armenia industry is mainly based on the country own mineral and agricultural raw material. Fuel, ferrous metals and auxiliary raw materials are imported from abroad. The growth of gross domestic product (GDP) is due to the development of sectors such as industry, building/construction, agriculture, transport, communications, trade and catering.

In Armenia industrial products are mainly manufactured by the following branches: processing industry, mining, electricity, gas and water production and distribution.

In Industry 2008, GDP had the smallest share (in 2003-2008 the average growth amounted to 3.3%), which was the result of several factors. First, during the economy growth in 2006 the industry had decline of 2.5%, which was mainly caused by electricity, gas, water and steam production 11% decline, as well as reduction in sectors of manufacturing industry, including the chemical industry, diamond processing and tobacco production. In addition, the growth of industry sector as a whole in the same period was restricted as a result of export unfavourable pricing environment. Upon the crisis, the industry decline made 6.9%, primarily due to the reduction of global and domestic demand for food and building materials industry. After the crisis, the industry growth was due to production of food and drinks, as well as du to the growth of the mining and metallurgy, which bore the government's anti-crisis policy, tailoring favourable pricing for export and the impact of the global economic recovery.

In RoA, during 2013, industrial products were manufactured to 1,240,578.7 million AMD in current prices and the cost of realized products made 1,214,412.7 million AMD. In relation to 2012 the industrial production index made 106.8%.

In 2013 the structure of industrial production according to branches of industry was as follows: processing industry – 58.6%, electricity, gas, steam and air conditioning supplies – 29.1%, mining industry and opencast mines operation – 11.2%, water supply, sewerage, waste management and treatment – 1.1%.

The processing industry included production of food (37.0%), beverages (16.9%), manufacture of basic metals (16.1%), tobacco products (6.1%), other non-metallic mineral products (6.0%), printing activity, recorded media multiplication (2.3%), production of jewelry (2.0%), manufacture of fabricated metal products (1.5%), manufacture of electrical equipment (1.1%), clothing production (1.0%), manufacture of chemicals and chemical products (0.8%), etc.

Mining industry and open mines operation mainly include metal ores excavation (96.9%).

In 2013, the main part of the industrial production (output) belongs to Yerevan (40.9%) followed by Syunik marz (16.5%), Kotayk marz (13.4%), Ararat marz (10.0%) and Lori (6.1%).

Table 1.1.3-1: **The structure of industrial production by economic activity types (according to NACE 2 classification), 2009-2013, in %.**

Branch of Industry	2009	2010	2011	2012	2013
Overall industrial production	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Mining and quarrying	**13.2**	**17.7**	**17.0**	**17.2**	**15.8**
Metal ore mining	95.1	96.5	97.3	96.9	97.2
other branches of mining and quarrying industry	4.9	3.5	2.7	3.1	2.8
Manufacturing/processing industry	**66.3**	**66.1**	**64.6**	**62.3**	**62.6**
Production of food	38.3	34.5	37.0	35.8	35.4
Production of beverages	11.5	12.8	13.2	14.5	16.3
Production of tobacco goods	3.2	3.7	2.5	3.6	4.9
Production of textile	0.1	0.1	0.2	0.1	0.1
Production of clothes	0.8	0.6	0.9	0.7	0.8
Production of leather, leather goods and shoe-wear	0.2	0.2	0.2	0.2	0.2
Production of timber/wood and wooden products, wood processing, production of wood and cork, straw and plaiting materials, except furniture	0.2	0.3	0.2	0.2	0.1
Production of paper and paper-made products	0.7	0.8	0.9	1.1	1.5
Publishing/ printing activity; replication of recorded information-carrying media	2.0	1.7	1.6	1.5	1.8
Production of chemicals and chemicals-related products	2.1	1.6	1.2	1.1	1.0
Production of pharmaceuticals	0.6	0.6	0.5	0.6	0.7

Branch of Industry	2009	2010	2011	2012	2013
Production of rubber and plastic goods	3.1	2.8	2.9	3.0	2.6
Production of other non-metallic mineral products	9.4	9.2	7.3	6.9	7.0
Manufacture of basic metals	21.4	24.8	24.9	23.5	20.5
Manufacture of fabricated metal products, except machinery and equipment	1.1	1.2	1.6	1.7	1.7
Manufacture of computers, electronic and optical equipment	0.9	0.9	0.8	0.8	0.8
Manufacture of electrical equipment	0.6	0.7	0.9	0.8	0.7
Manufacture of machinery and equipment, not included in other groups	0.7	0.4	0.4	0.7	0.5
Manufacture of other transport equipment	0.0	0.0	0.0	0.0	0.0
Manufacture of furniture	0.5	0.4	0.3	0.4	0.4
Manufacture of products' types, not included in other groups	1.7	2.0	2.1	2.4	2.7
Repair and installation of machinery and equipment	0.9	0.7	0.4	0.4	0.3
Electricity, gas, steam and air conditioning supplies	**18.1**	**14.1**	**16.6**	**18.9**	**20.2**
Electricity, gas, steam and air conditioning supplies	18.1	14.1	16.6	18.9	20.2
Water supply, sewerage, waste management and recycling	**2.4**	**2.1**	**1.8**	**1.6**	**1.4**
Water collection, treatment and distribution	61.2	59.2	59.2	52.6	67.6
Sewerage	13.8	12.7	12.6	12.5	11.8
Waste collection, treatment and disposal, materials recovery	25.0	28.1	28.2	34.9	20.6

Table 1.1.3-2: **Number of Industrial Organizations by Economic Activity types (according to NACE 2 classification), 2009-2013**

Branch of Industry	2009	2010	2011	2012	2013
Overall industrial production	**2302**	**2484**	**2648**	**2587**	**2726**
Mining and quarrying	**63**	**62**	**65**	**71**	**75**
Metal ore mining	7	7	7	8	9
other branches of mining and quarrying industry	56	55	58	63	66
Manufacturing/processing industry	**2147**	**2241**	**2380**	**2290**	**2405**
Production of food	716	789	847	793	801
Production of beverages	113	125	125	116	128
Production of tobacco goods	4	4	4	4	4
Production of textile	18	21	20	21	19
Production of clothes	78	69	76	74	82
Production of leather, leather goods and shoe-wear	40	45	54	50	47
Production of timber/wood and wooden products, wood processing, production of wood and cork, straw and plaiting materials, except furniture	72	70	73	65	72
Production of paper and paper-made products	34	44	52	47	54
Publishing/ printing activity; replication of recorded information-carrying media	133	115	117	121	120
Production of chemicals and chemicals-related products	54	59	65	65	76
Production of pharmaceuticals	17	13	14	15	19
Production of rubber and plastic goods	102	205	210	203	201
Production of other non-metallic mineral products	218	226	229	227	230
Manufacture of basic metals	20	27	28	28	28
Manufacture of fabricated metal products, except machinery and equipment	192	103	110	105	125
Manufacture of computers, electronic and optical equipment	44	38	38	40	43
Manufacture of electrical equipment	46	45	48	43	47
Manufacture of machinery and equipment, not included in other groups	55	49	49	51	50
Manufacture of other transport equipment	1	1	2	1	1
Manufacture of furniture	100	105	116	118	151

Branch of Industry	2009	2010	2011	2012	2013
Manufacture of products' types, not included in other groups	70	65	72	74	76
Repair and installation of machinery and equipment	20	23	31	29	31
Electricity, gas, steam and air conditioning supplies	**87**	**105**	**124**	**144**	**165**
Electricity, gas, steam and air conditioning supplies	87	105	124	144	165
Water supply, sewerage, waste management and recycling	**5**	**76**	**79**	**82**	**81**
Water collection, treatment and distribution	2	2	2	3	4
Sewerage	…	9	9	9	7
Waste collection, treatment and disposal, materials recovery	3	65	68	70	70

PART 2. INSTITUTIONAL, POLICY AND REGULATORY FRAMEWORK

2.1. International Commitments and Obligations

In various spheres, including the issues of environmental protection and human health, RoA has a close co-operation with the world community. At the World Summit on Sustainable Development (Johannesburg, 2002) great attention was devoted to discussion of problems on protection of the environment and human health. At the World Summit, Johannesburg Declaration on sustainable Development was adopted and recommendations proposed for submission to the UN Assembly General. RoA also actively participates in international organizations and agreements on management of chemicals and wastes.

A number of international environmental Conventions and Agreements were signed and ratified by RoA (*see* Table 2.1-1).

Table 2.1-1: **Involvement of RoA in International Environmental Conventions and Agreements**

No.	Conventions (dates and places of adoption)	CONVENTION STATUS		
		Date of signing	Date of ratification by the National Assembly	Date of registration at UN Secretariat
1.	"Convention on Wetlands (Ramsar, Iran, 1971)", – The Convention on Wetlands of International Importance especially as Waterfowl Habitat		acceded in 1993 as a successor	RoA acceded to Convention according to the request of November 6, 1993
2.	The Rio de Janeiro Convention on Biological Diversity, 1992	June 5, 1992	March 31, 1993	May 14, 1993
	- Cartagena Protocol to the Convention on Biological Diversity (Montreal, January 29, 2000) -		March 16, 2004	April 30, 2004
3.	Framework Convention on Climate Change (New York, 1992)	June 13, 1992	March 29, 1993	May 14, 1993
	- Kyoto Protocol (Kyoto, 1997) - -		December 26, 2002	April 25, 2003
4.	UNECE Convention on Long-range Transboundary Air Pollution (Geneva, 1979)		May 14, 1996	February 21, 1997
	- Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of		20.10.2013թ.	21.04.2014թ.

No.	Conventions (dates and places of adoption)	CONVENTION STATUS		
		Date of signing	Date of ratification by the National Assembly	Date of registration at UN Secretariat
	Air Pollutants in Europe (EMEP), 1984 Geneva			
	- Protocol on Heavy Metals (Aarhus, 1998)	December 14, 1998		
	- Protocol on Persistent Organic Pollutants (Aarhus, 1998)	*December 14, 1998*		
	- Protocol to Abate Acidification, Euthrophication and Ground-level Ozone Formation (Gothyenburg)	November 30, 1999		
5.	UNECE Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 1991)		May 14, 1996	February 21, 1997
	- Protocol on Strategic Environmental Assessment (Kiev, 2003)	May 21, 2003	25.10. 2010	24.04. 2011
6.	UNECE Convention on the Transboundary Effects of Industrial Accidents (Helsinki, 1992)		May 14, 1996	February 21,1997
	- Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents (Kiev, 2003) to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992) and Convention on Transboundary Impact of Industrial Accidents (1992)	May 21, 2003		
7.	Convention to Combat Desertification (Paris, 1994)	October 14, 1994	June 23, 1997	July 2, 1997
8.	Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel, 1989)		March 26, 1999	September 30, 1999
9.	Convention for the Protection of the Ozone Layer (Vienna, 1985)		April 28, 1999	September 30, 1999
	Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal, 1987)		April 28, 1999	September 30, 1999

No.	Conventions (dates and places of adoption)	CONVENTION STATUS		
		Date of signing	Date of ratification by the National Assembly	Date of registration at UN Secretariat
	- London Amendments to the Montreal Protocol (London, 1990)		22.10.2003	October 22, 2003
	- Copenhagen Amendments to the Montreal Protocol (Copenhagen, 1992)		22.10.2003	October 22, 2003
	- Beijing Amendments to the Montreal Protocol (Beijing, 1998) 2008		29.09. 2008	18.03. 2009
	- Montreal Amendments to the Montreal Protocol (Montreal, 2008)		29.09. 2008	18.03. 2009
10.	UNECE Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters (Aarhus, 1998)	June 25, 1998	May 14, 2001	August 1, 2001
	- Protocol on Pollutant Release and Transfer Registers (Kiev, 2003	May 21, 2003		
11.	Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam, 1998)	September 10, 1998	October 22, 2003	November 26, 2003
12.	Convention on the Protection and Use of Transboundary Watercourses and International lakes (Helsinki, 1992)	June 17 , 1999		
	- Protocol on Water and Health (London, 1999)	1999		
13.	Stockholm Convention on Persistent Organic Pollutants (Stockholm, 2001)	May 23, 2001	October 22, 2003	November 26, 2003
14.	Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques (Geneva, 1976)		December 4, 2001	May 15, 2002
15.	Convention on the prohibition of the development production, stockpiling and use of chemical weapons and on their destruction (Chemical Weapons Convention) (1992)	March 19, 1993		January 27,1995
16.	Minamata Convention on Mercury	October 10, 2013	October 6, 2017	December 13, 2017

2.2. International Regulation of Mercury Containing Products and Wastes Handling

Apart to the Minamata Convention on Mercury, the international regulation of mercury containing products and wastes handling is carried out to the following documents under the international law:

- United Nations conventions under the United Nations Environment Program (UNEP) http: // www, chem.unep.ch, http://synergies.pops.int
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal dated March 22, 1989 (http://www.basel.int).
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade dated September 10, 1998 (http://www.pic.int).
- The Overarching international instrument - the Strategic Approach to International Chemicals Management (SAICM) of 2006 (http://www.saicm.org).

In addition to the Minamata Convention on Mercury, in 1998 the international community, in the frame of UNECE Convention on Long-range Transboundary Air Pollution (1979), the Protocol on Heavy Metals was signed the main purpose of which is to control the heavy metals emissions into the atmosphere. According to Protocol, mercury is considered a priority heavy metal. Each Party to the Protocol should develop and maintain heavy metals emission inventories (primarily: cadmium, lead and mercury). Information on national emissions is received by the Cadastre and Emissions Projections Center where it is processed and summarized by substances, countries, and years. Since the Republic of Armenia has not ratified the Protocol on Heavy Metals, it does not provide information about its emissions to the Cadastre Center.

2.3. The Republic of Armenia Legislation on Chemicals and Wastes Management Relating to Mercury

Table 2.3.-1: **National Legislation on Chemicals and Wastes Management Relating to Mercury**

HO-159-N of November 24, 2004	**Law "On Waste" of the Republic of Armenia**
No. 874-N of May 20, 2004	Governmental Decision of the Republic of Armenia "On approval of the "Republic of Armenia List of hazardous wastes"
No.1093-N of July 8, 2004	Governmental Decision of the Republic of Armenia "On applying changes to the Decision of the Republic of Armenia No. 97 of December 8, 1995 and on approval of the Republic of Armenia "List of prohibited hazardous wastes"
No. 1508-N of October 29, 2004	Decision of the Government of the Republic of Armenia "On implementation of the Republic of Armenia obligations under Rotterdam Convention signed September 10, 1998"
No. 430-N of December 25, 2006	Order of the Republic of Armenia Minister of Nature Protection "On approval of the List of wastes classified by hazard"
No. 1524-N of December 25, 2014	List of hazardous waste banned for import from third countries or from the EEU member states to the territory of the Republic of Armenia
No. 90 of February 5, 2015	List of hazardous waste, transportation of which in EEU area is limited for import and/or export.
No. 90-N of February 5, 2015	Decision of the Republic of Armenia Government "On approval of the List of certain products/ goods prohibited and subject to restriction for the transit movement by the customs territory of the Republic of Armenia, Export and Import Licenses and Application Forms; on establishing the peculiarities of issuing Export and Import Licenses for certain products; and on changes in Decision of the Government of the Republic of Armenia No. 327-N of March 15, 2007"
No. 930-N of September 8, 2016	Decision of the Government of the Republic of Armenia dated "On approval of changes to Decision of the Government of the Republic of Armenia 'On approval of the List of chemicals and pesticides regulated by Rotterdam Convention and banned in the Republic of Armenia' (No. 293-N of March 17, 2005)"
No. 15 of April 13, 2017	Protocol Decision of the Republic of Armenia Government "On approval the concept for implementation of extended producer (importer) responsibility systems to industrial products"
No. 429-N of April 27, 2017	Decision of the Government of the Republic of Armenia "On defining cases and establishing the procedure for carrying-out mining waste facility maintenance, monitoring and control measures after final closure of mining waste facilities in connection with the use of mineral resources in the area of environmental protection by authorized governing body"
No. 666-N of June 15, 2017	Decision of the Government of the Republic of Armenia "On establishing criteria set forth to the best available techniques"

No. 674-N of June 15, 2017	Decision of the Government of the Republic of Armenia "On establishing a procedure for conciliation procedure with the Authority responsible in the area of the State Environmental Protection Body regarding mining waste management and mining waste recycling changed plans, relating to environmental protection issues in mining sector"
No. 675-N of June 15, 2017	Decision of the Government of the Republic of Armenia "On defining the content of mining waste management and mining waste recycling plans, as well as mining waste management and mining waste recycling activities"
No. 676-N of June 15, 2017	Decision of the Government of the Republic of Armenia "On establishing the exemplary forms of mining waste management plans and mining waste recycling plans"
No. 689-N of June 15, 2017	Decision of the Government of the Republic of Armenia "On establishing the procedure for mining waste and mining waste management facilities classification according to hazard"
No. 774-N of July 6, 2017	Decision of the Government of the Republic of Armenia "On establishing the procedure for inventory of closed mining waste facilities"
No. 256-N of August 1, 2017	Order of the Minister of Nature Protection of the Republic of Armenia "On approval of the procedure for determination of the maximum admissible concentrations / limits of hazardous chemicals required for processing of ore mineral resources"
No. 985-N of August 10, 2017	Decision of the Government of the Republic of Armenia "On establishing technical requirements and criteria set forth to mining waste management facilities and mining waste management and processing"

2.4. Assessment of existing legislation and proposed actions on legal reforms in the Republic of Armenia

Table 2.4.-1: **Assessment of existing legislation and proposed actions on legal reforms**

Provision of the Minamata Convention	Relevant existing legislation	Proposed legal reform action (if needed)
Article 3 on supply sources and trade **Party obligations related to:**		
- primary mercury mining	Absent / Not available	
- excess mercury from chlor-alkali plants	absent	
- export and import of mercury	absent	
- notification and consent of import/export of mercury		• To develop the order regulating mercury export/ and import of. • To make amendments to the national legislation,;

Provision of the Minamata Convention	Relevant existing legislation	Proposed legal reform action (if needed)
		• To develop the Order and content of order and consent of import/export notifications
Article 4 on mercury-added products **Party obligations related to:**		
- manufacture, import, and export of mercury-added products of Annex A of the Convention	-	a) The List of mercury-added products is under approval. This List embraces products the manufacture, import and export of which is allowed until the stage-by-stage elimination, as provided by the Convention b) to establish the Order for stage-by-stage elimination of mercury-added products (indicated in Annex A, Part I c) Annex A, Part II
- manufacture, import, and export of new mercury-added products	-	
Article 5 on manufacturing processes in which mercury or mercury compounds are used **Party obligations related to:**		
- use of mercury or mercury compounds in processes listed in Annex B of the Convention	None	In the Republic of Armenia there were no manufacturing processes with the use of mercury or mercury compounds indicated in Article 5
- emissions and releases of mercury and mercury compounds from these processes		
- use of mercury or mercury compounds in new processes		
Article 6 on exemptions available to a Party upon request Any state may register for exemptions from the phase-out dates listed in Annex A (mercury-added products)		No exemptions are envisaged for categories listed in Annex A or B

Provision of the Minamata Convention	Relevant existing legislation	Proposed legal reform action (if needed)
and Annex B (manufacturing processes in which mercury or mercury compounds are used)		
Article 7 on artisanal and small-scale gold mining **Party obligations related to:** - reduction/elimination of use of mercury in this process	There is no artisanal and small-scale gold mining in the Republic of Armenia	Legal reforms are not planned
Article 8 on emissions **Party obligations related to:** **-** controlling emissions of mercury or mercury compounds - use of best available techniques and best environmental practices to control and reduce emissions from existing and new sources - establishment of an inventory of emissions from relevant sources	**–**	• Working-out acts (by-laws) regulating threshold values of emissions of mercury and elimination of emissions, where actually possible • Legal act establishing the creation and maintenance Cadastre from appropriate sources
Article 9 on releases **Party obligations related to:**		• Creation and maintenance of Cadastre on mercury releases from appropriate sources • Preparation of the National Action Plan for control on mercury releases
- identification of relevant point source categories		
- controlling releases of mercury or mercury compounds		
- establishment of an inventory of releases from relevant sources		
Article 10 on environmentally sound interim storage of mercury, other than waste mercury **Party obligations related to:** - environmentally sound storage of mercury and mercury compounds pending use or disposal		Working out regulatory document and adoption of requirements on environmentally sound temporary storage of mercury and mercury compounds pending use or disposal

Provision of the Minamata Convention	Relevant existing legislation	Proposed legal reform action (if needed)
Article 11 on mercury wastes **Party obligations related to:** **-** environmentally sound management of mercury-containing waste - application of the Basel Convention on Control of Transboundary Movements of Hazardous Wastes and their Disposal**.**	• Decision of the Government of the Republic of Armenia "On approval of the List of chemicals and pesticides regulated by Rotterdam Convention and banned in the Republic of Armenia" (No. 293-N of March 17, 2005). The List involves compounds of mercury, including: inorganic mercury compounds, compounds of alkyl mercury, as well as alkyloxyalkyl and arylated compounds of mercury. • In 2004 the Republic of Armenia approved the Law "On Waste" and more than 20 by-laws were approved by the Government of the Republic of Armenia. Some of mentioned legislative documents include management of mercury-containing waste, in particular: • Decision of the Government of the Republic of Armenia "On the approval of the List of the Republic of Armenia hazardous wastes" (No. 874-N of May 20, 2004). This List encompasses (i) wastes containing mercury, mercury compounds as a component or pollutant, (ii) scrap (wastes), electrical equipment or electro-technical nodes, involving galvanic elements, batteries, mercury switches, glass of cathode ray tubes, and other types of glass with the active covering or polluted by cadmium, mercury, lead, polychlorinated biphenyls at the concentration level from 50 mg/kg and above, (iii) worked-out mercury lamps and luminescent tubes. • Decision of the Government of the Republic of Armenia "On approval of the List of the Republic of Armenia banned hazardous wastes" (No.1093-N of July 8, 2004).	It is necessary to work out Guidelines for environmentally sound disposal of mercury-containing wastes or wastes contaminated by mercury or mercury compounds

Provision of the Minamata Convention	Relevant existing legislation	Proposed legal reform action (if needed)
	This List includes wastes containing mercury, mercury compounds as a component or pollutant	
Article 12 on contaminates sites **Party obligations related to:** **-** developing strategies for the identification and assessment of contaminated sites	Normative documents / regulations/ Standards	Development of Strategy for identification and assessment of sites contaminated by mercury or mercury-containing wastes and actions for remediation of such sites
Article 16 on health aspects **Parties are encouraged to:** **-** Promote the development and implementation of strategies and programmes to identify and protect populations at risk, setting targets for mercury exposure reduction, and public education - Promote the development and implementation of science-based educational and preventive programmes on occupational exposure to mercury and mercury compounds - Promote appropriate health-care services for prevention, treatment and care of populations affected by the exposure to mercury and mercury compounds - Establish and strengthen the institutional and health professional capacities for the prevention, diagnosis, treatment, and monitoring of health risks related to the exposure to mercury and mercury compounds		Guidelines, regulations should be developed

2.5. Competences of State Bodies in Chemicals and Waste Management

2.5.1 Competences of the Government of Republic of Armenia in Chemicals and Wastes Management

Competences of the Government of RoA in the sphere of waste are set forth mainly in RoA Law "On Waste".

According to Article 7 of RoA Law "On Waste", competences of the Government of the RoA in waste management are as follows:

- development and implementation of state policy in waste management;
- coordination of state governance bodies in waste management;
- introduction of low-waste technologies, promotion of economic mechanisms for waste management;
- defining the procedure for waste accounting, generation, disposal (liquidation, decontamination and placement) and utilization;
- defining the licensing procedure for hazardous-waste recycling, treatment, storage, transportation and placement;
- defining the inventories of hazardous and banned waste;
- defining the procedure for transboundary waste movement and disposal;
- establishment of facilities for placement of decontaminated and unusable waste;
- international cooperation in waste management.

2.5.2 Competences of the Republic of Armenia Ministry of Nature Protection in Chemicals and Wastes Management

According to Article 8, paragraph 1 of RoA Law "On Waste", the competences of the state governance authorized body in charge of nature protection are as follows:

- participation in the formulation of state waste management policy;
- drafting targeted programs in waste management;
- state accounting of waste;
- approval of waste placement limits for legal entities and private entrepreneurs;
- defining the inventories of hazardous and banned waste;
- establishment of waste inventories based on hazard classification;
- proposals on issuance of permits for transboundary shipment of hazardous waste;
- approval of the sites for waste management facilities;
- approval of waste certificates as compiled by waste generators;
- creation of a Data Bank for the amounts of generated waste;

- maintaining the State Cadastre of Waste;
- sharing information with other agencies about low-waste and wasteless technologies;
- compilation, maintaining and monitoring of Registers for waste generation, recycling and utilization facilities and landfills;
- signing international cooperation agreements on waste management and international inter-agency agreements on transboundary waste shipment;
- sharing information on waste utilization with international organizations and competent states.

2.5.3 Competences of Republic of Armenia Ministry of Health in chemicals and wastes management

According to Article 9 of RoA Law "On Waste", the competences of the authorized healthcare governance body in waste management are as follows:

- the development of safety requirements for human health in the secondary legislation related to waste management, and the development of sanitation and anti-epidemic regulations and norms to rule out dangerous impacts on the human body during waste generation, collection, shipment, storage, recycling, utilization, disposal, decontamination and burial, and supervision over the implementation of these requirements;
- development of priority measures in protecting human health from hazardous waste impact and submitting the latter to the Government of the RoA;
- approval of the sites for waste management facilities;
- sanitation and hygiene requirements to products manufactured from waste and issuance of hygiene conclusions.

According to Annex 1, paragraph 7 of Resolution of the Government of RoA dated August 15, 2002, No.1300-N "On the establishment of the state governance agency "Republic of Armenia Health Ministry Staff and approval of the charter and staff structure of the Health Ministry of the Republic of Armenia", the goals of RoA Health Ministry are the protection of human and public health, improvement of the population's health, sanitation and hygiene safety of public health and population, etc. which as we can see directly or indirectly are related to chemicals and wastes management**.**

According to article 18, paragraph 2 of RoA Law "On sanitation and epidemic safety of RoA population" of December 12, 1992, HO-43, enterprises, institutions, organizations, citizens during collection, recycling, utilization, decontamination and burial of industrial and household waste shall observe sanitation rules. State hygiene and anti-epidemic supervision is delegated to RoA Ministry of Health.

2.5.4 Competences of Republic of Armenia Ministry of Emergency Situations in chemicals and wastes management

Article 4 of the Law of the RoA "On the protection of population in emergency situations" of December 2, 1998, HO 265 provides that the preventive measures for the protection of the population are as follows:

- moniotring and supervision of the radiological, chemical and bacteriological contamination of the environment, territory and facilities.

Article 7 of the same law provides that in emergency situations the basic measures of population protection are as follows:

- population protection from radiological, chemical and bacteriological substances.

Governmental Decision No. 861 of 8 July 2010 has laid down:

1) the plan of protection of the population in case of accident or chemical hazard of the chemical objects of the RoA;
2) emergency-response operations in case of an accident in a chemical hazardous facility.

2.5.5 Competences of Republic of Armenia Ministry of Transport, Communications and Information Technologies in chemicals and wastes management

According to the Law of the RoA "On the shipment of hazardous cargo and undecontaminated containers by automobile transport" of February 27, 2012, HO 30-N**,** Article 8, part 1, paragraph 4, RoA Ministry of Transport and Communication shall issue a permit for the shipment of hazardous cargo.

2.5.6 Competences of Republic of Armenia Ministry of Agriculture in chemicals and wastes management

The RoA Ministry of Agriculture has no competences in chemicals and wastes management either in RoA Law "On Waste", or in the ministerial charter.

The Ministry of Agriculture develops and implements state policy in the field of food safety, phytosanitary.

2.5.7 Competences of local self-government bodies in chemicals and wastes management

According to Article 11 of RoA Law "On Waste", the community leader within the limits of the administrative boundary of community:

- supervises garbage collection;
- compiles the schemes of sanitatary cleaning of territories;
- iquidates uncontrollable and unauthorized garbage dumps;
- organizes the participation of the population in the collection of not hazardous waste that is a valuable resource.

2.5.8 Competences of regional government bodies in chemicals and wastes management

According to Article 10 of RoA Law "On Waste", the competences of local government bodies in the management of chemicals and waste are as follows:

1. participation in state policy formulation in waste management;
2. participation in the drafting of state programs in waste management;
3. within their administrative territory, drafting local programs in waste management and coordination of implementation thereof;
4. within their administrative territory, issuance of permits in coordination with the authorized state body for waste disposal;
5. within their administrative territory, drafting sanitary cleaning schemes and supervision over garbage collection;
6. compilation and maintaining of logs for waste generation, recycling, disposal and utilization facilities;
7. accounting of waste generation, decontamination, utilization and disposal and certification thereof;
8. liquidation of uncontrollable and unauthorized garbage dumps within their administrative territory;
9. within their administrative territory, engaging the population in the collection of not hazardous waste that is a valuable resource.

Part 3. INVENTORY OF MERCURY EMISSIONS TO THE ENVIRONMENT OF THE REPUBLIC OF ARMENIA

This inventory was developed in the frames of "Minamata Convention Initial Assessment of Armenia" GEF/ UNIDO Project implementation.

Data for 2010-2015 were used in the inventory, when available. For some data types, in particular, for mercury containing consumer goods data from 2015 have not been available yet. The year for all data given is noted with the data in question in the relevant sections of this report.
This mercury release inventory was made with the use of the UNEP's "Toolkit for identification and quantification of mercury releases", Inventory Level 1 (version 1.02, April 2013) and "Toolkit for identification and quantification of mercury releases"", Inventory Level 2 (version 1.02, January 2013).
The Toolkits are available at UNEP Chemicals' website:

http://www.unep.org/hazardoussubstances/Mercury/MercuryPublications/GuidanceTrainingMaterialToolkits/MercuryToolkit/tabid/4566/language/en-US/Default.aspx

This inventory was developed on the Toolkits Inventory Levels 1 and 2. The Toolkit methodology is based on mass balances for each mercury release source sub-category. Inventory level 1 works with pre-determined factors used in calculating mercury entry factors into society and the emissions, the so-called entry and distribution factors for mercury at the output by default. These factors are derived from data on mercury in and out of the relevant source categories from available literature and other relevant data sources.

With regard to the following sub-categories of mercury sources, the assessment of inputs and emissions was nevertheless based on a more detailed level 2 of the inventory methodology, when the assessment was performed at a more detailed level.

3.1. Introduction

The goal of the Minamata Initial Assessment (MIA) development is to protect human health and the environment from the risks posed by the unsound use, management and release of mercury.

The inventory has been developed during 2014-2016 and implied testing of the both Level 1 and Level 2 of the UNEP methodology.

The present report includes the results of inventory using Level 1 and 2 methodology is based on mass balances for each mercury release source sub-category.

The level 1 inventory report for 2010-2015 and the spreadsheets for both Level l and Level 2 for the period of 2010-2014 are available.

Due to the fact that the country is performing such assessment for the first time, the comprehensive data has been collected for the period covering 6 year (2010-2015), yet it has been decided to provide as reference year for inventory Level 2 - 2014. At the same time for all the sections within the report the data and dynamics for 6 yearsis being incorporated.

Reference data that has been collected using the official data of the Republic of Armenia for all the sectors / categories concerned that comprises of the Statistical Yearbooks, import-

export data provided by the customs office and other sectoral publications and official requests submitted to various national institutions.

The present mercury release inventory was made with the use of the "Toolkit for identification and quantification of mercury releases" made available by the Chemicals Branch of the United Nations Environment Programme (UNEP chemicals). The Toolkit is available at UNEP Chemicals' website.

As a test, the inventory has been undertaken for both levels: Level 1 and Level 2 accordingly. Yet, the Inventory Level 1 methodology being a simplified tool, has some limitations, particularly due to the fact that the calculations are automatic and are based on default input factors and default output distribution factors. Thus most relevant to the country context has been selected to be the Level 2 approach that allowed to apply the country specific input factors for several major categories. Another important tool that has been used in order to compare the Level 1 and Level 2 methodologies in calculation approaches. The comparison was done at the Hg input ratio.

3.2. Mercury release source types present in the Republic of Armenia

Table 2-1 shows which mercury release sources were identified as present or absent in the country. Only source types positively identified as present are included in the quantitative assessment.

Table 3.2-1: **Identification of mercury release sources in the country; sources present (Y), absent (N), and possible but not positively identified (?)**

Source category	**Source present?**
	Y/N/?
Energy consumption	
Coal combustion in large power plants	N
Other coal uses	Y
Combustion/use of petroleum coke and heavy oil	Y
Combustion/use of diesel, gasoil, petroleum, kerosene	Y
Biomass fired power and heat production	N
Charcoal combustion	N
Fuel production	
Oil extraction	N
Oil refining	N
Extraction and processing of natural gas	N
Primary metal production	
Mercury (primary) extraction and initial processing	N
Production of zinc concentrates	Y
Production of copper concentrates	Y
Production of black (blister) copper	Y
Production of lead from concentrates	N

Source category	Source present?
Gold extraction by methods other than mercury amalgamation	Y
Alumina production from bauxite (aluminium production)	N
Primary ferrous metal production (iron, steel production)	Y
Gold extraction with mercury amalgamation - without use of retort	N
Gold extraction with mercury amalgamation - with use of retorts	N
Other materials production	
Cement production	Y
Pulp and paper production	Y
Production of chemicals and polymers	
Chlor-alkali production with mercury-cells	N
VCM production with mercury catalyst	N
Acetaldehyde production with mercury catalyst	N
Production of products with mercury content	
Hg thermometers (medical, air, lab, industrial etc.)	N
Electrical switches and relays with mercury	N
Light sources with mercury (fluorescent, compact, others: see guideline)	N
Batteries with mercury	N
Manometers and gauges with mercury	?
Biocides and pesticides with mercury	N
Paints with mercury	?
Skin lightening creams and soaps with mercury chemicals	N
Use and disposal of products with mercury content	
Dental amalgam fillings ("silver" fillings)	N
Thermometers	Y
Electrical switches and relays with mercury	Y
Light sources with mercury	Y
Batteries with mercury	Y
Polyurethane (PU, PUR) produced with mercury catalyst	N
Paints with mercury preservatives	?
Skin lightening creams and soaps with mercury chemicals	Y
Medical blood pressure gauges (mercury sphygmomanometers)	Y
Other manometers and gauges with mercury	Y
Laboratory chemicals	Y
Other laboratory and medical equipment with mercury	Y
Production of recycled of metals	
Production of recycled mercury ("secondary production")	N
Production of recycled ferrous metals (iron and steel)	N
Waste incineration	
Incineration of municipal/general waste	N
Incineration of hazardous waste	Y

Source category	Source present?
Incineration of medical waste	Y
Sewage sludge incineration	N
Open fire waste burning (on landfills and informally)	Y
Waste deposition/landfilling and waste water treatment	
Controlled landfills/deposits	N
Informal dumping of general waste *1	Y
Waste water system/treatment	N
Crematoria and cemeteries	
Crematoria	N
Cemeteries	Y

However, it should be noted that the presumably minor mercury release source types shown in Table 2-2 were not included in the detailed source identification and quantification work.

Table 3.2-2: **Miscellaneous potential mercury sources not included in the quantitative inventory; with preliminary indication of possible presence in the country**

Source category	Source present?
	Y/N/?
Combustion of oil shale	N
Combustion of peat	N
Geothermal power production	N
Production of other recycled metals	N
Production of lime	Y
Production of light weight aggregates (burnt clay nuts for building purposes)	N
Chloride and potassium hydroxide produced from mercury-cell technology	N
Polyurethane production with mercury catalysts	N
Seed dressing with mercury chemicals	?
Infrared detection semiconductors	N
Bougie tubes and Cantor tubes (medical)	?
Educational uses	N
Gyroscopes with mercury	?
Vacuum pumps with mercury	?
Mercury used in religious rituals (amulets and other uses)	N
Mercury used in traditional medicines (ayurvedic and others) and homeopathic medicine	N
Use of mercury as a refrigerant in certain cooling systems	N
Light houses (levelling bearings in marine navigation lights)	N
Mercury in large bearings of rotating mechanic parts in for example older waste water treatment plants	?
Tanning	?

Source category	Source present?
Pigments	?
Products for browning and etching steel	?
Certain colour photograph paper types	?
Recoil softeners in rifles	?
Explosives (mercury-fulminate a.o.)	?
Fireworks	?
Executive toys	?

The origin of mercury in waste and waste water produced in the country is mercury in products and materials. Therefore, waste fractions and waste water do not represent original mercury inputs to society (except imported waste). Waste and waste water may however represent substantial flows of mercury through society. The following were found to be the major flows of mercury with waste and waste water: open waste burning (at landfills and illegal/ at random), informal dumping of general wastes.

Notations

1. In case of copper, zinc concentrates and black (blister) copper production, we used the following enter input factors for mercury emissions.

- copper concentrate production – 0.1 g/t;
- zinc concentrates production – 0.5 g/t;
- black (blister) copper production – 1 g/t

To avoid the double calculation of mercury emissions in the production of non-ferrous metals we excluded from calculations of Level 2 the extraction of copper ore, which was considered in Level 1.
2. For categories of consumption of petroleum products and natural gas and production of iron and steel we used recommended average data on the mercury content in these products.
3. In Level 2, as the number of mercury medical thermometers the amount of 50% of the total number of imported thermometers was taken. Of this number, 50% are thrown out because of breakage. The numbers of environmental and industrial thermometers were taken at the rate of 50:50%, of which 10% of these amounts were considered as out of order. Disposal of medical tonometers (blood pressure monitors) also were taken at the rate of 10% of the total number
4. Dental fillings containing mercury, are not used in dental clinics of Armenia for a long time already. Therefore, in Level 2 this position is deleted. For the same reason, the calculations of mercury releases from the cemeteries conditioned mainly by the presence of amalgamated dental fillings, for calculation of mercury input factor known data on mercury content in human organism were used, namely: 13 mg/person.
5. As to the number of electrical switches and relays coming out of operation, the emissions of mercury were taken for 10% of the total number of switches is calculated by the total number of inhabitants.

3.3. Summary of Mercury Inputs to Society

In the Table 3.3-1 below, a summary of mercury releases from all source categories present is given. The key mercury releases here are releases to air (the atmosphere), to water (marine and freshwater bodies, including via waste water systems), to land, to general waste, and to sectors specific waste treatment. An additional output pathway is "by-products and impurities" which designate mercury flows back into the market with by-products and products where mercury does not play an intentional role. See Table 3.3-1 below for a more detailed description and definition of the output pathways.

The following source categories made the major part in factors of mercury inputs to society:

- Open fire waste burning (on landfills and informally)
- Informal dumping of general waste
- Consumer goods and other int. use
- Cement production.
- Production of copper concentrate and blister copper
- Production of zinc concentrate

Table 3.3-1: **Summary Mercury Inputs to Society in the Republic of Armenia for 2010 - 2015**

Source category	Estimated Hg input, Kg Hg/y	Estimated Hg releases, standard estimates, Kg Hg/y							Percent of total releases *3*4
		Air	Water	Land	By-products	General waste	Sector specific waste treatment /disposal	Total releases *3*4*5	
Coal combustion and other coal use	0.15 g/t	1.8	-	-	-	-	-	1,8	0.038
Combustion of other types natural fuels(petrol, kerosene, diesel, liquid petroleum gas l)	2 mg/t	12						12	0.256
Natural gas	0.22 mcg/m^3	3	-	-	-	-	-	3	0.064
Oil and gas production	No								
Zinc concentrate production	0.5 g/t	39.6	-	-	-		4.4	44	0.94
Copper concentrate production	0.1 g/t	196.2	-	-	-	-	11	207.2	4.42
Black copper converter production	1 g/t	53.1					5.9	59	1.26
Pig iron and steel production	0,05 g/t	6						6	0.128
Cement production	0.11 g/t	222			54			276	5.89
Pulp and paper production	0.03g/t	0							
Chlor-alkali production with mercury cells	No								
Other production of chemicals and polymers	No								
Production of products with mercury content*1	No								
Application, use and disposal of dental amalgam fillings	No								
Consumer goods and other int. use		114.3	256	47.3		729.1		1146.7	24.46
Use and disposal of other products	No								
Production of recycled metals	No								
Waste incineration and open waste burning*2	5 g/t	1622						1622	34.61
Waste deposition*2	No								
Informal dumping of general waste *2*3	5 g/t	130.7	130.7	1045.6				1307	27.88
Waste water system/treatment *4	No								
Crematoria and cemeteries	13 mg/corpse	-	-	2.4	-	-	-	2.4	0.051
Total (rounded) *1*2*3*4*5		**2401**	**387**	**1095**	**54**	**729**	**21**	**4687**	**100**

3.4. Data and inventory on energy consumption and fuel production

3.4.1. Petroleum Fuels - Production, Refining and Use

In the Republic of Armenia no oil extraction and refining are done. However, there is a large-scale use of oil refining products: heavy oil – bitumen (asphalt) and products with the low boiling temperature – benzene, diesel fuel, and kerosene.
It is known that petrochemicals (oil products) are potential sources of significant mercury emissions to the atmosphere and, – to a lesser degree – source of releases to soil and water.
The most important factors defining emissions resulting from oil and oil products burning processes are

- mercury contained in the initial raw material and
- the amount of burnt fuel.

3.4.2. Natural gas: extraction, refining and use

Likewise other numerous raw materials of natural origin, the natural gas contains mercury as small amounts of impurities mobilized then into the biosphere; it occurs upon gas extraction, refining, and use. However, in some regions of the world the natural gas contains mercury at significant concentrations. Mercury releases might occur at the stages of gas extraction, refining, treating and use. As stated by Pirrone et al. (2001), natural gas, as a whole, might be considered clean fuel containing mercury at minor quantities, because the greater part of mercury contained in the raw natural gas might be removed during extraction and refining, especially at the stage of hydrogen sulfide removal.
There are no gas or oil deposits in Armenia, therefore natural gas and all oil products (gasoline, kerosene, diesel fuel, oils, tar, etc.) are exported, mainly from the Russian Federation.
“Gazprom” OJSC is the only stockholder of the “Gazprom Armenia” CJSC. “Gazprom Armenia” CJSC provides the natural gas supply and sale in the internal market of the Republic of Armenia.
To date, CJSC "Gazprom Armenia" due to macroeconomic indicators occupies a leading and stable position in the system-forming branch of the Armenian economy – energy production, and provides the necessary conditions for the dynamic development of many related sectors of the economy.

Today, due to large-scale gasification of the country, 594 localities are using natural gas in Armenia. The gasification level of Armenia is around 95 percent, and with this indicator country is among the world leaders. Armenia is among countries where natural gas is used as motor fuel.
Since the beginning of 2014 from Russia to Armenia there began supplies of oil products such as diesel fuel and petroleum, including special products, particularly the tar. Raw materials are supplied from the refineries of JSC “NK “Rosneft”, by tankers or by rail.

Mercury emissions to air after consuming various types of fuel is presented in Table 4.2-1 and in Chart 4.2-1. As to coal, in Armenia it is used in limited quantities, and its supplies are steadily falling.

It should be noted that mercury emissions from used petrol are small compared to the number of cars in the republic, since about 77% of urban vehicles and private cars operate on natural gas.

The use of gas as a motor fuel in comparison with petrol not only profitable, but also allows solving environmental problems significantly reducing emissions of harmful substances into the atmosphere. For this reason, the import of petrol is decreasing, and the flow of natural gas to the republic, on the contrary, is increasing.

In Armenia the thermal power plants also operate on natural gas.

In general, emissions of mercury into the air upon consumption of all types of fuel remain almost at the same level.

Table 3.4.2-1: **Mercury emissions to air at the use of all types of fuel, Republic of Armenia, 2010-2015 (kg/y), Level 1 and Level 2**

Cat. No	Source category	2010	2011	2012	2013	2014	2015
		air	air	air	air	air	air
5.1.2	coal	0.3	0.3	0.3	0.3	0.3	0.3
5.1.3	heavy oil	1	1	1	1	1	1
5.1.3	kerosene	0.15	0.15	0.15	0.15	0.15	0.15
5.1.3	diesel fuel	0.3	0.3	0.3	0.3	0.3	0.3
5.1.3	petrol	0.5	0.5	0.5	0.5	0.5	0.5
5.1.3	LPG	0.05	0.05	0.05	0.05	0.05	0.05
5.1.4.	pipeline gas	0.4	0.5	0.5	0.5	0.5	0.5
Total		**2.7**	**2.8**	**2.8**	**2.8**	**2.8**	**2.8**

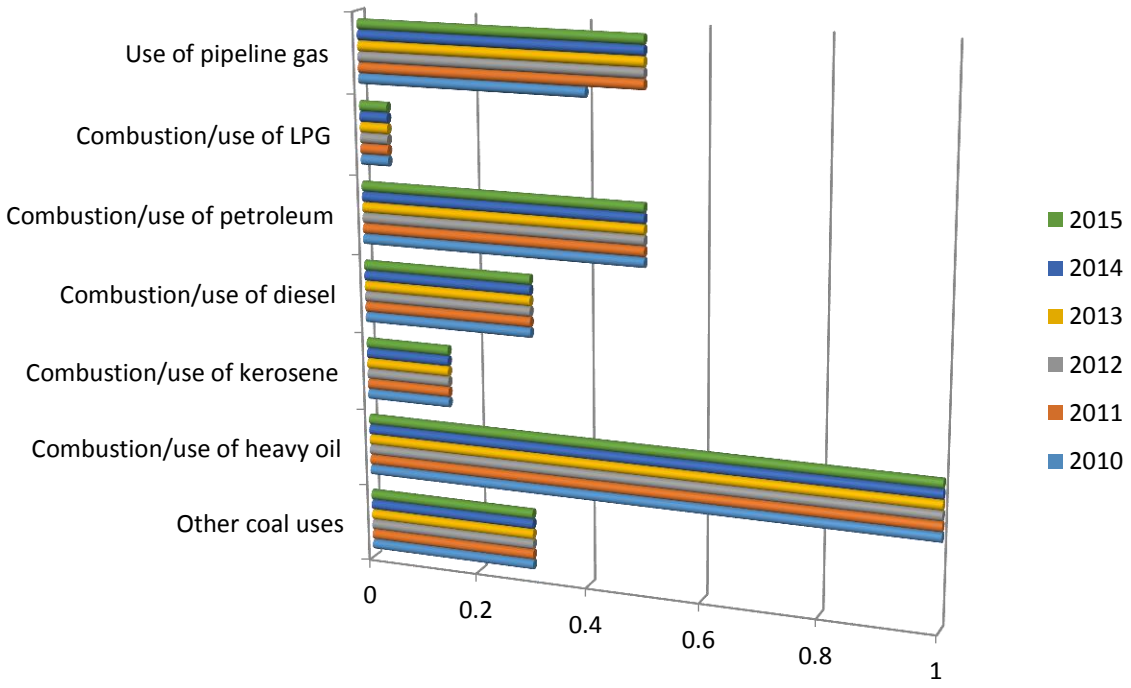


Chart 3.4.2-1: **Mercury releases to air at the use of all types of fuel, Republic of Armenia, 2010-2015 (kg/y)**

3.5. Data and inventory on domestic production of metals and raw materials

In the second phase of the inventory (Level-2) the fact was taken into account that at the extraction of copper ore only the insignificant small amount of mercury remains in the tailings in the form of tails. For this reason, in order to avoid double calculation of the mercury emissions, data on mercury releases at copper ore extraction were removed from the calculations. Besides, as indicated above, mercury emission factors at production of zinc and copper concentrates, as well as black copper were used at 0.5; 0.1 and 1.0 g/t, respectfully.

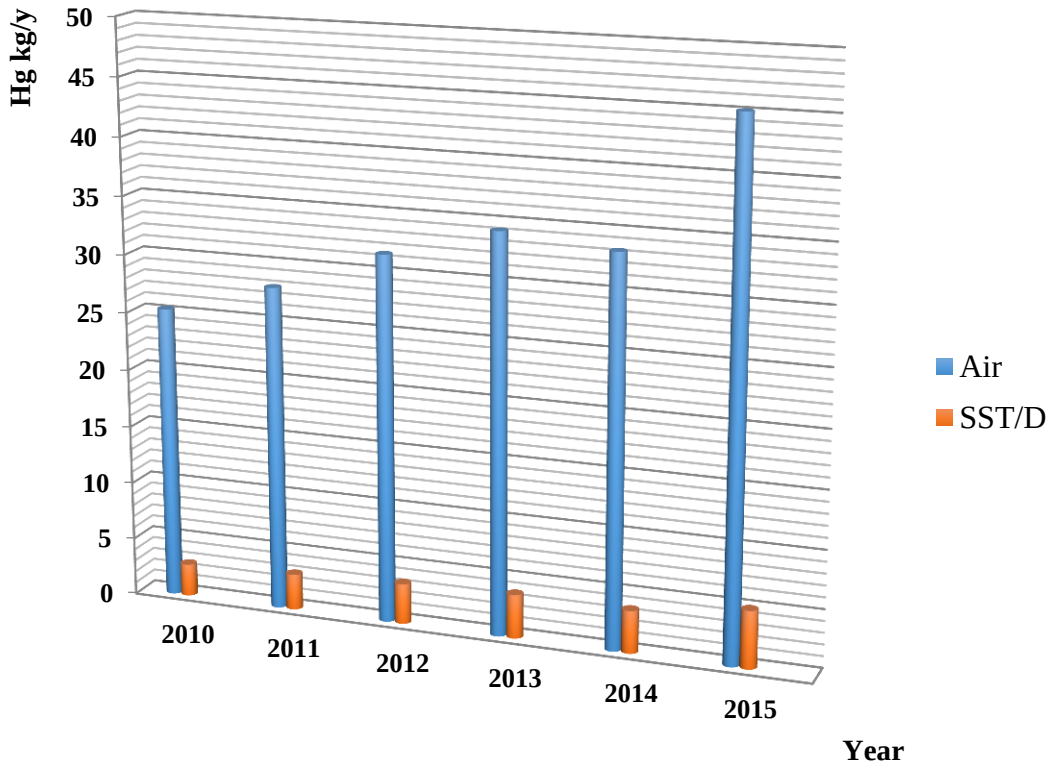


Chart 3.5-1:.**Mercury releases at metals extraction, processing in the Republic of Armenia, 2010-2015, Level 2 (kg/year)**

Table 3.5-2. **Mercury emissions/releases to environmental matrices at non-ferrous metals extraction and processing, as well as iron and steel production in the Republic of Armenia, 2010-2015, Level 2 (kg/year)**

Cat. No	Category	2010		2011		2012		2013		2014		2015	
		Air	SSTD	Air	SSTD	Air	SSTD	Air	SSTD	Air	SSTD	Air	SSTD
5.3.3	Zinc concentrate	6.3	0.7	7.2	0.8	7.2	0.8	7.2	0.8	6.3	0.7	5.4	0.6
5.3.4	Copper concentrate	10.8	1.2	11.7	1.3	14.4	1.6	16.2	1.8	17.1	1.9	28.8	3.2
	Blister copper	7.2	0.8	8.1	0.9	9.0	1.0	9.9	1.1	9.0	1.0	9.9	1.1
5.3.9	Iron and steel	0.95	0.05	0.95	0.05	0.95	0.05	0.95	0.05	0.95	0.05	0.95	0.05
Total		**25.3**	**2.8**	**28.0**	**3.1**	**31.6**	**3.5**	**34.3**	**3.8**	**33.4**	**3.7**	**45.1**	**5.0**

Note: ***SSTD –Sector specific treatment/disposal***

3.6 Production of other minerals and materials with mercury impurities

3.6.1. Cement Production

At both cement plants functioning in Armenia the natural gas is used as fuel. It goes without saying that in case of cement production upon calculation of mercury output factors from raw materials we should also take into consideration mercury output from the natural gas used as fuel. However, in the previous Part "Sources of fuel" mercury output in the natural gas used in the Republic of Armenia was already taken into consideration. Therefore, in this Part mercury output from natural gas used in cement production was not considered.

Chart 3.6.1-1 presents calculated data on mercury releases to air occurring at cement production.

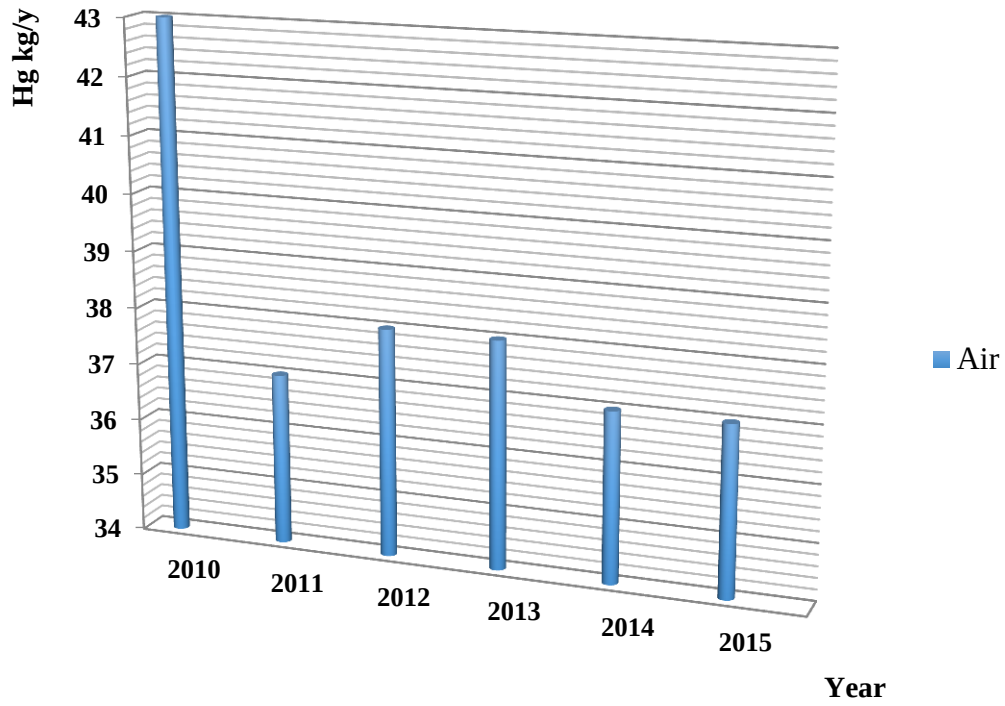


Chart 3.6.1-1. **Mercury releases at cement production, Republic of Armenia, 2010-2015, Level 1 and Level 2, kg/y.**

3.7 Data and inventory on waste handling and recycling

Table 3.7-1: **Mercury emissions from wastes handling/ recycling/incineration sector, Republic of Armenia, 2011-2015, Level 2 (kg/year)**

Cat. No.	Category	2011			2012			2013			2014			2015		
		air	water	land	air	water	land	air	water	land	air	water	land	air	water	land
5.8.1	Incineration of municipal/ general wastes	338			227			320			326			353		
5.8.3	Incineration of medical wastes										4			3.6		
5.9.4	Informal dumping of general waste	21,3	21,3	170,4	25,8	25,8	206,4	33,3	33,3	266,4	27,2	27,2	217,6	23,1	23,1	184,8
5.10.2	Cemetery			0,4			0,4			0,4			0,4			0,4
Total		**359.3**	**21.3**	**170,8**	**252.8**	**25.8**	**206,8**	**353.3**	**33.3**	**266,8**	**357.2**	**27.2**	**218**	**379.7**	**23.1**	**116,2**

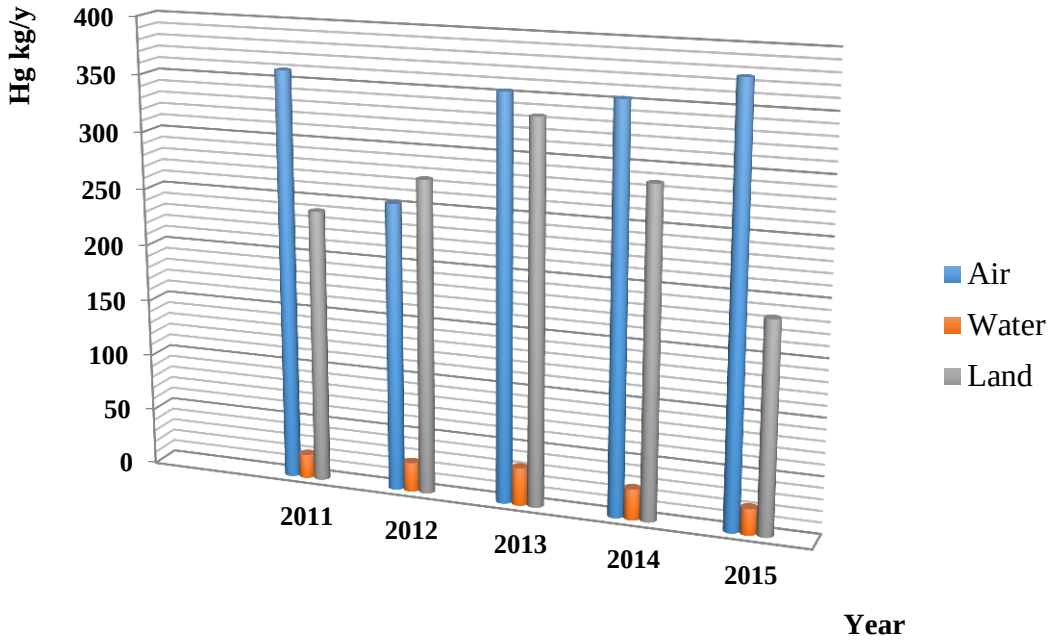


Chart 3.7-1. **Mercury releases at wastes handling/ recycling/ incineration, Republic of Armenia, 2011-2015, Level 1 (kg/year)**

3.8 Data and inventory on general consumption of mercury in products, as metal mercury and as mercury containing substances

3.8.1. Thermometers with Mercury

As thermometers are hermetically sealed, no emissions of mercury occur during their appropriate use unless the thermometer breaks or fractures. The breakage of thermometers can lead to increased mercury levels in the ambient air of residential buildings, resulting in risks to vulnerable populations: especially in small children (Carpi and Chen, 2001). Upon thermometers' breakage, mercury is released to environmental media, including air (as vapours), land, waste water and solid wastes.

Depending on the sphere of use thermometers are classified as medical, household, those for measurement of the ambient air, laboratory, industrial and special thermometers.

Considering the fact that in Armenia thermometers manufactured in the Russian Federation are most frequently used, we paid attention to the mercury content in Russian thermometers. In particular, in medical thermometers the content of mercury makes 1.85 g per unit; in thermometers for measurement of ambient air temperature: 2-5 g; in industrial and special thermometers – 3.9-7.4 g; in laboratory thermometers: 1.4-48 g (Yanin, 2004).

As to statistical data, they were available only on the general number of imported medical thermometers (mercury-containing, alcohol, electronic), as well as the general number of imported air and industrial thermometers containing different amounts of mercury. Therefore, at Level 2 Inventory as the number of mercury-containing thermometers we considered 50% of the total number of imported thermometers, then from that number 50% were considered as "non-functioning" due to breakage.

3.8.2 Electrical Switches and Relays with Mercury

Unlike thermometers, mercury switches and relays usually reach consumers as components of other types of equipment; therefore, it is difficult to obtain a reliable estimate of the actual consumption of mercury from products sold out.
In some countries, due to the long life-time of the equipment and the significant decrease in the consumption during the recent years, availability of historical consumption data is crucial for determination of the amounts of mercury disposed of with discarded equipment.

3.8.3 Light Sources and Batteries with Mercury

As to light sources and batteries with mercury which are imported to the Republic of Armenia, all calculations were done based on data recommended in Tables for Inventory Level 2.

3.8.4 Cosmetics and Related Products

Mercury has been used in skin lightening creams, soaps, and as preservatives in some eye cosmetics.
The production of mercury containing cosmetics was banned in 2003 under Annex 5 of EU Regulation on implementation of the Rotterdam Convention.

Table 3.8-1: **Consumer products with intentional use of mercury, import, Republic of Armenia, 2010-2014, Level 2**

Cat. No.	Source category	2010	2011	2012	2013	2014	Unit
5.5.1	**Thermometers with mercury**						
	Medical thermometers	125150	98780	92875	107650	78350	*Items/y*
	Ambient air temperature measuring thermometers	19145	2280	9786	1879	6809	*Items/y*
	Industrial and special thermometers	19145	2280	9786	1879	6809	*Items/y*
5.5.2	**Electrical relays with Hg (inhabitants)**	437	437	437	437	437	*kg/y*
5.5.3	**Light sources with Hg**						
	Fluorescent tubes (double end)	142077	129632	107061	122698	70651	*Items/y*
	Compact fluorescent lamp (CFL, single end)	390356	471134	450903	545179	360372	*Items/y*
	UV-lamps	1417	773	3044	-	-	*Items/y*
	High-pressure sodium lamps	4560	6245	9540	11250	7680	*Items/y*
	Metal halide lamps	6844	9687	7463	8642	10254	*Items/y*
5.5.4	**Batteries with mercury**						
	Mercury oxide (all sizes); also called mercury-zinc cells	0.0014	0.0012	0.0015	0.0011	0.0012	*t/y*
	Zinc-air button cells	0.1243	0.098	0.115	0.0845	0.077	*t/y*

Cat. No.	Source category	2010	2011	2012	2013	2014	Unit
	Alkaline button cells	0.085	0.099	0.123	0.205	0.079	*t/y*
	Silver oxide button cells	0.094	0.0785	0.112	0.142	0.105	*t/y*
	Alkaline, other than button cell shapes	32.42	44.23	35.38	30.52	24.88	*t/y*
5.6.1	Preparation of fillings at dentist clinics (share of current mercury supply for amalgam fillings) **(inhabitants)**	468	468	468	468	468	*kg/y*
5.6.2	Medical tonometers	125	105	98	75	132	*Items/ y*
5.6.3	Laboratory chemicals **(inhabitants)**	31.2	31.2	31.2	31.2	31.2	*kg/y*

Table 3.8-2: **Consumer products with intentional use of mercury: Mercury Releases, Republic of Armenia, 2010-2014, Level 2** *(kg/year)*

Cat. No	Source category	2010				2011				2012				2013				2014			
		Air	Water	Land	Waste	Air	Water	Land	Waste	Air	Water	Land	Waste	Air	Water	Land	Waste	Air	Water	Land	Waste
5.5.1	**Thermometers with mercury**																				
	Medical thermometers	6.2	18.6		37.2	5	15		30	4.6	13.8		27.6	5.4	16.2		32.4	4	12		24
	Ambient air temperature measuring thermometers.	1.34	2.01	1.34	2.01	0.2	0.3	0.2	0.3	0.68	1.02	0.68	1.02	0.2	0.3	0.2	0.3	0.4	0.6	0.4	0.6
	Industrial and special thermometers	19.7	59.2		118.1	2.4	7.2		14.4	10	30		60	1.94	5.82		11.64	7	21		42
5.5.2	**Electrical relays with Hg**	5		5	35	5		5	35	5		5	35	5		5	35	5		5	35
5.5.3	Fluorescent tubes (double end)	0.2			2.8	0.15			2.85	0.15			2.85	0.15			2.85	0.1			1.9
	Compact fluorescent lamp (CFL, single end)	1.2		1.2	1.6	1.5		1.5	2.0	1.5		1.5	2.0	1.5		1.5	2.0	1.2		1.2	1.6
5.5.4	Zinc-air button cells	0.25		0.25	0.5	0.25		0.25	0.5	0.25		0.25	0.5	0.25		0.25	0.5	0.25		0.25	0.5
	Alkaline, other than button cell shapes	2		2	4	2.6		2.6	5.3	2.3		2.3	4.5	2		2	4	1.5		1.5	3.0
5.6.1	Preparation of fillings at dentist clinics	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0
5.6.2	Medical tonometers	0.2	0.3	0.2	0.3	0.17	0.25	0.17	0.25	0.16	0.24	0.16	0.24	0.17	0.25	0.17	0.25	0.2	0.3	0.2	0.3
5.6.3	Laboratory chemicals (level 1 default for lab chemicals)		10.3		20.9		10.3		20.9		10.3		20.9		10.3		20.9		10.3		20.9
	Total	**36.1**	**90.4**	**9.99**	**222.4**	**17.27**	**33.1**	**9.72**	**111.5**	**24.6**	**55.4**	**9.89**	**154.6**	**16.6**	**32.9**	**9.12**	**109.8**	**19.7**	**44.2**	**8.6**	**129.3**

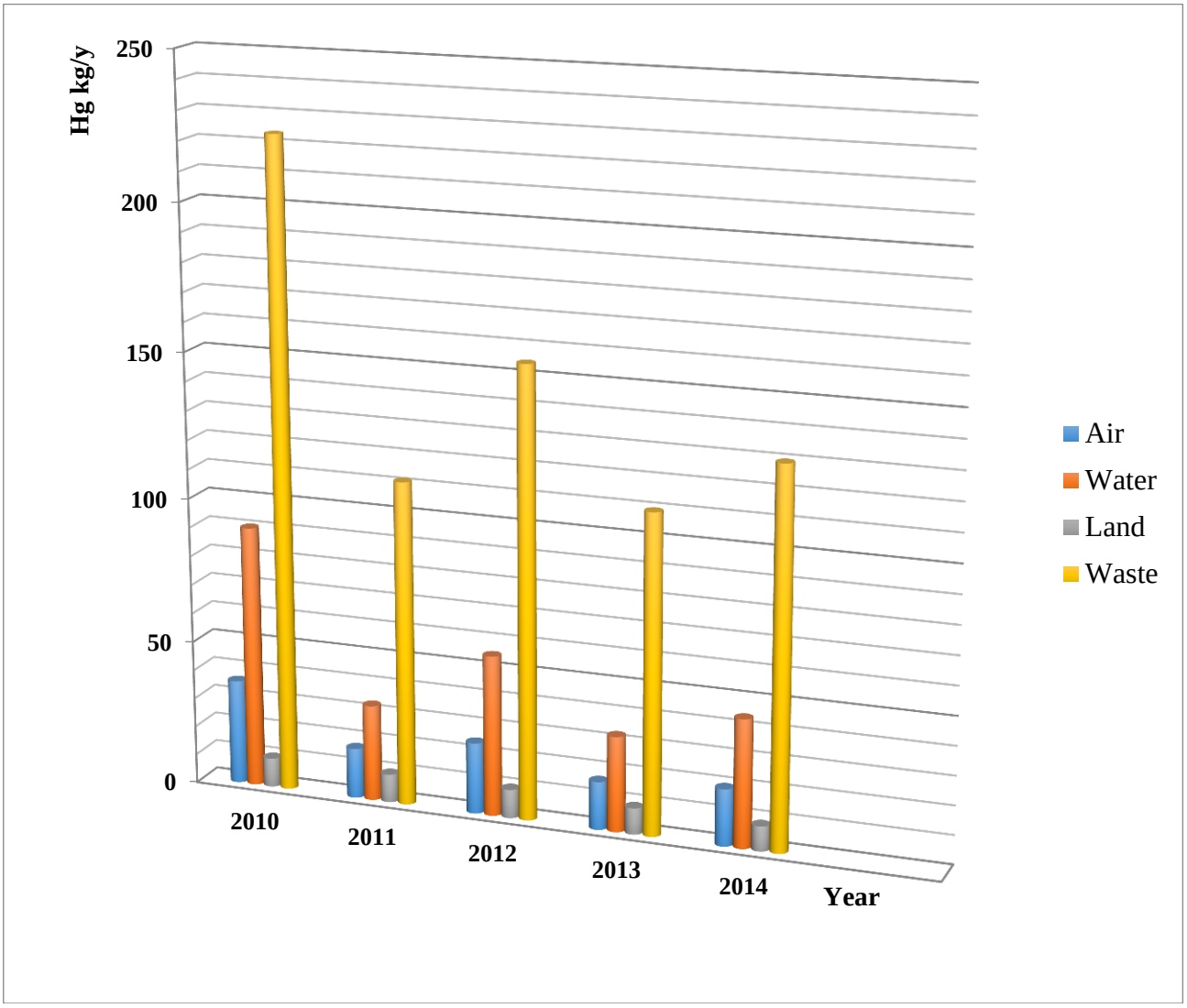


Chart 3.8-1: Consumer products with intentional use of mercury, import: Mercury releases, Republic of Armenia, 2010-2014, Level 2, kg/year.

3.9 Data on General Mercury Emissions in the Republic of Armenia

Generalized data on summary mercury releases to air, water, land, by-products, general waste and SSTD according to source categories are presented as Charts 3.9-1 and 3.9-2.

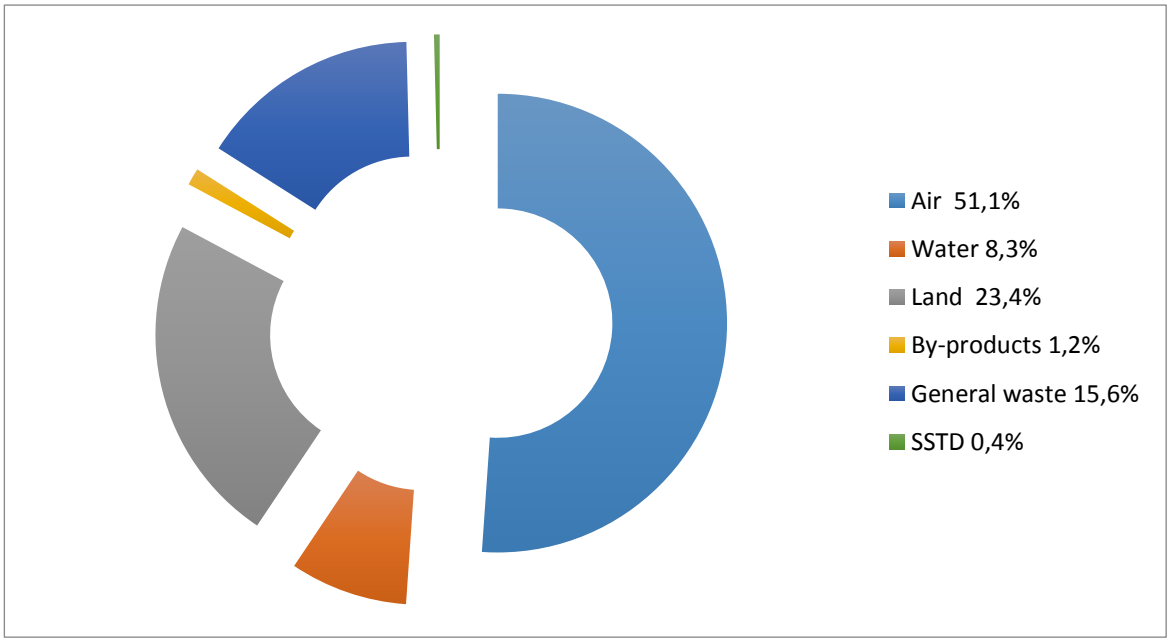


Chart 3.9-1. Mercury releases by environmental matrices, Republic of Armenia, 2010-2015.

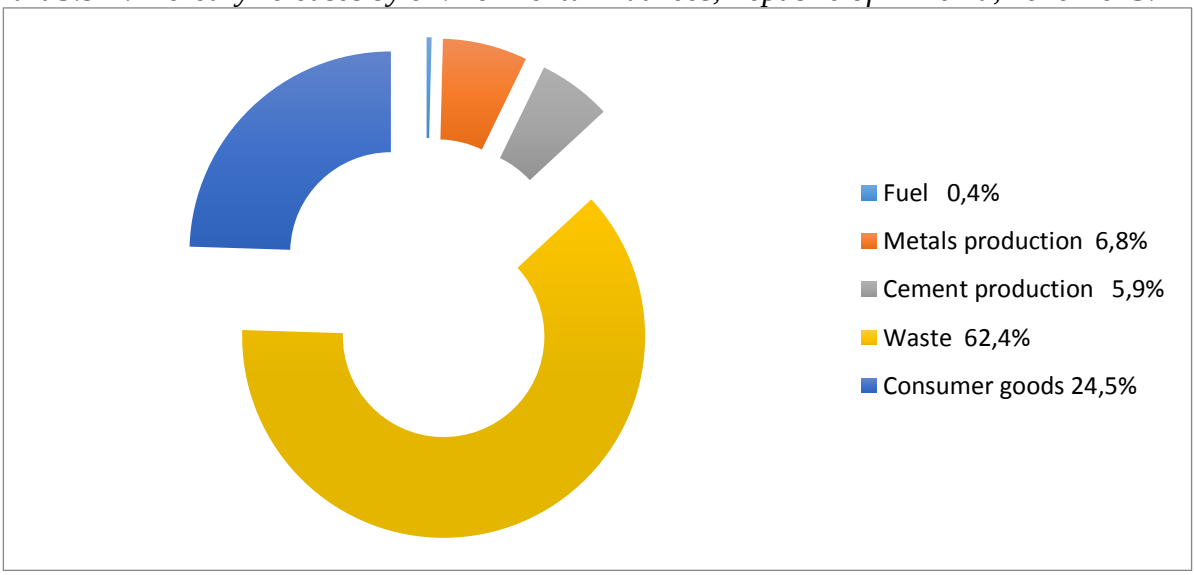


Chart 3.9-2. Mercury releases by source categories, Republic of Armenia, 2010-2015.

3.10 Inventory Level 2: Identification and Quantification of Mercury Releases to Air, Water, and Land from Different Categories of Sources:

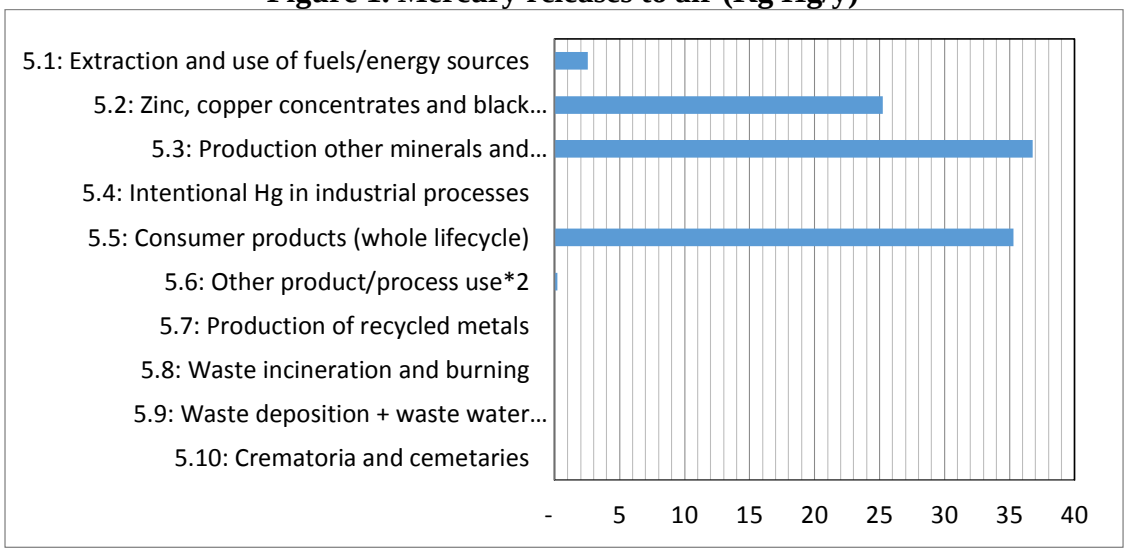
2010- 2015

Mercury emissions to air, water, land from different categories of sources: 2010

Source category	Calculated Hg output, Kg/y						Total releases by source category	Percent of total releases
	Air	Water	Land	By-products and impurities	General waste	SSTD		
5.1: Extraction and use of fuels/energy sources	2,5	0,0	-	-	0,0	-	3	1%
5.2: Zinc, copper concentrates, black copper and ferrous metal production	25,3	-	-	-	-	2,8	28	7%
5.3: Production other minerals and materials	36,8	-	-	9,2	-	-	46	11%
5.4: Intentional Hg in industrial processes	-	-	-	-	-	-	-	0%
5.5: Consumer products (whole lifecycle)	35,3	79,8	9,2	-	143,5	59,2	327	81%
5.6: Other product/process use	0,2	0,3	0,2	-	0,3	-	1	0%
5.7: Production of recycled metals	-	-	-	-	-	-	-	0%
5.8: Waste incineration and burning	-	-	-	-	-	-	-	0%
5.9: Waste deposition + waste water treatment	-	-	-	-	-	-	-	0%
5.10: Crematoria and cemeteries	-	-	0,4	-	-	-	0	0%
SUM OF QUANTIFIED RELEASES	100	80	10	9	144	62	405	100%

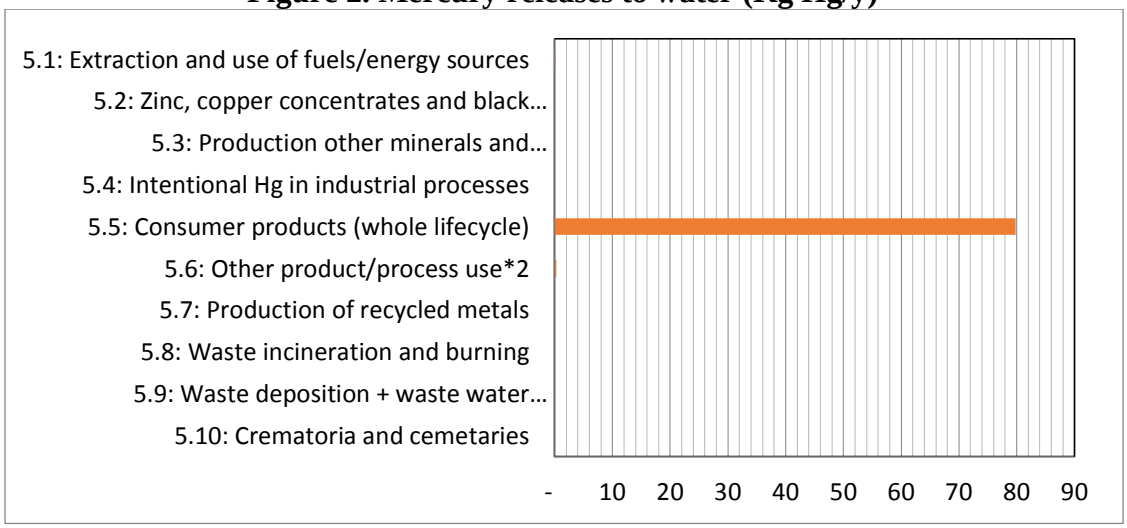
Charts presenting summary data of estimated mercury releases per source category: 2010

Figure 1. Mercury releases to air (Kg Hg/y)



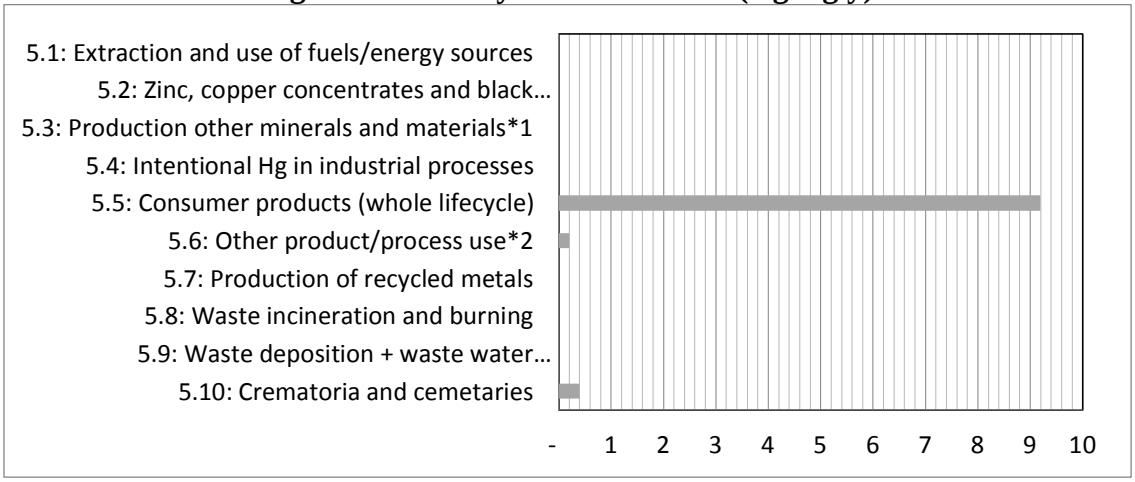
5.1. Extraction and use of fuel/energy sources: 2.5 Kg (2.5%)
5.2. Zinc, copper concentrates and black copper: 25.3 Kg (25.3%)
5.3. Production of other minerals and materials: 36.8 Kg (36.8%)
5.5. Consumer products (whole lifecycle): 35.3 Kg (35.3%)
5.6. Other product/ process use: 0.2 Kg (0.2%)

Figure 2. Mercury releases to water (Kg Hg/y)



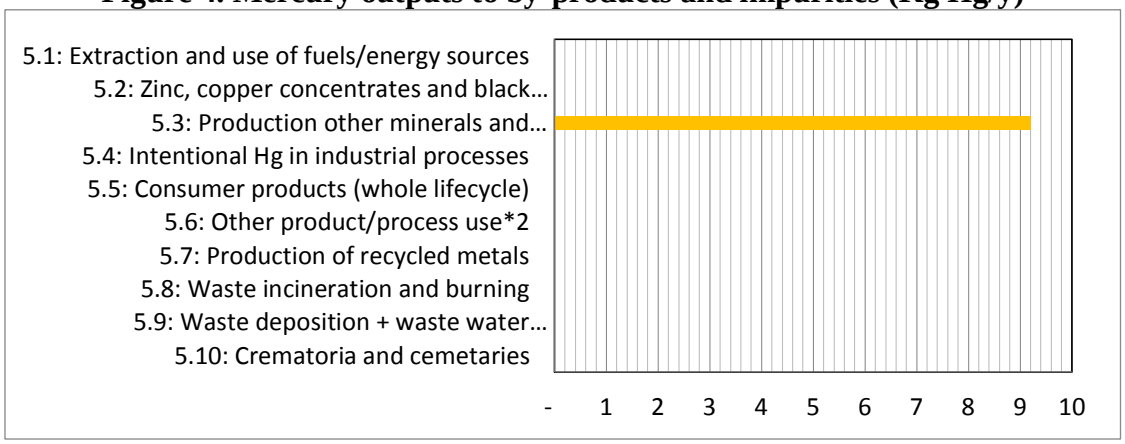
5.5. Consumer products (whole lifecycle): 79.8 Kg (99.8%)
5.6. Other product/ process use: 0.3 Kg (0.2%)

Figure 3. Mercury releases to land (Kg Hg/y)



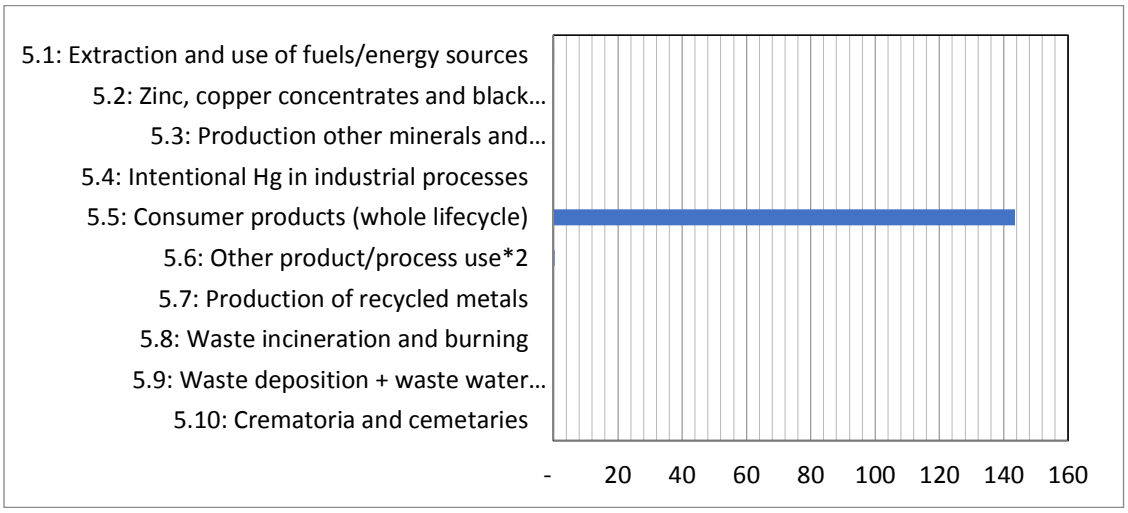
5.5. Consumer products (whole lifecycle): 9.2 Kg (92%)
5.6. Other product/ process use: 0.2 Kg (2%)
5.10. Crematoria and cemeteries: 0.4 Kg (4%)

Figure 4. Mercury outputs to by-products and impurities (Kg Hg/y)



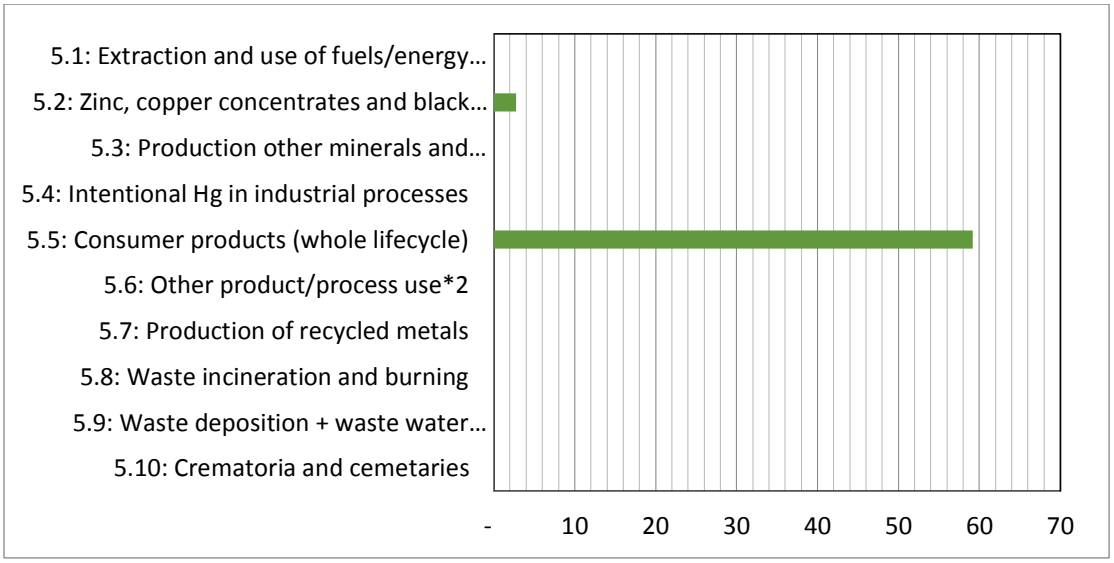
5.3. Production of other minerals and materials: 9.2 Kg (100%)

Figure 5. Mercury releases to general waste (Kg Hg/y)



5.5. Consumer products (whole lifecycle): 143.5 Kg (100%)

Figure 6. Mercury releases to sector specific waste treatment/disposal (Kg Hg/y)



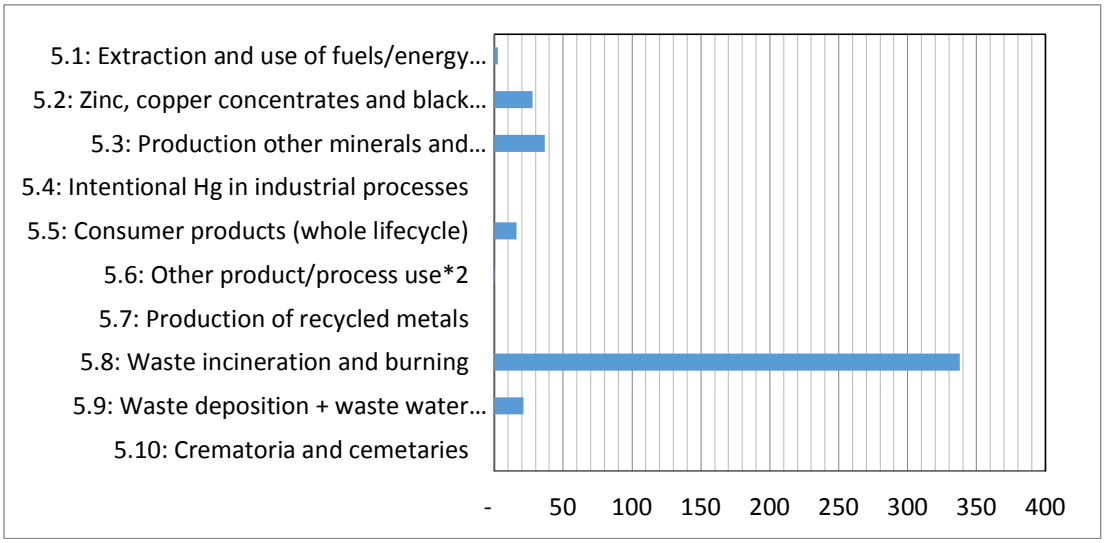
5.2. Zinc, copper concentrates and black copper: 2.8 Kg (4.5%)
5.5. Consumer products (whole lifecycle): 59.2 Kg (95.5%)

Mercury emissions to air, water, land from different categories of sources: 2011

Source category	Calculated Hg output, Kg/y						Total releases by source category	Percent of total releases
	Air	Water	Land	By-products and impurities	General waste	SSTD		
5.1: Extraction and use of fuels/energy sources	2,5	0,0	-	-	0,0	-	3	0%
5.2: Zinc, copper concentrates, black copper and ferrous metal production	28,0	-	-	-	-	3,1	31	4%
5.3: Production of other minerals and materials with mercury impurities	36,8	-	-	9,2	-	-	46	6%
5.4: Intentional use of mercury in industrial processes	-	-	-	-	-	-	-	0%
5.5: Consumer products (whole lifecycle)	16,1	22,4	8,6	-	83,4	7,1	138	18%
5.6: Other intentional product/process use	0,2	0,3	0,2	-	0,3	-	1	0%
5.7: Production of recycled metals	-	-	-	-	-	-	-	0%
5.8: Waste incineration and burning	338,0	-	-	-	-	-	338	44%
5.9: Waste deposition/landfilling and waste water treatment	21,3	21,3	170,4	-	-	-	213	28%
5.10: Crematoria and cemeteries	-	-	0,4	-	-	-	0	0%
SUM OF QUANTIFIED RELEASES	443	44	179	9	84	10	769	100%

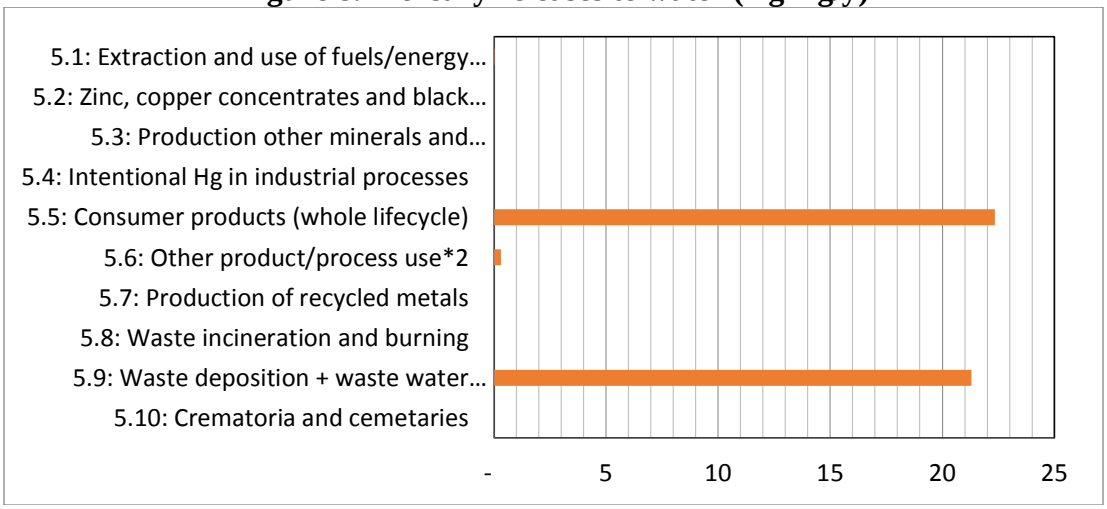
Charts presenting summary data of estimated mercury releases per source category: 2011

Figure 7. Mercury releases to air (Kg Hg/y)



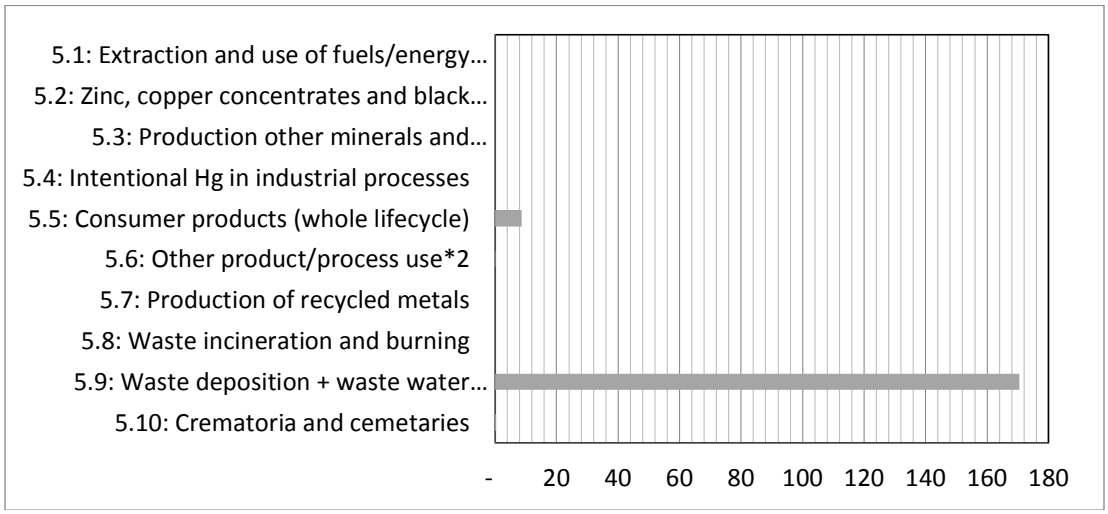
5.1. Extraction and use of fuel/energy sources: 2.5 Kg (0.56%)
5.2. Zinc, copper concentrates and black copper: 28.0 Kg (6.3%)
5.3. Production of other minerals and materials: 36.8 Kg (8.3%)
5.5. Consumer products (whole lifecycle): 16.1 Kg (3.6%)
5.8. Waste incineration and burning: 338 Kg (76.3%)
5.9. Waste deposition + waste water treatment: 21.3 Kg (4.8%)

Figure 8. Mercury releases to water (Kg Hg/y)



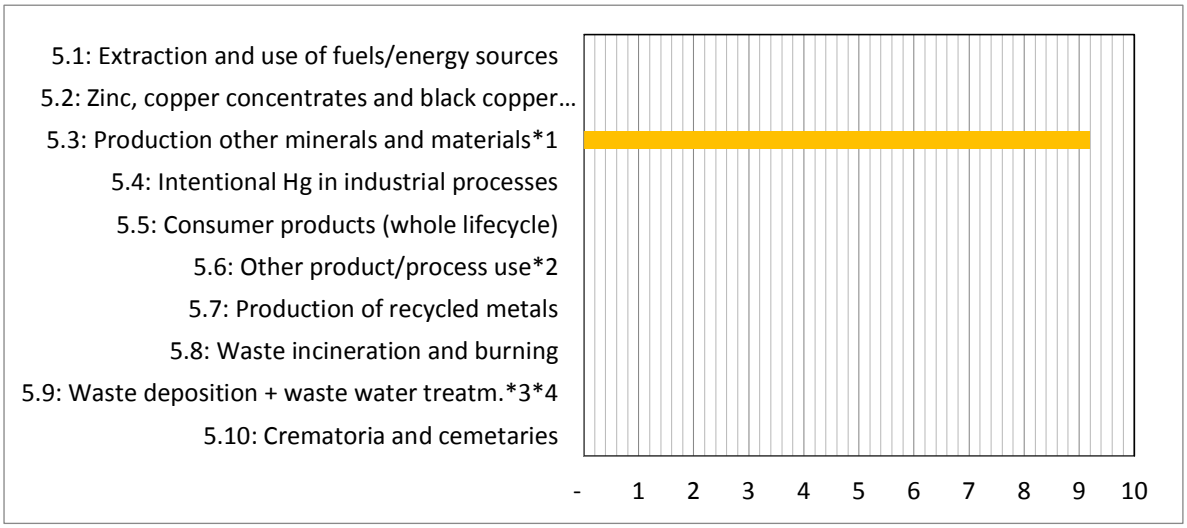
5.5. Consumer products (whole lifecycle): 22.4 Kg (50.9%)
5.6. Other product/ process use: 0.3 Kg (0.7%)
5.9. Waste deposition + waste water treatment: 21.3 Kg (48.4%)

Figure 9. Mercury releases to land (Kg Hg/y)



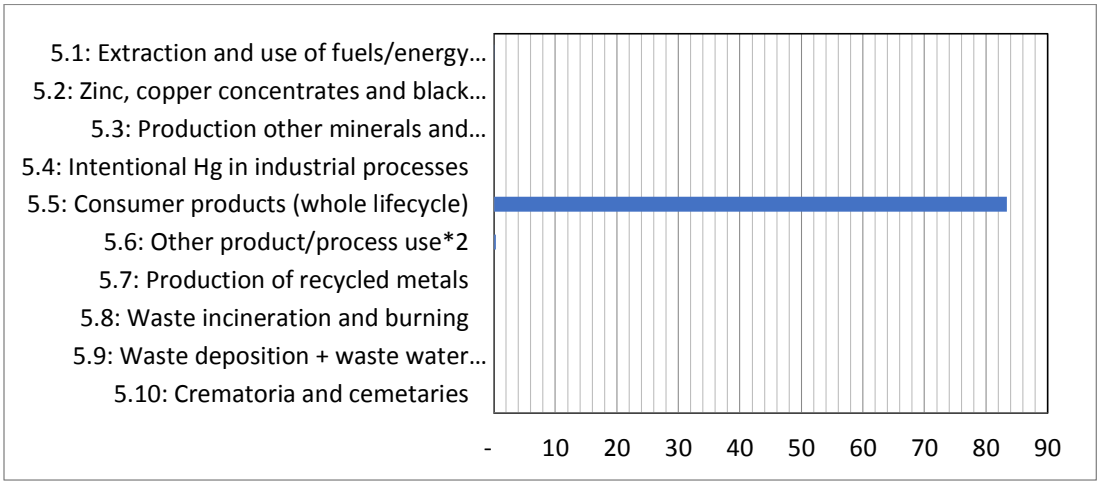
5.5. Consumer products (whole lifecycle): 8.6 Kg (4.8%)
5.9. Waste deposition + waste water treatment: 170.4 Kg (95.2%)

Figure 10. Mercury outputs to by-products and impurities (Kg Hg/y)



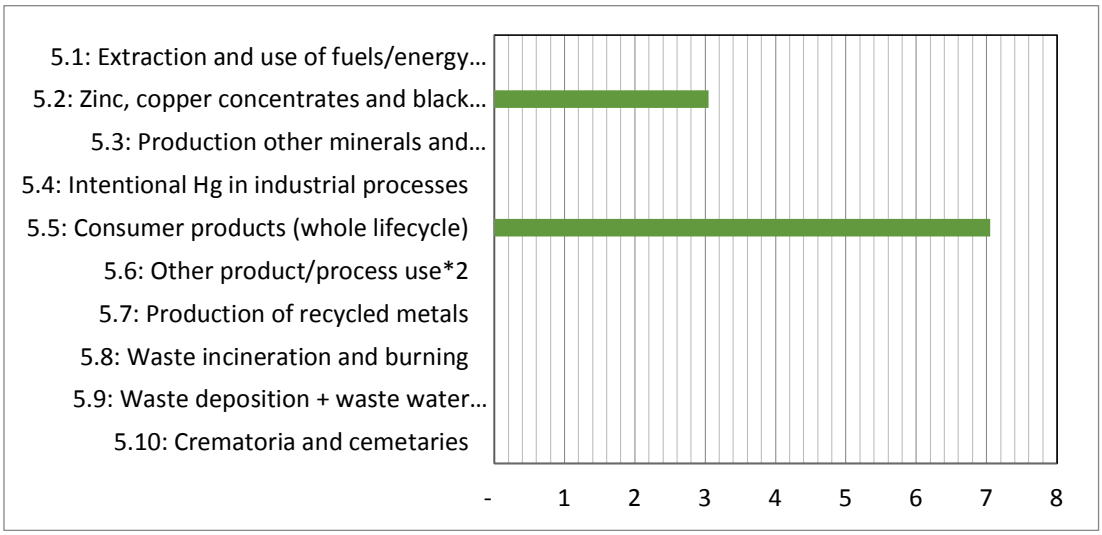
5.3. Production of other minerals and materials: 9.2 Kg (100%)

Figure 11. Mercury releases to general waste (Kg Hg/y)



5.3. Production of other minerals and materials: 83.4 Kg (100%)

Figure 12. Mercury releases to sector specific waste treatment/disposal (Kg Hg/y)



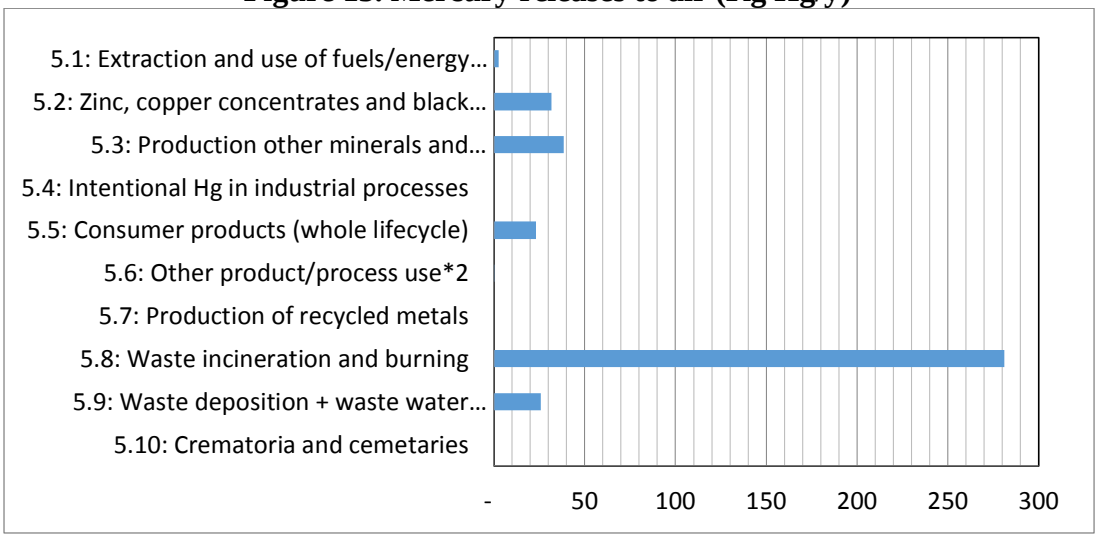
5.2. Zinc, copper concentrates and black copper: 3.1 Kg (30%)
5.5. Consumer products (whole lifecycle): 7.1 Kg (70%)

Mercury emissions to air, water, land from different categories of sources: 2012

Source category	Calculated Hg output, Kg/y						Total releases by source category	Percent of total releases
	Air	Water	Land	By-products and impurities	General waste	SSTD		
5.1: Extraction and use of fuels/energy sources	2,5	0,0	-	-	0,1	-	3	0%
5.2: Zinc, copper concentrates, black copper and ferrous metal production	31,6	-	-	-	-	3,5	35	4%
5.3: Production other minerals and materials	38,4	-	-	9,6	-	-	48	6%
5.4: Intentional Hg in industrial processes	-	-	-	-	-	-	-	0%
5.5: Consumer products (whole lifecycle)	23,1	44,8	8,3	-	102,8	30,4	209	25%
5.6: Other product/process use	0,2	0,2	0,2	-	0,2	-	1	0%
5.7: Production of recycled metals	-	-	-	-	-	-	-	0%
5.8: Waste incineration and burning	277,0	-	-	-	-	-	277	33%
5.9: Waste deposition + waste water treatment	25,8	25,8	206,4	-	-	-	258	31%
5.10: Crematoria and cemeteries	-	-	0,4	-	-	-	0	0%
SUM OF QUANTIFIED RELEASES	398	71	215	10	103	34	831	100%

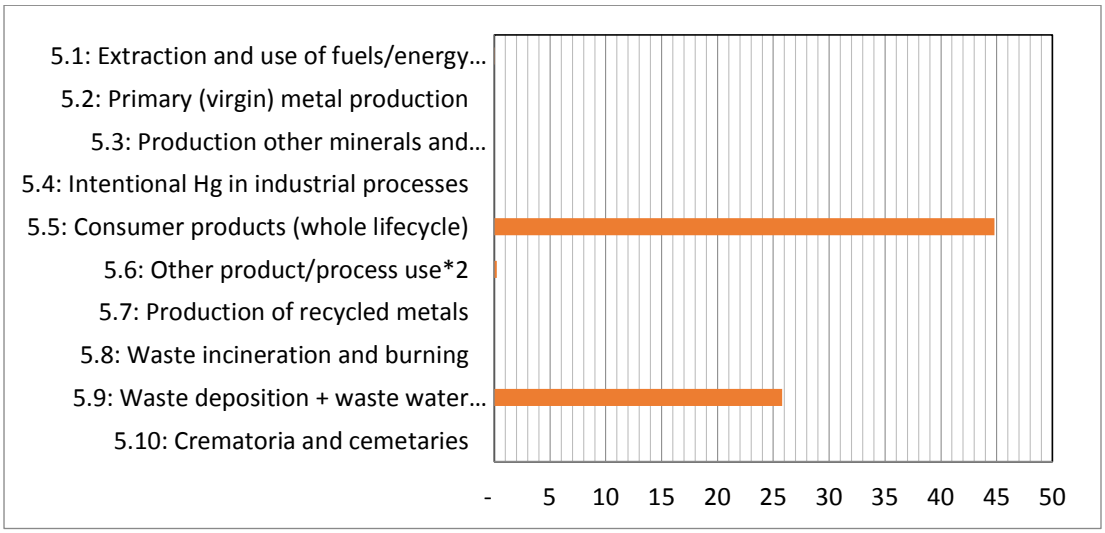
Charts presenting summary data of estimated mercury releases per source category: 2012

Figure 13. Mercury releases to air (Kg Hg/y)



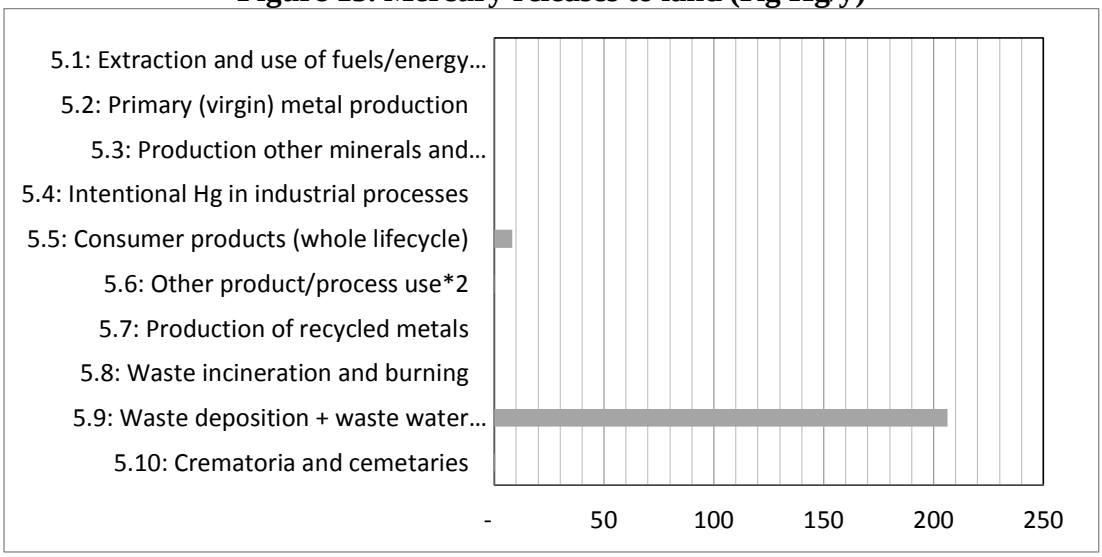
5.1. Extraction and use of fuel/energy sources: 2.5 Kg (0.6%)
5.2. Zinc, copper concentrates and black copper: 31.6 Kg (7.9%)
5.3. Production of other minerals and materials: 38.4 Kg (9.6%)
5.5. Consumer products (whole lifecycle): 23.1 Kg (5.8%)
5.8. Waste incineration and burning: 277 Kg (69.6%)
5.9. Waste deposition + waste water treatment: 25.8 Kg (6.5%)

Figure 14. Mercury releases to water (Kg Hg/y)



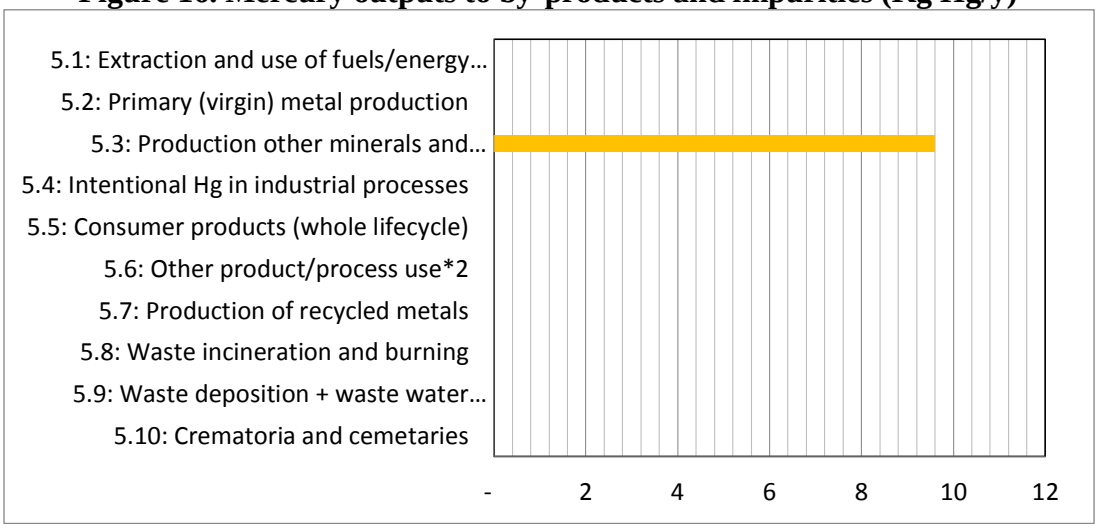
5.5. Consumer products (whole lifecycle): 44.8 Kg (63.1%)
5.9. Waste deposition + waste water treatment: 25.8 Kg (36.4%)

Figure 15. Mercury releases to land (Kg Hg/y)



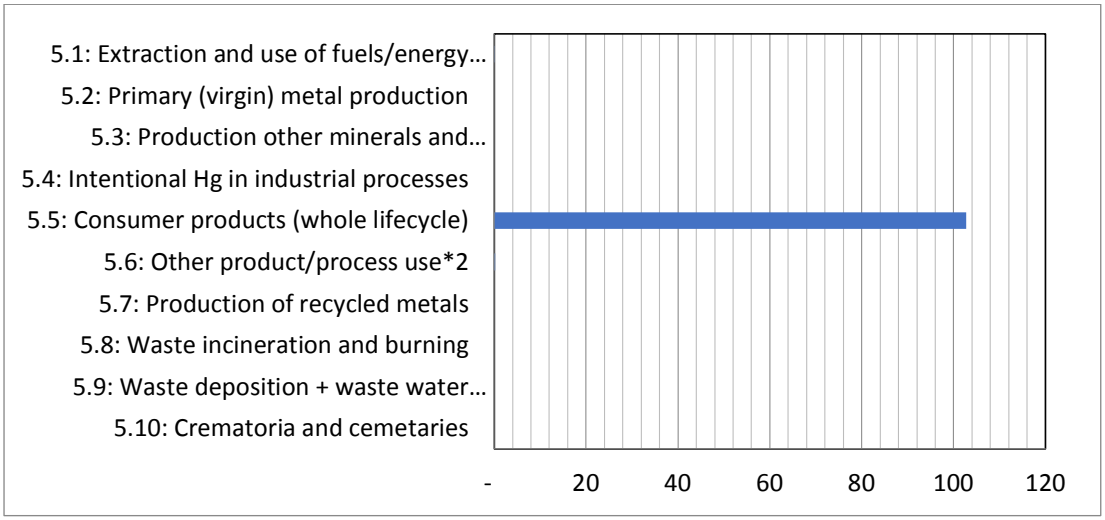
5.5. Consumer products (whole lifecycle): 8.3 Kg (3.9%)
5.9. Waste deposition + waste water treatment: 206.4 Kg (96%)
5.10. Crematoria and cemeteries: 0.4 Kg (0.1%)

Figure 16. Mercury outputs to by-products and impurities (Kg Hg/y)



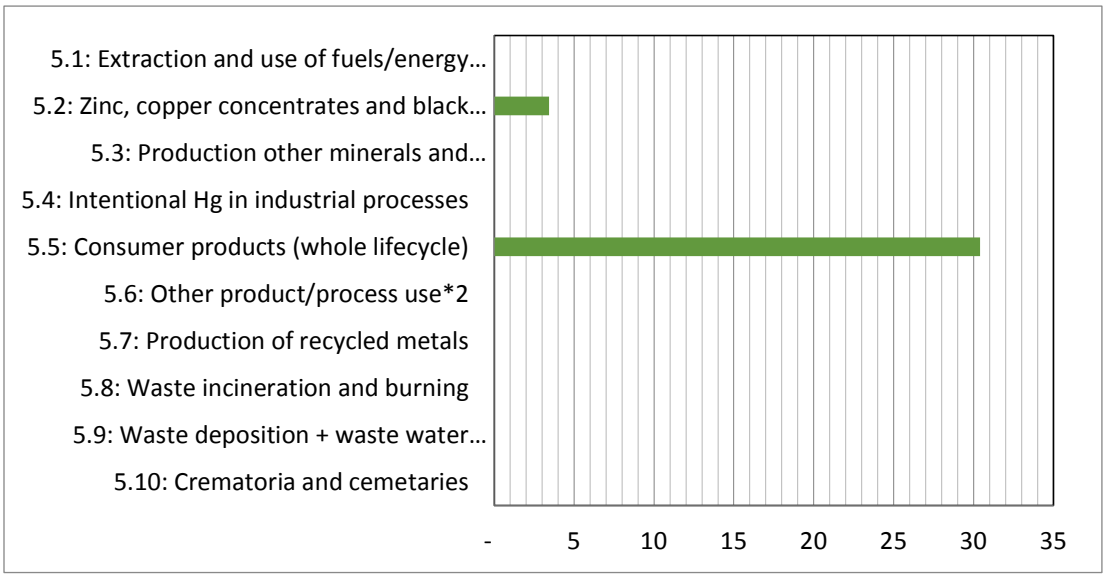
5.3. Production of other minerals and materials: 9.6 Kg (100%)

Figure 17. Mercury releases to general waste (Kg Hg/y)



5.5. Consumer products (whole lifecycle): 102.8 Kg (99.8%)
5.6. Other product/process use: 0.2 Kg (0.2%)

Figure 18. Mercury releases to sector specific waste treatment/disposal (Kg Hg/y)



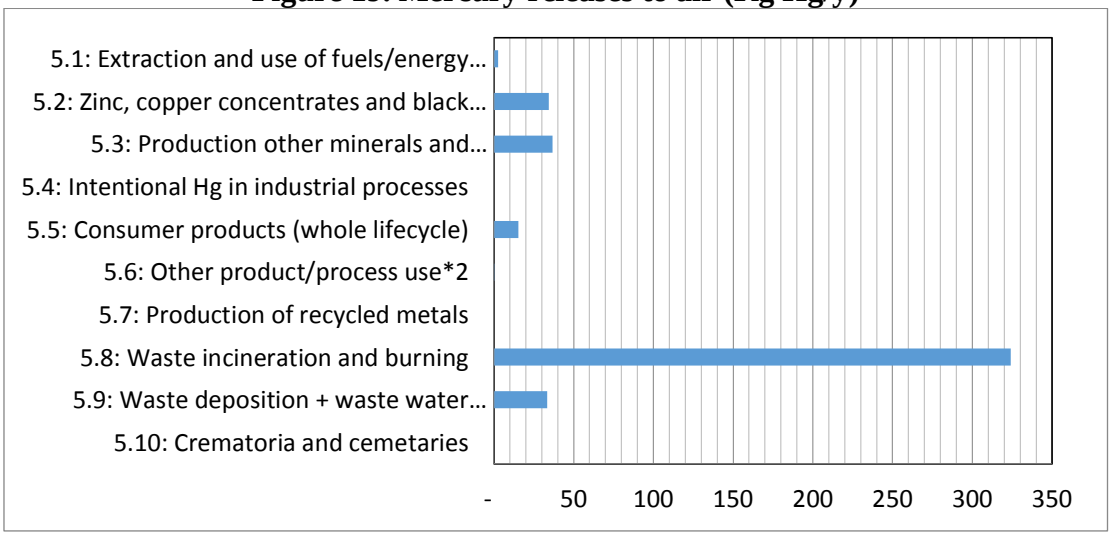
5.2. Zinc, copper concentrates and black copper: 3.5 Kg (10.4%)
5.5. Consumer products (whole lifecycle): 30.4 Kg (89.6%)

Mercury emissions to air, water, land from different categories of sources: 2013

Source category	Calculated Hg output, Kg/y						Total releases by source category	Percent of total releases
	Air	Water	Land	By-products and impurities	General waste	SSTD		
5.1: Extraction and use of fuels/energy sources	2,5	0,0	-	-	0,0	-	3	0%
5.2: Zinc, copper concentrates, black copper and ferrous metal production	34,3	-	-	-	-	3,8	38	4%
5.3: Production other minerals and materials	36,8	-	-	9,2	-	-	46	5%
5.4: Intentional Hg in industrial processes	-	-	-	-	-	-	-	0%
5.5: Consumer products (whole lifecycle)	15,3	22,3	7,9	-	82,7	6,2	134	15%
5.6: Other product/process use	0,2	0,3	0,2	-	0,3	-	1	0%
5.7: Production of recycled metals	-	-	-	-	-	-	-	0%
5.8: Waste incineration and burning	320,0	-	-	-	-	-	320	37%
5.9: Waste deposition + waste water treatment	33,3	33,3	266,4	-	-	-	333	38%
5.10: Crematoria and cemeteries	-	-	0,4	-	-	-	0	0%
SUM OF QUANTIFIED RELEASES	442	56	275	9	83	10	875	100%

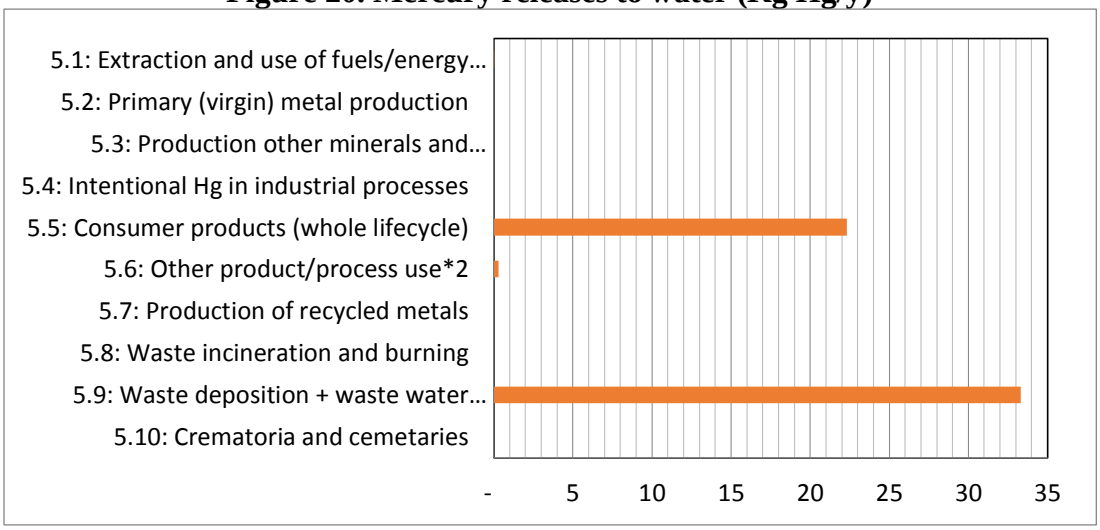
Charts presenting summary data of estimated mercury releases per source category: 2013

Figure 19. Mercury releases to air (Kg Hg/y)



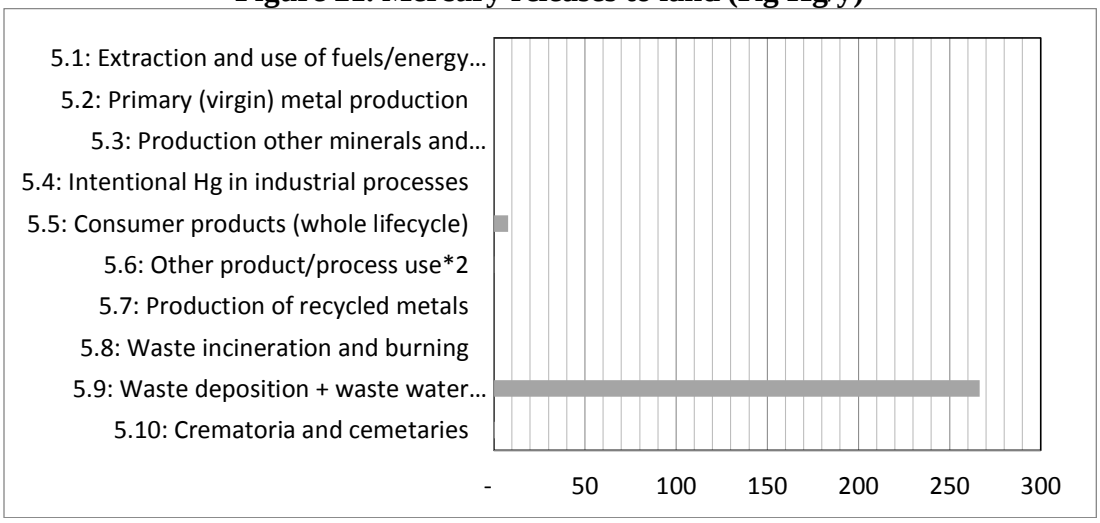
5.1. Extraction and use of fuel/energy sources: 2.5 Kg (0.6%)
5.2. Zinc, copper concentrates and black copper: 34.3 Kg (7.8%)
5.3. Production of other minerals and materials: 36.8 Kg (8.3%)
5.5. Consumer products (whole lifecycle): 15.3 Kg (3.4%)
5.8. Waste incineration and burning: 320 Kg (72.4%)
5.9. Waste deposition + waste water treatment: 33.3 Kg (7.5%)

Figure 20. Mercury releases to water (Kg Hg/y)



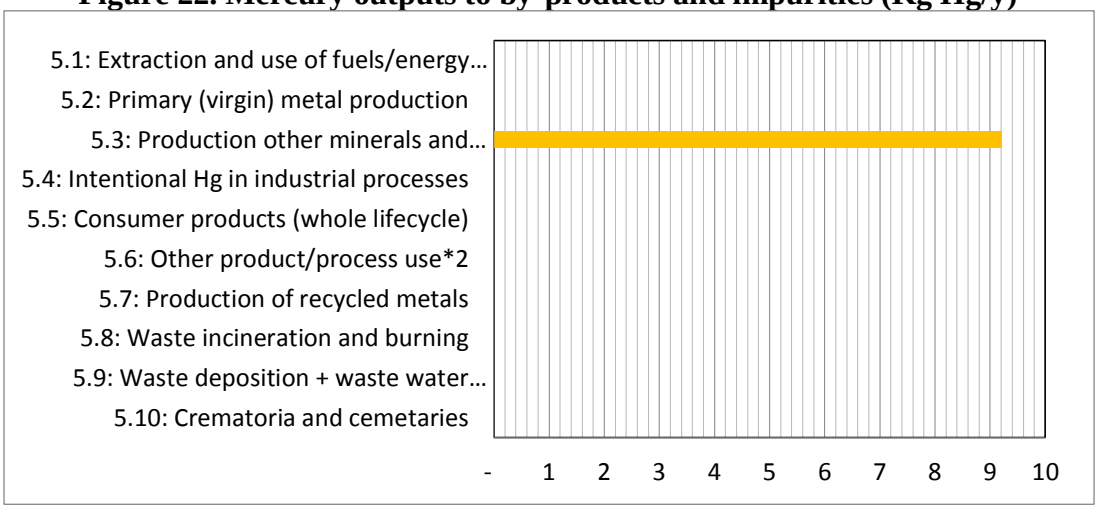
5.5. Consumer products (whole lifecycle): 22.33 Kg (39.8%)
5.6. Other product/ process use: 0.3 Kg (0.5%)
5.9. Waste deposition + waste water treatment: 33.3 Kg (59.5%)

Figure 21. Mercury releases to land (Kg Hg/y)



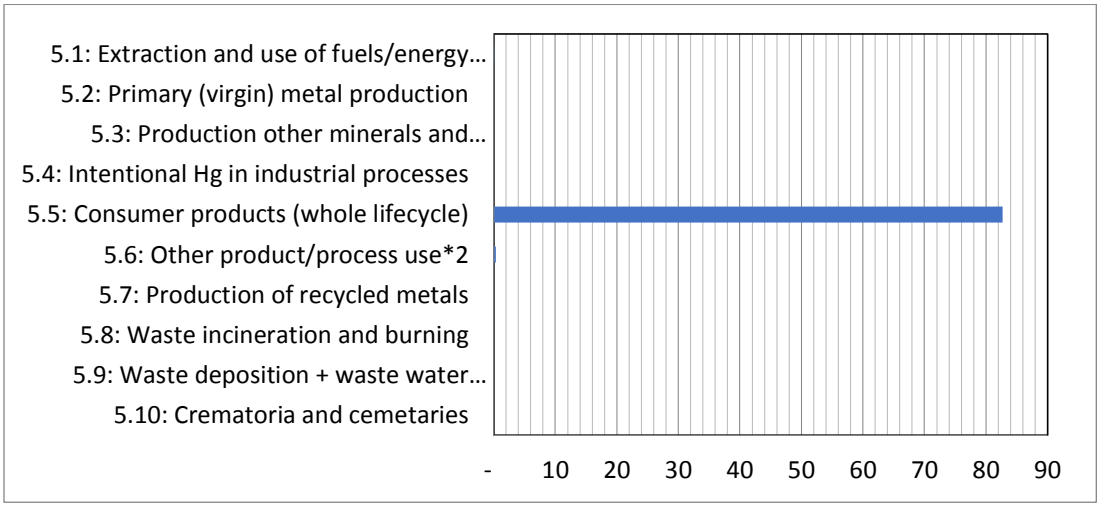
5.5. Consumer products (whole lifecycle): 7.9 Kg (2.9%)
5.9. Waste deposition + waste water treatment: 266.4 Kg (96.9%)
5.10. Crematoria and cemeteries: 0.4 Kg (0.1%)

Figure 22. Mercury outputs to by-products and impurities (Kg Hg/y)



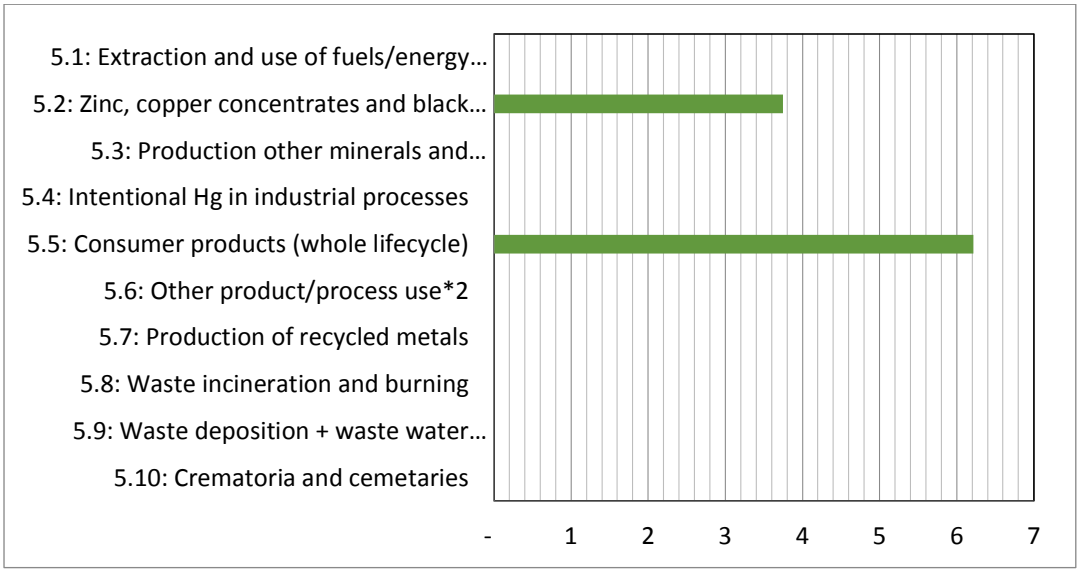
5.3. Production of other minerals and materials: 9.2 Kg (100%)

Figure 23. Mercury releases to general waste (Kg Hg/y)



5.5. Consumer products (whole lifecycle): 82.7 Kg (99.6%)
5.6. Other product/ process use: 0.3 Kg (0.4%)

Figure 24. Mercury releases to sector specific waste treatment/disposal (Kg Hg/y)



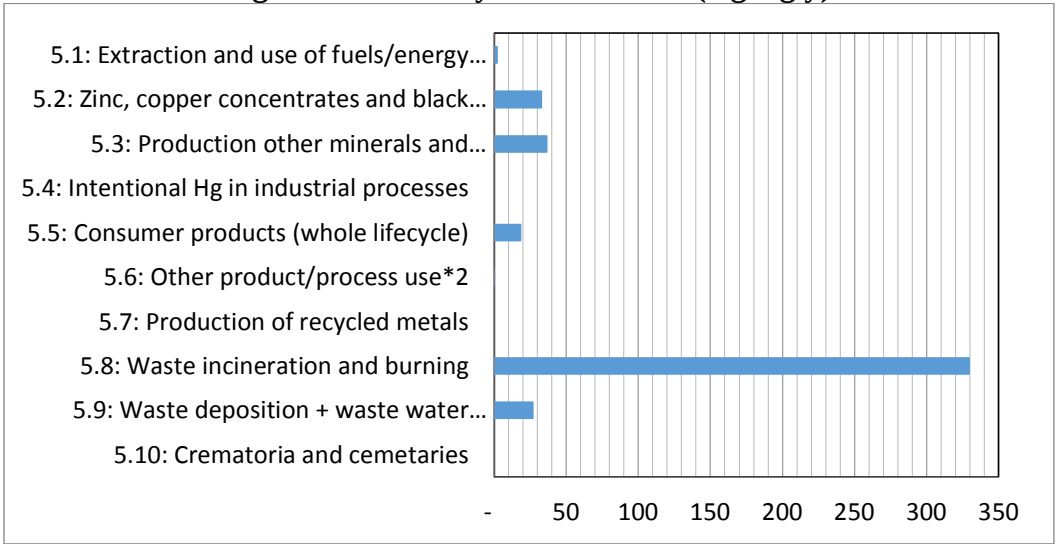
5.2. Zinc, copper concentrates and black copper: 3.8 Kg (38%)
5.5. Consumer products (whole lifecycle): 6.2 Kg (62%)

Mercury emissions to air, water, land from different categories of sources: 2014

Source category	Calculated Hg output, Kg/y						Total releases by source category	Percent of total releases
	Air	Water	Land	By-products and impurities	General waste	SSTD		
5.1: Extraction and use of fuels/energy sources	2,5	0,0	-	-	0,0	-	3	0%
5.2: Zinc, copper concentrates, black copper and ferrous metal production	33,4	-	-	-	-	3,7	37	4%
5.3: Production other minerals and materials	36,8	-	-	9,2	-	-	46	5%
5.4: Intentional Hg in industrial processes	-	-	-	-	-	-	-	0%
5.5: Consumer products (whole lifecycle)	18,9	33,6	7,8	-	87,8	21,0	169	20%
5.6: Other product/process use	0,2	0,3	0,2	-	0,3	-	1	0%
5.7: Production of recycled metals	-	-	-	-	-	-	-	0%
5.8: Waste incineration and burning	330,0	-	-	-	-	-	330	38%
5.9: Waste deposition + waste water treatment	27,2	27,2	217,6	-	-	-	272	32%
5.10: Crematoria and cemeteries	-	-	0,4	-	-	-	0	0%
SUM OF QUANTIFIED RELEASES	449	61	226	9	88	25	858	100%

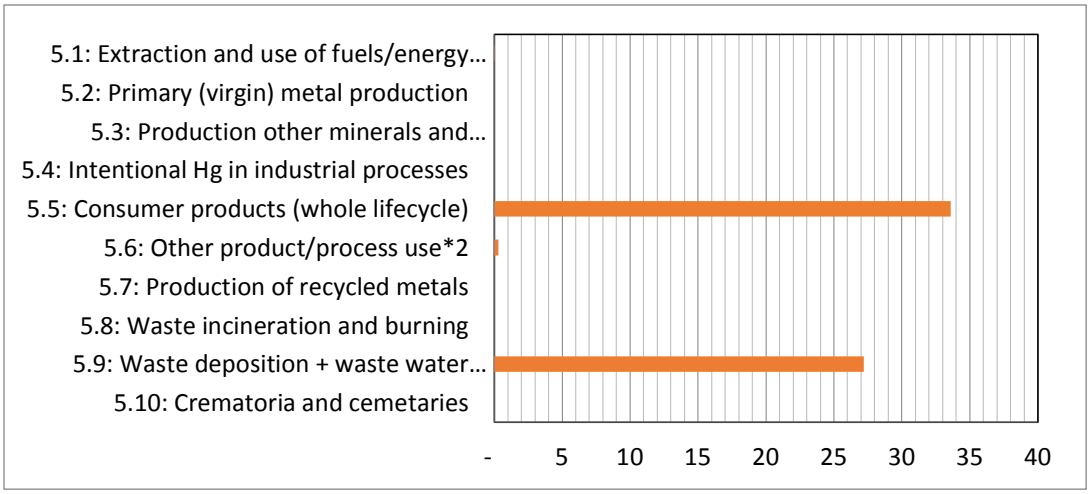
Charts presenting summary data of estimated mercury releases per source category: 2014

Figure 25. Mercury releases to air (Kg Hg/y)



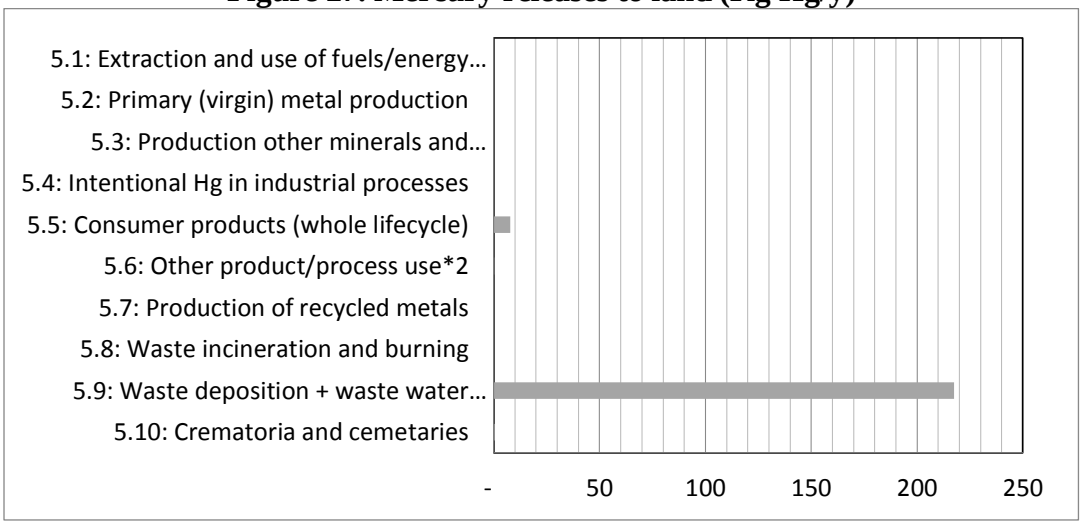
5.1. Extraction and use of fuel/energy sources: 2.5 Kg (0.6%)
5.2. Zinc, copper concentrates and black copper: 33.4 Kg (7.4%)
5.3. Production of other minerals and materials :36.8 Kg (8.2%)
5.5. Consumer products (whole lifecycle): 18.9 Kg (4.2%)
5.8. Waste incineration and burning: 330 Kg (73.5%)
5.9. Waste deposition + waste water treatment: 27.2 Kg (6.1%)

Figure 26. Mercury releases to water (Kg Hg/y)



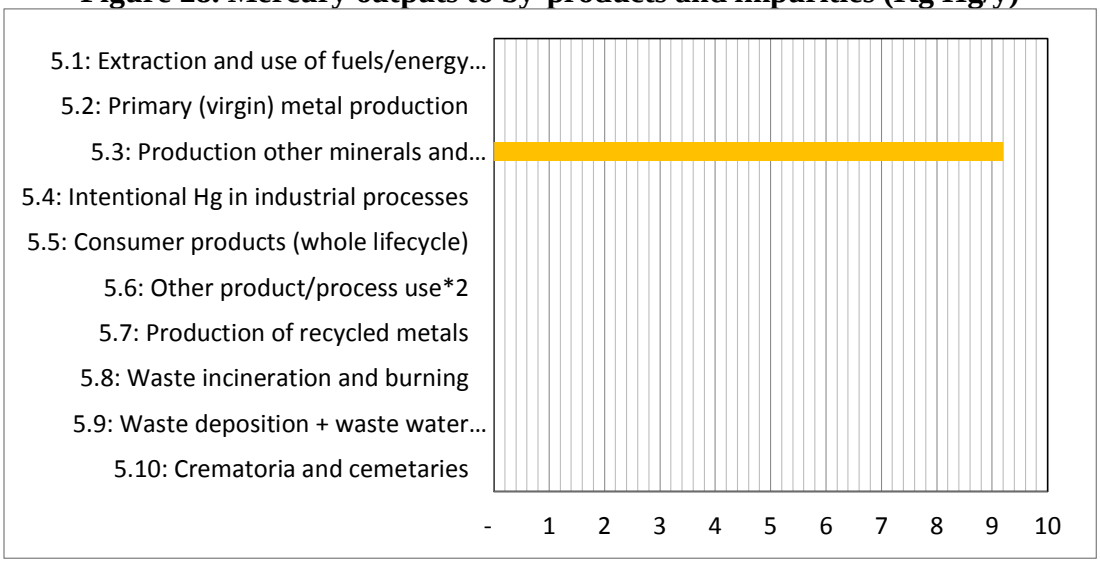
5.5. Consumer products (whole lifecycle): 33.6 Kg (55.1%)
5.6. Other product/ process use: 0.3 Kg (0.5%)
5.9. Waste deposition + waste water treatment: 27.2 Kg (44.6%)

Figure 27. Mercury releases to land (Kg Hg/y)



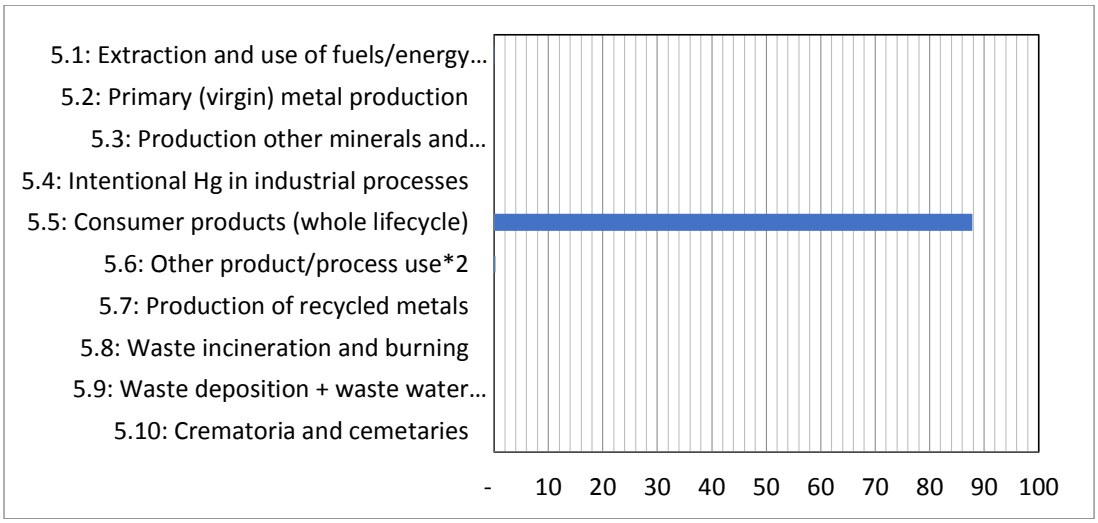
5.5. Consumer products (whole lifecycle): 7.8 Kg (3.5%)
5.9. Waste deposition + waste water treatment 217.6 Kg (96.3%)
5.10. Crematoria and cemeteries: 4 Kg (0.2%)

Figure 28. Mercury outputs to by-products and impurities (Kg Hg/y)



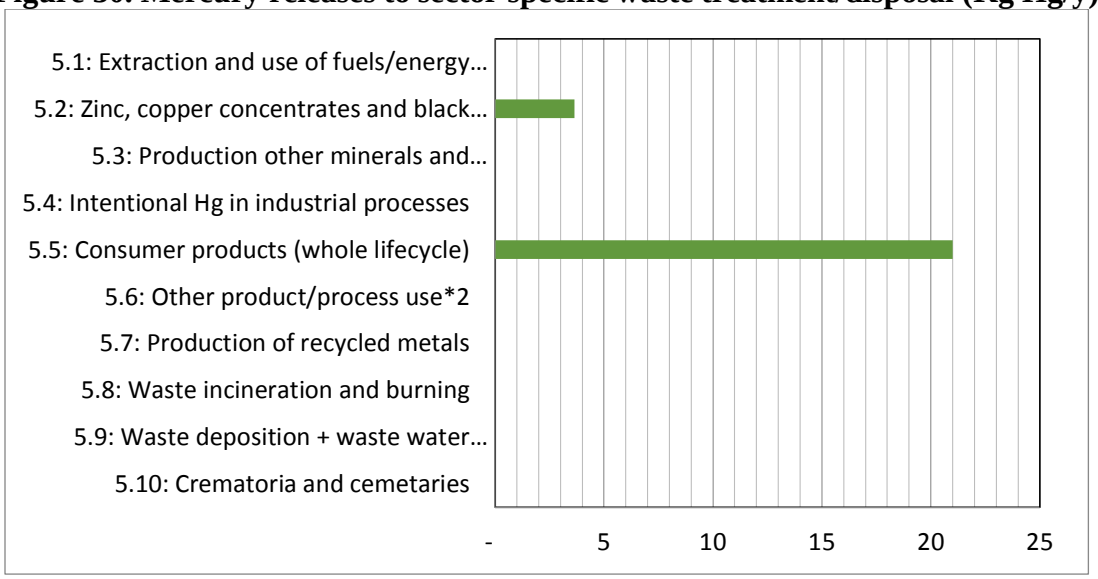
5.3. Production of other minerals and materials 9.2 Kg (100%)

Figure 29. Mercury releases to general waste (Kg Hg/y)



5.5. Consumer products (whole lifecycle): 87.8 Kg (99.8%)
5.6. Other product/ process use: 0.3 Kg (0.2%)

Figure 30. Mercury releases to sector specific waste treatment/disposal (Kg Hg/y)



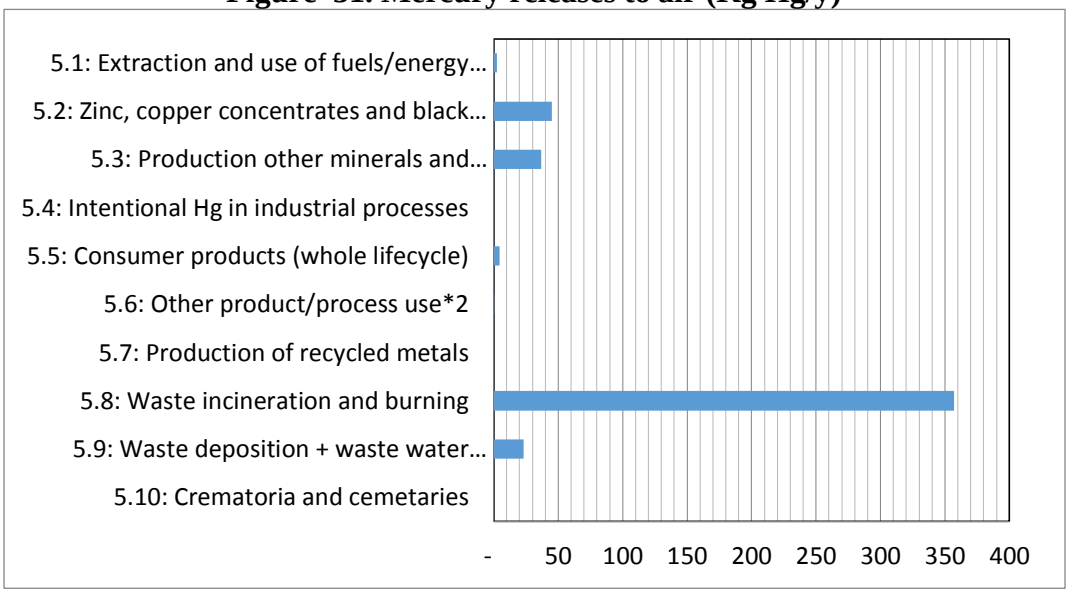
5.2. Zinc, copper concentrates and black copper: 3.7 Kg (14.8%)
5.5. Consumer products (whole lifecycle): 21.0 Kg (85%)

Mercury emissions to air, water, land from different categories of sources: 2015

Source category	Calculated Hg output, Kg/y						Total releases by source category	Percent of total releases
	Air	Water	Land	By-products and impurities	General waste	SSTD		
5.1: Extraction and use of fuels/energy sources	2,5	0,0	-	-	0,0	-	3	0%
5.2: Zinc, copper concentrates, black copper and ferrous metal production	45,1	-	-	-	-	5,0	50	7%
5.3: Production other minerals and materials	36,8	-	-	9,2	-	-	46	6%
5.4: Intentional Hg in industrial processes	-	-	-	-	-	-	-	0%
5.5: Consumer products (whole lifecycle)	4,4	-	4,4	-	35,2	-	44	6%
5.6: Other product/process use	0,2	0,3	0,2	-	0,3	-	1	0%
5.7: Production of recycled metals	-	-	-	-	-	-	-	0%
5.8: Waste incineration and burning	357,0	-	-	-	-	-	357	49%
5.9: Waste deposition + waste water treatment	23,1	23,1	184,8	-	-	-	231	32%
5.10: Crematoria and cemeteries	-	-	0,4	-	-	-	0	0%
SUM OF QUANTIFIED RELEASES	469	23	190	9	36	5	732	100%

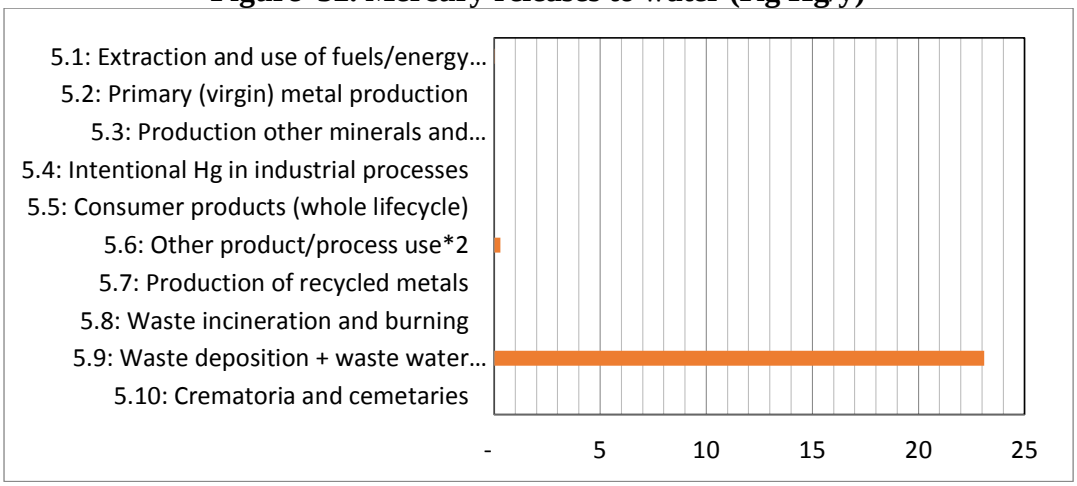
Charts presenting summary data of estimated mercury releases per source category: 2015

Figure 31. Mercury releases to air (Kg Hg/y)



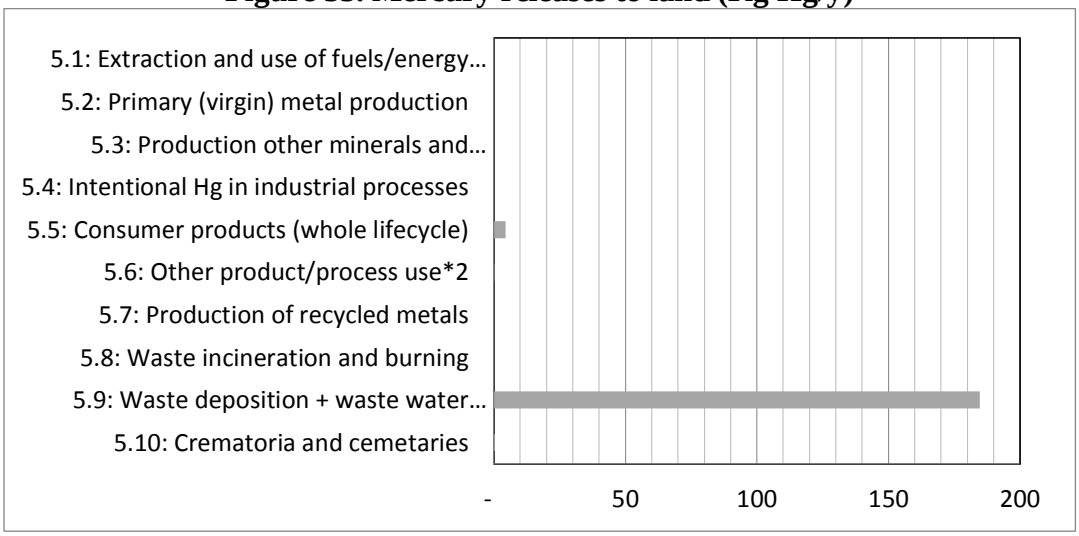
5.1. Extraction and use of fuel/energy sources: 2.5 Kg (0.5%)
5.2. Zinc, copper concentrates and black copper: 45.1 (9.7%)
5.3. Production of other minerals and materials 36.8 Kg (7.9%)
5.5. Consumer products (whole lifecycle): 4.4 Kg (0.9%)
5.8. Waste incineration and burning: 357 Kg (76.1%)
5.9. Waste deposition + waste water treatment 23.1 Kg (4.9%)

Figure 32. Mercury releases to water (Kg Hg/y)



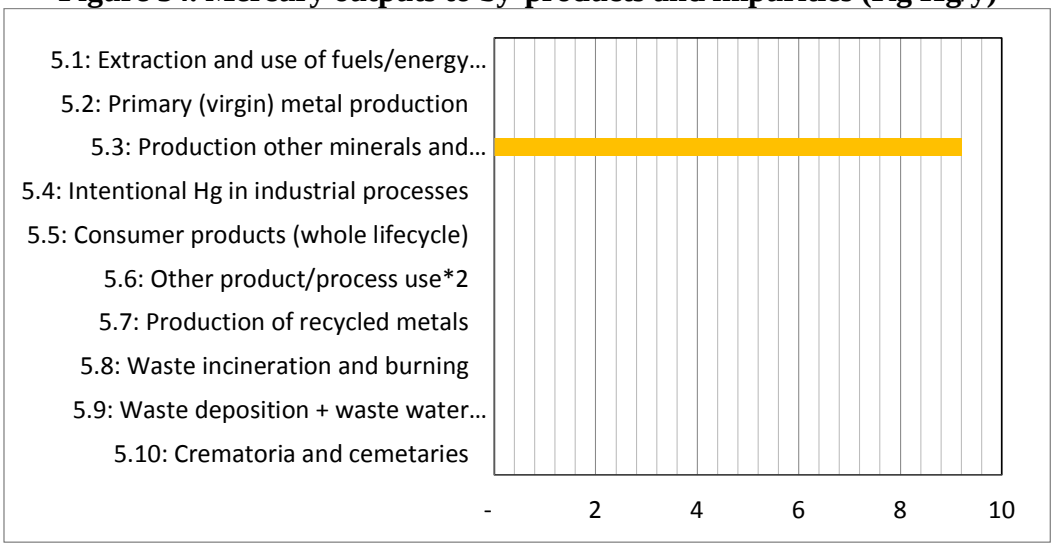
5.6. Other product/ process use: 0.3 Kg (1.0%)
5.9. Waste deposition + waste water treatment: 23.1 Kg (99%)

Figure 33. Mercury releases to land (Kg Hg/y)



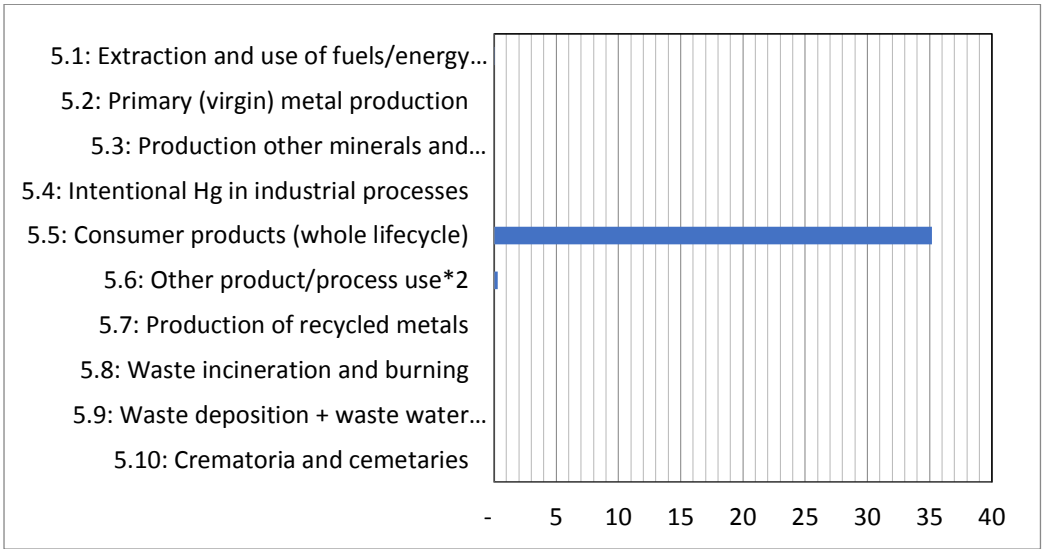
5.5. Consumer products (whole lifecycle): 4.4 Kg (2.3%)
5.6. Other product/ process use: 0.2 Kg (0.2%)
5.9. Waste deposition + waste water treatment: 184.8 Kg (97.2%)
5.10. Crematoria and cemeteries: 0.4 Kg (0.3%)

Figure 34. Mercury outputs to by-products and impurities (Kg Hg/y)



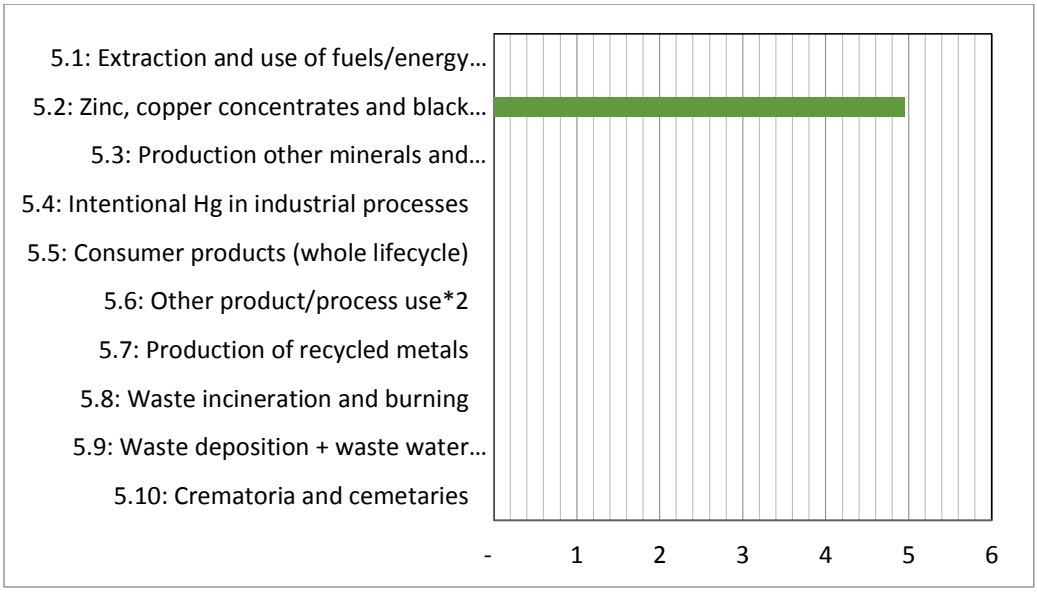
5.3. Production of other minerals and materials: 9.2 Kg (100%)

Figure 35. Mercury releases to general waste (Kg Hg/y)



5.5. Consumer products (whole lifecycle): 35.2 Kg (97.8%)
5.6. Other product/ process use: 0.3 Kg (2.2%)

Figure 36. Mercury releases to sector specific waste treatment/disposal (Kg Hg/y)



5.2. Zinc, copper concentrates and black copper: 5.0 Kg (100%)

Part 4: PROPOSAL FOR FURTHER ACTIVITIES FOR THE IMPLEMENTATION OF MINAMATA CONVENTION IN THE REPUBLIC OF ARMENIA

In order to meet country obligations under Minamata Convention on Mercury, the Republic of Armenia, as a Party to this Agreement and in compliance with Article 20 of the Convention, launched development of the National Implementation Plan (NIP), taking into account its domestic circumstances.
Since the NIP will embrace actions required for implementation of country obligations, the appropriate draft proposal is formulated based on analysis of relevant provisions of the Convention.

National Action Plan
Summary of the Main articles of the Minamata Convention relevant to the Republic of Armenia

Relevant Articles	Provisions of the article	Relevance to the Republic of Armenia
Article 3 Mercury supply sources and trade	In accordance with Article 3, primary mining of mercury must be put under the ban. Such a ban is set depending on conducting primary mercury mining within the territory of the Party. If a Party conducts primary mercury mining, the ban is set not later than fifteen years from the date the Convention enters into force. Otherwise, the ban is effective immediately from the date of the Convention's entry into force.	In Armenia mercury mining is not conducted, but it is not prohibited; therefore, after the entry into force of the Convention mercury mining must be banned.
	Article 3 of the Convention also provides that each Party takes steps to identify within its territory the individual stocks of mercury or mercury compounds exceeding 50 tons, as well as sources of mercury supply generating formation of mercury stocks in excess of 10 tons per year.	Yerevan Electric Lamps Plant was founded in 1951. In 1966, the industrial Association "ArmElectroSwet" (ArmElectroLight) was arranged under the Ministry of Electrotechnical industry of the Former Soviet Union. At "ArmElectroSwet" the electrotechnical equipment was manufactured. In 2000, "GrandSun" company was established on the base of the plant. The company produced and exported electrical equipment. Currently, the company temporarily does not work. Currently business entities are known: both conducting production (recovery) of mercury and using mercury and its compounds. Furthermore, at present, there are no business entities that use mercury and mercury compounds, the deposits of which exceed 50 tons.
		The third obligation under Article 3 is the requirement to dispose the excess

Relevant Articles	Provisions of the article	Relevance to the Republic of Armenia
		mercury resulting from decommissioning of the chlor-alkali facilities in accordance with the guidelines for the environmentally sound management with the application of operations, which that do not lead to recovery, recycling, reclamation, direct re-use or alternative uses.
	Another requirement contained in Article 3 of the Convention is the requirement to ban the export of mercury except for permitted use or safe temporary storage, and import of mercury, if mercury was obtained from unauthorized sources. .	Since no such ban was set by the legislation of the Republic of Armenia, it is required to set forth prohibition taking into consideration the provisions of the Convention. In particular, there is a requirement for a ban on import of mercury from non-Party States, except cases when such State has provided evidence (through proper notification) that mercury was not obtained from unauthorized sources (the mercury does not originate from primary mining or as a result of decommissioning of facilities for chlor-alkali production).
	It is also required to set forth a ban on the export of mercury. The ban does not refer to the cases when the exported mercury is imported to the territory of the Parties to the Convention providing its written consent (notification) and only for the purposes of use allowed to the importing Party under the Convention or for environmentally sound interim storage in accordance with article 10 of the Convention	
Article 4 Mercury-added products	Article 4 of the Convention envisages ban for import, export and manufacture of mercury-added products listed in Part I of Annex A to the Convention after their phase-out date.	The ban applies to 9 groups of products, including: batteries, switches and relays, fluorescent lamps, general lighting lamps, cosmetics, pesticides, biocides and local antiseptics, non-electronic measuring devices
		Measures should be taken to prevent inclusion of mercury-added products in the composite products, the export, import and manufacture of which is prohibited. Since any restrictions on this issue were not set forth by the national legislation, their inclusion should be provided for in National Implementation Plans (NIPs).
Article 5 Manufacturing processes in which mercury or mercury compounds are used	• Adoption of measures to restrict the use of mercury or mercury compounds in the processes listed in part II of Annex B (production of vinyl chloride monomer, methylate, or sodium or potassium ethylate, the production of polyurethane using	Despite the fact that new industrial facilities use mercury-free technology, any restrictions to use mercury (mercury compounds) in manufacturing process, including the use at new facilities, do not exist, so the NIP should provide for appropriate prohibitions by introduction

Relevant Articles	Provisions of the article	Relevance to the Republic of Armenia
	mercury-containing catalysts), in accordance with the stated provisions; • taking measures for identification of facilities sites where mercury (mercury compounds) are used in manufacturing processes included in Annex B; no later than 3 years after the ratification of the Convention information should be submitted on the number and types of such facilities, the estimated annual consumption of mercury (mercury compounds), the decision-making on issues of emissions and releases of mercury or mercury compounds from those facilities; • ban to use mercury (mercury compounds) at new facilities using the manufacturing processes listed in Annex B, as well as the adoption of measures to prevent the establishment of other manufacturing facilities that use mercury (or its compounds), except cases when the manufacturing process provides for significant benefits to the environment and human health or no mercury-free alternatives are in place.	of appropriate changes in legislation, the beginning of which depends on the period of ratification of the Convention. In Armenia sodium hydroxide is obtained electrochemically through electrolysis of solutions of halite (a mineral consisting mainly of NaCl salt) with the simultaneous production of hydrogen and chlorine. Caustic alkali and chlorine are produced by three electrochemical methods. Two of them involve electrolysis with solid cathode (diaphragm and membrane cell methods), the third method is electrolysis with a liquid mercury cathode (mercury method). In the global manufacturing practice all three methods are used for production of chlorine and caustic soda, with a clear tendency to increase the proportion of membrane electrolysis. The simplest electrochemical method, in terms of process organization and structural materials for electrolytic cell, is diaphragm method of obtaining sodium hydroxide. The salt solution in a diaphragm cell (electrolyzer) is continuously fed to the anode space and, as a rule, flows through the asbestos diaphragm applied on a steel mesh cathode; sometimes a small amount of polymer fibers is added. Due to its relative ease and low cost a diaphragm method of sodium hydroxide obtaining is still widely used in industry.
Article 7 Artisanal and small-scale gold mining	Obligation relating to artisanal and small-scale gold mining and processing at which mercury amalgamation is used to extract gold from ore.	In Armenia mercury (amalgamation) is not used in technological processes for enrichment of gold-bearing ores. The NIP should envisage a ban on the use of mercury in enrichment of gold ores.
Articles 8 and 9 Emissions and Releases	Monitoring and, where feasible, reducing emissions of mercury and mercury compounds into the atmosphere through measures on emissions control from point sources listed amongst the source categories in Annex D. Parties should establish and further maintain an inventory of releases of mercury and mercury compounds from sources belonging to one of the categories listed in Annex D, and	In view of the above-mentioned, it is proposed to include in the NIP activities ensuring control on meeting the requirement for considering technological parameters of the best available technologies in design, construction and reconstruction of facilities related to one of the categories listed in Annex D to the Convention, the commissioning of which will be implemented in a period of five years since the date of ratifying the Convention.

Relevant Articles	Provisions of the article	Relevance to the Republic of Armenia
	emissions of mercury and mercury compounds from any significant anthropogenic point sources, the categories of which should be identified within three years after the ratification of the Convention and continue to be identified on an ongoing basis. Control and, where feasible, reducing releases of mercury and mercury compounds in water bodies and land from the relevant (significant antropogenic) point sources not addressed by other provisions of the Convention. The source categories listed in Annex D correspond to activity types related to the areas for the application of the best available technologies. For existing sources, Parties must take control measures on emissions and releases, in particular: • to establish quantitative targets for monitoring and, where feasible, reducing emissions from relevant sources; • to establish limit values of emissions/releases for control and, where feasible, reducing releases from relevant sources; •to use the best available techniques and best environmental practices to control emissions/releases from relevant sources; • to implement the strategy to control the simultaneous impact of several pollutants that will ensure co-benefits for control of emissions/ releases of mercury; • to adopt alternative measures to reduce releases from relevant sources	
Article 10 Environmentally sound interim storage of mercury, other than waste mercury	Interim storage of mercury and mercury compounds intended for a permitted use that is carried out in an environmentally sound manner considering any guidelines or manuals, and in accordance with any requirements adopted by the Conference of the Parties.	Because national legislation does not adequately address the issue of safe storage of mercury, after the adoption of Guidelines or Manuals by the Conference of the Parties the National Implementation Plans (NIPs) must include activities on improvement of legislation. Cooperation of the Parties among each other and with relevant intergovernmental organizations, as well as other institutions

Relevant Articles	Provisions of the article	Relevance to the Republic of Armenia
		for capacity-building on environmentally sound interim storage of mercury and mercury compounds. In this connection it is proposed to include an event similar to recommendation into the NIP.
Article 11 Mercury wastes	Obligation for the adoption by Parties of the following measures: • on management of mercury wastes in an environmentally sound manner taking into account the guidelines, in compliance with the Basel Convention and requirements to be adopted by the Conference of the Parties in the Appendix to the Convention; • on recovery, recycling, reclaim or direct re-use of mercury waste exclusively within the use permitted for the Party under the Convention or for environmentally sound disposal in accordance with the foregoing obligation; • to prohibit for the Parties to the Basel Convention the transboundary movements of mercury wastes, except for environmentally sound disposal.	As a Party to the Basel Convention, the Republic of Armenia included in the national legislation relevant regulations/rules of international law. "The List of hazardous wastes" prohibited for import to the territory of Armenia includes mercury-containing wastes. Mentioned legislative documents include, in particular: - Decision of the Government of the Republic of Armenia "On the approval of the List of the Republic of Armenia hazardous wastes" (No. 874-N of May 20, 2004). This List encompasses (i) wastes containing mercury, mercury compounds as a component or pollutant, (ii) scrap (wastes), electrical equipment or electro-technical nodes, involving galvanic elements, batteries, mercury switches, glass of cathode ray tubes, and other types of glass with the active covering or polluted by cadmium, mercury, lead, polychlorinated biphenyls at the concentration level from 50 mg/kg and above, (iii) worked-out mercury lamps and luminescent tubes. - Decision of the Government of the Republic of Armenia "On approval of the List of the Republic of Armenia banned hazardous wastes" (No.1093-N of July 8, 2004). This List includes wastes containing mercury, mercury compounds as a components or pollutants. It is also necessary to include in the NIP actions for inclusion of changes and amendments to the legislation to take into account the relevant requirements after their adoption by the Conference of the Parties. Article 11 also recommends cooperation between Parties, with relevant intergovernmental organizations and other entities, in order to develop and maintain global, regional and national capacities for the management of mercury wastes in

Relevant Articles	Provisions of the article	Relevance to the Republic of Armenia
		an environmentally sound manner, and it is proposed that the NIP includes an activity similar to the recommendation.
Article 12 Contaminated Sites	Endeavour to develop appropriate strategies for identification and assessment of sites contaminated by mercury or mercury compounds. Any action to reduce the risks posed by such sites should be carried out in an environmentally sound manner. Part of the actions, if appropriate, should include an assessment of risks to the environment and human health due to the content of mercury or mercury compounds at such areas	In the NIP it is recommended to include activities such as: 1) identification and assessment of sites contaminated by mercury and mercury compounds; 2) cooperation with Parties under article 12 in the development of strategies and implementation measures for the identification, assessment, prioritization, management and, if necessary, remediation of contaminated sites.
Article 16 Health aspects	• Assistance in the development and implementation of strategies and programmes to identify and protect the population at risk, especially vulnerable groups, including development of science-based guidelines on health, regarding the impact of mercury and mercury compounds, as well as definition of targets for reducing exposure to mercury where applicable, and public education with the participation of the public health system and other relevant sectors; • Assistance in the development and implementation of science-based education and prevention programs concerning the impact of mercury and mercury compounds; • Promotion in provision of adequate health services on prevention, treatment and care for populations affected by the exposure to mercury and mercury compounds; • Establishing and strengthening, as necessary, the institutional and health professional capacities for the prevention, diagnosis, treatment and monitoring of health risks related to mercury and mercury compounds.	It is proposed to include in NIP the feasible measures on sanitary-and-epidemiologic surveillance and medical maintenance of human health against the dangers of exposure to hazardous chemicals, which include mercury and its compounds, in particular: • sanitary and epidemiological surveillance and medical maintenance of human health protection against the risks of exposure to hazardous chemicals, including mercury and its compounds, including: • legal regulation aimed to reduce the adverse effects of hazardous chemicals on human health and the environment, including the establishment of sanitary and epidemiological requirements that satisfy the security conditions of the environment/habitat for human health; • development and provision for implementation of programs in the field of chemical safety; • implementation of programmes and projects in the field of chemical safety; • professional training of medical and sanitary-epidemiological workers, their retraining, improvement of qualification and training in the field of chemical safety of the population; • prevention of occupational diseases and poisoning caused by superecotoxicants; • monitoring of hazardous chemicals, as well as associated diseases in order to predict chemical hazards and making routine and emergency

Relevant Articles	Provisions of the article	Relevance to the Republic of Armenia
		sanitary and anti-epidemic actions to ensure chemical safety of the population and the environment; • operational response to emergencies associated with occurrence/ penetration of hazardous chemicals into the environment; • providing the population with information on issues of chemical safety maintenance using media and awareness-raising / outreach materials.
Article 17 **Information exchange**	facilitate the exchange of the following information: • scientific, technical, economic and legal information concerning mercury and mercury compounds, including information on toxicological and ecotoxicological character, as well as and information on security issues; • information on the reduction or liquidation of the production, use, trade, emissions and releases of mercury and mercury compounds; • information on technically and economically viable alternatives: • products with added mercury; • manufacturing processes, in which mercury or mercury compounds are applied; • epidemiological information referring to health after-effects associated with the impacts of mercury and mercury compounds, in close cooperation with the World Health Organization and other relevant organizations, as appropriate.	Taking into account the above-mentioned, the event related to cooperation of the Parties and aimed at exchange of the specified information, including the exchange through the Convention Secretariat or in cooperation with other relevant organizations, should be reflected in the NIP.
Article 18 **Public information, awareness and education**	Promote and facilitate provision to the public of available information: • on the impact of mercury and mercury compounds to the environment and human health; • on alternatives to mercury and mercury compounds • about the topics of the information recommended for sharing with the Parties in accordance with Article 17 of the Convention; • about the results of activities in the area of research, development and monitoring in accordance with	To promote and facilitate education, training and awareness raising in population about the impacts of mercury and mercury compounds to the environment and human health; actions should be performed in cooperation with relevant intergovernmental and non-governmental organizations and vulnerable populations. Providing the above-mentioned information to the public can be achieved by its posting on the websites of the Ministry of Nature Protection and Ministry of Health of the republic of

Relevant Articles	Provisions of the article	Relevance to the Republic of Armenia
	Article 19 of the Convention; • activities performed to meet obligations under the Convention.	Armenia. The event to provide the public with such information is proposed for inclusion in the NIP.
Article 19 Research, development and monitoring	Cooperation with consideration of conditions and opportunities available at Parties to develop and improve: • inventories of mercury and mercury compounds use, consumption and anthropogenic emissions to air and discharges to water and land; • modeling and geographically representative monitoring of levels of mercury and mercury compounds in vulnerable populations and environmental matrices, including biota, including fish, marine mammals, sea turtles and birds, as well as cooperation in the field of relevant and appropriate samples taking and sharing; • assessments of the impact exerted by mercury and mercury compounds towards the environment and human health along with social, economic and cultural impacts, particularly in relation to vulnerable groups; • agreed-upon methodologies in relation to the activities enumerated above; • information on the environmental cycle, transfer (including long-range transport and deposition), transformation and cycling of mercury and mercury compounds in different ecosystems, with due regard to the differences between anthropogenic and natural emissions and discharges of mercury and mercury remobilization from the previously formed depositions; • information on trade in mercury, mercury compounds and products with added mercury; • information and scientific studies concerning technical and economic availability of mercury-free products and processes, as well as the best available techniques and best environmental practices to reduce and monitor emissions and releases of mercury and mercury compounds.	The list of directions of scientific cooperation formulated in Article 19 applies to various fields of State policy carried out accordingly by several state authorities. It is necessary to include research work on mercury in the state programs of various research institutes.

Annex 1.

PUBLICATIONS
in proceedings of international conferences and periodicals based on outcomes of GEF/ UNIDO Project "Minamata Convention Initial Assessment of Armenia"

No.	*Title*	*Conference / periodical*	*Date*	*Details*
1	Mercury Regulation Issues in Armenia	SETAC Europe 25th Annual Meeting in Barcelona, Spain	3-7 May, 2015	Abstract TUPC13
2	Mercury Main Sources and Policy Issues in Armenia	12th International Conference on Mercury as a Global Pollutant, Jeju, Korea.	June 14 ~ 19, 2015	Abstract Book. P. 232. 15-PP-168.
3	Risk Analysis for Hazard Impacts Prevention	Occupational Hygiene 2016. British Occupational health Society (BOHS) Annual Conference	Glasgow, April 25-28, 2016	Scientific poster www.oh-2016.com
4	Mercury Releases to Environmental Media from Anthropogenic Sources in Armenia	SETAC Asia/Pacific Conference, Singapore,	September 16-19, 2016	Abstract Book. Session 8A "Mercury Emissions and Environmental Cycling in Asia and its Effects on Ecosystem and Human Health. P. 225.
5	Ratification of Minamata Convention on Mercury in the Republic of Armenia	Patnesh, No. 1(26) 2018		p. 6-11
6	Main sources of mercury releases in Armenia	1. SETAC Europe 28th Annual Meeting.	13–17 May 2018, Rome, Italy	Abstract Book p. 216 (Abstract MO 347). PRINT ISSN 2309-8031 - ONLINE ISSN 2310-3043 © 2018.

Annex 2.

Awareness Raising Campaigns

Mass-Media Coverage of Awareness Raising Events

Inception Workshop (Yerevan, Armenia, October 24, 2014)

http://henaran.am/news_view.php?post_id=49277
http://shamshyan.com/hy/article/2014/10/24/31538/
http://varkanish.am/news/22109
http://news.am/arm/news/235842.html
http://armenpress.am/arm/news/781312/haystanum-khetazotvi-sndiki-parunakutyuny.html
http://www.oratert.com/armenian/%D5%B0%D5%A1%D5%B5%D5%A1%D5%BD%D5%BF%D5%A1%D5%B6-%D5%AC%D5%B8%D6%82%D6%80%D5%A5%D6%80/75608.html
http://www.a1plus.am/1345326.html
http://www.iranahayer.com/index.php/armenianews/22061.html
http://www.irakan.info/full_news.php?id=20804
http://nt.am/am/news/198673/

"Mercury Risks for Human Health and Environment" Awareness Raising and Training Workshop (Yerevan, Armenia, September 28-29, 2016)

http://www.mnp.am/?aid=5350
http://econews.am/?p=8422&l=am
http://nt.am/am/news/227572/
http://armlur.am/588626/
http://zham.am/am/news/70783.html
http://shabat.am/am/article/86792/86792.html
http://www.slaq.am/arm/news/1128612/
http://www.a1plus.am/1489661.html

Workshop on Mercury Inventory Data Validation (Yerevan, Armenia, January 25, 2018)

http://mnp.am/am/post/2666
http://yerkirmedia.am/social/sndik-guyqagrum/
http://ecolur.org/hy/news/officials/workshop-on-mercury-inventory-data-ratification-of-was-held/9872/
https://news.am/arm/news/434001.html
http://www.noyan-tapan.am/am/news/249682/
https://www.slaq.am/arm/news/1226809/
http://haynews.am/hy/1517402691
http://www.globnews.am/?p=24165&l=am

Events arranged by the Armenian Women for Health and healthy Environment NGO (AWHHE)

- **Awareness raising event on July 20, 2018 at Hrazdan Town Aarhus Center of the Republic of Armenia**
  https://www.lragir.am/2018/07/28/367771/

- **Seminar on August 17, 2018 at Municipality / Aarhus Center of Dilijan Town of the Republic of Armenia**
  http://www.dilijancity.am/Pages/Home/newsdetails.aspx?nID=1216#.W3sDObglHIV),

- **Seminar on August 22, 2018 at Stepanavan Municipality /Aarhus Center**
  http://awhhe.am/wp-content/uploads/2014/02/alt_pest_eng_2008.pdf).
  http://www.stepanavan.am/Pages/Home/Default.aspx).

- **Seminar on September 19, 2018 at the Faculty of Natural Sciences at the State University of Gavar** with the support of Aarhus Center of Gavar City of the Republic of Armenia

  http://gsu.am/hy/2018/09/19/%D5%A2%D5%B6%D5%A1%D5%BA%D5%A1%D5%B0%D5%BA%D5%A1%D5%B6%D5%A1%D5%AF%D5%A1%D5%B6-%D5%B0%D5%AB%D5%B4%D5%B6%D5%A1%D5%AD%D5%B6%D5%A4%D5%AB%D6%80%D5%B6%D5%A5%D6%80%D5%A8%D5%9D-%D6%84%D5%B6%D5%B6%D5%A1/).

References

1. UNEP "Toolkit for identification and quantification of mercury releases", Inventory Level 1 (version 1.02, April 2013)
2. "Toolkit for identification and quantification of mercury releases"", Inventory Level 2 (version 1.02, January 2013). http://www.unep.org/hazardoussubstances/Mercury/MercuryPublications/GuidanceTrainingMaterialToolkits/MercuryToolkit/tabid/4566/language/en-US/Default.aspx
3. https://www.gov.am/en/official/
4. https://www.gov.am/en/geography/
5. https://www.gov.am/en/demographics/
6. https://www.gov.am/en/gov-system/
7. www.mineconomy.am/hy/98
8. www.mineconomy.am/media/2017/08/2204.pdf
9. https://www.armstat.am
10. http://armstat.am/file/doc/99504393.pdf

Minamata Disease

11. "Environmental costs of mercury pollution," Lars D. Hylander et al, Science of the Total Environment, 2006, http://www.elsevier.com/authored_subject_sections/P09/misc/STOTENbestpaper.pdf.
12. "Minamata disease," Wikipedia, http://en.wikipedia.org/wiki/Minamata_disease and
13. "The Poisoning of Minamata," Douglas Allchin, http://www1.umn.edu/ships/ethics/
14. minamata.htm
15. Ibid., 40
16. Grandjean, P.,Satoh, H.,Murata, K. Eto, K., (2010). Adverse effects of methylmercury:
17. environmental health research implications. Environ Health Perspect 118(8): 1137-1145
18. http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info%3Adoi%2F10.12
19. 89%2Fehp.0901757.
20. Arne Jernelov, "Iraq's Secret Environmental Disasters," http://www.project-syndicate.org/commentary/jernelov3/English.
21. "Grassy Narrows Protests Mercury Poisoning," CBC News, April 7, 2010, http://www.cbc.ca/canada/toronto/story/2010/04/07/tor-grassy-narrows.html.
22. Asahi Shimbun, "Interview with Masazumi Harada," Asia Network, http://www.asahi.com/english/asianet/hatsu/eng_hatsu020923f.html.

Fuel extraction and use

23. Lassen, C. (Ed.), Treger, Y.A., Yanin, E.P., Revich, B.A., Shenfeld, B.E., Dutchak, S.V., Ozorova, N.A., Laperdina, T.G. and Kubasov, V.L. (2004): Assessment of mercury releases from the Russian Federation. Ministry of Natural Resources of the Russian Federation, Danish Environment Protection agency, Arctic Council. Draft, 2004.
24. PAJ: Submitted material and personal communication between UNEP and Yoshihiro Inoue of the Petroleum Association of Japan. 2012.
25. Wilhelm, S.M. Liang, L., Cussen, D and Kirchgessner, D.A. (2007): Mercury in crude oil processed in the United States (2004). Environ. Sci. Technol. 41, p. 4509–4514.
26. Pirrone, N., Munthe, J., Barregård, L., Ehrlich, H.C., Petersen, G., Fernandez, R., Hansen, J.C., Grandjean, P., Horvat, M., Steinnes, E., Ahrens, R., Pacyna, J.M., Borowiak, A., Boffetta, P. and Wichmann-Fiebig, M. (2001): EU Ambient Air Pollution by Mercury (Hg) - Position
27. Paper. Office for Official Publications of the European Communities, 2001. Submitted by Italy (available on http://europa.eu.int/comm/environment/air/background.htm#mercury).
28. Wilhelm, S.M. (2001): Mercury in petroleum and natural gas: Estimation of emissions from production, processing, and combustion. US Environmental Protection Agency, Office of Research and Development, Washington. Available at: http://www.epa.gov/ORD/NRMRL/pubs/600r01066/600r01066.pdf
29. Toolkit for Identification and Quantification of Mercury Sources, Reference Report and

Guideline for Inventory Level 2, Version 1.2, April 2013. UNEP Chemicals Branch, Geneva, Switzerland.
30. UNEP (2011), Romanov: Reducing mercury emissions from coal combustion in the energy sector of the Russian Federation. Prepared by the Scientific Research Institute for Atmospheric Air Protection (SRI Atmosphere, JSC), Saint-Petersburg, Russia. November 2011, as cited by UNEP/AMAP, 2012.
31. European Commission (2005): Communication from the commission to the Council and the European Parliament -Community Strategy Concerning Mercury- {SEC(2005) 101}. Available at: http://europa.eu.int/comm/environment/chemicals/mercury/
32. Statistical Yearbooks. National Statistical Service of the Republic of Armenia. 2010-2014.

Metals extraction and processing

33. Kutliakhmetov, A.N. (2002): Mercury contamination of landscapes by mining enterprises of Bashkirian East-of-Ural Region (in Russian). Autoref. thesis of Cand. Geogr. Sc. - Yekaterinburg. As cited in Lassen *et al.* (2004).
34. Fursov, V.Z. (1983): Gas-and-Mercury Method for Mineral Products.
35. Bobrova et al., 1990
36. Ozerova, N. A. (1986): Mercury and endogenetic ore formation. Moscow, Akad. Nauk SSSR, Ordena Trudovogo Krasnogo Znameni, Inst. Geol. Rudnykh Mestorozhdeniy, Petrog., Mineral., Geochim., 231 p. (in Russian).
37. Klimenko and Kiazimov (1987)
38. Toolkit for Identification and Quantification of Mercury Sources, Reference Report and Guideline for Inventory Level 2, Version 1.2, April 2013. UNEP Chemicals Branch, Geneva, Switzerland.

Cement production

39. US EPA (1997a): Locating and estimating air emissions from sources of mercury and mercury compounds. Report EPA-454/R-97-012, (NTIS PB98- 117054), Office of Air Quality Planning and Standards, Research Triangle Park, NC. Available at: http://www.epa.gov/ttn/chief/le/index.html
40. CEMBUREAU (2010): Mercury in the cement industry. University of Liege for CEMBUREAU - CSI, April 2010. Sumitted to UNEP. Accessed 2012 at http://www.unep.org/hazardoussubstances/Portals/9/Mercury/A_Inventories/CEMENT%20Industry%20-%20Hg%20report%20CEMBUREAU%20April%202010.pdf
41. Schneider, M. and Oerter, M. (2000): "Limiting and Determining Mercury Emissions in the Cement Industry," Zement-Kalk-Gips International, Germany, Vol., 53, No. 3, 2000.
42. Adriano, D.C. (2001): Trace Elements in the Terrestrial Environment, Springer-Verlag, New York, NY, USA, 2001.
43. Airey, D. (1982): Contributions from Coal and Industrial Materials to Mercury in Air, Rainwater and Snow, *Sci. total. Envir*. 25, 1982, pages 19 to 40.
44. Hills LM and Stevenson RW (2006): Mercury and lead content in raw materials, PCA R&D Serial No. 2888, 2006. As cited by Zheng Y (2011): Mercury removal from cement plants by sorbent injection upstream of a pulse jet fabric filter. Ph.D. The-sis, June 2011, CHEC/DTU, Denmark.
45. Pirrone, N., Munthe, J., Barregård, L., Ehrlich, H.C., Petersen, G., Fernandez, R., Hansen, J.C., Grandjean, P., Horvat, M., Steinnes, E., Ahrens, R., Pacyna, J.M., Borowiak, A., Boffetta, P. and Wichmann-Fiebig, M. (2001): EU Ambient Air Pollu-tion by Mercury (Hg) - Position Paper. Office for Official Publications of the European Communities, 2001. Submitted by Ita-ly (available on http://europa.eu.int/comm/environment/air/background.htm#mercury).
46. BUWAL (1997): Waste Disposal in Cement Plants, Environment-Materials Nr. 70, Bundesamt für Umwelt, Wald und Land-schaft (BUWAL), 3003 Bern, Switzerland, 1997.
47. Toolkit for Identification and Quantification of Mercury Sources, Reference Report and Guideline for Inventory Level 2, Version 1.2, April 2013. UNEP Chemicals Branch, Geneva, Switzerland.

Pulp and paper production

48. Skårup, S., Christensen, C.L., Maag, J. and Jensen, S.H. (2003): Substance Flow Analysis for

Mercury. Environmental project no. 808, The Danish EPA, 2003(in Danish with summary in English). Available at www.mst.dk. Since 2004 also available in English at same website.
49. Kindbom, K and Munthe, J. (1998): Hur påverkas kvicksilver i miljön av olika energialternativ? [How is mercury in the envi-ronment influenced by different energy alternatives]. IVL Svenska Miljöinstitutttet. (In Swedish)
50. UNEP, 2013. Toolkit for Identification and Quantification of Mercury Sources, Reference Report and Guideline for Inventory Level 2, Version 1.2, April 2013. UNEP Chemicals Branch, Geneva, Switzerland.

Production of lime

51. UNEP, 2013. Toolkit for Identification and Quantification of Mercury Sources, Reference Report and Guideline for Inventory Level 2, Version 1.2, April 2013. UNEP Chemicals Branch, Geneva, Switzerland.

Incineration of Wastes

52. UNEP, 2013. Toolkit for Identification and Quantification of Mercury Sources, Reference Report and Guideline for Inventory Level 2, Version 1.2, April 2013. UNEP Chemicals Branch, Geneva, Switzerland.
53. Franklin Associates, Ltd. (1989): Characterization of Products Containing Mercury in Municipal Solid Waste in the United States, 1970 to 2000. EPA-530/SW-89-015A. U. S. Environmental Protection Agency, Washington, D.C. January 1989.
54. Yep, C., Algazi, A. and Low, J. (2002): Mercury report. Department of Toxic Substances Control, Hazardous Waste Manage-ment Program and State Regulatory Programs Division, Sacramento, California. Available at: http://www.dtsc.ca.gov/hazardouswaste/mercury/HWM_REP_Mercury_Final.pdf.
55. Skårup, S., Christensen, C.L., Maag, J. and Jensen, S.H. (2003): Substance Flow Analysis for Mercury. Environmental project no. 808, The Danish EPA, 2003(in Danish with summary in English). Available at www.mst.dk. Since 2004 also available in English at same website.
56. UNEP (2003): Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases, 1st edition, May 2003, UNEP Chemicals, Geneva, Switzerland.
57. US EPA (2004): Mercury in medical waste. Available at: http://www.epa.gov/reg5oair/glakes/fact1.htm
58. US EPA (1997a): Locating and estimating air emissions from sources of mercury and mercury compounds. Report EPA-454/R-97-012, (NTIS PB98- 117054), Office of Air Quality Planning and Standards, Research Triangle Park, NC. Available at: http://www.epa.gov/ttn/chief/le/index.html
59. Lindberg S.E., Walschläger D., Prestbo E.M., Bloom N.S., Price J. and Reinhart D. (2001): Methylated mercury species in municipal waste landfill gas sampled in Florida, USA. Atmos. Environ. 35, 4011-4015.
60. Shunlin Tang, Xinbin Feng, Zhonggen Li, Shaofeng Wang and Lian Liang (2004): A preliminary study on mercury speciation in municipal waste landfill gas from Guizhou, China. In Mercury as a Global Pullotant, part 1, RMZ - Materials and Geoenvi-ronment - periodical for mining, metallurgy and geology, Ljubliana, Slovenia, 2004.
61. COWI (2002): ACAP and Danish EPA Reduction of Atmospheric mercury emissions from Arctic countries – questionnaire on emissions and related topics. November 2002.

Consumer products

62. Carpi, A. and Chen, Y.F. (2001): Gaseous Elemental Mercury as an Indoor Pollutant. Environ. Sci. Technol. Vol 35:4170-417
63. Yanin (2004): Description of non-ferrous metal industry in Lassen et al. (2004).
64. Toolkit for Identification and Quantification of Mercury Sources, Reference Report and Guideline for Inventory Level 2, Version 1.2, April 2013. UNEP Chemicals Branch, Geneva, Switzerland.
65. US EPA (1992): Characterization of Products Containing Mercury in Municipal Solid Waste in the United States, 1970 to 2000. Office of Solid Waste, Washington, DC. March 1992.
66. Barr (2001): Substance Flow Analysis of Mercury in Products. Prepared for Minnesota

Pollution Control Agency. August 15, 2001. Barr Engineering, Minneapolis, MN.
67. US EPA (1997b): Mercury Study Report to Congress. US EPA, Dec. 1997. Available at: http://www.epa.gov/mercury/report.htm
68. COWI (2002): ACAP and Danish EPA Reduction of Atmospheric mercury emissions from Arctic countries – questionnaire on emissions and related topics. November 2002.
69. US EPA (1997a): Locating and estimating air emissions from sources of mercury and mercury compounds. Report EPA-454/R-97-012, (NTIS PB98- 117054), Office of Air Quality Planning and Standards, Research Triangle Park, NC. Available at: http://www.epa.gov/ttn/chief/le/index.html
70. Lassen, C. (Ed.), Treger, Y.A., Yanin, E.P., Revich, B.A., Shenfeld, B.E., Dutchak, S.V., Ozorova, N.A., Laperdina, T.G. and Kubasov, V.L. (2004): Assessment of mercury releases from the Russian Federation. Ministry of Natural Resources of the Russian Federation, Danish Environment Protection agency, Arctic Council. Draft, 2004.
71. Agos, M., Etzel, R., Parrish, R., Paschal, D., Campagna, P., Cohen, D., Kilbourne, E. and Heese, J. (1990): Mercury exposure from interior latex paint, New England Journal of Medicine, 323, 1096-1101.
72. NJ MTF (2002): New Jersey Mercury Task Force Report. Volume III. Sources of Mercury in New Jersey. January 2002. Available at website: http://www.state.nj.us/dep/dsr/Vol3-chapter1.pdf.
73. UNEP (2002): Global Mercury Assessment, UNEP Chemicals, Geneva, Switzerland, December 2002.