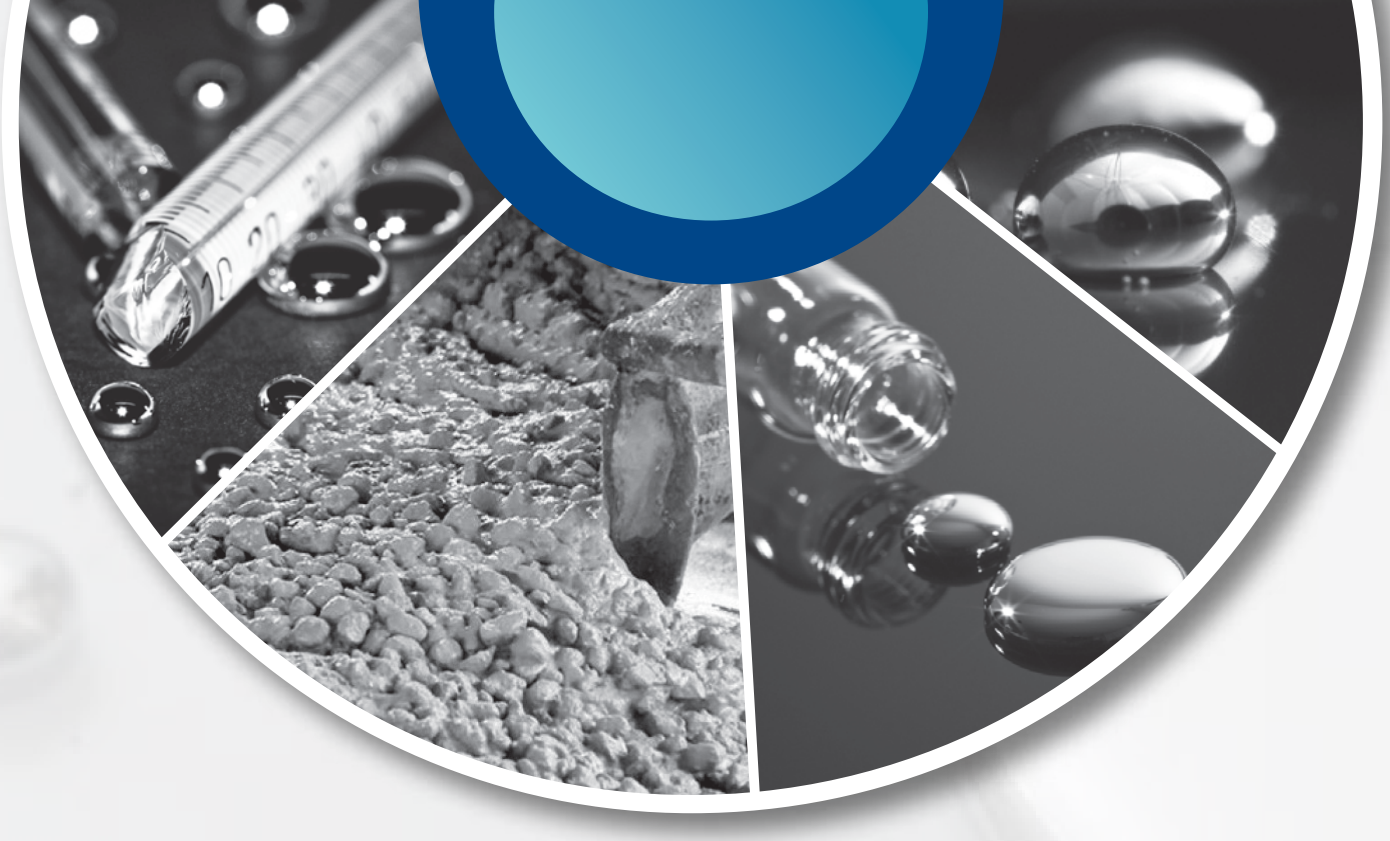

Minamata Initial Assessment

Report

GEORGIA

2017



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2017

საქართველოს გარემოსა
და ბუნებრივი რესურსების
დაცვის სამინისტრო

Empowered lives.
Resilient nations.

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Disclaimer
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Glossary

AA	Association Agreement
ASGM	Artisanal and Small-scale Gold Mining
BAT/BEP	Best Available Technology/Best Environmental Practice
BTC	Baku-Tbilisi-Ceyhan
CSOs	Civil Society Organizations
DCFTA	Deep and Comprehensive Free Trade Agreement
DNA	Designated National Authority
EE	Environmental Expertise
EIA	Environmental Impact Assessment
EIEC	Environmental Information and Education Center
EIP	Environmental Impact Permit
ELV	Emission Limit Value
EMA	Emergency Management Agency
ESM	Environmental Sound Management
EQS	Environmental Quality Standard
EUAA	European Union Association Agreement
EU REACH	European Union Registration, Evaluation, Authorization and Restriction of Chemicals
GEF	Global Environment Facility
Hg	Mercury
HDR	Human Development Report
IED	Industrial Emissions Directive
IPPC	Integrated Pollution Prevention and Control
JOC	Joint Operational Centre
Kg	Killogramme
LPG	Liquefied Petroleum Gas
MAP	Mercury Added Product
MAC	Maximum Allowable Concentration
MC	Minamata Convention
MIA	Mercury Initial Assessment
MoA	Ministry of Agriculture
MoENRP	Ministry of Environment and Natural Resources Protection
MoLHSA	Ministry of Labor, Health and Social Affair
MT	Metric Tone
m3	Cubic metre
NEA	National Environmental Agency
NAP	National Action Plan
NCDC	National Centre for Disease Control
NFA	National Food Agency
NSCRMC	National Security and Crisis Management Council
NRDC	Natural Resources Defense Council
POPs	Persistent Organic Pollutant
PRTR	Pollutants Release and Transfer Register
SAICM	Strategic Approach for International Chemicals Management
SOP	Standard Operating Procedures
SWMCG	Solid Waste Management Company of Georgia
UNDP	United Nations Development Programmme
UNEP	United Nations Environmental Programme
UNIDO	United Nations Industrial Development Organization
VCM	Vinyl Chlorine Monomer

Foreword by Government Official

Mercury is a chemical of concern with negative effects on human health and the environment. The Minamata Convention on Mercury is a global treaty designed to protect human health and the environment from the adverse effects of mercury. The Convention calls for its parties to control the supply and trade of mercury and its compounds.

The Global Environment Facility (GEF) has made funding available for countries that need assistance with early ratification and implementation efforts related to the Minamata Convention. These projects funded by GEF are called Minamata Initial Assessments (MIAs). "MIA projects" aim to strengthen national decision-making towards ratification of the Convention and build national capacity for its successful implementation.

As part of Georgia's efforts to meet provisions of the Convention, the Ministry of Environment and Natural Resources Protection of Georgia, in its capacity as a main policy making agency in environmental field, is responsible for the implementation of MIA project and presents a national partner of UNDP in application of project activities in Georgia.

As part of the MIA project country undertook its first national mercury inventory using newly designed UNEP Toolkit for Identification and Quantification of Mercury Releases – Level 1. The inventory results will help Georgia to build national capacity around issues related to mercury releases, and chemicals management in general.

Besides the inventory activities, assessment of legal/regulatory and policy frameworks and institutional capacity for implementation of the Convention was also conducted. The assessment will help meeting the preconditions of the Convention in these regards.

Based on the major gaps identified during the institutional and legislative analysis and national mercury inventory, the Ministry of Environment and Natural Resources Protection of Georgia will continue working on successful implementation of the Minamata Convention at the national level. These efforts will include improvement of legal framework on management of chemicals and hazardous waste, strengthening institutional and administrative capacities for sound management of chemicals, adoption of Best Available Technology/Best Environmental Practice (BAT/BEP) standards and leading intensive awareness raising and education activities all of which will give Georgia an opportunity to accomplish the primary objective of the Convention - protecting the environment and human health from adverse effects of mercury.

Ekaterine Grigalava
Deputy Minister of Environment and Natural Resources Protection of Georgia

Executive Summary

The report summarizes the results of main outputs of the project "Strengthen national decision making towards ratification of the Minamata Convention and build capacity towards implementation of future provisions" (further referred as MIA Project). It provides the review of inventory results and policy/regulatory and institutional frameworks assessment, as well as the review of potential future interventions that target major sectors responsible for mercury and hazardous waste management in Georgia.

I. Results from the National Mercury Inventory

The national mercury inventory in Georgia was developed using the UN Environment *Toolkit for Identification and Quantification of Mercury Releases*, Level 1 approach. Results from the Level 1 Inventory identified several key sectors that are responsible for emissions and releases of mercury in Georgia.

Total estimated releases of mercury in Georgia were estimated to be 4,200 kg Hg/y in 2014. Primary metal production (including industrial gold mining and pig iron production) was responsible for the highest amount of mercury releases 1,898 kg Hg/y (to all environmental media). The use and disposal of mercury-added products also represents a major source of mercury releases, totally 1,165 kg Hg/y, of switches and thermometers had the highest individual contributions. The production of cement contributed an additional 219 kg Hg/y, while energy consumption including the combustion of coal, oil and biomass contributed 131 kg Hg/y. Mercury releases from the incineration of medical waste and open waste burning is estimated to be 449 kg Hg/y.

Results from the Level 1 inventory provided information on four different output pathways for mercury: 1) emissions to air, 2) direct releases to water, 3) direct releases to land, and 4) others. The 'other' category includes output pathways for by-products, general waste and sector-specific waste treatment. Below is a brief summary of mercury emissions and releases to each of these output pathways, identifying the major sectors responsible for these emissions and releases.

Emissions to air: The estimated mercury emission to air is 1170 kg Hg/y. The primary sector responsible for emissions to air is waste incineration and open waste burning 449 kg/y, use and disposal of mercury added products 254 kg Hg/y, cement production 164.2 kg Hg/y, as well as primary metal production and coal combustion.

Releases to Water: Releases to water totally estimated 240 kg Hg/y. The main sources include waste water system/treatment and the use and disposal of mercury added products, including thermometers, laboratory chemicals, and gauges. Informal dumping, particularly in steep-sloped areas and rural communities where little or no formal waste collection system is present, also represents a significant source of mercury releases to water. Although industrial gold production in Georgia, there is loss of mercury to water that occurs during the crushing, grinding and washing of gold ore.

Releases to Land: Mercury releases to land totally estimated 2140 kg Hg/y. The primary source category is primary metal production, which includes industrial gold mining. The use and disposal of mercury added products totals more than 328.5 kg Hg/y. Informal dumping of waste 323.2 kg/y also represent significant sources of mercury release to land. The total amount of mercury released to land from the burial of individuals with dental amalgam is estimated at 122.7 kg Hg/y. During the inventory, it was determined that dental amalgams are no longer utilized by the vast

majority of dentists in Georgia and it is thought that this output pathway will not be a significant source of mercury releases to land in the near future.

Other: Mercury releases associated with output pathways for by-products, general waste and sector-specific waste totaled 740 kg Hg/y. The primary contributor to this category is the use and disposal of mercury added products, including the disposal of items such as switches and relays, thermometers, polyurethane, and laboratory and medical equipment. It is important to note that many of these values are derived from relatively course estimates that likely represent an overestimation. In addition to mercury-containing products, waste from primary metal production, by-products associated with cement production and waste water are large contributors of mercury to the Other category

II. Policy, regulatory and institutional assessment

While Georgia has signed the Minamata Convention, it was yet to ratify it. The policy, regulatory and institutional assessment identified systemic gaps that may impede the successful implementation of the Convention at a national scale. Regulations, increased institutional capacity, and improved coordination among and between stakeholders will be critical for the successful implementation of the Convention. Some of the primary gaps identified through this component of the MIA include:

- ✔ An improved Mining Code that appropriately prohibits any future primary mercury mining and adequately addresses potential releases of mercury associated with tailings from processed ore.
- ✔ An expansion of Georgia's Waste Code that will help with compliance of phase-out dates and prohibitions under Article 4 and the associated Annex A of the Convention.
- ✔ Anecdotal evidence suggests that Artisanal and Small Scale Gold Mining (ASGM) has been practiced in the recent past. However, the use of mercury in ASGM has not be confirmed or denied during the Level 1 Inventory. Regardless, legislation that brings Georgia into compliance with Article 7 of the Convention is recommended in part because of the proximity of known mercury mines in the Autonomous Republic of Abkhazia and to prohibit any future use of mercury within the ASGM sector in the country.
- ✔ The Environmental Impact Permit and Law on Air Protection should be strengthened to incorporate provisions associated with Best Available Technology/Best Environmental Practice (BAT/BEP) standards that will help the country comply with Article 8 of the Convention.
- ✔ The Law on Water and other associated regulations that address the release of contaminants to water provide an opportunity to strengthen control measures to protect the environment and human health from releases of mercury to streams, rivers, and lakes in Georgia.
- ✔ Georgia's Law on Transboundary Movement of Hazardous Wastes and the Waste Management Code together provide a structure for effective compliance with Articles 10 and 11 of the Convention. However, a lack of organizational and human capacity to monitor the transboundary movement of hazardous wastes and no existing facility for the environmentally sound interim storage of mercury-containing hazardous wastes presents a challenge for the complete implementation of these Articles.
- ✔ The Georgian Law on Product Safety and Free Movement Code should be updated with requirements that deal specifically with mercury. The review of public health information on mercury exposure in Georgians revealed a general lack of information on potential pathways of exposure or vulnerable populations in the country.
- ✔ It was generally accepted by the team of consultants and members of the Steering Committee that there is an overall lack of public awareness about the risks associated with mercury expo-

sure in Georgia. An awareness raising campaign will be an important component of any future ratification and implementation activities.

III. Priority areas for implementation of the Convention

The priority areas for successful implementation of the Minamata Convention on Mercury are derived from the major gaps in information identified during the institutional and legislative gap analysis and national mercury inventory. There exist potential synergies between the Minamata Convention and implementation strategies of other chemicals conventions (e.g., Basel) and it will be beneficial for future implementation efforts to take advantage of the overlapping needs of these conventions in order to enhance coordination of chemicals management efforts within the country. In addition, an effort should be made to identify priority areas that are similar across countries in the region as this will help to improve collaboration on issues such as trade and the transportation of waste and may also open greater opportunities for international funding to assist with these implementation efforts.

Areas of Intervention

In order to better assist the country of Georgia with meeting the overall goal of the Minamata Convention, at least five key areas of intervention have been identified. These include:

1. Strengthening the legal and institutional framework;
2. Developing interim storage and environmental sound management plan for mercury;
3. Capacity building, education and awareness;
4. Adoption of BAT/BEP standards;
5. Research, monitoring and reporting.

Introduction

The Minamata Convention on Mercury, hereafter referred to as the Convention, was adopted by the Conference of Plenipotentiaries on 10 October 2013 in Japan and was opened for signature thereafter. Georgia has signed the treaty, but has not ratified it so far.

The objective of the Convention is to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds into the environment. In order to achieve this objective, the treaty requires/calls for its parties to set and implement a number of regulatory and policy measures to control the supply and trade with mercury and/or its compounds, including certain specific sources of mercury such as primary mining, mercury-added products such as dental amalgams, various measurement equipment, fluorescent bulbs, etc. and, manufacturing processes in which mercury or mercury compounds are used, as well as artisanal and small scale gold mining. In addition, the Convention requires/calls for its parties to control air emissions and water and land releases of mercury and/or its compounds by setting mercury emission limit values for industries such as coal-fired power plants; coal-fired industrial boilers; smelting and roasting processes used in the production of non-ferrous metals; waste incineration facilities; cement clinker production facilities, based on BAT and implementing of emission/releases control measures for existing facilities. It also contains provisions on the environmentally sound interim storage of mercury and on mercury wastes, contaminated sites, public health and information dissemination aspects.

In 2016-2017, in order to enable Georgia to ratify the Convention, UNDP Georgia with a financial support of GEF implemented a project: "Strengthen national decision making towards ratification of the Minamata Convention and build capacity towards implementation of future provisions" (referred to as MIA project). The intervention envisaged achievement of two major outcomes:

1. Establishment of enabling environment for decision-making on the ratification of Minamata Convention;
2. Development of national Mercury Profile and Mercury Initial Assessment Report.

This Minamata Initial Assessment (MIA) for Georgia is a final deliverable of the project that contains general country background, findings of legal-regulatory and institutional gap analysis for mercury management and mercury inventory, initial recommendations for the legal-regulatory and capacity development measures to be implemented for ratification and implementation of Minamata Convention in the country and, mercury-related health and public information aspects. It does not; however, contain an action plan, since this exercise requires mobilization of significant level of efforts and resources, including financial resources and extensive stakeholder consultations that might be a lengthy process requiring consistent approach. Thus, this action can be considered as a follow-up for the enabling activity.

The report has been developed with contribution of following experts:
1. Mr. David Buck, international technical advisor;
2. Ms. Mariam Shotadze, national legal-institutional expert;
3. Mr. Ralf Juelich, international legal expert;
4. Ms. Khatuna Gogaladze, national expert;
5. Mr. Irakli Kobulia, national expert on rapid mercury assessment;
6. Ms. Khatuna Chikviladze, mercury inventory team leader;
7. Mr. Tamaz Budagashvili, national mercury inventory expert;
8. Mr. Nugzar Buachidze, national mercury inventory expert;
9. Ms. Nia Giuashvili, health expert;
10. Ms. Maia Barkaia, gender expert.

At the initial stage of the project, a Project Steering Committee was established composed of representatives of the Ministry of Environment and Natural Resources Management (MoENRP) and its specialized agencies – National Environmental Agency (NEA) and Environmental Information and Education Centre (EIEC), Customs Department of Revenue Service of Georgia, Ministry of Finance, Technical and Construction Supervision Agency of the Ministry of Sustainable Economic Development, Ministry of Energy, Ministry of Agriculture and Its National Food Agency, Ministry of Health and Its National Center for Disease Control (NCDC), Tbilisi State University, Tbilisi Technical University, Institute of Organic Chemistry and a number of NGOs, including Greens Movement of Georgia, Energy Efficiency Centre, the Center for Strategic Research and Development, etc. This large group of mid to technical level decision makers and, academic and civil society sector representatives participated in discussions of results/findings under each major milestone of the project, including legal-regulatory and institutional gap analysis, initial mercury inventory, development of legal and institutional recommendations for enabling the country to implement the Convention and, provided their feedback on the produced technical reports (Please see Annex I for the list of stakeholders/the members of Steering Committee). It is supposed that this consultative body will be maintained after the Ratification of the Convention and its implementation for better interagency coordination, stakeholder participation and provision of technical advice to key decision-makers.

For the development of various substantive parts of MIA, the experts' team carried out:

1. desk review and gap analysis of all national laws, sub-laws, technical guidance/methodologies and policy documents regulating hazardous chemicals and waste management and mercury lifecycle management;
2. comparative analysis of provisions of Minamata Convention and national legislation and policies;
3. survey of key stakeholders, their current capacities and capacity needs based on questionnaires and vis-à-vis semi-structured interviews;
4. survey of key data sources and data needs;
5. mercury inventory, applying UN Environment's Toolkit's Level 1 inventory approach and using input data acquired from State Statistical Service of Georgia, various Ministries and specialized agencies, industries, dental clinics, etc.;
6. desk review of existing literature on health impacts of mercury exposure.

Chapter I:
National Background Information

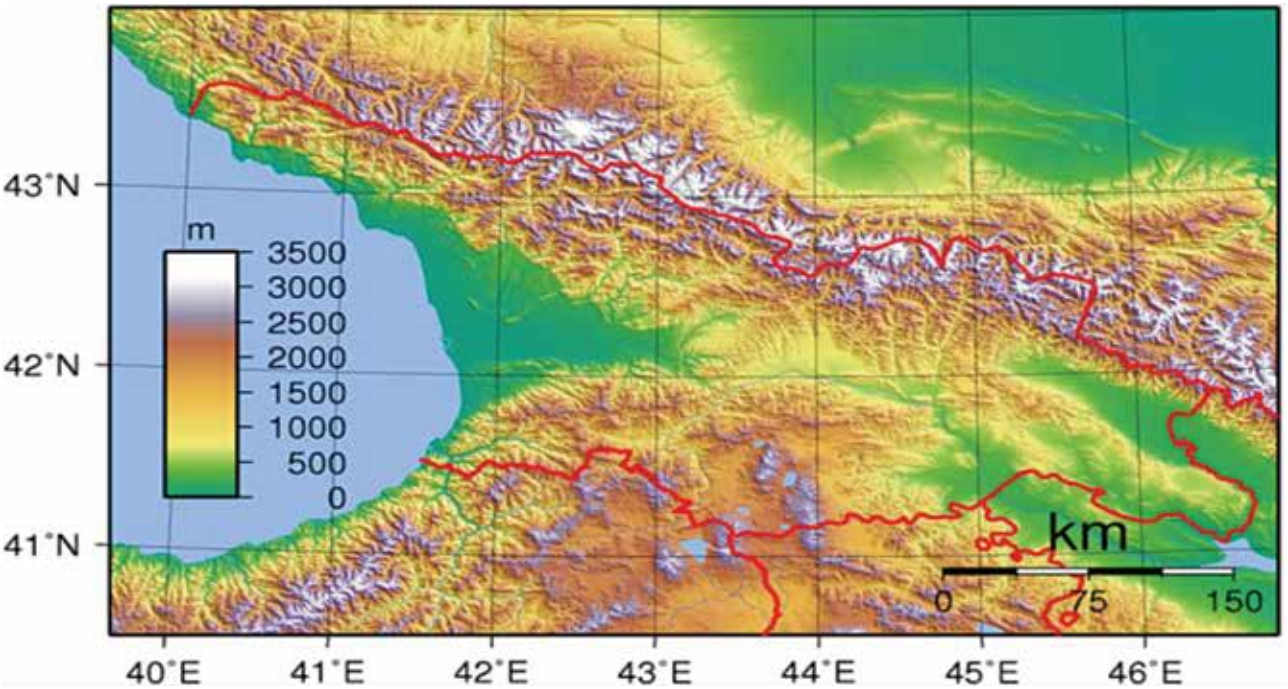
1.1. Country profile

1.1.1 Geography and natural resources

Location, topography: Georgia is located in the South Caucasus region, stretching between the Black sea to the west, the Greater Caucasus Mountains to the north, and the Lesser Caucasus Mountains to the south. Total territory of the country makes up 69,700 km2, of which 80% is mountainous area. Neighbouring countries are: Russian Federation from north, Azerbaijan from east and southeast, Turkey from south and Armenia from southwest. The west edge of the country is 310-km long Black Sea coastline. Likhi Range divides the country into East and West Georgia.

Georgia has complex terrain and diverse landscapes including: eternal snow cover and glaciers, high middle to lower mountains and forests, alpine and sub-alpine meadows, plains, marsh-forests, swamps and temperate rainforests, floodplain valleys and forests, light (savannah type) forests, steppes and semi-deserts.

Figure 1. Topography of Georgia



Climate and natural environment: Georgia's diverse climate is formed as a result of interaction of various factors, including complex terrain and regional circulation of air masses. The Greater Caucasus blocks intrusion of north cold air masses, while the Lesser Caucasus partially protects the country from the influence of dry and hot air masses from the south. The weather is influenced by both dry Caspian air masses from the east and humid Black Sea air masses from the west. Circulation of these air masses largely determines the precipitation regime on the whole territory. The Likhi Range defines peculiarities of climatic regimes in East and West Georgia. Western Georgia

is largely located in the northern periphery of the humid subtropical zone, with annual precipitation ranging from 1,000 to 4,000 mm. In low to middle-mountain regions the climate varies from humid sub-tropical to alpine. At some places (high mountains) humid-subtropical climate zone abruptly changes to permafrost. Eastern Georgia is characterized by the climate transitional between humid subtropical and continental and has considerably lower annual precipitation, ranging from 400 to 1,600 mm.

Georgia is rich in fresh water and forest resources and, is distinguished with wide variety of species. The country's per capita renewable water resource is 14,406.3 m^3, which is almost 35% higher than that of Europe's and almost 75% higher than that of World's per capita figure. There are more than 26 thousand streams and rivers in the country, with smaller mountainous streams making-up the absolute majority of the hydrographic network. All rivers in West Georgia belong to the Black Sea Basin and those in East Georgia – to the Caspian Sea Basin. Total volume of fresh ground water is estimated at 24 million cubic meters. Georgia also has more than 800 fresh water lakes and substantial mineral water resources, with an estimated 2,300 springs. Over 600 glaciers are currently registered on the territory of the country. Forests occupy 2,772,400 ha in Georgia, making up 39.9 per cent of the country's whole territory. Total forest stock is estimated at 451.7 million m^3. Average growing stock per hectare is 167 m3 significantly higher than the average value of Europe (107 m^3) and the world (110 m^3). More than 28,900 plant and animal species are recorded in the country, with 2,745 algal species, more than 8,000 fungi and lichens, 4,100 vascular plants and about 14,100 animal species. About 7.35% (512,123,170 ha) of Georgia's territory is covered by Protected Areas, with 75% of forests. There are 14 nature reserves, 9 national parks, 18 managed resources, 21 natural monuments, 2 protected landscapes and 1 multiple use areas in Georgia.

Georgia has limited land resources, with 65-70% of the country's territory covered with soils poor in nutrients. Only 43.5% of the total land is occupied by cultivated areas, of which 35% are arable lands and perennial plantations and the rest – pastures and hayfields. Many pastures represent high-mountain, sub-alpine and alpine meadows. Over 60% of arable lands are situated at elevations greater than 500 m ASL, with some of them located at elevations greater than 1,500 m ASL. Around 22% of agriculture lands represent less productive, saline, acid and boggy soils.

1.1.2 Population

In accordance with official statistics data, by 1 January 2017 total population size of Georgia was around 3.72 million, with approx. 2.13 million (57%) urban population and 1.59 million (43%) rural population. Tbilisi is a capital of the country with 1.115 million inhabitants making up around 30% of the country's total population. Below table 1 contains major demographic statistics for 2016[1].

Table 1. Key selected demographic indicators for Georgia (2016)

Birth rate (per thousand population)	15.2
Mortality rate (per thousand population)	13.7
Infant mortality rate (per thousand live births)	9
Natural increase rate (per thousand population)	1.6
Stillbirth rate	12.7
Marriage rate (per thousand population)	6.7
Divorce rate (per thousand population)	2.6

1. National Statistics Office of Georgia (Geostat): www.geostat.ge/index.php?action=page&p_id=152&lang=eng

1.1.3 Political and institutional profile

Georgia is a democratic semi-presidential country with a publicly elected president as the head of state and appointed Prime Minister as the head of the government. The executive branch of the power is made up of the president and the cabinet of Ministers of Georgia, composed of ministers and headed by the prime minister. The legislative branch is represented by the parliament of Georgia and the judicial branch includes the Supreme, Constitutional, District and Municipal courts.

There are 150 members of parliament of Georgia, of which 77 are party representatives elected through proportional system, and 73 are majoritarian representatives elected through a single-member district plurality system. Members of the parliament are elected for 4 year term while president is elected for 5 years. Currently, the constitutional reform is ongoing, by which the President won't be elected by public vote, but by members of the parliament or 300 nominated delegates.

The central government is composed of the following Ministries:
1. Ministry of Finance of Georgia;
2. Ministry of Energy of Georgia;
3. Ministry of Science and Education of Georgia;
4. Ministry of Labour, Health and Social Affair;
5. Ministry of Foreign Affairs;
6. Ministry of Justice of Georgia;
7. Ministry of Internal Affairs of Georgia;
8. Ministry of Internally Displaced Persons from the Occupied Territories, Accommodation and Refugees of Georgia;
9. Ministry of Regional Development and Infrastructure of Georgia;
10. Ministry of Agriculture of Georgia;
11. Ministry of Environment and Natural Resources Protection of Georgia;
12. Ministry of Corrections of Georgia;
13. Ministry of Sports and Youth Affairs of Georgia.

There is also one State Minister of Georgia on European and Euro-Atlantic Integration without a defined portfolio. The Minister is served by its administrative office.

At the regional and municipal level, the country is divided into:
1. Nine administrative regions with regional governors appointed by the President, having only regional coordination functions;
2. Two Autonomous Republics: Ajara and Abkhazia, with heads of the government and publicly elected Supreme Council of the Republics;
3. 64 municipalities with publicly elected local councils and appointed municipal governors;
4. 11 self-governing cities, including Tbilisi.

There are two breakaway regions: Abkhazia and South Ossetia in Georgia, over which the Georgian Government has no control and which are occupied by the Russian Federation. Below on figure 2 is given the administrative map of Georgia.

Figure 2. Administrative map of Georgia



Georgia has strong aspiration towards Euro-Atlantic integration. EU-Georgia relations date back to 1992, following the break-up of the Soviet Union and declaration of Georgia's independence. In June 2014, the EU and Georgia signed an Association Agreement, which includes membership in the Deep and Comprehensive Free Trade Area (AA/DCFTA). The agreement significantly deepens Georgia's political and economic ties with the EU and facilitates the political association and economic integration.

1.1.4 Economic profile

1.1.4.1 General description of the economic sectors

Since the break-up of the Soviet Union, Georgia has been transforming from a country with a centrally planned economy to one with a free market economy. Before 2003, it was considered a "failed state". Since the 2003 "Rose Revolution" the country has been carrying out large-scale socio-economic and governance reforms as a result of which it has become a "low to middle income" country, with high Human Development Report (HDR) index (0.769)[2], ranking 16th among 190 world economies by "Doing Business" in 2017[3] and 44th among 127 countries by "Corruption Perception Index[4]" in 2016 (as compared to 127th in 2003[5]), best indicator among CIS (Common-wealth of Independent States). Below in table 2 are given Georgia's major development indicators.

2. Human Development Report 2016, UNDP: www. hdr.undp.org/sites/default/files/2016_human_development_report.pdf
3. Doing Business, Data of Georgia, The World Bank: www.doingbusiness.org/data/exploreeconomies/georgia
4. Corruption Perception Index 2016, Transparency International: www.transparency.org/news/feature/corruption_perceptions_index_2016
5. Corruption Perception Index 2003, Transparency International: www.transparency.org/policy_research/surveys_indices/cpi/2003

Table 2. Key development indicators for Georgia (2015)[6]

Population, total, million	3.7
- Urban	2.1 (57%)
- Rural	1.6 (43%)
- Male	1.8 (49%)
- Female	1.9 (51%)
Natural increase, per 1000 population	2.7
Life Expectancy at birth, years	73
Enrollment in general education, thousand people	554
Enrollment in higher education, thousand people	139
GDP, current US$ billion	14
GDP per capita, current US$	3,759
GDP real growth, %	2.8
Foreign Direct Investment (FDI), million US$	1,565
GINI index	
- by total income	0.42
- by total expenditure	0.45
Share of population under poverty threshold (Registered Poverty) (%)	10.1
Poverty rate ($5/day 2005 PPP terms)	69.3
Average share of population under 60 percent of the median consumption (%)	18
- Urban	15
- Rural	20
Share of population under 60 percent of the median consumption (%)	8
- Urban	5
- Rural	10
Active population (labour force), thousand persons	2,021
- Urban	865 (43%)
- Rural	1,156 (57%)
- Male (aged 15 and older)	1,085 (54%)
- Female (aged 15 and older)	937 (46%)
Employed active population, thousand persons	1,780
- Urban	679 (38%)
- Rural	1,101 (62%)
- Male	939 (53%)
- Female	481 (47%)
Unemployed, thousand persons	242
- Urban	186 (77%)
- Rural	56 (23%)

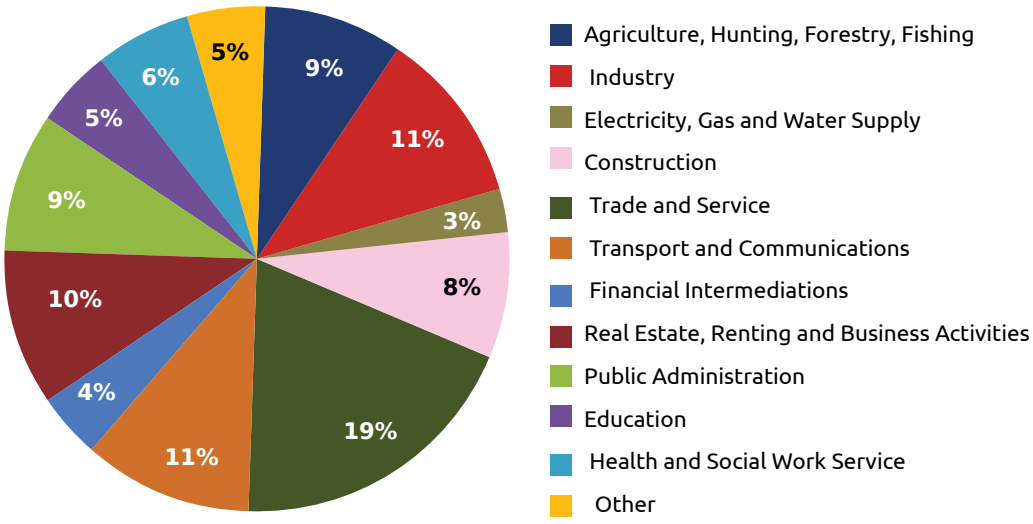
6. i) Country Context Georgia, The World Bank: www.worldbank.org/en/country/georgia/overview ii) Demographic Situation in Georgia 2015, National Statistics Office of Georgia (Geostat): www.geostat.ge/cms/site_images/_files/georgian/population/Demografiuli%20Vitareba%20SaqartveloSi%20Krebuli%202016.pdf

- Male	146 (60%)
- Female	96 (40%)
Unemployment rate, %	12
- Urban	22
- Rural	5
- Male	14
- Female	10
Average monthly income, total million Lari	1,040
- Urban	581 (56%)
- Rural	459 (44%)
Average monthly income per household, Lari	1,023
- Urban	1,142
- Rural	902
Average monthly income per capita, Lari	285
- Urban	325
- Rural	246
Subsistence minimum per average household, Lari	270

By 1 January 2017, GDP per capita in current prices was US$ 3,852.5 and real GDP growth rate -2.7%, by March 2017 annual inflation was 5.4% and, as of 1 January 2016, annual unemployment rate was 12%.

Major economic sectors of Georgia contributing the highest share to total GDP are trade and services (19%), industry (11%), transport and communications (11%), real estate, renting and business activities (10%), agriculture, including hunting, forestry and fisheries (9%) and construction (8%).

Figure 3. Contribution of various sectors to total GDP, in current prices, million GEL (2015)[7]

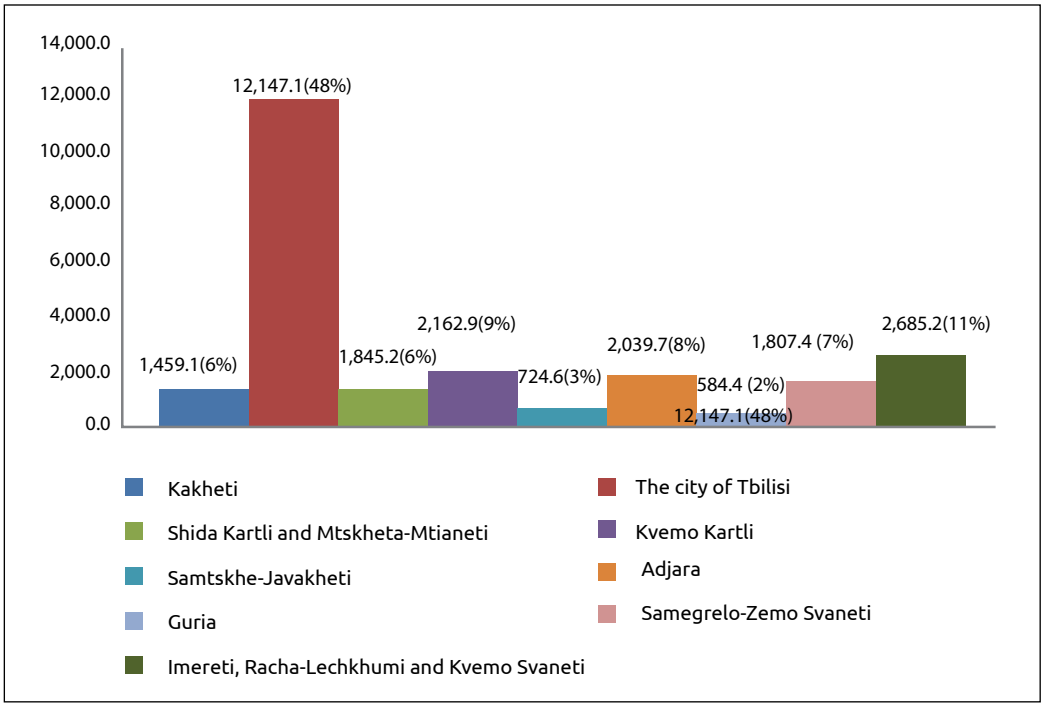


7. Gross Domestic Product of Georgia in 2015, National Statistics Office of Georgia (Geostat): www.geostat.ge/cms/site_images/_files/english/nad/pres-relizi_2015_ENG.pdf

Although 43% of entire population lives in rural areas, agriculture's share of total GDP is only 9.3% (2016), in part because the agricultural sector consists primarily of low-input and output small farm holdings and subsistence type of agriculture across the country. It is a slow growing sector, with almost zero real GDP growth rate in 2016 and 1.04% average annual real GDP growth rate during 2011-2016.

The fastest growing sector is mining (21% annual GDP growth rate, 2016), followed by construction businesses (15.2% annual GDP growth rate, 2016), financial intermediaries (9.4% annual GDP growth rate, 2016), hotels and restaurants (7.4% annual GDP growth rate, 2016) and real estate and renting (6.9%). The absolute majority of these activities are concentrated in urban areas predominantly, in Tbilisi and few larger cities (e.g. Batumi, Kutaisi). Tbilisi's share of total GDP is 48%, followed by Imereti (11%), Kvemo Kartli (9%), Ajara (8%) and Samegrelo-Zemo Svaneti (7%).

Figure 4. Regional distribution of total GDP, basic prices, million GEL (2015)



Major industries are manganese, copper, gold and coal mining and processing, production of construction materials, food and beverage production, wood processing, crude oil and oil products storage and trans-shipment, fertilizer production. The country imports nearly all its needed supplies of natural gas and oil products. It has sizeable hydropower capacity that now provides most of its electricity needs. There is also a significant electricity export potential to neighbouring countries and Europe and, the state has been implementing several large-scale investment projects in this direction. Two thermoelectric power plants located in the city of Gardabani also produce electricity. BTC (Baku-Tbilisi-Ceyhan) and Supsa oil and gas pipelines pass through the country.

Although the agricultural sector represents a relatively small proportion of the country's GDP, agriculture still plays an important role in the social and economic development of Georgia as a dominant source of financial and non-financial income for rural population. Major activities are cultivation of corn, grapes, citrus, stone fruits, hazelnuts and, livestock breeding. Apiculture is also an important economic activity particularly, for rural population living in mountain areas. According to official statistics, 55.6% of workforce is employed in the agriculture sector out of which 83% are self-employed earning very low incomes or no incomes at all. There are two types of farmers: the small scale or subsistence farmers that make up the overwhelming majority and market orient-

ed investor-driven farming. Currently, with EU and the World Bank financial assistance the state makes efforts to consolidate fragmented farmlands and create farmers' cooperatives. While large farmers have sufficient resources and expertise and ability to protect themselves from the various risks, including climate-induced risks, subsistence farmers due to limited knowledge and abilities are more vulnerable to natural disasters particularly, those living in remote mountainous areas.

1.1.4.2 Economic activities/source categories making mercury input-outputs to society in Georgia

In accordance with UNEP Level 1 mercury inventory toolkit economic activities that make mercury inputs to the society include intentional use of mercury in products such as thermometers, materials containing mercury in trace concentrations. Georgian mercury inventory results indicate on the presence of following source categories/economic activities that are contributors to mercury input-outputs (releases): i) energy consumption; ii) fuel production; iii) primary metal production; iv) other material production; v) use and disposal of products with mercury products; vi) waste incineration; vii) waste deposition/landfilling and waste water treatment and; viii) crematoria and cemeteries.

Of this, the greatest contributors are:

- ✔ ***Primary metal production*** - industrial gold and pig iron production;
- ✔ ***Use and disposal of mercury containing product*** - includes thermometers, electrical switchers and relays, light sources and batteries, polyurethane with mercury catalyst and paint with mercury, medical blood pressure gauges, other manometers and gauges with mercury, lab. chemicals;
- ✔ ***Other materials production*** - cement production;
- ✔ ***Crematoria and cemeteries*** - cemeteries;
- ✔ ***Coal combustion and other coal use.***

It must be noted that significant mercury inputs-outputs are also associated with waste deposition, informal dumping of general wastes and wastewater discharge/treatment.

1.1.4.3 Description of individual source categories contributing to mercury balance in the country

Energy consumption: In Georgia, there are no coal-based large power plants with thermal boiler effect above 300 MW. Furthermore, there are no small or medium size power plants with thermal boiler effect less than 300 MW, using coke as the fuel source in the country. Raw or pre-cleaned natural gas is not used, as Georgia doesn't produce natural gas. However natural gas prospecting works undergoing in the country. Georgia does not produce coal; for the industrial purpose country imports it. Private and public sector, also households use very small amount of coal. According to the data from the Energy Balance of Georgia (2014) anthracite, bituminous coal, lignite and furnace coke are used.

Petroleum products are intended mostly for the sectors of transport, industry and to a minor level, households, commercial sector and agriculture. Liquefied Petroleum Gas (LPG) is used mainly for cooking and water heating and to a lesser extent, as fuel for vehicles.

Almost all urban areas and many villages in Georgia are supplied with piped gas, imported from Azerbaijan. Main users of this fuel are thermal power plants and households and at a lesser extent, industry, transport, commercial and agriculture sectors.

Firewood remains main source of heat production in the regions of Georgia especially, in high mountain part of the country. There are some amounts of other biomass material (briquettes, herbal wastes) used in the country. Average annual consumption of the firewood is 2,543,200 m^3. According to the data from the National statistical service of Georgia the country has 8 small charcoal production enterprises, from which currently only 4 are operated.

Fuel production: In Georgia, there is currently no oil refining or extraction and processing of natural gas.

Concerning crude oil production, this economic activity in Georgia has been ongoing since 1920s. Until the seventies of the last century, extraction works were carried out on seven small fields (Mirzaani, Patara Shiraqi, Supsa, Norio, Satskhenisi, Taribana and East Chaladidi) and average annual production made up about 20-55 thousand tons. Later on, several prolific oil fields were discovered near Tbilisi (Samgori-Patarzeuli-Ninoitsminda, Samgoti South Dome, and Teleti) and the annual production exceeded 3 million tons. At present, the territory is divided into license blocks, where several investment companies, selected through international tenders carry out extraction works in Georgia, among them are: Blake Oil and Gas, Jindal Petroleum (Georgia) Limited, Frontera Resource Georgia, Georgian Oil and Gas and VP Georgia. Seven other companies - Strait Oil and Gas, Elenito, International Oil Consortium, Marexin, Strait Adjara, Trans-Atlantic and Georgian Oil Consortium are conducting only exploration works. Cumulative oil production in Georgia amounts to 27.7 million tons to date.[8] Over the last decade the annual production averaged 70,500 tons. In accordance with energy balance of Georgia, in recent years average annual extraction is around 47,000-48,000 t/y crude oil (2013 data).

Domestic production of metals and raw materials: In Georgia, large-scale copper and multi-metal extraction and processing is carried out by "Madneuli" mine and enrichment plant. Ore extraction is conducted through open pit mining method using rock drilling and explosion methods. Currently, the facility processes only copper ore every day, round-the-clock. Designed capacity of the plant is 1,360 thousand tons of ore processing. Thus, the copper concentrate is produced. The concentrate is fed to the bunker where it is sorted and packed, loaded to railway wagons and transported. Production of copper from concentrates is not carried out in Georgia.

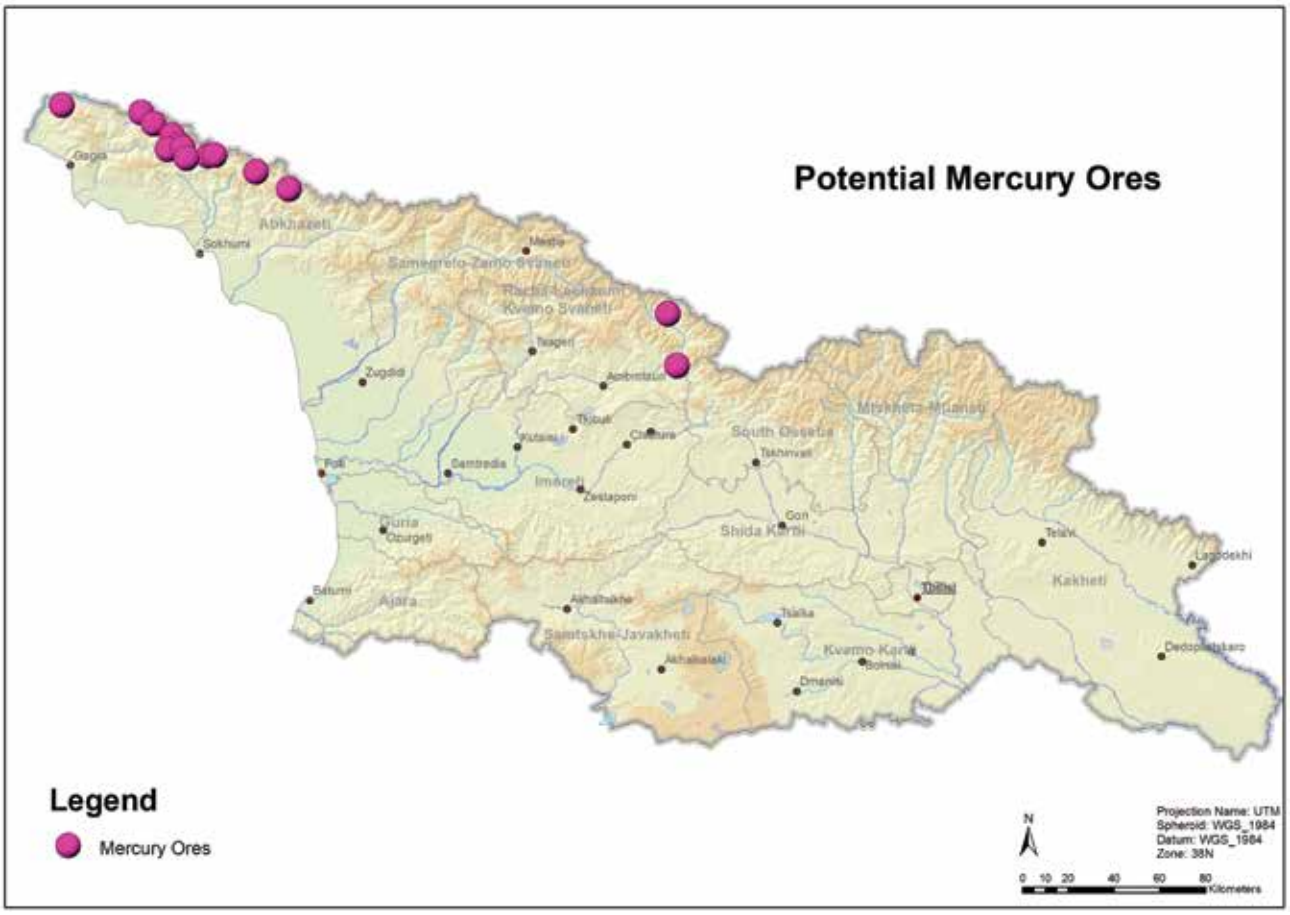
There are a number of mercury, copper and zinc deposits in two break away regions of Georgia that were exploited during Soviet period. These are Kvaisa copper and zinc mines located in South Ossetia, Jejora River watershed close to Racha region and several mercury deposits and mines in Abkhazia. Current information on the condition of mines, accumulated wastes and environment there is unavailable. Nevertheless, there is some information on the reserves from the past geological surveys. Below is given the summary table of potential and proven mercury deposits.

8. Georgian Oil and Gas Corporation: www.gogc.ge/en/oil-production

Table 3. Non-ferrous metal ore deposits of breakaway regions of Georgia

Ore	Municipality	Region
Akhakhcha	Gagra	Autonomous Republic of Abkhazia
Avadhara	Gudauta	Autonomous Republic of Abkhazia
Anchkho	Sokhumi	Autonomous Republic of Abkhazia
Aguristpa	Sokhumi	Autonomous Republic of Abkhazia
Patara Ahei (Small Ahei)	Sokhumi	Autonomous Republic of Abkhazia
Sanchari	Sokhumi	Autonomous Republic of Abkhazia
Rikza	Sokhumi	Autonomous Republic of Abkhazia
Ahei	Sokhumi	Autonomous Republic of Abkhazia
Gribza	Sokhumi	Autonomous Republic of Abkhazia
Bitaga	Sokhumi	Autonomous Republic of Abkhazia
Gvashtkhva	Sokhumi	Autonomous Republic of Abkhazia
Adange	Sokhumi	Autonomous Republic of Abkhazia
Sipistavi	Gulripshi	Autonomous Republic of Abkhazia
Gomi	Oni	Racha-Lechkumi and Kvemo Svaneti
Kodidziri	Oni	Racha-Lechkumi and Kvemo Svaneti

Figure 5. Mercury ores in Georgia[9]



9. Map was prepared in the scope of UNDP/GEF project "Strengthen national decision making towards ratification of the Minamata Convention and build capacity towards implementation of future provisions" based on available data and information

In summary, according to the data from the National Statistical Office there is no domestic production of primary mercury, zinc from concentrates, lead from concentrates and aluminum from bauxite, which might directly or indirectly lead to releases of mercury in Georgia.

Concerning gold production, there is no gold extraction with mercury amalgamation - without and with use of retorts too. The only plant is operated is "RMG Gold". It produces gold from gold bearing quartzite through cyanide leaching method that envisages gold recovery through pouring the liquid to the ore pile. According to the data from the Minerals Yearbook of U.S. Department of the Interior, U.S. Geological Survey (2013, The Mineral Industry of Georgia, By Elena Safirova pg. 17) about 4.3 t/y gold is produced.

About to production of ferrous metals, there is one large-scale primary ferrous metal production (pig iron production) plant located in Zestaphoni town, West Georgia and round 32 small enterprises, of which only 12 are operated. Major product of Ferroalloy plant is silicomanganese, which is produced from manganese. According to the data obtained from industries, Ferroalloy plant produced 191,748 tons of silicomanganese in 2014. Furthermore, in total 84,940 tons of silicon manganese was produced by the small enterprises.

At present, secondary metal production from recycled materials (metal scrap) is taking place in Georgia by company "GeoSteel". According to the interview carried out with plant representative, it produces 175,000 tons of pig iron. Taking into consideration above mentioned circumstance- pig iron quantity produced by "GeoSteel" was added to the produced amount of primary ferrous metal. In total, in 2014 all existing enterprises produced about 451,688 t/y.

Furthermore, import records do not show any significant amounts of elemental Mercury being imported.

Other materials production: In Georgia, cement is produced by several large plants and a number of smaller enterprises. Out of 52 registered small-scale cement production facilities only 23 are operational. Heidelberg Cement Georgia (former Saqcementi) was founded in 2004, becoming a member of Heidelberg Cement group in February 2007. At present, Heidelberg Cement Georgia operates two cement plants in Kaspi and Rustavi, one cement mill in Poti and a cement terminal in Supsa. The company's total production capacity reaches up to 2 million tons of cement and 1.4 million tons of clinker per year. An integrated dry cement plant in Rustavi city, Kartuli Cementi, was put into exploitation in January 2008, with overall clinker capacity of 0.4 million tons per year. Today, the production capacity reaches up to 1 million ton of clinker per year.[10]

Currently, in Georgia all big and small cement producer enterprises are equipped with bag filters against the emission of particles given off cement cilns and none of them used/ing waste materials as a fuel. Based on 2014 data, obtained during mercury inventory process through interviews and survey of cement plans, total of 4.116 million t/y of cement is produced annually in the country.

With respect to pulp and paper production, only paper recycling is carried out in the country. There are 11 registered recycling companies in the country, but operations cycle of these facilities is intermittent and temporary suspension of activities occurs there. For instance, only one of them was operated in 2014 and the amount of produced paper equals 3,400 t/y.

10. HeidelbergCement Georgia webpage: www.heidelbergcement.ge/en/plants-and-companies

Domestic production and processing with intentional mercury use: According to the data from National Statistics Service of Georgia there is no domestic production of chemicals: Acetaldehyde and Vinyl Chloride Monomer (VCM) with Mercury catalyst. Chlor-alkali production with Mercury cells in Georgia does not exist either.

In Georgia production of products with Mercury content (such as thermometers with Mercury, light sources with Mercury, Manometers/gauges with Mercury, biocides & pesticides with Mercury, batteries with Mercury, paints with Mercury or skin lightening creams and soaps with Mercury) is not in place.

Concerning production of recycled metals, the only secondary steel mill in Georgia is the "Geosteel", which processes scrap steel, but there is no data about number of vehicles in the scrap.

Waste handling and recycling: According to the national Waste Management Strategy of Georgia (2016) there is no full coverage of municipal waste collection across the country. It is estimated that 800,000 tons of the total amount of municipal waste is collected today in Georgia. Currently waste collection services are offered mainly in the cities, most of villages are out of service and population is dumping generated wastes in open space, mainly near river valleys. According to Waste Management Code Municipal waste collection and transportation is the responsibility of the municipalities.

Waste separation and recycling does not widely take place in Georgia. Only limited types, e.g. scrap, paper, tires, etc. and amounts of wastes are recycled. Concerning recycling of mercury, it does not take place in Georgia. Moreover, incinerator of municipal/general waste and sewage sludge does not occur in the country, together with incineration of waste for recovery of energy.

The medical waste management is regulated and controlled by the Ministry of Labour, Health and Social Affairs together with the MoENRP. Responsibility for safely management of medical wastes within its premises rests upon the medical institutions. Most of them have contractual agreement with a medical waste operator; taking into consideration above mentioned situation, it can be predicted that some portion of healthcare waste is still disposed at landfills without any pre-treatment mixed with municipal waste. This particularly could be true for rural and small town medical facilities /ambulatories. Currently the capacity of medical waste incinerators is not sufficient. Currently, there are 12 registered medical waste incineration facilities, of which only 6 are operational. According to inventory data, in 2014 total of 1,876 tons /year of medical waste was treated mostly through incineration. As the Mercury emissions resulting from incineration and open burning are heavily influenced by the Mercury content of the waste being incinerated / burned, it is unclear at this stage of the inventory how many Mercury containing medical devices are discarded each year. However, whether these are incinerated along with the infectious waste streams or disposed of separately has a major impact on the release of mercury emissions to flue gas and incinerator ashes.

In Georgia, all types of waste are disposed on the landfills or dumpsites. Municipal/general waste, which is not being collected, is most likely informally dumped or burned in open. As of 2014, there are only four landfills (one private and three public) in Georgia having Environmental Impacts Permit. In general, nearly every rural settlement has one or even more - in principal illegal – dumpsites. Several impose serious impacts to the environment and the surrounding communities. Totally more than 56 official landfills and hundreds of illegal dumpsites (small not official landfills) are recorded in the country. There are no landfills for hazardous or special wastes e.g. construction waste and only few landfills have separate cells for special waste, like asbestos waste. A number of major steps have been taken by the responsible agencies to address the challenge. Among other,

100% State owned a LEPL "Solid Waste Management Company of Georgia" (SWMCG) have been established in 2012-under the Ministry of Regional Development and Infrastructure, to manage solid household waste landfills (53) throughout the country (except City of Tbilisi and Autonomous Republic of Ajara). SWMCG takes steps to improve the state of the old landfills and construct new modern landfills. As of today, the Company has rehabilitated 30 landfills. Other actions are taken to construct new sanitary landfills in Kvemo Kartli, Imereti, Samegrelo-Zemo Svaneti and Kakheti regions.

The centralized sewerage systems operate only in 45 towns of Georgia. Most of them were constructed in the 1980s. Due to the systematic violation of the operation rules of these systems, most of them do not meet technical standards. In addition, only 33 towns have the communal wastewater treatment plants with the total designed capacity of 1,640.2 thousand m3/day. Most of them are also outdated. From these, only 26 towns have the biological treatment facilities. But most of them are also out dated and inactive.

The mechanical cleaning phase operates only in Tbilisi-Rustavi (Gardabani), Kutaisi, Tkibuli, Gori and Batumi treatment facilities. In addition to the mechanical treatment, wastewater collected from Batumi and Sachkhere is also treated biologically. The construction of the new treatment facility is currently on-going in Mestia and the construction of the treatment facilities is planned in Anaklia and Ureki.

General consumption of mercury in products as metal mercury and as mercury containing substances: In accordance with the results of Mercury inventory, dental amalgams are no more in use by dental clinics and there are not imported in the country.

Information of the number of electrical switches and relays with mercury is missing and only indirect calculation can be made based on the number of population and access to electricity in Georgia.

Information on polyurethane produced with mercury catalyst is also missing therefore; rough calculation/estimate on this product can be made based on UNEP mercury inventory tier 1 approach

Thermometers containing mercury are not identified by the Customs Service of Georgia. Consequently, the amount of mercury thermometers imported the country is unknown. One of the major pharmacies in Georgia, PSP's pharmacy sells 400-420 years thermometers, among them is 357 (85%) mercury thermometer. in the country there are 183 PSP pharmacy shops (1/4 of country's market). Therefore, the approximate number of sold mercury thermometers per year is 261,324.

Laboratory thermometers are sold only by several shops, including: "Samaya" and "Reagents Store". Both shops within a year are selling 180 units a laboratory mercury thermometer

Concerning electronic products, which may contain mercury, in accordance with National Customs Department of Georgia, annual imports of such products are insignificant (only few units).

Concerning mercury containing light bulbs, in accordance with the National Customs Department, the country imports every year several thousands of mercury lamps, but last year this amount decreased. The total amount of imported mercury lamps was 5,287 units in 2013.

A number of small enterpises operate in Georgia that produce paints. Several enterpises improt paints. Based on the invetnory results, non of the interviewed (33) enterpises produce/import paints with mercury content.

There are up to 20 small-size enterpises in Georgia producing skin care products, including creams and soaps. None of these companies produce producs that contain mercury or use mercury at any stage of production.

Mercury inventory results indicate that there is no institution responsible for registering or collecting/monitoring Laboratory chemicals with mercury. It can be assumed, that there are quite number of laboratories have outdated chemicals as they used chemicals with mercury for research purpose in previous years. Thus, data about Laboratory chemicals and Laboratory chemicals equipment with mercury from the existing chemical laboratories in the country is unknown.

Crematoria and cemeteries: In Georgia, there is no cremation in practice. Therefore, here are no crematoriums in the country. As for cemeteries, the number of deaths registered in 2014 was at 490,000 with an increase of approximately 1.1% as compared to 2013 (Geostat, 2014).

1.1.5 Environmental management system

Georgian constitution is an overarching legal document that defines the right to healthy environment as one of the fundamental rights for the citizens of Georgia. Stipulated from the constitution, there is an Environmental Protection Law (1996) that establishes a general framework, including goals, objectives, principles and requirements for environmental management in the country. Environmental media-specific Laws on Air Protection, Water Resources Management and Wastes stem from this law.

Concerning the national legislation on hazardous chemicals and waste management, there is no single law setting a comprehensive system for chemicals registration, evaluation, testing and authorization/admission to the national market. Georgia has developed a system for the management of agrichemicals and pesticides that reflects the European Union's Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) and this provides a model for future, broader chemicals management including Hg. This recommendation is included in the Chemicals Profile of Georgia that was developed in 2009 under the Strategic Approach to International Chemicals Management (SAICM) enabling activities. To-date, no visible steps have been made towards establishing unified chemicals registration, evaluation, testing and authorization system in the country consistent with EU REACH.

Thus, in Georgia various national laws, sub-laws and international treaties regulating various aspects of a chemical's life-cycle define the legal regime for a chemical's production, transportation, use, export-import, storage and disposal.

Major laws setting general regulatory regimes for hazardous wastes are as follows:

- ✔ The Law on Pesticides and Agrochemicals;
- ✔ The Law on Atmospheric Air Protection - emission;
- ✔ The Law on Import, Export and Transit of Wastes on the Territory of Georgia;
- ✔ Waste Management Code;
- ✔ The Law on the Control of Military and Dual-use Goods;
- ✔ The Law on Environmental Impact Permit.

General requirements set out in relevant laws are further specified in following sub-laws:

- ✔ 443/31/12/2013 Government Decree on the Approval of the Provision on Examination, Expertise and Registration of Pesticides and Agrichemicals;
- ✔ 2-235/29/10/2013 decree of the Ministry of Agriculture on the Approval of the State Catalogue for Permitted Pesticides;

- ✔ 427/31/12/2013 Government Decree on the Technical Regulation for Labeling of the Pesticides and Agrichemicals;
- ✔ 451/31/12/2014 Government Decree on the Approval of the Technical Regulation on the Storage, Transportation, Sale and Use of Pesticides and Agrichemicals;
- ✔ 437/31/12/2013 Government Decree on the Approval of the Technical Rule on Small-scale Packaging of Pesticides, as amended by No 646 1/12/2014 Government Decree;
- ✔ Government Decree on the Approval of Technical Rule on Permitting Export-import, Re-export and Transit of ODS and Allocation of ODS Annual Import Quotas;
- ✔ 263 Government Decree on the Rule of Export-Import of Certain Hazardous Chemicals and the Pesticides and Prior Informed Consent Procedure;
- ✔ 9/06/2016 Government Decree on the Approval of the List of Wastes Permitted for Trans-boundary Movement in Georgia;
- ✔ 394/13/06/2014 Government Decree on Approval of Tithe List of Military and Dual-Use Items;
- ✔ 1-1/1562/18/08/2011 Decree of the Ministry of Economy and Sustainable Development on the Technical Rule for Transportation of Goods.

Export-import, re-export and transit of chemicals and wastes are governed by international conventions and relevant national regulations and are managed through Designated National Authorities (DNAs). These international agreements are:

- ✔ The Rotterdam Convention on Prior Informed Consent;
- ✔ Basel Convention on Trans-boundary Movement of Hazardous Wastes;
- ✔ Vienna Convention on Ozone Layer Protection
- ✔ Montreal Protocol on Ozone Depleting Substances;
- ✔ Paris Convention on Non-Proliferation of Chemical Weapons;
- ✔ Stockholm Convention on Persistent Organic Pollutants.

In terms of industrial accidents, currently the new law regulating this area in line with EU relevant directive is being elaborated with assistance from an international donor.

Concerning institutional setting, there is no institutional mechanism, including a single state agency responsible for setting and operating unified chemicals registration, evaluation, testing and authorization/admission to the market like EU REACH and unified chemicals information management system. Responsibilities for various chemicals and aspects of chemicals life-cycle management are spread among various state agencies and there is no institutional mechanism set for inter-agency coordination within the chemicals management field. Only two coordination mechanisms exist at present, one for recommending authorizations for export-import/circulation of military items, including chemicals of military purpose under the Ministry of Defense, and the second for developing and coordinating implementation of the Strategy and an Action Plan for Chemicals, Radiation, Nuclear and Bacteriological Safety of the country, under the leadership of the State Security Council.

The major policy-making authority in the area chemicals and waste management is **the Wastes and Chemicals Management Service** of the MoENRP which is in charge of developing waste management policies and legislation and overseeing their implementation, as well as for compiling national inventories of hazardous wastes and contaminated sites. Other functions related to hazardous chemicals and waste management are spread among various services and agencies of the MoENRP, including the Department of Environmental Supervision (compliance assurance monitoring and control), Environmental Permitting Department (state ecological expertise and environmental impact permitting), National Environmental Agency (environmental quality monitoring), as well as among other Ministries and agencies, including National Food Agency, Customs Department of the Ministry of Finance, Ministry of Labour, Health and Social Affairs, Ministry of Economic Development, Ministry of Internal Affairs.

In terms of disaster risk management, including the management of disasters related to hazardous chemicals and wastes, at the highest political level there is a National Security and Crisis Management Council (NSCRMC) under the Prime Minister's office who is in charge of developing national-level security and crisis management policies, including preventive and response measures to political, social economic and environmental threats of national importance and coordinating their implementation, deciding on the scale of the disaster and, in the case of national-level disasters, coordinating activities of various responsible parties during emergencies through the National Crisis Management Center. At the operational level, the crisis management is ensured by the Ministry of Internal Affairs through the Emergency Management Agency (EMA) and Joint Operational Centre (JOC). The main function of the Joint Operational Centre is the operational monitoring of crisis situation through CCTV cameras and analysis of potential risks through smart analysers, while the EMA's functions include: inter-agency coordination of emergency management activities; development of a Civil Protection plan at the national level; implementation of civil safety activities etc. At the local level, regional governors, the President's representatives in administrative regions are in charge of coordinating the activities of the local municipalities, while the local governments are responsible for developing municipal emergency preparedness and response plans and implementing them.

Concerning policy framework on chemicals and wastes, there is no single overarching policy on chemicals management, while there is one for waste management, which among others implies setting of hazardous waste management system, including waste collection, temporary storage, treatment and disposal as well as development of hazardous waste management action plan. In addition, the action plan contains the measures for inventory of contaminated sites and development of an action plan for their management;

Key legal-regulatory, policy and institutional gaps in the area of hazardous chemicals and waste management are as follows:

- ✔ Absent/lack of hazardous chemicals and waste inventory data;
- ✔ Absent/lack of data on hazardous waste sites, their condition and waste accumulated there;
- ✔ Underdeveloped regulations and policies for governing hazardous wastes. For instance, relevant technical regulations are absent for safe management of contaminated sites. The inventory system for contaminated sites does not exist within the Chemicals and Waste Management Service of MoENRP; relevant capacities for developing and implementing site clean-up/remediation strategies are absent/weak;
- ✔ Absent legal acts regulating mining wastes. This gap is currently being addressed by the MoENRP with international donor assistance;
- ✔ Poor capacities, including infrastructure for collection, treatment, storage and disposal/elimination of hazardous wastes. At present, the majority of hazardous wastes, excluding medical and radioactive wastes, are disposed at existing legal unsanitary regional waste disposal sites/landfills. The number of waste treatment facilities is limited;
- ✔ Poor/absent capacities within local authorities for emergency preparedness and response;
- ✔ Absent EU-compliant standards (e.g. BAT/BEP) for air emission and releases of hazardous substances. In accordance with the European Union Association Agreement (EUAA) major provisions of certain EU directives should be transposed into national legislation and relevant implementation mechanisms set. More specifically, for the control/reduction of industrial emissions and releases, as per EUAA the country should transpose major provisions of EU IPPC (Integrated Pollution Prevention and Control) directive and set emission limit values based on BAT/BEP for a few new industries, including coal-fired thermo-power plants, industrial boilers, co-incineration, etc. Moreover, it should negotiate maximum 10-year transitional emission reduction plans with existing facilities. At present, relevant knowledge and capacities of environmental media-specific services (Air Protection, Chemicals and Waste Management

and Water Resources Management Services) of the MoENRP for implementation of EU IPPC provisions are absent. It is noteworthy to mention that this capacity gap will be addressed through a new EU Twinning Technical Assistance project that provides support to Georgia for the adoption and implementation of IPPC directives;

- ✔ Absent/weak capacities of responsible institutions for assessing and communicating health and environmental risks of various hazardous chemicals or chemical industries, preventing, mitigating and providing early warnings for industrial/chemical emergencies and conducting effective response (rescue and recovery) measures during such accidents are either weak or absent. Currently, the Law on Industrial Accidents is being elaborated that will set a general basis for managing industrial accidents;
- ✔ Lack of awareness raising and education programmes and materials for decision-makers, businesses, consumers and general public on health and environmental effects of exposure to hazardous chemicals and wastes, food and product's chemical safety and preparedness to industrial emergencies;
- ✔ Lack of institutional capacities to collect, process, store and make publicly available data on primary sources, including stocks of hazardous chemicals, products containing hazardous chemicals, industrial uses of hazardous chemicals, hazardous wastes and contaminated sites as well as on environmental releases (air emissions and land and water discharges).

Chapter II:
Mercury Inventory and Identification of Emissions and Resources

2.1 Inventory methodology and limitations

The inventory of Mercury releases in Georgia was developed by a team of national consultants, using the "Toolkit for identification and quantification of mercury releases (version 2017)" made available by the Chemicals Branch of the United Nations Environment Programme (UNEP Chemicals) in 2016. More specifically, the team applied Toolkit's Inventory Level 1.[11] The method is based on mass balances for each mercury release source types. Pre-determined factors (so-called default input factors and default output distribution factors) were used in the calculation of mercury inputs to society and releases. These factors were derived from data on mercury inputs and releases from the relevant mercury source types from available literature and other relevant data sources.

The year of 2014 was chosen as the baseline year for data collection. Thus, where available, 2014 input data was used; however, when such data was not available the most recent data was used instead.

Three data collection tools were applied for the inventory. First, readily available online resources on source categories/economic activities and their characteristic were searched through the internet. Second, request letters were sent to the relevant institutions aiming at identification of emission and release sources of mercury. Third, interviews were conducted with main stakeholders, including representatives of relevant agencies, potential recipients and users of mercury containing items such are medical tools/instruments and lab devises (Thermometers, manometers etc.).

Collected information and data were analyzed, main mercury emission and release sources in Georgia were identified and mercury input-output quantified. Quantitative data were analyzed through Toolkit (LEVEL 1) spread sheet. Meanwhile, content analysis was used to review qualitative data.

It must be noted that for more accurate estimations of Hg emissions and releases, a Level 2 inventory is required. The estimation of the Hg values through a direct measurement can also be used for data validation, e.g. measurement of mercury emissions from the wastewater treatment system. Thus, the current mercury inventory contains a number uncertainties and inaccuracies, due to the lack/absence of data on some mercury sources and subsectors and therefore, is recommended to further build a national capacity in keeping mercury-related statistics and conducting mercury inventories.

2.2 Summary of mercury releases, stockpiles, and supply and trade

Initial task of the inventory team was to identify major mercury release sources present in Georgia. Table 4 below shows which mercury release sources are present or absent in Georgia. Only source types positively identified as present were included in the quantitative assessment.

11. Unprecedented experience in mercury inventory together with the limited timeframe, financial resources and lack/absence of data on many sub-sectors was the basis for a decision to carry out mercury inventory based on Inventory Level 1

*Table 4. Mercury release sources in Georgia**

Source category	Source present Y/N
Energy consumption	
Coal combustion in large power plants	N
Coal combustion in coal fired industrial boilers	N
Other coal uses	Y
Combustion/use of petroleum coke and heavy oil	N
Combustion/use of diesel, gasoil, petroleum, kerosene, LPG and other light to medium distillates	Y
Use of raw or pre-cleaned natural gas	N
Use of pipeline gas (consumer quality)	Y
Biomass fired power and heat production	Y
Charcoal combustion	Y
Fuel production	
Oil extraction	Y
Oil refining	N
Extraction and processing of natural gas	Y
Primary metal production	
Mercury (primary) extraction and initial processing	N
Production of zinc from concentrates	N
Production of copper from concentrates	N
Production of lead from concentrates	N
Gold extraction by methods other than mercury amalgamation	Y
Alumina production from bauxite (aluminum production)	N
Primary ferrous metal production (pig iron 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	
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	N
Biocides and pesticides with mercury	N

Paints with mercury	N
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	Y
Paints with mercury preservatives	N
Skin lightening creams and soaps with mercury chemicals	N
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)	Y
Waste incineration	
Incineration of municipal/general waste	N
Incineration of hazardous waste	N
Incineration and open burning 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	Y
Informal dumping of general waste *1	Y
Waste water system/treatment	Y
Crematoria and cemeteries	
Crematoria	N
Cemeteries	Y

**** Source present – Y, source absent – N***

It should be noted that some of the minor mercury release source types might be present in Georgia. However, due to the lack/absence of data on these sources there were not included in the detailed source identification and quantification work.

Table 5. Miscellaneous potential mercury sources not included in the quantitative inventory with preliminary indication of possible presence

Source category	Source present
	Y/N
Combustion of oil shale	N
Combustion of peat	N
Geothermal power production	y
Production of other recycled metals	y
Production of lime	Y
Production of light weight aggregates (burnt clay nuts for building purposes)	y
Production of other chemicals (than chlorine and sodium hydroxide) in Chlor-alkali facilities with mercury-cell technology	N
Polyurethane production with mercury catalysts	N
Seed dressing with mercury chemicals	N
Infra red detection semiconductors	y
Bougie tubes and Cantor tubes (medical)	y
Educational uses	y
Gyroscopes with mercury	N
Vacuum pumps with mercury	N
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	N
Tanning	Y
Pigments	N
Products for browning and etching steel	N
Certain colour photograph paper types	N
Recoil softeners in rifles	N
Explosives (mercury-fulminate a.o.)	N
Fireworks	Y
Executive toys	Y

2.1.2 Summary of mercury inputs to society

Mercury inputs to society should be understood as the mercury amounts made available for potential releases through economic activity in the country. This includes mercury intentionally used in products such as thermometers, blood pressure gauges, fluorescent light bulbs, etc. It also includes mercury mobilised via extraction and use of raw materials, which contain mercury in trace concentrations. Below in table 6 is given a summary of mercury inputs to Georgian society.

Table 6. Summary of mercury inputs to society[12]

Source category	Source present?			Estimated Hg input, Kg Hg/y
	Y/N/?	Activity rate	Unit	Standard estimate
Energy consumption				
Coal combustion in large power plants	N	0	Coal combusted, t/y	-
Coal combustion in coal fired industrial boilers	N	0	Coal combusted, t/y	-
Other coal uses	Y	622,700	Coal used, t/y	83
Combustion/use of petroleum coke and heavy oil	N	0	Oil product combusted, t/y	-
Combustion/use of diesel, gasoil, petroleum, kerosene, LPG and other light to medium distillates	Y	1,031,100	Oil product combusted, t/y	6
Use of raw or pre-cleaned natural gas	N	0	Gas used, Nm^3/y	-
Use of pipeline gas (consumer quality)	Y	1,316,800,000	Gas used, Nm^3/y	0
Biomass fired power and heat production	Y	1,376,069	Biomass combusted, t/y	41
Charcoal combustion	Y	71	Charcoal combusted, t/y	0
Fuel production				
Oil extraction	Y	47,900	Crude oil produced, t/y	0
Oil refining	N	0	Crude oil refined, t/y	-
Extraction and processing of natural gas	Y	5,400,000	Gas produced, Nm^3/y	1
Primary metal production				
Mercury (primary) extraction and initial processing	N	0	Mercury produced, t/y	-
Production of zinc from concentrates	N	0	Concentrate used, t/y	-
Production of copper from concentrates	N	0	Concentrate used, t/y	-
Production of lead from concentrates	N	0	Concentrate used, t/y	-
Gold extraction by methods other than mercury amalgamation	Y	125,000	Gold ore used, t/y	1,875
Alumina production from bauxite (aluminium production)	N	0	Bauxit processed, t/y	-
Primary ferrous metal production (pig iron production)	Y	451,688	Pig iron produced, t/y	23
Gold extraction with mercury amalgamation - from whole ore	N	0	Gold produced, kg/y	-
Gold extraction with mercury amalgamation - from concentrate	N	0	Gold produced, kg/y	-
Other materials production				
Cement production*4	Y	1,600,000	Cement produced, t/y	219

12. Notes to the table: *1: To avoid double counting of mercury inputs from waste and products in the input TOTAL, only 10% of the mercury input to waste incineration sources, waste deposition and informal dumping is included in the total for mercury inputs. These 10% represent approximately the mercury input to waste from materials which were not quantified individually in Inventory Level 1 of this Toolkit. See Appendix 1 to the Inventory Level 1 Guideline for more explanation. *2: The estimated quantities include mercury in products which has also been accounted for under each product category. To avoid double counting, the release to land from informal dumping of general waste has been subtracted automatically in the TOTALS. *3: The estimated input and release to water include mercury amounts which have also been accounted for under each source category. To avoid double counting, input to, and release to water from waste water system/treatment have been subtracted automatically in the TOTALS. *4: To avoid double counting, fossil fuel mercury contributions to cement production was subtracted automatically in the TOTALS

Pulp and paper production	N	0	Biomass used for production, t/y	-
Production of chemicals				
Chlor-alkali production with mercury-cells	N	0	Cl2 produced, t/y	-
VCM production with mercury catalyst	N	0	VCM produced, t/y	-
Acetaldehyde production with mercury catalyst	N	0	Acetaldehyde produced, t/y	-
Production of products with mercury content				
Hg thermometers (medical, air, lab, industrial etc.)	N	0	Mercury used for production, kg/y	-
Electrical switches and relays with mercury	N	0	Mercury used for production, kg/y	-
Light sources with mercury (fluorescent, compact, others: see guideline)	N	0	Mercury used for production, kg/y	-
Batteries with mercury	N	0	Mercury used for production, kg/y	-
Manometers and gauges with mercury	N	0	Mercury used for production, kg/y	-
Biocides and pesticides with mercury	N	0	Mercury used for production, kg/y	-
Paints with mercury	N	0	Mercury used for production, kg/y	-
Skin lightening creams and soaps with mercury chemicals	N	0	Mercury used for production, kg/y	-
Use and disposal of products with mercury content				
Dental amalgam fillings (“silver” fillings)	N	3,729,500	Number of inhabitants	-
Thermometers	Y	261,504	Items sold/y	263
Electrical switches and relays with mercury	Y	3,729,500	Number of inhabitants	522
Light sources with mercury	Y	2,459,845	Items sold/y	61
Batteries with mercury	Y	0	t batteries sold/y	2
Polyurethane (PU, PUR) produced with mercury catalyst	Y	3,729,500	Number of inhabitants	112
Paints with mercury preservatives	N	0	Paint sold, t/y	-
Skin lightening creams and soaps with mercury chemicals	N	0	Cream or soap sold, t/y	-
Medical blood pressure gauges (mercury sphygmomanometers)	Y	0	Items sold/y	0
Other manometers and gauges with mercury	Y	3,729,500	Number of inhabitants	19
Laboratory chemicals	Y	3,729,500	Number of inhabitants	37
Other laboratory and medical equipment with mercury	Y	3,729,500	Number of inhabitants	149
Production of recycled of metals				
Production of recycled mercury (“secondary production”)	N	0	Mercury produced, kg/y	-
Production of recycled ferrous metals (iron and steel)	Y	0	Number of vehicles recycled/y	0
Waste incineration				
Incineration of municipal/general waste	N	0	Waste incinerated, t/y	-
Incineration of hazardous waste	N	0	Waste incinerated, t/y	-
Incineration / burning of medical waste	Y	1,876	Waste incinerated, t/y	45

Sewage sludge incineration	N	0	Waste incinerated, t/y	-
Open fire waste burning (on landfills and informally)	Y	80,806	Waste burned, t/y	404
Waste deposition/landfilling and waste water treatment				
Controlled landfills/deposits	Y	738,389	Waste landfilled, t/y	3,692
Informal dumping of general waste *1	Y	80,806	Waste dumped, t/y	404
Waste water system/treatment	Y	177,843,000	Waste water, m3/y	934
Crematoria and cemeteries				
Crematoria	N	0	Corpses cremated/y	-
Cemeteries	Y	49,087	Corpses buried/y	123
TOTAL of quantified inputs*1*2*3*4				3,980

Mercury inventory results indicate that the following categories represent the primary source of mercury inputs to society in Georgia:

- ✔ **Primary metal production** - industrial gold production and pig iron production are the primary sectors (1,898 kg Hg/y);
- ✔ **Use and disposal of products with mercury content/mercury containing products** - includes thermometers, electrical switches and relays, light sources and batteries, polyurethane with mercury catalyst and paint with mercury, medical blood pressure gauges, other manometers and gauges with mercury, laboratory chemicals (1,165 Kg Hg/y);
- ✔ **Waste incineration and open waste burning** (449 kg Hg/y);
- ✔ **Other materials production** - cement production (219 kg Hg/y);
- ✔ **Crematoria and cemeteries** - cemeteries (122.7 kg Hg/y);
- ✔ **Coal combustion and other coal use** (83.2 kg Hg/y).

2.1.3 Summary of mercury releases

Based on Mercury Inventory toolkit, mercury releases are defined as emissions to air (the atmosphere), water (marine and freshwater bodies, including via waste water systems), land, general waste and, sector-specific wastes (e.g. waste treatment). An additional output pathway is “by-products and impurities” which implies mercury flowback into the market with by-products and products where mercury does not play an intentional role.

Table 7. Summary of mercury releases in Georgia[13]

Source category	Estimated Hg releases, standard estimates, Kg Hg/y					
	Air	Water	Land	By-products and impurities	General waste	Sector specific waste treatment / disposal
Energy consumption						
Coal combustion in large power plants	-	-	-	-	-	-
Coal combustion in coal fired industrial boilers	-	-	-	-	-	-
Other coal uses	83.0	0.0	0.0	0.0	0.0	0.0
Combustion/use of petroleum coke and heavy oil	-	-	-	-	-	-
Combustion/use of diesel, gasoil, petroleum, kerosene, LPG and other light to medium distillates	5.7	0.0	0.0	0.0	0.0	0.0
Use of raw or pre-cleaned natural gas	-	-	-	-	-	-
Use of pipeline gas (consumer quality)	0.3	0.0	0.0	0.0	0.0	0.0
Biomass fired power and heat production	41.3	0.0	0.0	0.0	0.0	0.0
Charcoal combustion	0.0	0.0	0.0	0.0	0.0	0.0
Fuel production						
Oil extraction	0.0	0.0	0.0	0.0	0.0	0.0
Oil refining	-	-	-	-	-	-
Extraction and processing of natural gas	0.1	0.1	0.0	0.2	0.0	0.2
Primary metal production						
Mercury (primary) extraction and initial processing	-	-	-	-	-	-
Production of zinc from concentrates	-	-	-	-	-	-
Production of copper from concentrates	-	-	-	-	-	-
Production of lead from concentrates	-	-	-	-	-	-
Gold extraction by methods other than mercury amalgamation	75.0	37.5	1,687.5	75.0	0.0	0.0
Alumina production from bauxite (aluminium production)	-	-	-	-	-	-
Primary ferrous metal production (pig iron production)	21.5	0.0	0.0	0.0	0.0	1.1
Gold extraction with mercury amalgamation - from whole ore	-	-	-	-	-	-
Gold extraction with mercury amalgamation - from concentrate	-	-	-	-	-	-
Other materials production						
Cement production*3	164.2	0.0	0.0	54.7	0.0	0.0
Pulp and paper production	-	-	-	-	-	-

13. Notes to the Table: *1: The estimated quantities include mercury in products which have also been accounted for under each product category. To avoid double counting, the release to land from informal dumping of general waste has been subtracted automatically in the TOTALS. *2: The estimated release to water includes mercury amounts which have also been accounted for under each source category. To avoid double counting, input to and release to water from wastewater system/treatment have been subtracted automatically in the TOTALS. *3: To avoid double counting, fossil fuel contribution to cement production was subtracted automatically in the TOTALS

Production of chemicals						
Chlor-alkali production with mercury-cells	-	-	-	-	-	-
VCM production with mercury catalyst	-	-	-	-	-	-
Acetaldehyde production with mercury catalyst	-	-	-	-	-	-
Production of products with mercury content						
Hg thermometers (medical, air, lab, industrial etc.)	-	-	-	-	-	-
Electrical switches and relays with mercury	-	-	-	-	-	-
Light sources with mercury (fluorescent, compact, others: see guideline)	-	-	-	-	-	-
Batteries with mercury	-	-	-	-	-	-
Manometers and gauges with mercury	-	-	-	-	-	-
Biocides and pesticides with mercury	-	-	-	-	-	-
Paints with mercury	-	-	-	-	-	-
Skin lightening creams and soaps with mercury chemicals	-	-	-	-	-	-
Use and disposal of products with mercury content						
Dental amalgam fillings (“silver” fillings)	-	-	-	-	-	-
Thermometers	52.7	79.0	52.7	0.0	79.0	0.0
Electrical switches and relays with mercury	156.5	0.0	208.6	0.0	156.5	0.0
Light sources with mercury	18.4	0.0	18.4	0.0	24.5	0.0
Batteries with mercury	0.4	0.0	0.4	0.0	0.8	0.0
Polyurethane (PU, PUR) produced with mercury catalyst	22.4	11.2	44.7	0.0	33.5	0.0
Paints with mercury preservatives	-	-	-	-	-	-
Skin lightening creams and soaps with mercury chemicals	-	-	-	-	-	-
Medical blood pressure gauges (mercury sphygmomanometers)	0.0	0.0	0.0	0.0	0.0	0.0
Other manometers and gauges with mercury	3.7	5.6	3.7	0.0	5.6	0.0
Laboratory chemicals	0.0	12.3	0.0	0.0	12.3	12.7
Other laboratory and medical equipment with mercury	0.0	49.2	0.0	0.0	49.2	50.7
Production of recycled of metals						
Production of recycled mercury (“secondary production”)	-	-	-	-	-	-
Production of recycled ferrous metals (iron and steel)	0.0	0.0	0.0	0.0	0.0	0.0
Waste incineration						
Incineration of municipal/general waste	-	-	-	-	-	-
Incineration of hazardous waste	-	-	-	-	-	-
Incineration / burning of medical waste	45.0	0.0	0.0	0.0	0.0	0.0
Sewage sludge incineration	-	-	-	-	-	-
Open fire waste burning (on landfills and informally)	404.0	0.0	0.0	0.0	0.0	0.0

Waste deposition/landfilling and waste water treatment						
Controlled landfills/deposits	36.9	0.4	0.0	-	-	-
Informal dumping of general waste *1	40.4	40.4	323.2	-	-	-
Waste water system/treatment *2	0.0	840.3	0.0	0.0	93.4	0.0
Crematoria and cemeteries						
Crematoria	-	-	-	-	-	-
Cemeteries	0.0	0.0	122.7	-	0.0	0.0
TOTAL of quantified releases*1*2*3	1,160.0	240.0	2,140.0	130.0	450.0	60.0

Table 8 below provides general descriptions and definitions of the output pathways.

Table 8. Description of output pathways

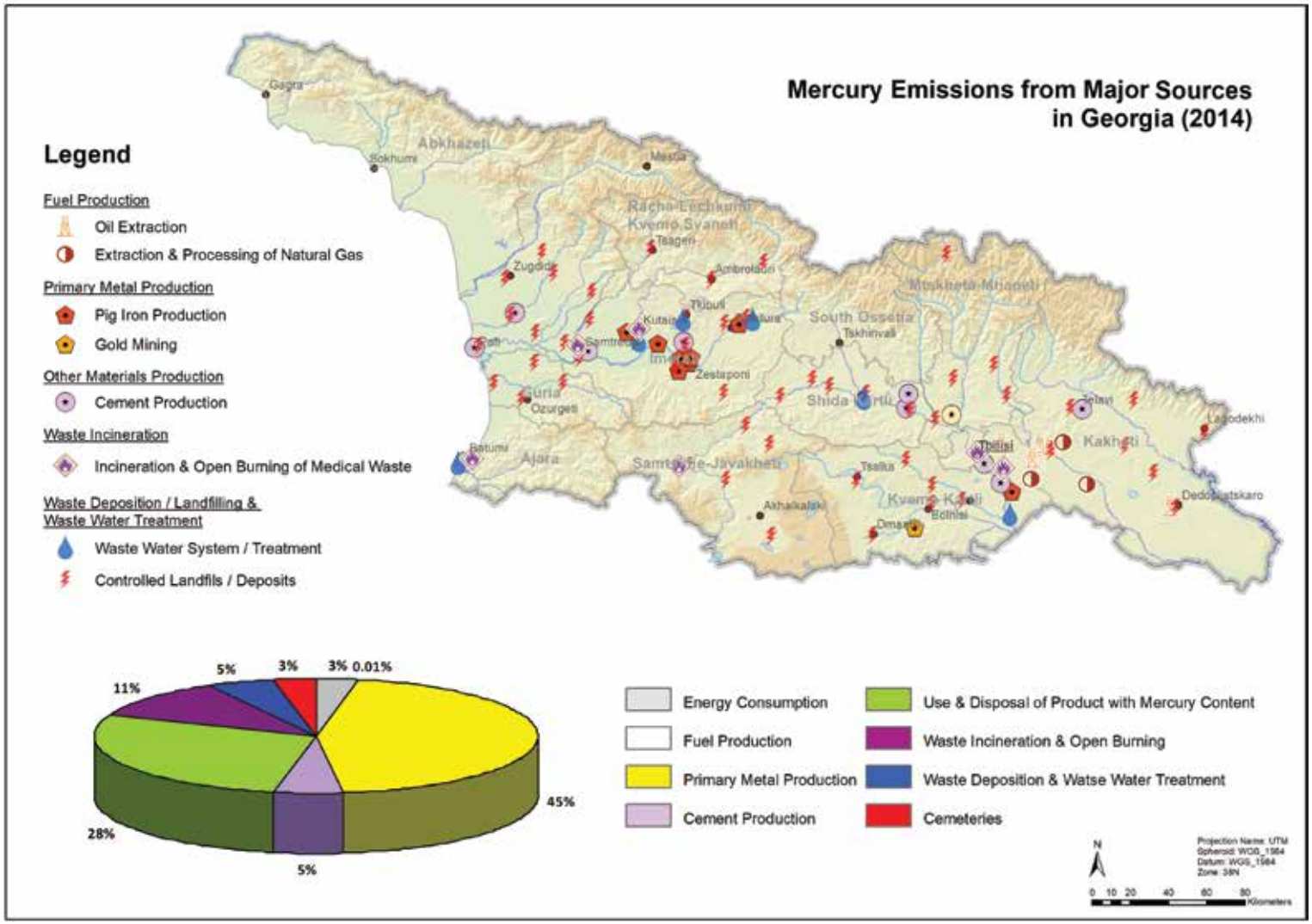
Calculation result type	Description
Estimated Hg input, Kg Hg/y	The standard estimate of the amount of mercury entering this source category with input materials, for example calculated mercury amount in coal used annually in the country for combustion in large power plants.
Air	Mercury emissions to the atmosphere from point sources and diffuse sources from which mercury may be spread locally or over long distances with air masses; for example, from: · Point sources such as coal fired power plants, metal smelter, waste incineration; · Diffuse sources such as small-scale gold mining, informal burning of waste with fluorescent lamps, batteries, thermometers.
Water	Mercury releases to aquatic environments and to waste water systems; point sources and diffuse sources from which mercury will be spread to marine environments (oceans), and freshwaters (rivers, lakes, etc.). for example, releases from: · Wet flue gas cleaning systems on coal fired power plants; · Industry, households, etc. to aquatic environments; · Surface run-off and leachate from mercury contaminated soil and waste dumps.
Land	Mercury releases to the terrestrial environment: General soil and ground water. For example, releases from: · Solid residues from flue gas cleaning on coal fired power plants used for gravel road construction; · Uncollected waste products dumped or buried informally; · Local un-confined releases from industry such as on site hazardous waste storage/burial; · Spreading of sewage sludge with mercury content on agricultural land (sludge used as fertilizer); · Application on land, seeds or seedlings of pesticides with mercury compounds.
By-products and impurities	By-products that contain mercury and are sent back into the market and cannot be directly allocated to environmental releases, for example: · Gypsum wallboard produced from solid residues from flue gas cleaning on coal fired power plants; · Sulphuric acid produced from desulphurization of flue gas (flue gas cleaning) in non-ferrous metal plants with mercury trace concentrations; · Chlorine and sodium hydroxide produced with mercury-based chlor-alkali technology; with mercury trace concentrations; · Metal mercury or calomel as by-product from non-ferrous metal mining (high mercury concentrations).

Calculation result type	Description
General waste	General waste: Also, called municipal waste in some countries. Typically, household and institution waste where the waste undergoes a general treatment, such as incineration, landfilling or, informal dumping. The mercury sources to waste are consumer products with intentional mercury content (batteries, thermometers, fluorescent tubes, etc.) as well as high volume waste like printed paper, plastic, etc., with small trace concentrations of mercury.
Sector specific waste treatment /disposal	Waste from industry and consumers which is collected and treated in separate systems, and in some cases recycled; for example: · Confined deposition of solid residues from flue gas cleaning on coal fired power plants on dedicated sites; · Hazardous industrial waste with high mercury content which is deposited in dedicated, safe sites; · Hazardous consumer waste with mercury content, mainly separately collected and safely treated batteries, thermometers, mercury switches, lost teeth with amalgam fillings, etc.; · Confined deposition of tailings and high-volume rock/waste from extraction of non-ferrous metals.

Mercury releases in Georgia totalled approximately 4,200 kg Hg/y. The individual categories contributing the highest mercury in terms of percentage of total releases in the country were:

- ✔ **Primary metal production** - 45%, 1,898 kg Hg/y;
- ✔ **Use and disposal of products with mercury content/mercury containing products** - 28%, 1,165 kg Hg/y;
- ✔ **Waste incineration and open waste burning** - 11%, 449 kg Hg/y;
- ✔ **Other materials production** - 5%, 219 kg Hg/y.

Figure 6. Map of mercury emissions from major sources in Georgia (2014)[14]



14. Map was prepared in the scope of UNDP/GEF project "Strengthen national decision making towards ratification of the Minamata Convention and build capacity towards implementation of future provisions" based on available data and information collected by project experts

The amount of mercury released through the major output pathways is summarized in figures 7-15.

Figure 7. Mercury releases to air in Georgia (2014)

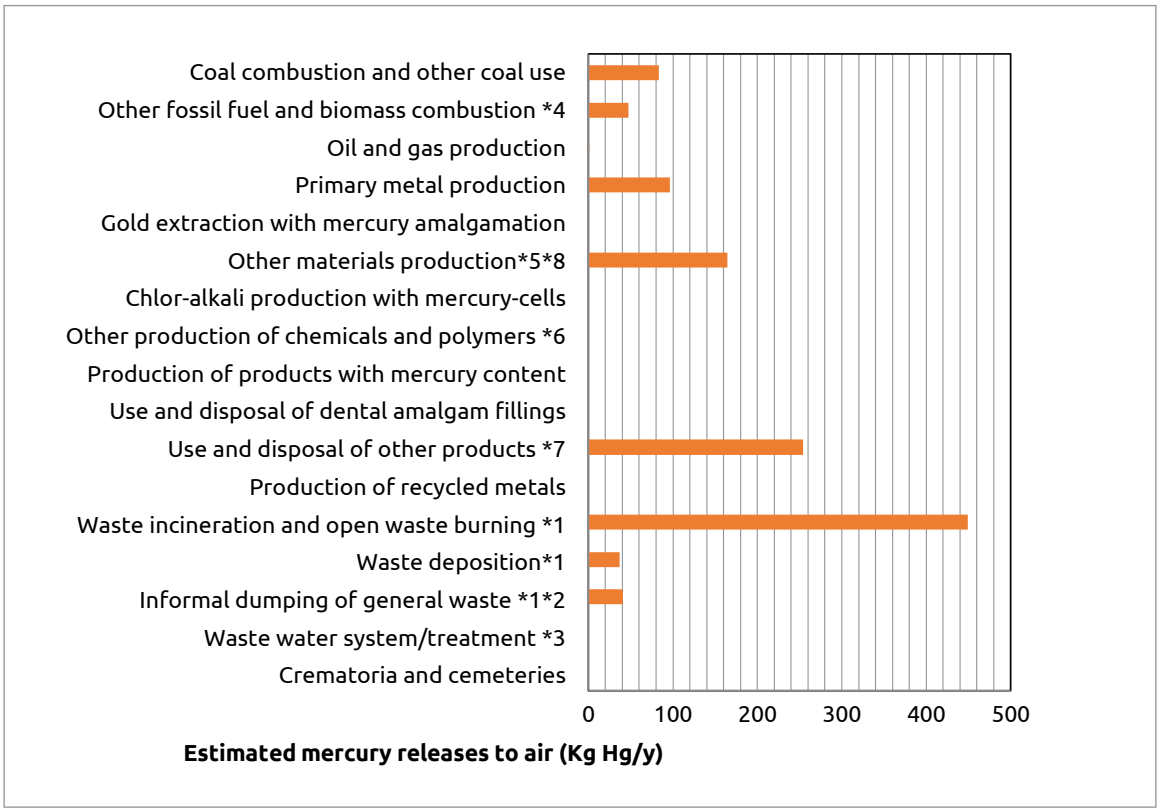
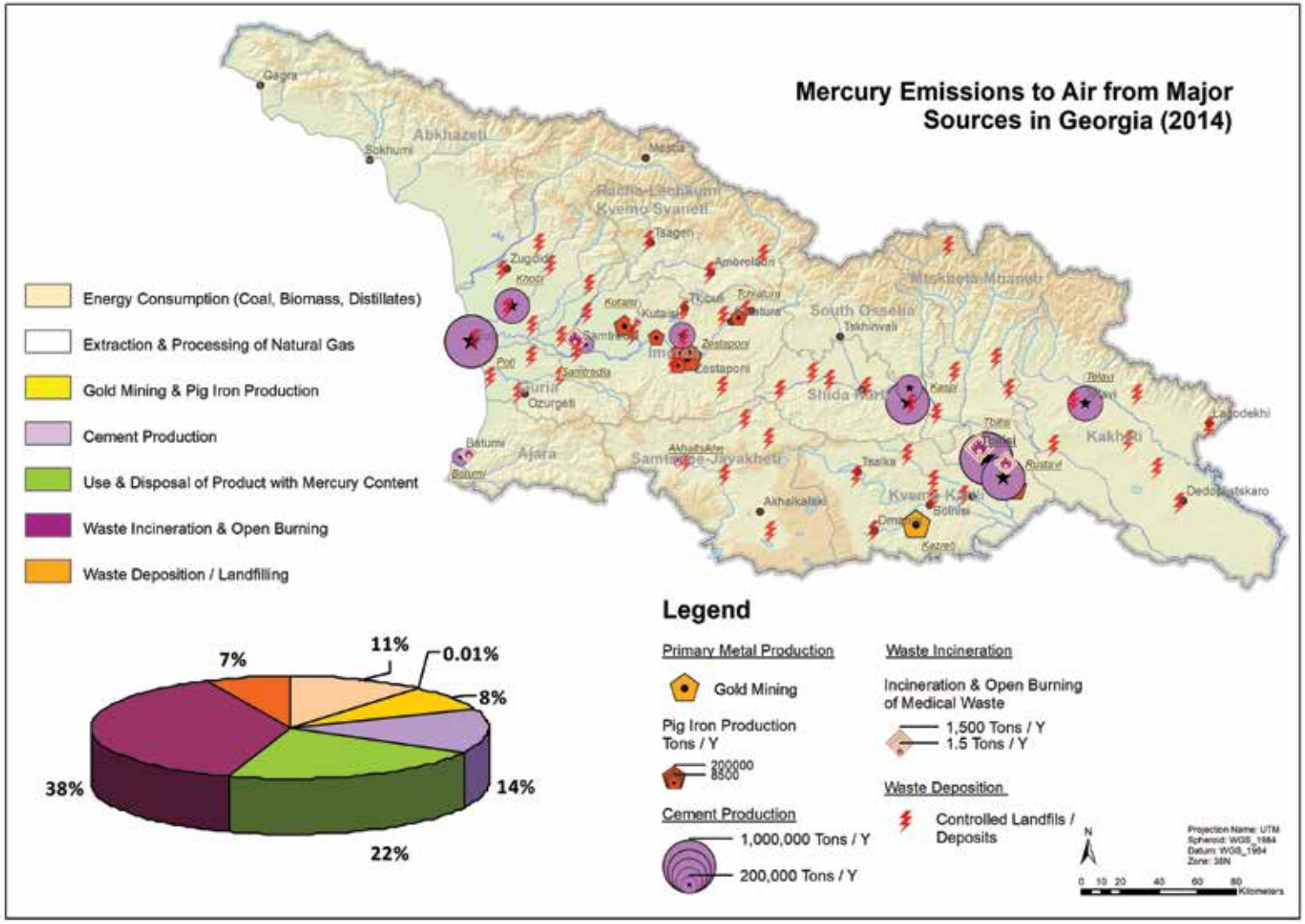


Figure 8. Map of mercury releases to air from major sources in Georgia (2014)[15]



15. Map was prepared in the scope of UNDP/GEF project "Strengthen national decision making towards ratification of the Minamata Convention and build capacity towards implementation of future provisions" based on available data and information collected by project experts

Figure 9. Mercury releases to water in Georgia (2014))

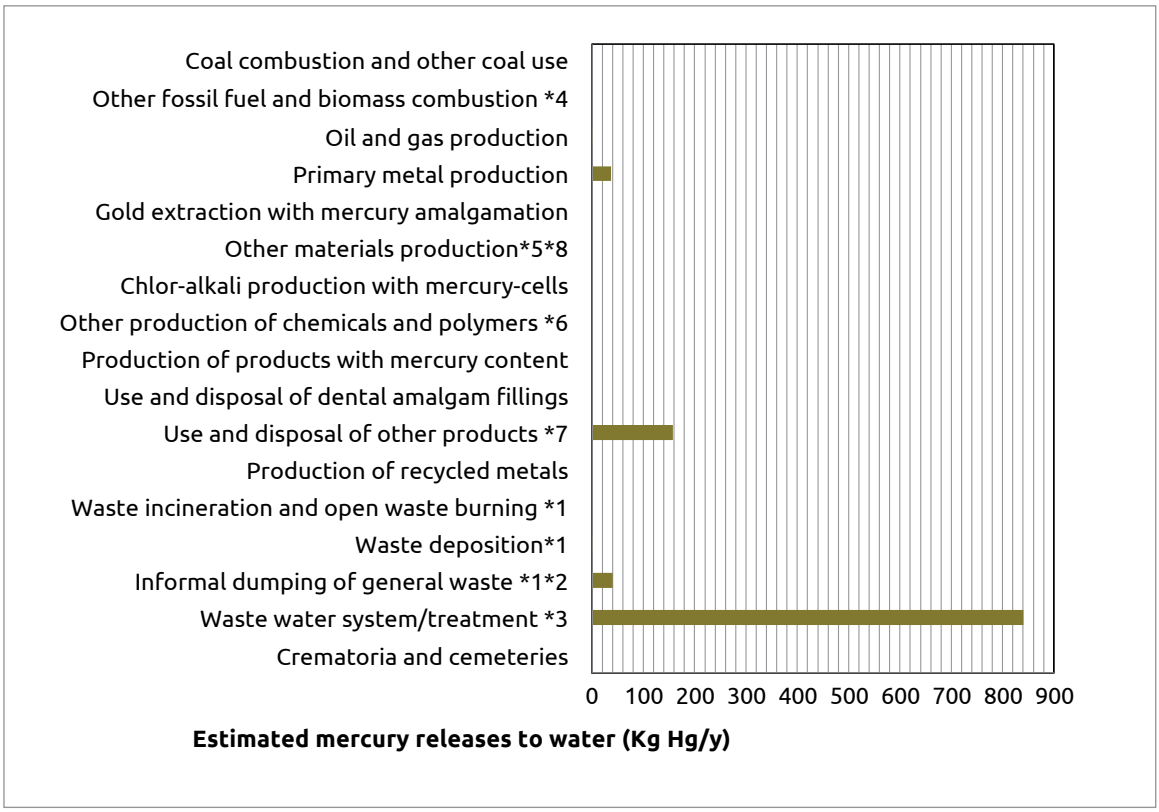
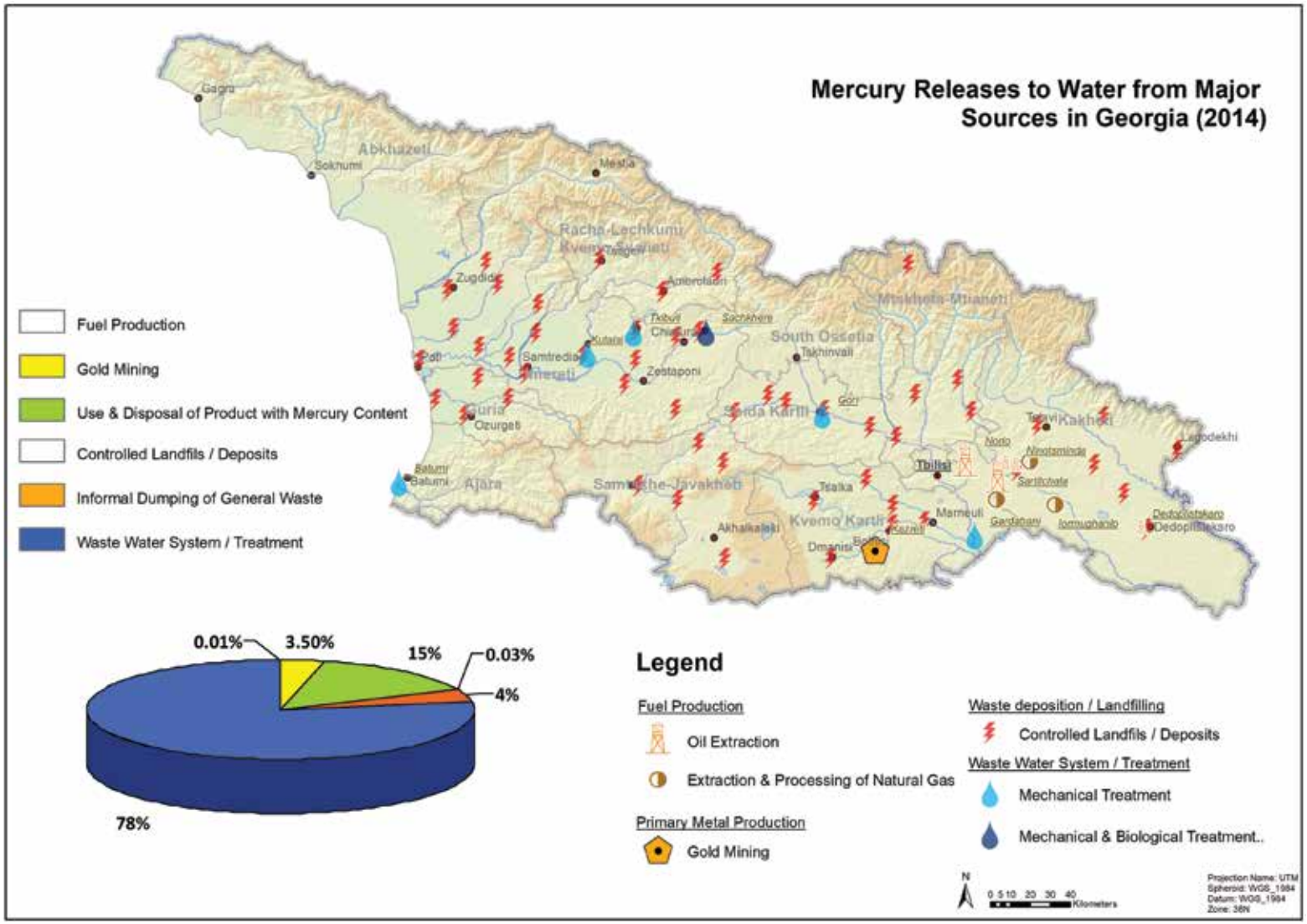


Figure 10. Map of mercury releases to water from major sources in Georgia (2014)[16]



16. Map was prepared in the scope of UNDP/GEF project "Strengthen national decision making towards ratification of the Minamata Convention and build capacity towards implementation of future provisions" based on available data and information collected by project experts

Figure 11. Mercury releases to land in Georgia (2014)

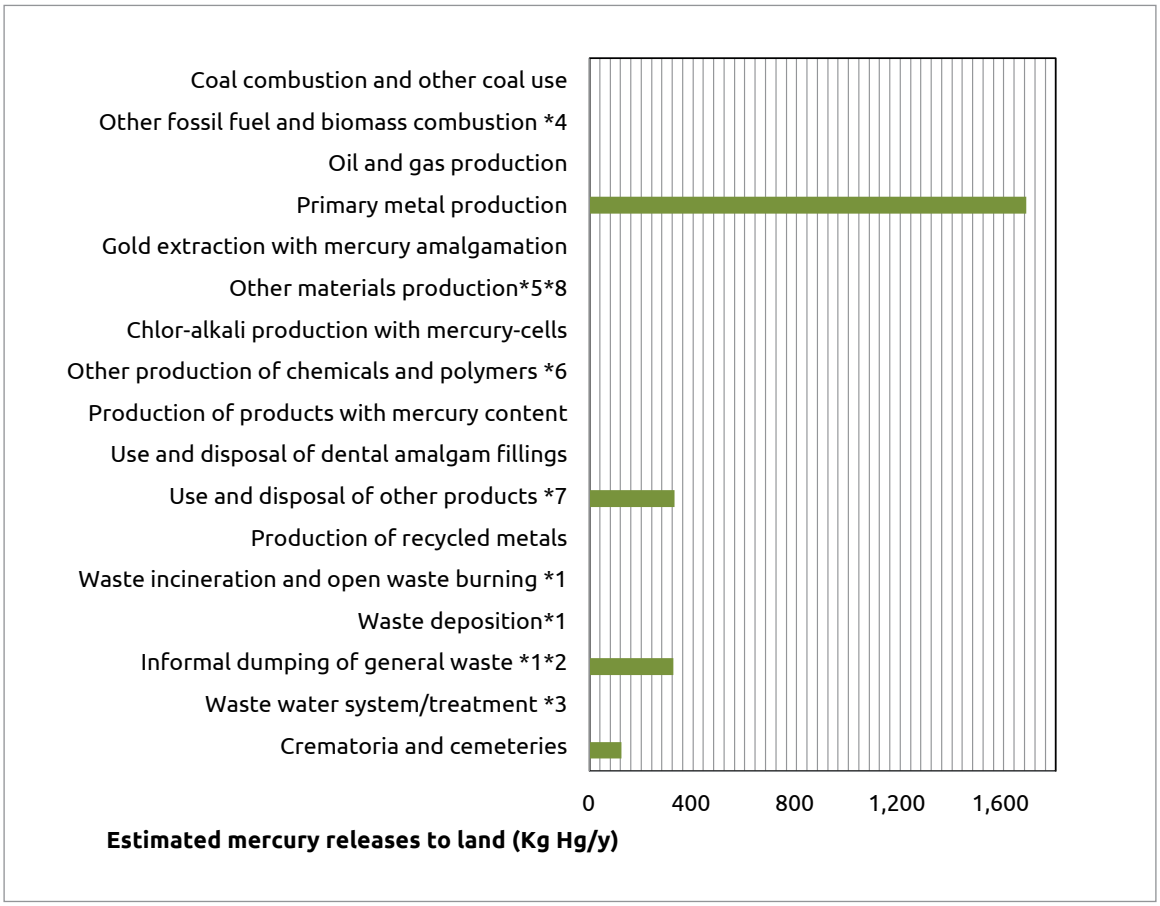
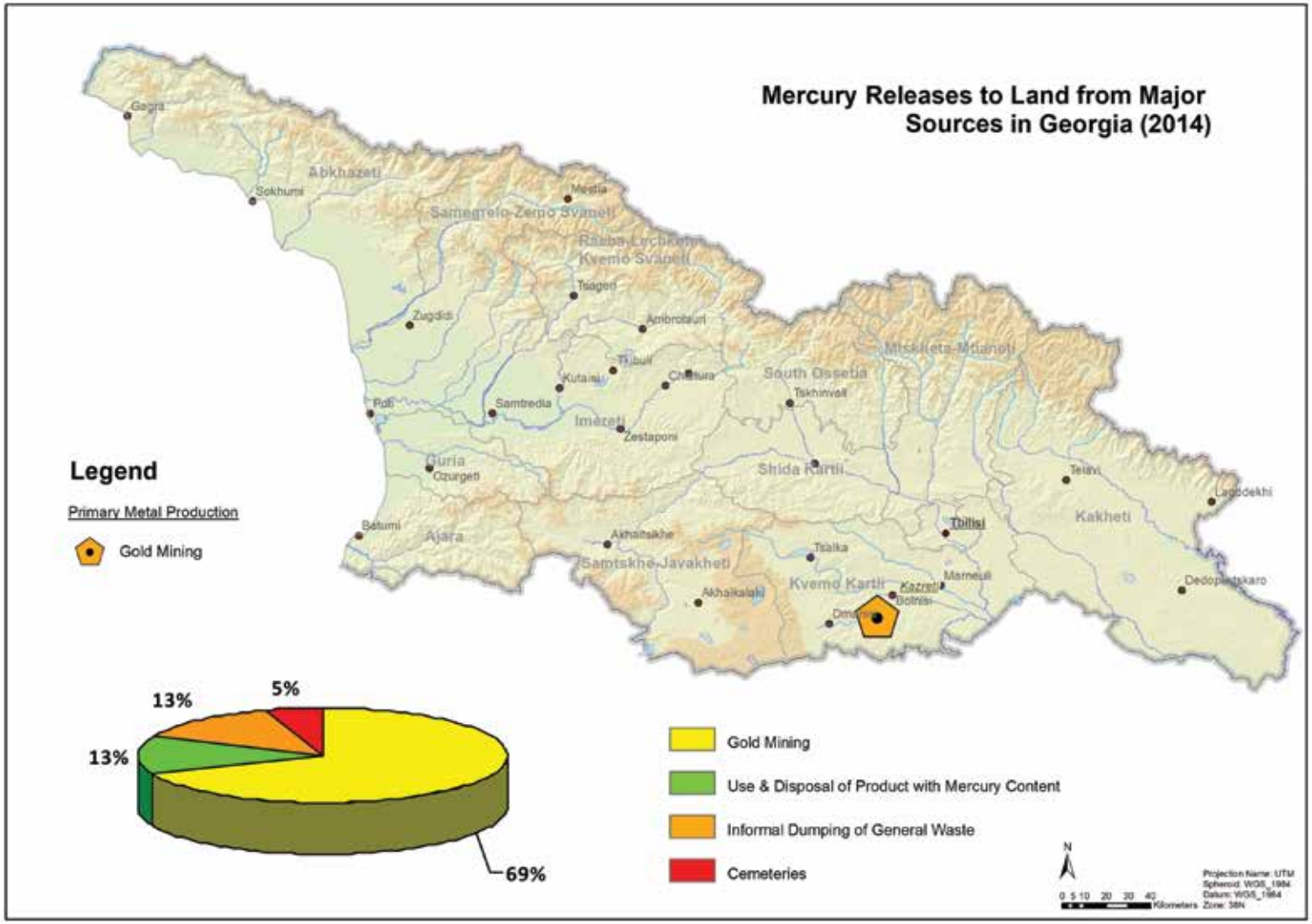


Figure 12. Map of mercury releases to land from major sources in Georgia (2014) [17]



17. Map was prepared in the scope of UNDP/GEF project “Strengthen national decision making towards ratification of the Minamata Convention and build capacity towards implementation of future provisions” based on available data and information collected by project experts

Figure 13. Mercury outputs to by-products and other impurities in Georgia (2014)

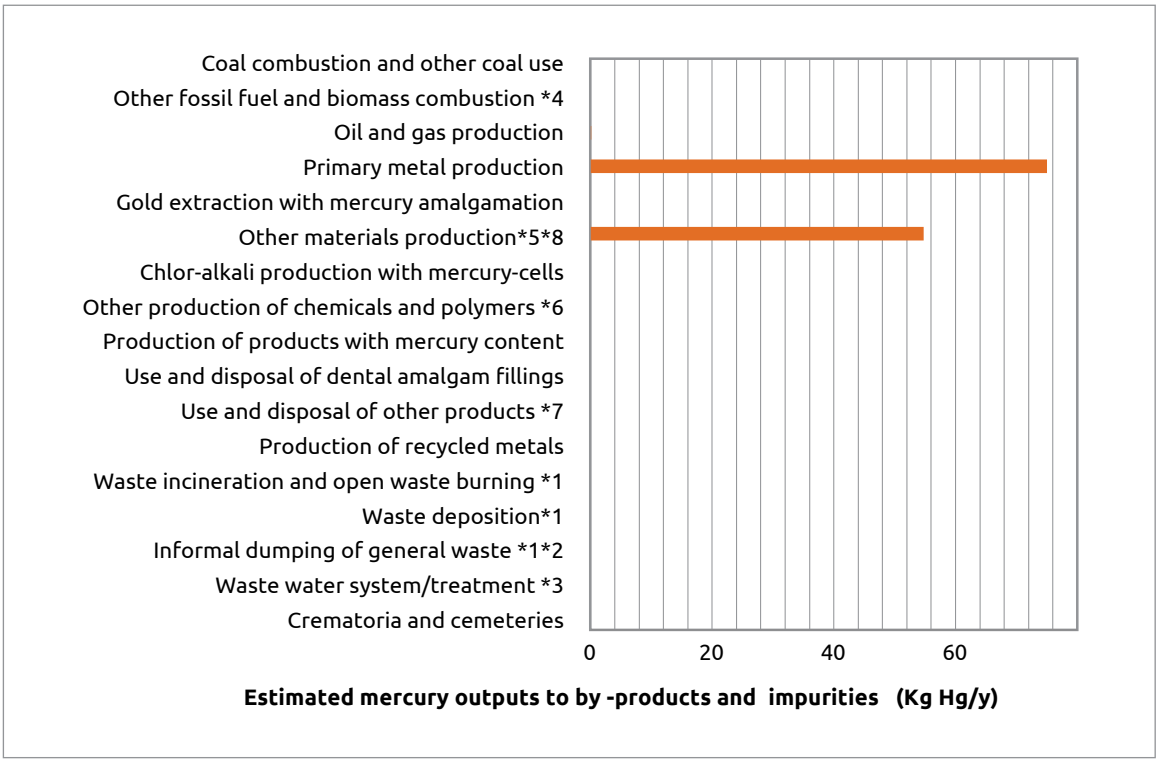


Figure 14. Mercury releases to general waste in Georgia (2014)

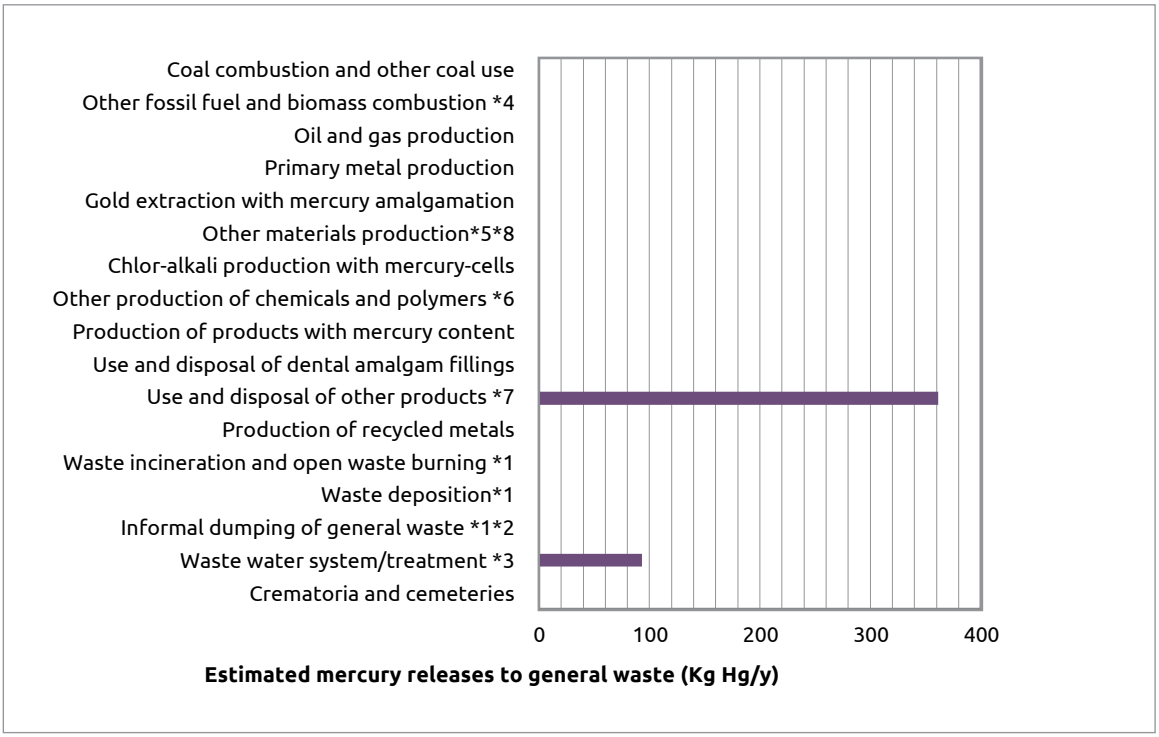
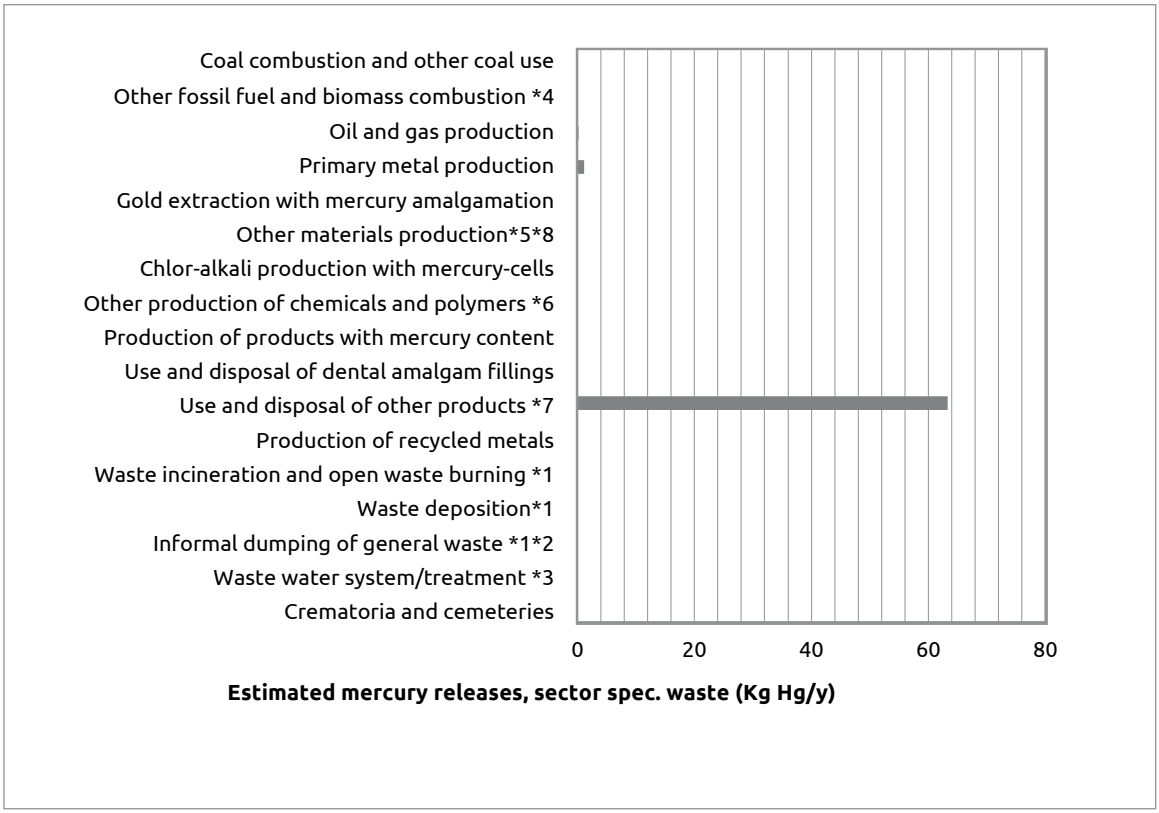


Figure 15. Mercury releases to sector specific waste in Georgia (2014)



2.3 Data and inventory on energy consumption and fuel production

For the inventory on energy consumption and fuel production "Energy Balance of Georgia" (2014) was used as the main source of data.[18] As the validated data for baseline year (2014) was not available, 2013 data was used instead as an input to the UNEP toolkit spreadsheet.

Abovementioned data gap should be verified during Level 2 Inventory. Further data collection in this regard is also necessary.

2.3.1 Sub- category - Energy consumption

According to available data, following sub-categories are not presented in the country:

- ✔ **Coal combustion in large power plants** - power plant thermal boiler effect above 300 MW;
- ✔ **Combustion/use of petroleum coke and heavy oil** - small or medium size power plant with thermal boiler effect less than 300 MW, using coke as the fuel source in the country.

Other coal uses: Two types of coal, black and lignite (brown), are acknowledged fuel and energy resources. Out of nine coal deposits, only three of them are commercially important (Tkibuli-Shaori, Akhaltsikhe and Tkvarcheli) in Georgia, but coal mining is difficult because of the depth of the coal seams. The annual production of coal currently exceeds 300 thousand tonnes but is characterized with a low calorific value. For industrial purposes, the country imports coal. The private and public sectors as well as households use a very small amount of coal.

18. National statistics Office of Georgia (GEOStat): http://www.geostat.ge; websites of the Ministry of Environment and Natural Resources Protection: http://www.moe.gov.ge; web-site of the Ministry of Energy: http://www.energy.gov.ge) and web-site of the International Energy Agency's statistics website: http://www.iea.org/stats/

According to the data from the *Energy Balance of Georgia* (2014), Table "Coal supply and consumption" (page 30), the coal consumption equals to 622,700 t/y (**Anthracite** (7,900 t) + **Bituminous Coal** (70,400 t) + **Lignite** (399,100 t) + **Furnace coke** (145,300 t)). This number was used as an input for the toolkit.

Combustion/Use of Diesel, Gasoil, Petroleum, Kerosene, LPG and Other Light to Medium Distillates: Petroleum products are mostly used by the transport and industry sectors and in small quantities by households (LPG and kerosene) and the commercial and agriculture sectors.

The assumption was made that liquefied petroleum gas or LPG is a part of this category. LPG is used mainly as a cooking and water heating fuel and to a lesser extent as a fuel for vehicles.

Data on the use of oil and oil products have been extracted from the Energy Balance of Georgia table entitled "Oil and Oil Products Supply and Consumption" (page 34). According to this record, the total use is 1,046,400 t/y.

Use of Pipeline Gas (Consumer Quality): Data on the distribution of pipeline gas for domestic consumption as an input to the Toolkit have been extracted from the Energy Balance of Georgia (2014) table entitled "Natural Gas Supply and Use" (page 25). According to the abovementioned report, the main users are: thermal power plants, household and at a lesser extent the industry, transport, commercial and agriculture sectors.

Biomass Fired Power and Heat Production: Biomass consumption is increasing globally as a source of heat and electricity and is likewise playing a major role in Georgia's energy supply. Recent studies indicate that fuel-wood is the second biggest indigenous energy source as 57% of households (97% in rural areas, especially in the high mountainous part of the country) use the firewood for water and space heating, and cooking. This is mainly traditional biomass but recent studies also indicate that there is a considerable amount of residue from wood and agricultural crops being used for energy (*Energy Balance of Georgia, 2014*).

For the assessment of supplied and used firewood in tones, a conversion factor from volume unit (1 m^3) to weight unit (tones) - 0,534 t was used. According to the Technical Regulation/Rule on Calculation of Emissions from Stationary Sources of Atmospheric Air Pollution (Governmental Decree No. 435, dated 31.12.2013, Table 95, entitled "Timber (Primary) Processes," page 102), different tree species have varying conversion factors. Assuming the abovementioned, the mathematical conversion coefficients for all tree species was calculated. The obtained rate – 0.534 was multiplied by the amount of consumed firewood in volume (2,543,200 m^3* 0,534*) and the received amount was added to the amount of consumed other biomass materials (briquettes, solid fuel 16,200 t and other herbal wastes 800 t). Thus, the total amount of consumed biomass equals 1,376,069 t/y. This number was used as an input for the Toolkit.

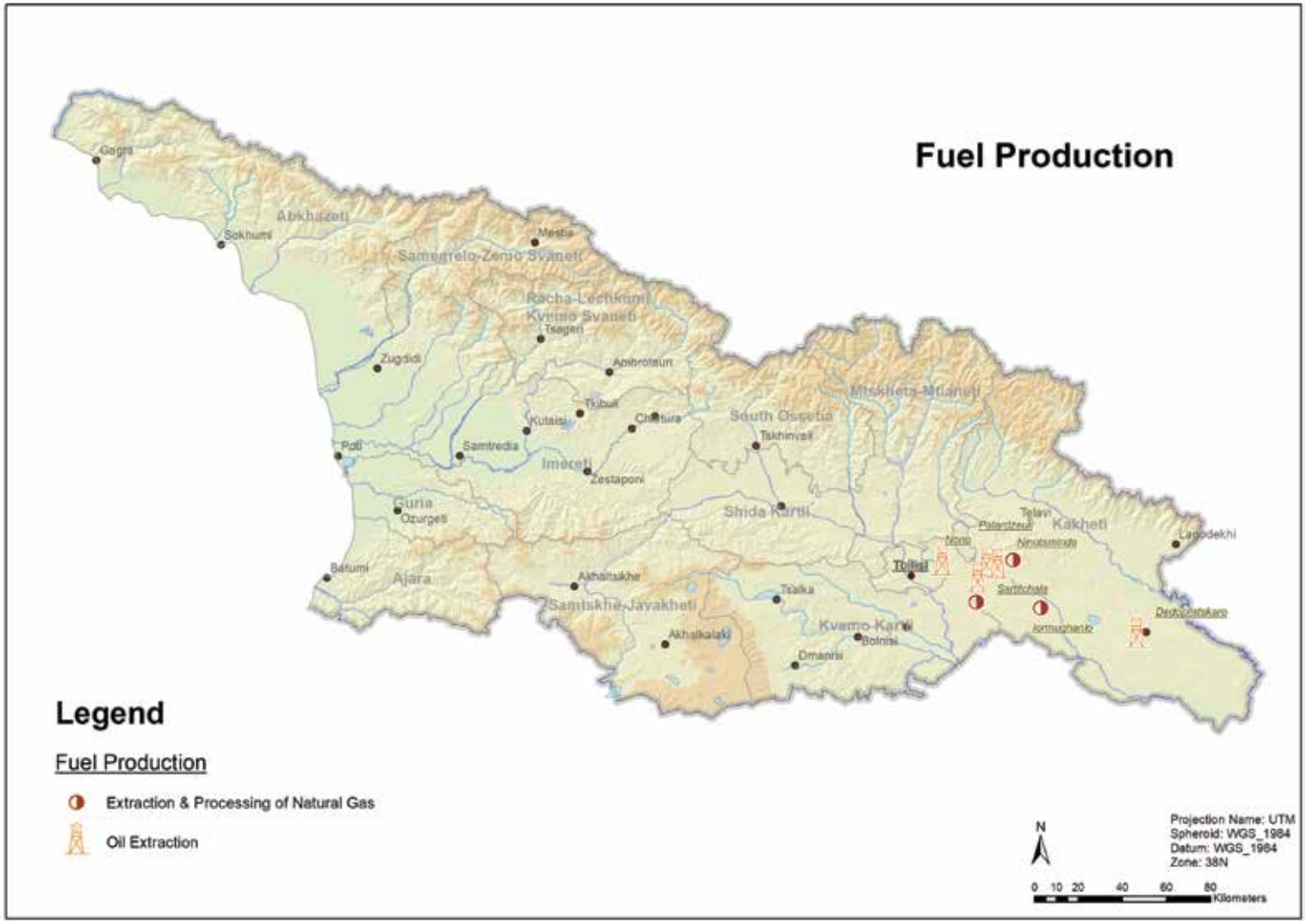
Charcoal Combustion: The *Energy Balance of Georgia* (2014) does not specify charcoal as an energy source. Data for charcoal combustion was calculated based on produced charcoal by the private sector/producers. Per the data from the National Statistics Office of Georgia, the country has eight small charcoals production enterprises of which only four are operational. The total charcoal production in 2013 was about 71 t/y. This number was used as an input for the Toolkit.

2.3.2 Sub-category - Fuel production

Oil Extraction, Oil Refining, Extraction and Processing of Natural Gas: Oil production started in the twentieth century and the annual production currently exceeds 40 thousand tonnes (Georgian Oil and Gas Corporation). The territory is divided into license blocks and production companies are selected through international tenders. These companies have already carried out significant exploration work within their licensed territories; new fields have not yet been discovered despite promising geological examinations.

Natural Gas Georgia started gas extraction in the late 1970s. Currently, gas production in Georgia is insignificant. During the last five years, the country's annual gas production has averaged 16.5 million cubic metres versus its consumption of 2 billion cubic metres. Extraction and processing of natural gas according to the Energy Balance of Georgia (2014) equals 5.4 million m^3. As concerns oil extraction data, about 47,900 t/y of crude oil was extracted in the country in 2013. This number was used as an input for the Toolkit.

Figure 16. Map of fuel production in Georgia[19]



19. Map was prepared in the scope of UNDP/GEF project "Strengthen national decision making towards ratification of the Minamata Convention and build capacity towards implementation of future provisions" based on available data and information

2.4 Data and inventory on domestic production of metals and raw materials

2.4.1 Sub-category - Primary metal production

There is a large-scale polymetallic mine and enrichment plant, Madneuli, in Georgia. Ore extraction is carried out through the open pit mining method using rock drilling and explosion methods. The designed capacity of the plant is 1,360 thousand tonnes of ore processing. Copper concentrate is produced. The concentrate is fed into a bunker where it is sorted and packed, loaded on railway cars and transported. The production of copper from concentrates is not carried out in Georgia. Mercury releases from the production of copper concentrate alone are not calculated in the Level 1 inventory for Georgia. The *Reference Report and Guideline for Inventory Level* 2 notes that mercury can be released through the wastes from mining and production of copper concentrates. The primary pathways for release include water, land and sector specific treatment and disposal. Future refinement of the inventory should take into consideration this potentially significant source of mercury releases.

There are a number of significant mercury, copper and zinc deposits in Georgia's two breakaway regions that were exploited during the Soviet period. These are the Kvaisa copper and zinc mine located in South Ossetia, the Jejora River watershed close to the Racha region and several mercury deposits and mines in Abkhazia. Current information on the condition of these mines, accumulated wastes and the environment there is unavailable. Nevertheless, there is some information on the reserves from past geological surveys. Below is a summary table of the existing non-ferrous metal ores located in South Ossetia and Abkhazia.

According to the data of the Department of Geology of the National Environmental Centre (NEA), two mercury ores are located in the Racha-Lechkhumi-Kvemo Svaneti region in the Oni Municipality (villages of Gomi and Kodisdziri) (Please, see Figure 5).

In summary, according to the data of the National Statistical Office, there is no domestic production of primary mercury, zinc from concentrates, lead from concentrates or aluminium from bauxite which might directly or indirectly lead to releases of mercury into the environment.

It should be mentioned that, based on the interviews with the Ministry it was determined that there is no gold extraction with mercury amalgamation or with or without the use of retorts. However, there are several anecdotal references to artisanal mining in the country, particularly in the region of Svaneti, where mining is conducted with the use of traditional sheep's fleece[20]. No visits were made to the mining regions and the inventory team could not confirm that no mercury is used by these artisanal miners.

Industrial-scale gold extraction is conducted in Georgia, in the Bolinisi region of southern Georgia. The only plant is currently operated is RMG Gold. It produces gold from gold bearing quartzite through the cyanide leaching method which involves gold recovery by pouring liquid onto the ore pile. According to the data from the Minerals Yearbook of US Department of the Interior, US Geological Survey (cited in The Mineral Industry of Georgia, by Elena Safirova, 2013 page 17), about

20. BBC reporting on gold rush in the Caucasus (http://www.bbc.com/news/av/world-europe-11808349/gold-rush-hits-georgia-s-caucasus-mountains)

4.3 t/y of gold is produced in Georgia[21]. In order to obtain additional clarifications, on-site visits should be a priority in follow-up work for an inventory Level 2.

One large primary ferrous metal production (pig-iron production) plant and a number of small smelters operate in Georgia. The major product of the ferroalloy plant is silicomanganese which is produced from manganese. For data collection purposes, representatives of the ferroalloy plant and 32 small enterprises were interviewed. Among the country's small facilities, only 12 were found to be in operation.

According to the data obtained, the ferroalloy plant produced 19,148 tonnes of silicomanganese in 2014. Furthermore, 84,940 tonnes of silico-manganese was produced by small enterprises.

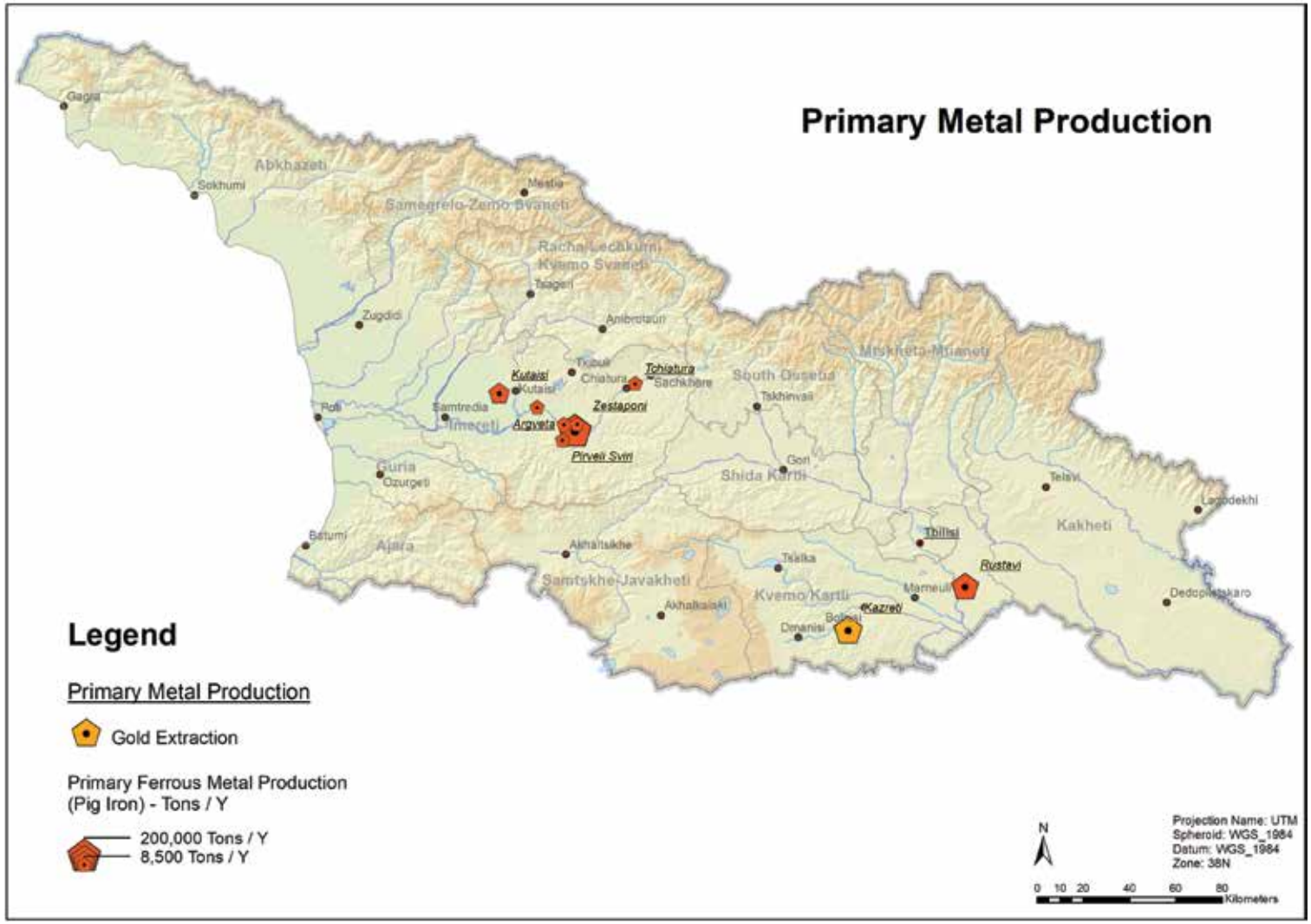
Georgia's iron and steel production sector is dominated by Rustavi-based steel producers which mainly consist of the large Rustavi Metallurgical Plant and GeoSteel. The Rustavi plant produced coke, sinter, pig-iron, steel, rolled items and hot-rolled and cold-drawn steel pipes. In the 1990s, the production of steel and iron significantly reduced, stopping altogether in 2000. The plant re-started its steel production in 2007 but only based on scrap steel. Scrap iron is now worth 3% of exports, slightly lower than processed steel bars. Currently, secondary metal production from recycled materials (metal scrap) is conducted by the Geo-Steel company. According to interviews, the plant produces 175,000 tonnes of pig-iron annually. It should be mentioned that it was impossible to quantify the number of vehicles scrapped since there are no such statistics. Taking into consideration the abovementioned circumstance, the pig-iron quantity produced by Geo-Steel was added to the produced amount of primary ferrous metal (175, 000 t/y). In total, 451,688 t/y (191,748 tonnes (silico-manganese) + 84,940 tonnes (silico-manganese from small enterprises) + 175,000 tonnes (pig-iron) of ferrous metal was produced in the country in 2014. This figure was used as part of Step 3 for the inventory Toolkit. This alternative methodology introduces some uncertainties in the mercury emissions calculated, but they have only moderate importance in the total national release estimate.

Furthermore, import records do not show any significant amounts of elemental mercury being imported into the country.

It should be mentioned, that emissions from this sub-category may significantly increase in the future as the long-term plan of the Rustavi plant envisages the construction of one new steel production line with an annual production of 350,000 tonnes and the rehabilitation of the Sinter Plant and Blast Furnace complex to produce 750,000 tonnes of pig-iron annually.

21. NOTE ON CALUCATION OF HG RELEASES FROM GOLD MINING: The Level 1 unit conversion tab provides a conversion from tonnes of gold produced to tonnes of ore used of 250,000. This conversion also assumes a concentration of 4 grams of Au / tonne of ore. However, in Georgia, the mining company RMG Copper reports a range of concentrations of Au in the Bolnisi deposits of 15 – 50 g Au/t (mean 32.5 g Au/t). Therefore, to estimate the releases of mercury from this sector we corrected the conversion by a factor of 8 to arrive at an activity rate, based on 4 tonnes of Au produced per year, of approximately 125,000 tonnes of gold ore used per year. It is understood that the concentration of Au in the ore provided by the mining company requires further validation

Figure 17. Map of metal extraction/production in Georgia[22]



22. Map was prepared in the scope of UNDP/GEF project "Strengthen national decision making towards ratification of the Minamata Convention and build capacity towards implementation of future provisions" based on available data and information

2.4.2 Sub-category - Other materials production

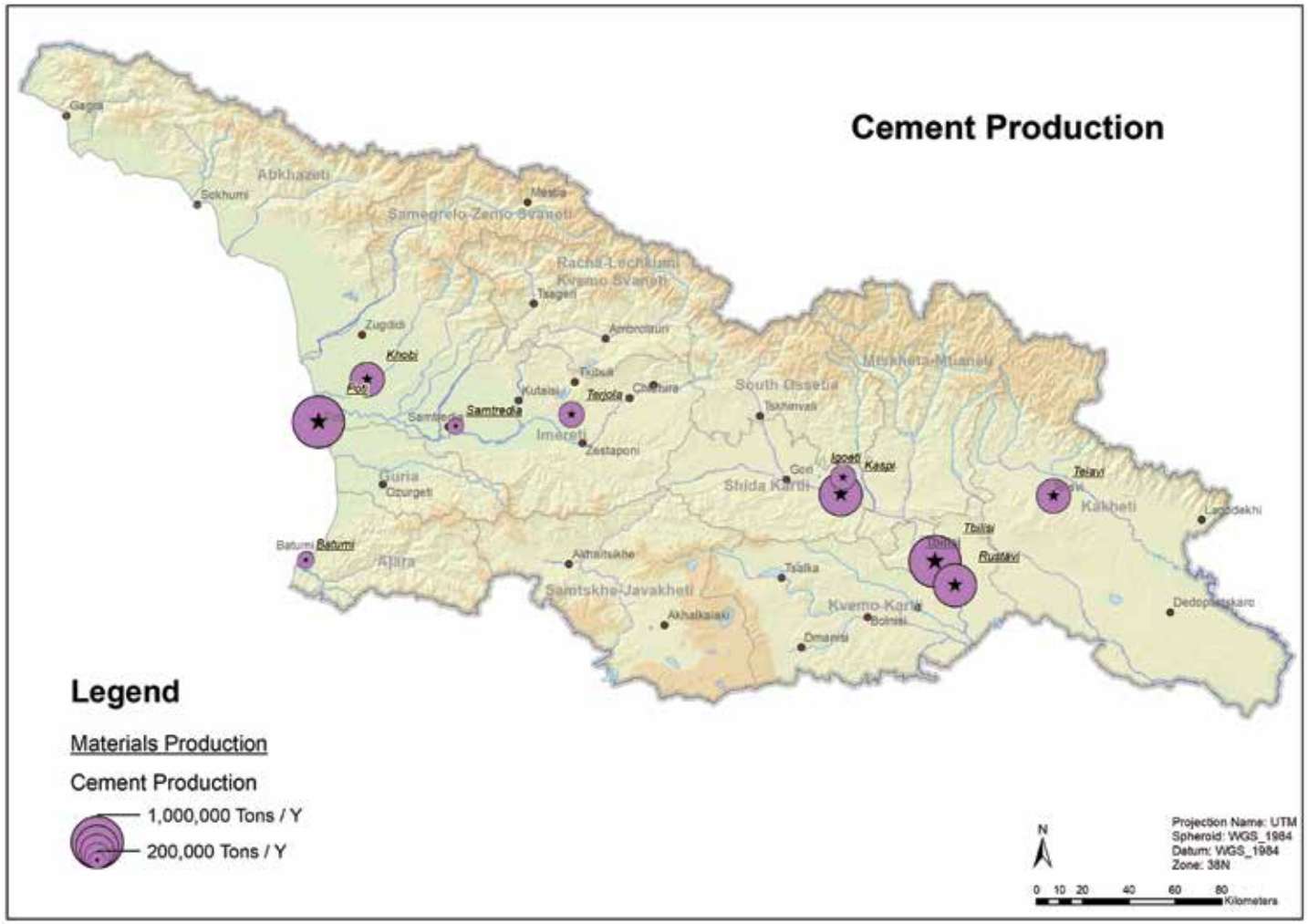
Cement production: Statistical data on the total amount of produced cement in the country, covering all small, medium and large cement manufacturer companies, do not exist. Interviews with representatives of 52 small registered enterprises were conducted in order to obtain information on cement production. Of these, only 23 are currently in operation. Moreover, a letter was sent to HeidelbergCement, the main cement producing company in Georgia, with a request for information.

Summarising the data collected 4,116,163 t/y cement was produced in the country in 2014. During the inventory was not possible to get data about imported or sold amount of clinker. As for this sub-category only cement produced from klinker made in Georgia should be counted (cement produced from imported clinker should be omitted). Above mentioned number is much larger than USGS's (950,000 t/y in 2013); furthermore, according to the Georgian statistical department 1,600,000t cement was produced in 2014 in Georgia. Taking into consideration above mentioned. The official data from Geostat was used as an input for the Toolkit. Based on these data; it is evident that cement production is one of the main contributors to mercury releases into the air (219 Kg Hg/y) in Georgia, after waste incineration and open waste burning activities.

Under the given inventory, the default input factor was used for the estimation of mercury release from cement production. The value of the default factor was based on the assumption that 50% of the cement is produced with fossil fuel only, and the other 50% of the cement is produced with waste materials burning providing part of the energy needed. Moreover, it was assumed that 50% of the cement is produced in plants that are equipped with relevant filters, while the other 50% of the cement is produced in plants that operate without them. Currently in Georgia, all of the small and large cement producing enterprises are equipped with bag filters controlling stack dust emissions and none of them use waste materials as fuel. Consequently, the default input factor for cement production might over-estimate the mercury releases from this sub-category. Additionally, the default emission factor which is used for calculation of mercury release to the atmosphere for the annual Statistical Yearbook relies on clinker production (t/y) while the mercury inventory Toolkit calculation is based on the produced cement (t/y) amount. Recalculation of mercury emissions from cement production is a priority follow-up activity, as feasible. Summarising the data, 4,116,163 t/y of cement was produced in the country in 2014. This data was used as an input to the toolkit.

Pulp and paper production: With respect to pulp and paper production, interviews with representatives of existing 11 paper recycling enterprises were carried out. As the result, only one of them was operated in 2014 and the amount of produced paper made up to 3,400 t/y. This number was used as part of Step 3 of the inventory toolkit.

Figure 18. Map of cement production in Georgia[23]



23. Map was prepared in the scope of UNDP/GEF project “Strengthen national decision making towards ratification of the Minamata Convention and build capacity towards implementation of future provisions” based on available data and information

2.5 Data and inventory on domestic production and processing with intentional mercury use

2.5.1 Sub-category - Production of chemicals

According to the data from National Statistics Service of Georgia there is no domestic production of chemicals: acetaldehyde, and vinyl chloride monomer (VCM) with Mercury catalyst. Moreover, chlor-alkali production with mercury cells in Georgia does not exist either.

2.5.2 Sub-category - Production of products with mercury content

In Georgia production of products with mercury content (such as thermometers with mercury, light sources with mercury, manometers/gauges with mercury, biocides & pesticides with mercury, batteries with mercury, paints with mercury or skin lightening creams and soaps with mercury) does not take place[24].

2.5.3 Sub-category - Production of recycled metals

Hg inventory toolkit recommends using the number of vehicles recycled per year under this sub-category. The only secondary steel mill in Georgia is the "Geosteel", which processes scrap steel, but there is no data about the number of vehicles in the scrap. Consequently, the production of recycled of metals by above mentioned plant was added to the Sub-category - **Primary metal production**, total number was used as the part of Step 3 of the inventory toolkit.

Data gap on recycled metals should be addressed under inventory level 2 and statistical accounting of vehicles in scrap should be introduced.

2.6 Data and inventory on waste handling and recycling

2.6.1 Sub-category - Waste incineration

In Georgia, exact data on wastes generated and disposed does not exist. It is estimated that on around 900,000 tons of the total amount of municipal waste is generated in the country.
Concerning the production of recycled mercury, it does not take place in the country. Moreover, there is no incineration of municipal/general waste and sewage sludge as well as incineration of waste for energy recovery.

Medical waste: Data on medical wastes captures waste incineration data by 6 companies, with whom the inventory team conducted interviews, or communicated otherwise. In fact, there are 12 registered inheritors, but on 6 are operational at present. According to data obtained from these entities, total of 1,876 t/y of medical waste is incinerated. This number was used as part of the Step 5 of the inventory toolkit.

As the mercury emissions resulting from incineration and open burning are heavily influenced by the mercury content of the waste being incinerated/burned, it is unclear at this stage of the inventory how many mercury containing medical devices are spent each year. However, whether these are incinerated along with the contagious waste streams or disposed separately has a major impact on the release of mercury emissions to flue gas and incinerator ashes.

During the level 2 inventory it will be important to further investigate the Mercury content in hazardous/medical waste streams that are being incinerated.

24. National Statistics Office of Georgia (GeoStat) 2014

2.6.2 Sub-category - Waste deposition/landfilling

Controlled landfills/deposits and Informal dumping of general waste: Available 2014 data on landfills dumpsites indicate that there are more than 56 official landfills (of which only 4 have environmental impact permits) and hundreds of illegal dumpsites mostly, in rural areas are recorded in the country. There are no landfills for hazardous or special wastes e.g. construction waste and only few landfills have separate cells for special waste, like asbestos waste.

Official information on wastes landfilled/deposited or dumped exists only on collected municipal solid waste disposed to official landfills. The inventory team made an assumption that 2/3 of generated wastes is collected and disposed to controlled landfills, the half of that uncollected waste is burned in the open and the other half is illegally dumped. Taking into consideration total amount of collected waste (900,000 t/y) and amount of landfilled waste (738,389 t/y) the rest will be the amount of informally dumped waste, making around 161,611t/y. This figure was used as an input to the toolkit.

Data gaps regarding this section might be caused by the fact that there is a lack of a waste management data and it is very difficult to obtain accurate data on waste amounts (non-hazardous, hazardous and specific wastes) and composition. It is recommended that a level 2 inventory look more closely at this data.

2.6.3 Sub-category - Waste water treatment

The centralized sewerage systems operate only in 45 towns of Georgia. Most of them were constructed in 1980s. Due to the systematic violation of the operation rules of these systems, most of them do not meet technical standards. In addition, only 33 towns have the communal wastewater treatment plants with the total design capacity of 1 640.2 thousand m3/day. Most of them are also outdated. From these, only 26 towns have the biological treatment facilities. But most of them are also out dated and inactive.

The mechanical cleaning phase operates only in Tbilisi-Rustavi (Gardabani), Kutaisi, Tkibuli, Gori and Batumi treatment facilities. In addition to the mechanical treatment, wastewater collected from Batumi and Sachkhere is also treated biologically. The construction of the new treatment facility is currently ongoing in Mestia and the construction of the treatment facilities is planned in Anaklia and Ureki.

Based on interviews with representatives of the Water Resources Protection Service of the MoENRP, total of 177,843,000 m^3/y waste water was generated and treated partially (mostly by primary treatment) in 2014. This figure was used as an input to the toolkit.

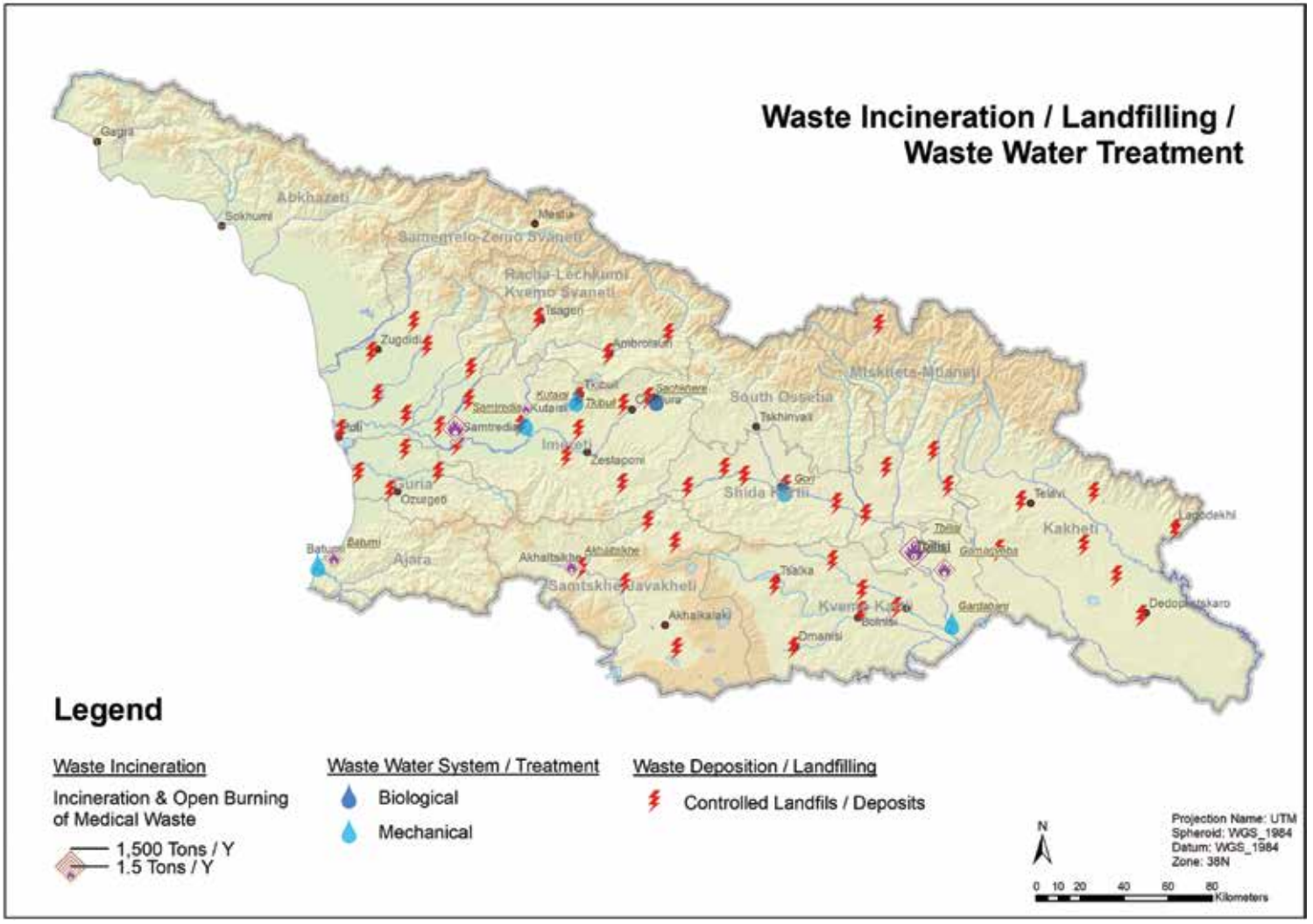
2.6.4 Test of waste and wastewater default factors

The given mercury inventory used default input factors for estimation of mercury releases from general waste treatment and wastewater treatment. The default factors were based on literature data on mercury contents in waste and wastewater, and these data were only available from developed countries.

The test made for general waste compared the calculated inputs to all four-general waste sub-categories with the sum of general waste outputs from intentional mercury uses in products plus processes as follows, using data from the Inventory level 1 spreadsheet. Likewise, the test made for wastewater compared the calculated inputs to wastewater treatment with the sum of outputs to water from intentional mercury uses in products plus processes as follows, using data from the Inventory level 1 spreadsheet.

The calculations made indicate that the default input factors for general waste and wastewater treatment may over-estimate the mercury releases from these sub-categories. This may be of priority in follow-up work, as feasible.

Figure 19. Map of waste incineration/landfilling and wastewater treatment locations[25]



25. Map was prepared in the scope of UNDP/GEF project "Strengthen national decision making towards ratification of the Minamata Convention and build capacity towards implementation of future provisions" based on available data and information

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

Background calculations for the product groups were based on the data on population, electrification rate and dental personnel as suggested by inventory level 1 methodology.

Table 9. Data types used as activity rates

Sub-category	Data types used as activity rates
Dental amalgam fillings ("silver" fillings)	Population, density of dental personnel
Electrical switches and relays with mercury	Population, electrification rate (percent of population with access to electricity)
Polyurethane (PU, PUR) produced with mercury catalyst	Population, electrification rate (percent of population with access to electricity)
Other manometers and gauges with mercury	Population, electrification rate (percent of population with access to electricity)
Laboratory chemicals	Population, electrification rate (percent of population with access to electricity)
Other laboratory equipment with mercury	Population, electrification rate (percent of population with access to electricity)

2.7.1 Sub-category - Dental amalgam fillings

During the information collection process several interviews with dentists were conducted. Each of them said that mercury based dental amalgam are not used anymore for filling the tooth cavities. Morethan that, a request letter was sent to the Georgian Dental Association. According to information received from all above sources, mercury dental amalgams are no more imported, and therefore, there are no longer in use for over 10 years.

Table 10. Background data for default calculations for dental amalgam and certain other products

BACKGROUND DATA FOR DEFAULT CALCULATIONS AND RANGE TEST			
Country	Population in 2014	Dental personnel per 1000 inhabitants	Electrification rate, % of population with access to electricity
Georgia*6	3,729,500	0.281	100

The data of the Table 10 was used as an input to the Toolkit. For most countries, they are based on authoritative international data sources (population data: UNSD; Dental data: WHO; Electrification data: IEA).

2.7.2 Sub-category - Electrical switches and relays with mercury

In Georgia, there is no information electrical switches and relays with mercury. The data was calculated using the number of population (mean ratio) and assumption that 100% of population has an access to electricity in Georgia.

2.7.3 Sub-category - Polyurethane (PU, PUR) produced with mercury catalyst

In Georgia, data on PU/PUR produced with mercury catalyst is not available. Therefore, the amount was calculated based on the number of population (mean ratio) and assumption that 100% of population has an access to electricity in Georgia.

2.7.4 Sub-category - Thermometers

Medical mercury thermometers: Thermometers containing mercury are not identified by the Customs Service of Georgia. Consequently, the amount of mercury thermometers imported to the country is unknown. In order to identify average annual turnover of mercury thermometers, the inventory team surveyed leading pharmacies. More specifically, interviewes were held with the drugstores of two major companies: PSP in order to determine annual amount of mercury thermometers, purchased by population and tmedical facilities during the year. Survey results show that PSP's pharmacy sells 400-420 thermometers per year, among them 357 (85%) are mercury thermometers. There are 183 PSP pharmacies in the country (1/4 of country's market). Therefore, the approximate number of sold mercury thermometers in a years is 357*183=261,324.

It has to be noted that that the in the future the survey should cover all major and smaller farmacies in order to have more representative and valid data on thermometers consumed.

Non-medical mercury thermometers (laboratory thermometers C°100, C°50): For determining the number of annual sales of Laboratory thermometers, representatives of all shops, selling non-medical thermometers were interviewed. Inventory results indicate that around 180 units of laboratory mercury thermometers are sold annually.

2.7.5 Light sources with mercury

Data on electrical products that may contain mercury were acquired from Customs Department. It indicates that annual amount of such products imported in the country is very small (a few units). Based on National Commodity Nomenclature of Foreign Economic Activity, the code 85393210000 means lamps, containing mercury. According to the information received from the Customs Department, the country imports several thousand mercury lamps annually, but in 2015 this amount. The total amount of imported mercury lamps was 5,287 units in 2013. According to the UN Comtrade database the amount of imported fluorescent tubes (double end) equals 2 343 195 items and sold Hg containing light sources equals 116 650 items. This figure was used in the Toolkit.

2.7.6 Sub-category - Paints with mercury preservatives

There are around 33 registered paint producers and importers in Georgia. Of this, only 2 are importers with around 235 t/y imports. Both enterprises receive products from abroad (particularly from Germany) that may indicate on the non-mercury content of these paints.

2.7.7 Sub-category - Skin lightening creams and soaps with mercury chemicals

In Georgia, there is no statistics on the real content of face creams and soaps domestically produced and imported from abroad, since no laboratory tests are conducted to check the quality of products against health and safety standards. Under the current inventory Interviews were taken from the 17 small enterprises producing soaps and creams. During the interview, all the manufacturers said that their products do not contain mercury, and do not consume it on any stage of the production.

In the future, more detailed survey of creams and soaps with mercury chemicals should be carried out for both imported and domestically produced products.

2.7.8 Sub-category - Laboratory chemicals and other laboratory chemicals equipment with mercury

In Georgia, there is no single institution registering or collecting/monitoring laboratory chemicals with mercury. It can be assumed, that there are quite a number of laboratories, keeping outdated chemicals, including those with mercury as they used chemicals with mercury for research purpose in previous years. During the Interview only 1.5 kg of metal mercury stored safely in one chemical laboratory was identified. Data about Laboratory chemicals and Laboratory chemicals equipment with mercury from the existing chemical laboratories in the country is unknown. Therefore, data types used as activity rates for this sub-group was derived from the number of population (mean ratio) and assumption that 100% of population with access to electricity in Georgia.

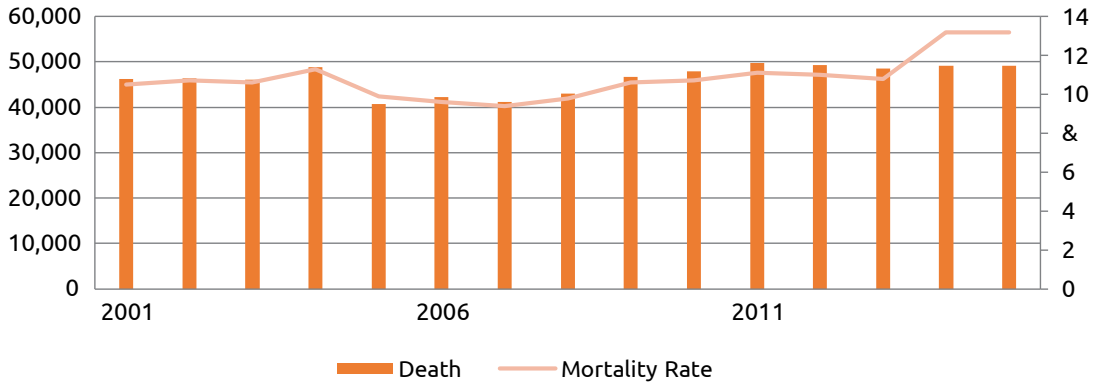
In general, data gaps regarding mercury in products and chemicals might be caused by the fact that there is no chemical register system in place in Georgia. There is also no governmental institution monitoring and registering/having database on mercury content in produced or imported products group mentioned above. Consequently the estimation of the amount of mercury contained in product groups and the number of mercury containing products imported requires further research as many uncertainties were identified.

2.8 Data and inventory on crematoria and cemeteries

Crematoria: In Georgia, there is no cremation in practice. Therefore, in the country there are no crematoriums.

Cemeteries: Data on cemeteries was derived from the number of deaths registered in 2014 and reported by State Statistical Service. This figure made up 49,000 deaths with an increase of approximately 1.1% as compared to 2013 (Geostat, 2014). This number was used as an input to the toolkit.

Figure 20. Death and mortality rate statistics of Georgia[26]



26. National Statistics Office of Georgia

Conclusions

The national mercury release inventory of Georgia was carried out and offers the following conclusions.

1. The standard estimation of the total mercury input by the Toolkit Level 1 was 3990 kg Hg/y. The share of mercury input was: Primary metal production 45%, use and disposal of products with mercury content (28%) waste deposition/landfilling, incineration (medical waste) and waste dumping (14%), cement production (5%) and energy consumption (3%). Inputs from remaining sources were less.
2. In the Toolkit Level 1 estimation which is applicable for a rough esti¬mation in developing countries, the total quantified mercury release into different phase's media was 4200kg Hg/y.
3. The most important categories of mercury releases to the atmosphere were identified as: use and disposal of other products (thermometers, electrical switches and relays, light sources and batteries, polyurethane with mercury catalyst and paint with mercury, medical blood pressure gauges, other manometers and gauges with mercury, laboratory chemicals) (1165 Kg Hg/y), waste incineration and open waste burning informal dumping of general waste (449 Kg Hg/y), other materials production (cement production) (219 Kg Hg/y) and coal combustion and other coal use (83.0 Kg Hg/y).
4. Mercury inventory in waste, wastewater and by-products need to be developed with real measurements.
5. During development of a Level 2 inventory (or in the period to come), it will be important to estimate the amount of mercury contained in product groups and the number of mercury containing products imported. Further, mercury treatment, recovery and safe storage issues need to be addressed and managed in the future.

2.9 Data and inventory on stocks of mercury and/or mercury compounds, and storage conditions, supply and trade of mercury and mercury containing compounds, including sources, recycling activities and quantities, and contaminated sites

Data on stocks and storage of mercury and/or mercury compounds are not available in Georgia. However, it can be assumed that there is no SCGM and chlor-alkali production, significant stocks of mercury are not present in the country. Concerning primary mercury mines, as it was mentioned in previous chapters there are many mercury deposits in north and northwestern mountainous parts of Georgia. Of these, many of them are located in breakaway region of Georgia and Georgian government has no access to these territories. Those deposits, which are located in controlled territories of Racha-Lechkumi, are not currently extracted.

Concerning temporary storage of non-waste mercury, such information does not exist in the country.

Regarding contaminated sites, the inventory team did not touch upon this issue, given there is no requirement to include it in the inventory. Data readily available on contaminated sites are not present in the country, given there is no inventory system put in place for carrying out inventory and assessment of contaminated sites. Therefore, significant resources and knowledge are required to generate new data. Under the new Waste Management Strategy and Action Plan, Georgia committed itself to set regulatory and policy framework for hazardous wastes management, including management of contaminated sites and carry out inventory of sites contaminated with hazardous wastes, including mercury.

2.10 Impacts of mercury on human health and the environment

In Georgia data on exposure to mercury and its impacts on human health and environment is practically absent, since there is no regular monitoring of mercury concentrations in various environmental media as well as in food and other products. Moreover, there is no single toxicological/epidemiological study on mercury exposure.

There are some sporadic studies of mercury content of imported fish in Georgia. These studies in different times (2012, 2014, 2015, and 2016) were commissioned by the Center for Strategic Research and Development of Georgian, local CSO, who implements a consumer protection program and maintains the interactive conesumer.ge web-portal. The results of these studies, including those of the most recent study (2016)[27] do not indicate on the exceedance of maximum available concentration in fish in tanned and frozen imported fish.

Initial mercury inventory indicates that the major mercury inputs to the society are from: i) waste deposition/landfilling and waste water treatment; ii) use and disposal of products with mercury switches and relays; iii) cement production. Likewise, largest mercury releases are from: i) cement production, though the data might be overestimated due to methodological specificities and lack of exact data on emission abatement technologies; ii) coal combustion by households and industries; iii) informal dumping of general wastes and; iv) use and disposal of electrical products with mercury (switches and relays).

Concerning geographic distribution of above sources and mercury potential pathways in order to roughly judge about the communities under higher risk of expose, informal dumpsites exist in all regions and municipalities of Georgia. Particularly, the grave situation is in small towns and villages, the majority of which are not covered by centralized waste collection services. Illegal dumps with a mixture of household/municipal, hazardous and specific wastes are most frequently located on riverbanks or river gorges and pose the risk of movement of heavy metals including mercury through water and soil pathways. Legal waste disposal sites located in each municipality and in more or less close vicinity of administrative centres of local municipalities also pose threat to ambient environment and population, since all types of wastes including electrical equipment with mercury are disposed there. There is a risk of leaching mercury through soil to ground water and getting into drinking water sources. There is also risk of mercury getting into surface water bodies, if the sites do not have drainage water control systems and are located next to the water bodies.

From estimates of releases of mercury from products containing mercury it appears that together with electrical switches and relays which are the major sources of mercury releases under the specific group of mercury sources, laboratory equipment, thermometers and other medical equipment with mercury contribute significantly to mercury releases. Therefore, these sub-categories have to be paid a high attention in terms of calculating more precisely amounts of releases, assessing direct exposure of consumers, direct and indirect exposure of population and environment through mercury getting to water and soil and food chain through the waste streams.

Furthermore, cement production appears as one of the major source categories in both input and output sides of the mass-balance equation. Major environmental releases from these industries are in the form of stack emissions of particulate matter. The primary pathway is air, but through

27. Source http://www.momxmarebeli.ge/?rec=7412

dry deposition mercury may get into soil and food chain. Major cement plants are located in the cities of Kaspi and Rustavi and populations residing there and in their vicinity may be under the risk of mercury exposure from air emissions and dust inhalation as well as through getting mercury in food chain as a result of dry deposition on agricultural lands.

Coal is used as a fuel by many industries, including Kaspi and Rustavi Cement plants and other manufacturing plants and therefore, inventory of mercury air emissions as well as water, land and waste releases should be regularly carried out.

Mercury is also released in some quantities (primarily in the form of air emissions) from Zestaphoni ferroalloys and few smaller plants and therefore, it is recommended to carry out periodic ambient air quality monitoring against mercury in the city of Zestaphoni as well as control/monitor mercury stack emissions here.

Chapter III:
Policy, Regulatory and Institutional Framework Assessment

3.1 Policy and regulatory assessment

3.1.1 Convention obligations and existing Georgian legislation

In Georgia, there is little legislation that concerns the management and control of mercury and mercury compounds. On the other side, several activities that are targeted in the Minamata Convention do not – yet - exist in Georgia and therefore may not need to be addressed by legislation at all. Mercury related activities that do not take place in Georgia are:

- ✔ Mercury mining[28] (Article 3 (3) and (4) MC);
- ✔ The use of mercury and mercury compounds in manufacturing processes (Article 5).

The corresponding provisions of the Convention are therefore irrelevant for any conversion into national law. However, concerning mercury mining, given the presence of some deposits in northwest of Georgia (Racha region) there might be useful to introduce a special provision in the new mining law to be developed in near future on the ban of mining of mercury deposits.

Definitions

Notably, definitions in the Convention are not only listed in Article 2 but also found in other provisions, such as Articles 3, 8, 9 and 11 of the Convention. The reason for such – rather unusual – "spreading" of definitions is that many terms defined concern only specific activities as defined in the respective provision of the Convention.

The transposition of the definitions into Georgian legislation is not mandatory but strongly advisable, as it contributes to clarity of legislation and hence its applicability. Today only very few relevant definitions have been incorporated into Georgian legislation whilst others have been integrated into pending legal drafts.

Article 3: Mercury supply sources and trade

Article 3 of the Convention addresses mercury sources that are available for use and trade. This article also specifies conditions and procedures that must be met in circumstances where such trade is allowed. There are two major provisions of Article 3 including: (1) the phasing out and ultimate closing of primary mercury mines and; (2) restrictions on the supply of mercury from decommissioned chlor-alkali facilities. In addition, Parties to the Convention are asked to identify any other large stocks of mercury and mercury-containing compounds.

Primary mercury mining is considered as least favored practice because mining effectively introduces new mercury into the global supply. In addition, primary mercury mining results in significant mercury releases to land and water adjacent to the mining area.

28. There are several mercury deposits and mines in Abkhazia – breakaway region of Georgia. However, current information on the condition of these mines, accumulated wastes and the environment there is unavailable

Article 3 establishes a prior-informed consent requirement before any trade of mercury can occur between Parties to the Convention. The relationship and obligations between Parties related to mercury trade are elaborated as are rules governing Party to non-Party trade.

Table 11. Brief analysis of Georgia's legislation in relation with Article 3 of the Minamata Convention

Article 3 - Supply and Trade	Georgia Domestic Law	Comments/ Recommendations
Not allow new primary mercury mining	No law covers this issue	Need to develop text for Mining Code to prohibit future mining of known deposits.
Phase out existing primary mercury mining within 15 years	No law covers this issue	There is no current mercury mining in the country.
Prevent the import and use of mercury from primary mercury mining for artisanal and small-scale gold mining (ASGM)	Law on Import, Export and Transit of Wastes on the Territory of Georgia	Georgia is party to the Basel Convention. Limited scale artesian gold mining (illegal) occurs in north-west of Georgia. Miners use gravity concentration method for extracting the gold. Therefore, the import and use of mercury for this very purpose does not occur. However, it is important to create legislation that restricts / prohibits/limits the use of Hg for these miners.
In accordance with Article 3.5(b), restrict the import and use of excess mercury from decommissioning chlor-alkali plants, and require environmentally sound disposal	Law on Import, Export and Transit of Wastes on the Territory of Georgia	Georgia is also a party to the Basel Convention.
Obtain information on stocks of mercury or mercury compounds exceeding 50 metric tons (MT), and mercury supply generating stocks exceeding 10 MT/y	Law on Environmental Impact Permit Waste Management Code	Law on Environmental Impact Permit requires construction of temporary storage facility for >10 MT of Hg. Initial inventory did not find presence of significant mercury stocks in Georgia.

Not allow the export of mercury unless the importing country provides written consent, the mercury is for an allowed use or environmentally sound storage, and all other conditions of Article 3.6 are met.	Law on Import, Export and Transit of Wastes on the Territory of Georgia No export of mercury/mercury compounds other than mercury wastes is regulated in Georgia	Georgia is also party to the Basel Convention. The clause should be introduced on the ban of mercury export-import in national legislation. Generally speaking, having a special by-law on mercury in place would have the advantage that key elements of the MC related to imports, products and assembled products could be regulated in one coherent piece of legislation (which could be amended easily if it is a by-law and not a Law, possibly under a new legal regime on Chemicals). However, it would have to be decided by the policy makers first, which types of mercury and mercury added products are banned, and to which extent, i.e. import, export and placing on the market.
Not allow the import of mercury without government consent, ensuring both the mercury source and proposed use are allowed under the Convention (and applicable domestic law)	Law on Import, Export and Transit of Wastes on the Territory of Georgia. There is no formal ban of Mercury import in any Georgian piece of legislation (except for mercury waste in new Basel draft law, which prohibits import of hazardous waste)	Georgia is also a party to the Basel Convention. Import ban should be taken up by legislation on chemicals management to avoid any potential future import. As concerns the prohibition of mercury imports the question must be decided if a complete import ban from all countries shall be set in Georgian legislation or if such ban (as required by the MC) shall only concern imports from non-Parties of the MC. Alternatively, any prohibition of mercury imports could be addressed in the new Law on Chemicals. The exemption clause of Article 3 (2 a and b) should be considered, in particular that the prohibition does not apply to mercury-added products as these are regulated individually and in other pieces of legislation.

The combination of Georgia's Waste Management Code and the Law on Import, Export and Transit of Wastes on the Territory of Georgia identify mercury and mercury containing wastes as hazardous materials that are banned without prior informed consent. The country lacks a well-developed mining code that regulates mining activities and this is a key gap in existing legislation. These laws, in conjunction with enforcement of requirements outlined under the Basel Convention, position Georgia to effectively monitor and prevent trade of mercury and mercury-containing compounds regardless of its point of origin.

Article 4: Mercury-added products

The Convention seeks to reduce demand for mercury through a combination of measures that phase down and ultimately phase out the use of mercury during the manufacturing of certain products. A mercury-added product (MAP) is defined by the Convention as a "product or product component that contains mercury or a mercury compound that was intentionally added" (Article 2, paragraph f).

The list of MAPs whose manufacturing and trade are restricted under the Convention are outlined specifically in Annex A and does not include products where mercury was not intentionally added during manufacturing, e.g., where trace contamination is derived from natural origin. The Secretariat of the Convention will continue to review other products for possible restrictions.

Table 12. Brief analysis of Georgia's legislation in relation with Article 4 of the Minamata Convention

Article 4 - Mercury Added Products	Georgia Domestic Laws	Comments / Recommendations
Not allow the manufacture, import, and export of products listed in Part I of Annex A not otherwise excluded following the phase out date listed in the Annex	Law on Pesticides and Agrichemicals. As regards the prohibition of manufacture/import/export of mercury-added products, other than mercury added pesticides after specified phase-out date, there is no legislation in place yet in Georgia. Article 9 (5) of the Georgian Waste Code entitles the MENRP to develop detailed obligations on extended producer responsibility (EPR) for specific waste which includes batteries, electrical devices, etc. (see Article 3 k)).	Georgia is a party to the Rotterdam Convention. Given the diversity of products to which mercury is added (including assembled products) it is recommended to adopt a by-law in which restrictions and/or bans on the production, import, export and placing on the market of mercury in new products are regulated. In such by-law on "chemical products restrictions" all concerned products could be addressed one by one. Notably, Article 10 of the Waste Code allows the Georgian lawmaker to "exceptionally, prohibit or restrict placement on the market of certain products" if this is suitable, necessary and proportionate to the objectives of this Law. This means that a suitable legal basis for product related provisions in a by-law is already in place. However, on the other side, it should be taken into consideration that mercury containing products are quite different and it may also be suitable to regulate them in specific by-laws as it is the case in most EU Member States. Within a Waste Management Code or specific by-law on batteries, electrical switches or relays, legal requirements on the mercury content should be set, assuming that these are controlled by customs department when imported.

Phase down the use of dental amalgam through two or more measures listed in Part II of Annex A	No law covers this issue, except for the governmental decree on handling dental amalgams in clinics.	The requirements related to measures to be taken to phase down the use of dental amalgam are diverse (see Part II of Annex A, MC). Legally, the use of dental amalgam shall be restricted to its encapsulated form (all other measures in the Annex are "soft" measures). The existing decree 309/n in Georgia sets number of safety measures for use of amalgam in dental clinics (in Art. 6, 7, 15, 18, 21) incl. safe storage but it neither addresses amalgam disposal from clinics nor does it restrict its use as such. It is questionable if the decree avoids the discharge of dental amalgam into waste water. Mercury inventory indicated that dental amalgams are on more in use in Georgia and ban on the use of "silver" fillings might not be relevant. However, as a precautionary measure such restrictive/complete ban clause may be introduced in the current legislation.
Take measures to prevent the incorporation of products listed in Part I of Annex A (i.e., switches and relays, batteries) into larger, assembled products	No law covers this issue.	See discussion below.
Discourage the manufacture and distribution of new mercury product types	No law covers this issue.	See discussion below.

The Law on Pesticides and Agrichemicals, as well as Waste Management Code in conjunction with Georgia's participation in the Rotterdam Convention, establishes a mechanism to effectively monitor and prohibit the use of mercury and mercury-containing compounds in pesticides.

As of this review, legislation restricting the amount of mercury in other products such as compact fluorescent lamps, batteries, and medical devices is not present and new legislation will need to be proposed and developed. This process will need to include participation from ministries and government agencies in charge of environment, trade, customs and energy. Examples of successful legislation developed for the European Union could be used as a model for such efforts. EU Directive 2002/95/EC (RoHS) limits the use of mercury during the manufacturing of new equipment marketed after 1 July 2006. In addition, the European Commission has established an Ecolabel program that can be used to identify lamps that contain less than 4 milligrams per bulb, making them compliant with the Minamata Convention.

Article 5: Manufacturing processes in which mercury or mercury compounds are used

Article 5 and its associated Annex B of the Convention identify manufacturing processes where mercury use will not be allowed and must be phased out (paragraph 2) and where the use of mercury and mercury compounds will be restricted (paragraph 3).

Mercury use during the production of chlorine gas and caustic soda (sodium hydroxide, NaOH) at mercury-cell chlor-alkali facilities will be phased out by 2025 unless exemptions are approved by the Secretariat. Similarly, mercury used as a catalyst in the production of acetaldehyde, a precursor in the production of acetic acid, will also be phased out by 2018. Other manufacturing processes that are addressed under Article 5 include mercury used during the production of vinyl chloride monomer (VCM), a precursor to PVC, and the production of polyurethane using mercury containing catalysts.

Table 13. Brief analysis of Georgia's legislation in relation with Article 5 of the Minamata Convention

Article 5 - Manufacturing Processes	Georgia Domestic Law
Not allow the use of mercury or mercury compounds in the manufacturing processes listed in Part I of Annex B	No law covers this issue.
Restrict (as specified in the Annex) the use of mercury in the processes listed in Part II of Annex B	No law covers this issue. None of the processes listed in Part II of Annex B are present in the country.
Not allow new facilities from using mercury in the processes listed in Annex B, except facilities using mercury catalysts to produce polyurethane	No law covers this issue. None of the processes listed in Part II of Annex B are present in the country.
For facilities with processes listed in Annex B, identify and obtain information on mercury or mercury compound use; and control mercury emissions to air, and releases to land and water	No law covers this issue. None of the processes listed in Part II of Annex B are present in the country.
Discourage new uses of mercury in industrial processes	No law covers this issue.

According to available government information and inventory results, there are no mercury-cell chlor-alkali facilities or plants that produce acetaldehyde in the country. Moreover, other manufacturing processes identified in Article 5 and Annex B that use mercury as a catalyst (VCM, sodium or potassium methylate or ethylate and polyurethane) are not conducted in Georgia.

Article 7: Artisanal and small-scale gold mining

The Convention defines artisanal and small-scale gold mining (ASGM) as "gold mining conducted by individual miners or small enterprises with limited capital investment and production" (Article 2). Globally, ASGM is responsible for emitting approximately 727 tons of mercury into the atmosphere annually and an estimated 800 tons of mercury released directly to land and water, making it the single largest source of anthropogenic mercury.

While ASGM is a major source of mercury to the environment, it also plays an important role in rural development. An estimated 10-15 million people worldwide participate in the sector producing 12-15% of the world's gold. As such, ASGM represents a complex development issue in many regions that seek to protect their environment but also provide opportunities for economic development in rural communities.

Artisanal and small-scale gold mining does occur in Georgia. During interviews with government officials, the national inventory team was informed that these miners do not use Hg to amalgamate gold. However, this could not be confirmed through direct observation and therefore cannot be ruled out entirely. An abundance of anecdotal information suggests that ASGM is actively practiced but none of these sources confirm the use of Hg. Therefore, while ASGM and the elevated risk of Hg use in this sector does not appear to be of immediate concern for the country, steps should be taken to restrict any future use of Hg in this sector.

Table 14. Brief analysis of Georgia's legislation in relation with Article 7 of the Minamata Convention

Article 7 – ASGM	Georgia Domestic Law	Comments/ Recommendations
Take measures to reduce, and where feasible, eliminate mercury and mercury compound use, emissions (to air), and releases (to land and water) associated with ASGM	Georgia Mining Code	According to the Ministry of Mining, artisanal miners do not use Hg to amalgamate gold. No site visits were conducted during the Hg inventory and this could not be confirmed through other sources.
For governments where ASGM and mercury use is "more than insignificant"	to be determined	See comment above.
Establish coordinating mechanism and delineate agency roles for development/ implementation of an ASGM National Action Plan (NAP)	to be determined	See comment above.
Define and formalize or regulate ASGM consistent with the Convention	Georgia Mining Code	Georgia Mining Code should adopt the definition of ASGM as defined by the Convention (Article 2(a)).
Eliminate whole ore amalgamation, open burning of amalgam or processed amalgam, burning of amalgam in residential areas, and cyanide leaching of mercury-laden sediment, ore or tailings (the "worst practices")	Georgia Mining Code	Mining Code could adopt language addressing these 'worst practices'.
Set mercury use reduction goals or targets consistent with the timely elimination of the worst practices and other use reduction efforts	to be determined	Not pertinent given the current understanding of ASGM in the country.
Reduce mercury emissions, releases, and exposures associated with ASGM, and prevent mercury exposures of vulnerable populations (particularly women of child-bearing age and children)	to be determined	Not pertinent given the current understanding of ASGM in the country.
Prevent the diversion of mercury and mercury compounds from other sectors to ASGM, and manage mercury trade consistent with the NAP	Georgia Mining Code; Law on Import, Export and Transit of Wastes on the Territory of Georgia	It is important to limit/prevent any future use of Hg within the ASGM sector in Georgia.
Implement a public health strategy to address mercury exposures to ASGM miners and communities	National Center for Disease Control and Public Health	Any future public health outreach and awareness raising could include information on exposure pathways related to the use of Hg in ASGM.

Article 8: emissions

Article 8 of the Convention seeks to control and reduce mercury emissions to the atmosphere from major existing and new point sources. Annex D identifies these major point sources to include: coal-fired power plants, coal-fired industrial boilers, smelting and roasting of non-ferrous metals, waste incineration, and cement clinker production facilities. The Conference of Parties to the Convention will adopt guidance on best available techniques and best environmental practices (BAT/BEP). Parties can be eligible for assistance to support the implementation of reduction measures that are outlined in paragraph 5 of Article 8.

Table 15. Brief analysis of Georgia's legislation in relation with Article 8 of the Minamata Convention

Article 8 - Air Emissions	Georgia Domestic Law	Comments / Recommendations
Require best available techniques/best environmental practices (BAT/BEP) or associated emission limit values (ELVs) for new sources as defined in Article 8.2(c) and listed in Annex D	Environmental Impact Permit. The Law on Air Protection	Georgia is obliged to approximate its legislation to key elements of the Directive on Industrial Emissions - IED (such as BAT, setting of ELV, establishment of a procedure for an integrated permit, control measures). It is strongly proposed to develop appropriate legislation on an integrated permit and related matters in the near future; a Twinning project in which Georgian legislation shall be approximated to the IED shall commence later this year. Within such IED transposing legislation specific ELV could be set (rather on by-law level or in Annex) for emissions, including mercury emissions into air. In addition, effective provisions for compliance control (with permits / ELV) will need to be set. Details of future Georgian IED legislation should be discussed and agreed upon with the Twinning team of above mentioned project – however, suitable measures in the sense of Article 8 (4) and (5) MC should definitely be included in this legislation.

Require one or more measures identified in Article 8.5 to control/reduce mercury emissions from existing sources listed in Annex D, which shall be operational at the source within 10 years	Environmental Impact Permit The Law on Air Protection	With respect to the regulation of mercury and mercury emissions into air from existing sources, legislation should provide a legal basis for developing a national plan on controlling emissions and establishing an emissions inventory (preferably not just on mercury). The preparation and adoption of a National Plan on Mercury should be possible in Georgia without any special legal basis related to the MC. However, if a legal basis for the adoption of such Plan is necessary, it should be incorporated into the 1999 Law on ambient air protection (or its planned follow-up, i.e. a newly planned "Law on Air Protection").
Require monitoring/reporting and otherwise establish a mercury emissions inventory for sources listed in Annex D	Environmental Impact Permit The Law on Air Protection and relevant technical regulation on the methods of emission inventories	Article 22 of the existing Law on Ambient Air Protection states that "Ambient air pollution adjustment measures include inventorying of pollution types and sources". There is also a sub-law defining the method and procedures for emission inventories. Notably, Georgia has not ratified the UNECE PRTR Protocol to the Aarhus Convention yet.

Emission limit values are not currently established for hazardous substances for industries subject to EIA, EE and EIP, including source categories listed in annex D of the convention. For industries, not subject to EIA/EE/EIP technical regulation is applied which sets fixed/default value for concentration of mercury in stack emissions and gives an equation for calculation of total allowable emissions.

In Georgia, emission inventories and reporting is required based on CorinAir emission inventory guidelines, using emission factors and mass-balance methods. Mercury emissions are also subject to emission inventories and national reporting. The National Mercury Inventory conducted as part of the MIA project in Georgia assisted the government in establishing a baseline upon which future reduction efforts in the country can be evaluated.

Existing regulations are not based on BAT/BEP and are not consistent with the values set out in EU directives.

Article 9: Releases

Article 9 addresses direct releases of mercury and mercury-containing compounds to land and water. Quantifying the amount of mercury entering the environment via direct releases is challenging because sources include both point and diffuse sources, some of which are related to legacy deposits from contaminated sites. Under Article 9, Parties to the Convention are required to identify source categories responsible for releases that are not addressed directly in other articles of the Convention.

Table 16. Brief analysis of Georgia's legislation in relation with Article 9 of the Minamata Convention

Article 9 – Releases	Georgia Domestic Law	Comments / Recommendations
Require reporting or otherwise obtain information as needed to identify significant sources of mercury/mercury compound releases to land or water, and to maintain an inventory of releases from the sources identified	Law on Water; Draft law on Water; Law on Environmental Impact Permit; Draft Law on Environmental Impact Assessment	According to Article 23 draft Water Law "the basis of water resources planning and controlling on a national level is a national strategy for water protection and use, developed by the state commission for water resources protection and use. Though the details of the content of such national strategy are unclear (and hence if it will set out concrete measures to be taken to control releases of mercury and other pollutants into waters), once adopted, the Water Law would serve as sufficient legal basis for such national plan / strategy. It is advisable to define either in the new Water Law or in by-law details of the content of the National Water Strategy.
Take one or more measures specified in Article 9.5 to control/reduce mercury and mercury compound releases to land and water from significant sources it identifies	Law on Water; Draft law on Water; Law on Environmental Impact Permit; Draft Law on Environmental Impact Assessment	The new draft water law mentions discharge limit values (in relation to "special water use permits") but does not set these limit values per relevant source yet. So far there exist only EQS in form of water quality concentration limits in surface water in Georgia, which is not sufficient to comply with the MC. It is recommended that the future water legislation of Georgia contains source-specific rules based on BAT and with detailed ELV set in an Annex or Annexes / by-laws per relevant source.
Carrying out release inventories	Law on Water; Draft law on Water; Law on Soil Protection; Law on Environmental Impact Permit	The adoption of the draft Water Law and its Article 33 would provide a sound legal basis for the establishment of a release inventory of mercury from relevant sources.

Effluent discharge limit values are not currently established although a technical assistance project conducted in collaboration with the EU will soon be initiated that will assist the Ministry of Environment with adoption of BAT/BEP guidelines. Under current guidelines, industries not subject to EIA/EE/EIP technical regulation are subject to a fixed/default value for effluent concentrations.

Because of Georgia's industrial history and currently active non-ferrous mineral processing sector, special attention should also be given to identifying diffuse releases associated with legacy deposits of mercury associated with abandoned industrial centers. This is also pertinent to Article 12 (see below).

Existing and draft laws on Water, existing law on Environmental Impact Permit and draft law on Environmental Impact Assessment provide the basis for Georgia to address releases of mercury to land and water. However, there will be a need to further elaborate on the approach and methodology for assessing releases, including the adoption of future guidance that will be provided once the Convention enters into force.

Article 10: Environmentally-sound interim storage of mercury other than waste mercury

Article 10 addresses the interim storage of mercury and mercury compounds that is intended for uses allowed under the Convention. The term "interim" is used to reflect the temporary, short-term nature of storage that should be considered during the transit of mercury. Mercury releases can occur throughout the supply chain (i.e., collection, handling, transport, and storage) and the Convention recognizes the importance of adopting recommendations for minimizing such loses. Article 10 does not address the management of mercury-containing waste as that is covered under Article 11 of the Convention. Future guidelines will be adopted by the Conference of Parties and will take into account existing guidelines outlined in the Basel Convention.

Table 17. Brief analysis of Georgia's legislation in relation with Article 10 of the Minamata Convention

Article 10 – Interim Storage	Georgia Domestic Law	Comments / Recommendations
Take measures to ensure interim mercury storage is conducted in an environmentally sound manner, taking into account guidelines to be developed by the Conference of the Parties (COP)	Law on Transboundary Movement of Hazardous Wastes Waste Management Code	Need to ensure interim storage follows established guidelines. According to the EU Study the interim storage of hazardous materials that is not considered waste under EU-law is not sufficiently regulated[29]. On the other side one has to keep in mind that under EU law more substances or objects are considered waste than under the MC, and consequently, processing such material is considered waste treatment (recovery) and falls under Article 11 MC. The storage of non-waste mercury on EU level is partly addressed by the Seveso Directive, namely insofar as it relates to the storage of dangerous substances which includes mercury as H3 toxicity category in accordance with Regulation 1272/2008 (CLP Regulation). Another EU Regulation (1102/2008) bans the export and regulates the safe storage of metallic mercury but it refers only to the storage of waste metallic mercury and hence rather falls under Article 11 MC. No example could be found that relates to any specific provision on storage of non-waste mercury in either Germany Sweden or Norway. The authors of the EU Study propose that the annexes of the Seveso Directive may be amended in order to cover the MC requirements for interim storage of mercury and its compounds (lower thresholds and perhaps additional wording to expand "safety" to "environmental sound storage")[30]. Given the fact that Georgia shall approximate its legislation to the Seveso (III) Directive it is recommended that legislation will be drafted and adopted in line with the Seveso requirements which may then also set lower thresholds regarding the storage of mercury non-waste as proposed by the authors of the EU study.

29. See Study on EU Implementation of the MC, Draft Final Report (revised), page 227
30. See Study on EU Implementation of the MC, Draft Final Report (revised), page 228

Georgia's Law on Transboundary Movement of Hazardous Wastes and the Waste Management Code has been amended to reflect the requirements of the Basel and Rotterdam Conventions, focusing primarily on export-import of wastes. Mercury inventory could not assess if Georgia imports commodity mercury for any approved uses under the Convention. It is only known that mercury in smaller amounts is imported for laboratory uses. The Customs Department and the Ministry of Environment will be important entities to engage when identifying any new regulations needed for interim storage of mercury.

Article 11: Mercury wastes

Article 11 of the Convention considers the guidelines developed under the Basel Convention for the environmentally sound management and disposal of mercury-containing waste. Mercury wastes can come in a variety of forms, depending upon the source. Industrial processes using mercury will create wastes from both the manufacturing process and pollution control operations.

Mercury-added products become wastes when discarded, either because it is broken or when consumers decide to buy a new model, e.g. the case of electronic gadgets such as mobile phones and computers, where functioning devices are discarded and replaced with the latest models before the end of their useful life. The cleanup of contaminated sites may generate mercury wastes, such as treatment residuals and contaminated soil.

Table 18. Brief analysis of Georgia's legislation in relation with Article 11 of the Minamata Convention

Article 11 – Mercury Waste Management	Georgia Domestic Law	Comments/ Recommendations
Use a definition of mercury waste consistent with Article 11.2	No definition in current national legislation	In Georgia, the new waste legislation system (see by law #145/2016 on Special Conditions for Collection and Treatment of Hazardous Waste) establishes legal provisions on temporary storage, transport and treatment of hazardous waste, which includes mercury waste. In addition, the landfill by-law (Governmental Decree #421/2015) sets hazardous waste landfill standards, which are based on EU landfill legislation. Insofar no further legislative action seems necessary. However, it is questionable if sufficient standards are in place for any potential waste recovery activities involving mercury waste – and if these are required or if such waste shall only be disposed of. The transboundary transport of hazardous waste is regulated for all EU Member States in the Waste Shipment Regulation 1013/2006, which is complying with Basel Convention requirements (and partly going beyond). Where not prohibited, all exports of waste containing mercury above the thresholds to be determined under MC will most likely be subject to the notification procedure under Article 3 (1) of that EU Regulation. As soon as Georgian government adopts the new Basel law, the import of mercury waste will be prohibited as well as the export of hazardous and other wastes to countries, which are not a Party to the Basel Convention. All other exports will be done in accordance with the Notification procedure established by that law which is in full compliance also with MC requirements.
Take measures to manage mercury wastes in an environmentally sound manner, taking into account guidelines developed under the Basel Convention and in accordance with COP requirements.	Waste Management Code; By-law #145/2016 on Special Conditions for Collection and Treatment of Hazardous Waste	
Take measures to restrict mercury derived from the treatment or re-use of mercury waste to allowed uses under the Convention or environmentally sound disposal	Waste Management Code; By-law #145/2016 on Special Conditions for Collection and Treatment of Hazardous Waste; Governmental Decree #421/2015	
Require transport across international boundaries in accordance with the Basel Convention, or if the Basel Convention does not apply, consistent with international rules, standards, and guidelines.	Law on Transboundary Movement of Hazardous Wastes; Draft Basel Law	

There is currently no definition of mercury waste in the national legislation that complies with Article 11, paragraph 2 of the Convention. Such a definition could be outlined under the Waste Management Code.

As a signatory to the Basel Convention, steps have already been taken to harmonize the country's Waste Management Code and Law on Transboundary Movement of Hazardous Wastes with this Convention. As soon as Georgian government adopts the new Basel law, the import of mercury waste will be prohibited as well as the export of hazardous and other wastes to countries, which are not a Party to the Basel Convention. All other exports will be done in accordance with the Notification procedure established by that law which is in full compliance also with MC requirements mandated through the Customs Department and the Ministry of Environment.

Current plans for establishing a hazardous waste management system, including waste collection, transportation, temporary storage and treatment provide an opportunity to confirm compliance with this article.

Article 12: Contaminated sites

Contaminated sites come in many forms. They can be active, where existing processes or practices continue to contribute to the contamination, or historical, where such processes or practices have stopped but the pollution remains.

The sources of the contamination may be waste management activities and/or spills and emergency incidents. The risk of exposure to local communities and the potential for prolonged releases into the environment if not remediated make contaminated sites of concern. Further, there is a need to address the following factors involving contaminated sites: determining the nature and extent of contamination, the risks to exposed populations, remediation options, and the identity of entities or persons who should assume liability for some or all or the remediation costs.

Table 19. Brief analysis of Georgia's legislation in relation with Article 12 of the Minamata Convention

Article 12 – Contaminated Sites	Georgia Domestic Law	Comments/ Recommendations
Develop strategies for identifying and assessing mercury/mercury compound contaminated sites	No legislation	It is recommended, but not a Convention obligation to have a suitable legal basis in law for the development of appropriate strategies and actions. This should be incorporated into new soil protection legislation. Given the rather unclear wording of the provisions of the existing soil protection law of 1994 this law needs a revision anyway. Bearing in mind that the Annex 4 of the Decree "on the adoption of technical regulation „Methodology of environmental damage assessment (calculation)" states when soil is considered heavily polluted, namely when the concentration of mercury in soil exceeds 10 mg/kg. This threshold could serve as benchmark for identification of polluted sites. The methodology for identifying contaminated sites can be harmonized with recommendations provided by the Conference of Parties. The development of appropriate management plans for any contaminated sites will help towards the goal of protecting human health and the environment from impacts associated with these sites.
If risk reduction activities are taken at contaminated sites, they are taken in an environmentally sound manner, incorporating risk assessment where appropriate	No legislation	

Article 12 calls for the creation and adoption of guidance in approaching contaminated sites and there are no obligations for cleaning up contaminated sites under the Convention.

There is no single law in Georgia regulating contaminated sites. If timing is appropriate and if there is a political will from lawmakers, soil protection law can be amended to set a legal basis for contaminated sites. The methodology for identifying contaminated sites can be harmonized with recommendations provided by the Conference of Parties. The development of appropriate management plans for any contaminated sites will help towards the goal of protecting human health and the environment from impacts associated with these sites.

Article 13: Financial resources and mechanisms

Under Article 13, each Party will undertake to provide, within its capabilities, resources in respect to those national activities that are intended to implement this Convention, in accordance with its national policies, priorities, plans and programmes. These resources may include domestic funding through relevant policies, development strategies and national budgets, and bilateral and multilateral funding, as well as private sector involvement.

Table 20. Brief analysis of Georgia's legislation in relation with Article 13 of the Minamata Convention

Article 13 – Financial Resources and Mechanisms	Georgia Domestic Law	Comments / Recommendations
Access domestic resources as may be needed to implement Convention obligations	No specific text covers this point	See discussion below.
Access financial resources available under the Convention financial mechanism and other resources available from multilateral, regional, and bilateral funding sources	No specific text covers this point	See discussion below.

Since Georgia has not ratified the Convention, there is no earmarked state funding for implementation of various provisions of the Convention. However, in case of ratification of the document, the country has internal financial resources in the form of state budget allocated to various agencies for implementation of their duties and state programmes, funds of private businesses working in the field of hazardous chemicals and waste management, including waste collection, transportation, storage and safe disposal/treatment. Moreover, the MoENRP and other relevant ministries have long-term successful experience in working with bi-lateral and multi-lateral donors, including UNDP, UNEP, FAO, UNIDO, USAID as well as Multi-Lateral Fund for the Montreal protocol and Global Environment Facility. Georgian NGOs are also very experience in mobilizing financial resources for implementation of environmental projects in general, and waste management projects in particular. Thus, it is critical to assess and mobilize domestic and international financial resources for implementation of Minamata Convention.

Article 16: Health aspects

The Minamata Convention on Mercury was developed with the primary goal of protecting human health (and the environment) from risks of mercury exposure. As such, Parties to the Convention are encouraged to develop strategies and programmes for identifying populations at risk and for providing preventative care to these populations. Article 16 focuses directly on Ministries of Health and Labor and identifies the need to establish and strengthen prevention programmes and improve the capacity of health care professionals for the prevention, diagnosis, treatment and monitoring of health care risks associated with mercury exposure.

Table 21. Brief analysis of Georgia's legislation in relation with Article 16 of the Minamata Convention

Article 16 – Health Aspects	Georgia Domestic Law	Comments / Recommendations
Promote the development and implementation of strategies to identify and protect populations at risk	Food Products/Animal Feed Safety, Veterinary and Plant Protection Code; The Law on Public Health Protection; Technical regulation on ambient environmental quality standards; Government Decree No 567/9/11/2015 on the Approval of Technical Regulation for Maximum Allowable Concentration of Certain Contaminants in Food Products	About the development and implementation of strategies and programmes to protect population at risk it may rather be in the competence of the Ministry of Health to prepare such strategies/programmes. To which extent additional or improved standards are required with respect to health aspects should also be decided by the Georgian Ministry of Health.
Promote occupational exposure educational and prevention programs	The Georgian Law on Product Safety and Free Movement Code; Civil Safety Law	The Georgian Law on Product Safety and Free Movement Code provides a general structure for laws and regulations related to occupational exposure under which facilities are required to meet certain safety requirements. However, none of these requirements deal specifically with mercury exposure in the work place. Modifications to this law or other relevant labor regulations will help protect against occupational exposure.
Promote prevention, treatment, and care services for affected populations	National Center for Disease Control and Public Health	Ministry of Health has the mandate but has not a programme.

The Law on Food/Feed Safety outlines maximum allowable concentrations of mercury in fish, fish products, and derivatives at 0.5 mg/kg. This law also outlines similar limits for animal feed. Such measures can help protect vulnerable populations, including children and women of childbearing age, from risks associated with dietary exposure to mercury. Furthermore, health based ambient environmental quality standards for mercury exists for all environmental media.

The Georgian Law on Product Safety and Free Movement Code provides a general structure for laws and regulations related to occupational exposure under which facilities are required to meet certain safety requirements. Modifications to this law or other relevant labor regulations will help protect against occupational exposure.

Mandate to conduct health risk assessments and to maintain health statistics on food poisoning, including any incidents that include mercury poisoning. These institutions and their associated mandates related to mercury exposure could be strengthened with more specific language related to mercury exposure and other chemicals.

Article 17: Information exchange & Article 18: Public information, awareness and education

Articles 17 and 18 relate to information shared between Parties (Article 17) and the general public (Article 18). Parties are encouraged to exchange information on technological and economic information on effective alternatives to aid in the reduction and elimination of mercury in the various sectors identified throughout the Convention. This should also include scientific, epidemiological, and legal information concerning mercury and mercury compounds.

Parties should also make available to the general public information on human health and environmental effects of mercury exposure, effective alternatives to mercury and mercury-added products and progress the country is making towards meeting the obligations of the Convention.

Table 22. Brief analysis of Georgia's legislation in relation with Articles 17 & 18 of the Minamata Convention

Article17– Information Exchange & Article 18 – Public information, awareness and education	Georgia Domestic Law	Comments/ Recommendations
Collect and disseminate information on annual quantities of mercury and mercury compounds emitted, released, or disposed; and other information specified in Article 18	The Law on Food/Feed Safety	See discussion below.
Share information on the health and safety of humans and the environment as non-confidential, in accordance with Article 17.5	No specific text covers this point	Ministry of Health and NCDC have mandate.
Report to the COP on progress in implementing Convention obligations under Article 21	No specific text covers this point	Ministry of Environment and Natural Resources Protection, as focal point, has responsibility.
Promote and facilitate education, training, and public awareness related to mercury	No specific text covers this point	Environmental Information and Education Center and NCDC have mandates.

Information exchange between Parties to the Convention can be facilitated by the MoENRP and should be communicated at the national level with other relevant stakeholders. There will be several opportunities for exchange between Parties, with the Conference of Parties serving as the primary, formal mechanism.

At the national level, the Ministry of Environment and the Environmental Information and Education Center are responsible for public awareness on hazardous chemicals and human and environmental health risks. Such efforts should be done in close collaboration with other national stakeholders including the Ministry of Health and the National Center for Disease Control.

In addition to above, given the fact that Georgia is legally required to approximate its environmental legislation to key elements of the EU Directive 2004/107/EC it is advisable, that the newly planned "Law on Air Protection" will stipulate in line with the EU Directive requirements:

a) *Measuring measures* for concentrations arsenic, cadmium, mercury, nickel and polyclinic aromatic hydrocarbons, and
b) Regulate how the *public shall be informed* on concentrations on air pollutants by means of regular information and also warnings in case of pollution levels, which exceed specific alert thresholds.

Below are given summary tables on legal-regulatory gap analysis.

Table 23. Article 3

Article 3 - Mercury supply sources and trade	
Description of Article:	
Succinct summary of provisions relevant to the country in question	· Not allow new primary mercury mining; · Phase out existing primary mercury mining within 15 years; · Prevent the import and use of mercury from primary mercury mining for artisanal and small-scale gold mining (ASGM); · In accordance with Article 3.5(b), restrict the import and use of excess mercury from decommissioning chlor-alkali plants, and require environmentally sound disposal; · Obtain information on stocks of mercury or mercury compounds exceeding 50 metric tons (MT), and mercury supply generating stocks exceeding 10 MT/y; · Not allow the export of mercury unless the importing country provides written consent, the mercury is for an allowed use or environmentally sound storage, and all other conditions of Article 3.6 are met[31]; · Not allow the import of mercury without government consent, ensuring both the mercury source and proposed use are allowed under the Convention (and applicable domestic law).
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
None	
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions (only in relation to binding provisions):	
None	

31. Governments may consider adoption of a mercury trade licensing system to meet the PIC requirements, the source/use restrictions, and the reporting obligations of Article 3

Table 24. Article 4

Article 4: on mercury-added products	
Description of Article:	
Succinct summary of provisions relevant to the country in question	· Not allow the manufacture, import, and export of products listed in Part 1 of Annex A not otherwise excluded following the phase out date listed in the Annex; · Phase down the use of dental amalgam through two or more measures listed in Part II of Annex A; · Take measures to prevent the incorporation of products listed in Part I of Annex A (i.e., switches and relays, batteries) into larger, assembled products; · Discourage the manufacture and distribution of new mercury product types.
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Rotterdam Convention, the Law on Pesticides and Agrichemicals, N 263 Government Decree on the Rule of Export-Import of Certain Hazardous Chemicals and Pesticides and Prior Informed Consent Procedure	· Not allow the export of inorganic mercury, alkyl, aryl mercury as part of pesticides unless the importing country provides written consent, the mercury is for an allowed use or environmentally sound storage; · Not allow the import of inorganic mercury, alkyl, aryl mercury as part of pesticides without government consent, ensuring both the mercury source and proposed use are allowed under the Convention (and applicable domestic law); · Registration, evaluation and authorization of hazardous pesticides and agrichemicals; · Customs control of export-import and re-export of hazardous pesticides and agrichemicals.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions (only in relation to binding provisions):	
List in bullet points: · Given the diversity of products to which mercury is added (including assembled products) it is recommended to adopt a by-law in which restrictions and/or bans on the production, import, export and placing on the market of mercury in new products are regulated. In such by-law on "chemical products restrictions" all concerned products could be addressed one by one. Notably, Article 10 of the Waste Code allows the Georgian lawmaker to "exceptionally, prohibit or restrict placement on the market of certain products" if this is suitable, necessary and proportionate to the objectives of this Law. This means that a suitable legal basis for product related provisions in a by-law is already in place. However, on the other side, it should be taken into consideration that mercury containing products are quite different and it may also be suitable to regulate them in specific by-laws, as it is the case in most EU Member States; · Within a Waste Management Code or specific by-laws on batteries, electrical switches or relays, legal requirements on the mercury content should be set, assuming that these are controlled by customs department when imported.	

Table 25. Article 5

Article 5: use of mercury in manufacture processes	
Description of Article:	
Succinct summary of provisions relevant to the country in question	· Article 5 on manufacturing processes in which mercury or mercury compounds are used; · Not allow the use of mercury or mercury compounds in the manufacturing processes listed in Part I of Annex B [5]; · Restrict (as specified in the Annex) the use of mercury in the processes listed in Part II of Annex B; · Not allow new facilities from using mercury in the processes listed in Annex B, except facilities using mercury catalysts to produce polyurethane; · For facilities with processes listed in Annex B, identify and obtain information on mercury or mercury compound use; and control mercury emissions to air, and releases to land and water; · Discourage new uses of mercury in industrial processes.
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
None (no industry present with intentional use of Hg).	
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions (only in relation to binding provisions):	
No law covers this issue. None of the processes listed in Part II of Annex B are presented in the country.	

Table 26. Article 7

Article 7 – use of mercury in artisanal and small-scale gold mining	
Description of Article:	
Succinct summary of provisions relevant to the country in question	· Take measures to reduce, and where feasible, eliminate mercury and mercury compound use, emissions (to air), and releases (to land and water) associated with ASGM where ASGM activity is "more than insignificant"; · Establish coordinating mechanism and delineate agency roles for development/ implementation of an ASGM National Action Plan (NAP); · Define and formalize or regulate ASGM consistent with the Convention; · Eliminate whole ore amalgamation, open burning of amalgam or processed amalgam, burning of amalgam in residential areas, and cyanide leaching of mercury-laden sediment, ore or tailings (the "worst practices"); · Set mercury use reduction goals or targets consistent with the timely elimination of the worst practices and other use reduction efforts; · Reduce mercury emissions, releases, and exposures associated with ASGM, and prevent mercury exposures of vulnerable populations (particularly women of child-bearing age and children); · Prevent the diversion of mercury and mercury compounds from other sectors to ASGM, and manage mercury trade consistent with the NAP; · Implement a public health strategy to address mercury exposures to ASGM miners and communities.
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	Currently no activities/revisions are being conducted to the Georgia Mining Code

Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions (only in relation to binding provisions):
· Georgia Mining Code should adopt a definition of ASGM that corresponds to Article 2, paragraph (a); · Law on Import, Export and Transit of Wastes on the Territory of Georgia should explicitly restrict the diversion of any Hg to the mining sector, now or in the future; · The National Center for Disease Control and Public Health could include in future educational campaigns information about the risks of Hg use in the gold mining sector as a preventative measure against any future use of Hg by small-scale miners.

Table 27. Article 8

Article 8 – Air emissions	
Description of Article:	
Succinct summary of provisions relevant to the country in question	· Require best available techniques/best environmental practices (BAT/BEP) or associated emission limit values (ELVs) for new (as defined in Article 8.2(c)) sources listed in Annex D (coal-fired power plants, coal-fired industrial boilers, non-ferrous metal smelting and roasting processes [6], waste incineration [7], and cement production [8]; · Require one or more measures identified in Article 8.5 to control/reduce mercury emissions from existing sources listed in Annex D, which shall be operational at the source within 10 years [9]; · Require monitoring/reporting and otherwise establish a mercury emissions inventory for sources listed in Annex D.
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
The Law on Air Protection; The Law on Environmental Impact Permit; #17 Environmental Regulation	· Emission limit values should be set for various hazardous substances for industries subject to EIA, EE and EIP, including source categories listed in annex D of the convention. For industries, not subject to EIA/EE/EIP technical regulation is applied which sets fixed/default value for concentration of mercury in stack emissions and gives an equation for calculation of total allowable emissions; · Emission inventories and reporting is required based on CorinAir emission inventory guidelines, using emission factors and mass-balance methods. Mercury emissions are also subject to emission inventories and national reporting; · Existing regulations are not based on BAT/BEP and are not consistent with the values set out in EU directives; · Nnotably, Georgia has not ratified the UNECE PRTR Protocol to the Aarhus Convention yet.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions (only in relation to binding provisions):	
· Georgia is obliged to approximate its legislation to key elements of the Directive on Industrial Emissions - IED (such as BAT, setting of ELV, establishment of a procedure for an integrated permit, control measures). It is strongly proposed to develop appropriate legislation on an integrated permit and related matters in the near future; A Twinning project in which Georgian legislation shall be approximated to the IED shall commence later this year. Within such IED transposing legislation specific ELV could be set (rather on by-law level or in Annex) for emissions, including mercury emissions into air. In addition, effective provisions for compliance control (with permits / ELV) will need to be set. Details of future Georgian IED legislation should be discussed and agreed upon with the Twinning team of above mentioned project – however, suitable measures in the sense of Article 8 (4) and (5) MC should be included in this legislation; · With respect to the regulation of mercury and mercury emissions into air from existing sources, legislation should provide a legal basis for developing a national plan on controlling emissions and establishing an emissions inventory (preferably not just on mercury); · The preparation and adoption of a National Plan on Mercury should be possible in Georgia without any special legal basis related to the MC. However, if a legal basis for the adoption of such Plan is necessary, it should be incorporated into the 1999 Law on ambient air protection (or its planned follow-up, i.e. a newly planned "Law on Air Protection"); · Article 22 of the existing Law on Ambient Air Protection states that "Ambient air pollution adjustment measures include inventorying of pollution types and sources". There is also a sub-law defining the method and procedures for emission inventories.	

Table 28. Article 9

Article 9 – Releases	
Description of Article:	
Succinct summary of provisions relevant to the country in question	· Require reporting or otherwise obtain information as needed to identify significant sources of mercury/mercury compound releases to land or water, and to maintain an inventory of releases from the sources identified; · Take one or more measures specified in Article 9.5 to control/reduce mercury and mercury compound releases to land and water from significant sources it identifies.
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
The Law on Water; The Law on Environmental Impact Permit and relevant technical regulations	· Effluent discharge limit values should be set for various hazardous substances for industries subject to EIA, EE and EIP, including source categories listed in annex D of the convention. For industries, not subject to EIA/EE/EIP technical regulation is applied which sets fixed/default value for effluent concentrations and gives an equation for calculation of total allowable wastewater discharges; · Wastewater discharges should be self-monitored by water users. No effluent discharge inventory is required. Mercury discharges are not reported; · Existing regulations are not based on BAT/BEP and are not consistent with the values set out in EU directives. As part of EU approximation process the country should adopt integrated pollution prevention and control permitting system, including BATs for new facilities and annual emission reduction caps for existing facilities.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions (only in relation to binding provisions):	
List in bullet points: · According to Article 23 draft Water Law "the basis of water resources planning and controlling on a national level is a national strategy for water protection and use, developed by the state commission for water resources protection and use. Though the details of the content of such national strategy are unclear (and hence if it will set out concrete measures to be taken to control releases of mercury and other pollutants into waters), once adopted, the Water Law would serve as sufficient legal basis for such national plan / strategy. It is advisable to define either in the new Water Law or in by-law details of the content of the National Water Strategy; · The new draft water law mentions discharge limit values (in relation to "special water use permits") but does not set these limit values per relevant source yet. So far there exist only EQS in form of water quality concentration limits in surface water in Georgia, which is not sufficient to comply with the MC; · It is recommended that the future water legislation of Georgia contains source-specific rules based on BAT and with detailed ELV set in an Annex or Annexes / by-laws per relevant source; · The adoption of the draft Water Law and its Article 33 would provide a sound legal basis for the establishment of a release inventory of mercury from relevant sources.	

Table 29. Article 10

Article 10 – Interim storage of mercury other than mercury wastes	
Description of Article:	
Succinct summary of provisions relevant to the country in question	· Take measures to ensure interim mercury storage is conducted in an environmentally sound manner, considering guidelines to be developed by the Conference of the Parties (COP).
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
None	
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions (only in relation to binding provisions):	
· Need to ensure interim storage follows established guidelines; · According to the EU Study the interim storage of hazardous materials that is not considered waste under EU-law is not sufficiently regulated[32]. On the other side one must keep in mind that under EU law more substances or objects are considered waste than under the MC, and consequently, processing such material is considered waste treatment (recovery) and falls under Article 11 MC; · The storage of non-waste mercury on EU level is partly addressed by the Seveso Directive, namely insofar as it relates to the storage of dangerous substances - which includes mercury as H3 toxicity category in accordance with Regulation 1272/2008 (CLP Regulation). Another EU Regulation (1102/2008) bans the export and regulates the safe storage of metallic mercury but it refers only to the storage of waste metallic mercury and hence rather falls under Article 11 MC. No example could be found that relates to any specific provision on storage of non-waste mercury in either Germany Sweden or Norway. The authors of the EU Study propose that the annexes of the Seveso Directive may be amended in order to cover the MC requirements for interim storage of mercury and its compounds (lower thresholds and perhaps additional wording to expand "safety" to "environmental sound storage")[33]; · Given the fact that Georgia shall approximate its legislation to the Seveso (III) Directive it is recommended that legislation will be drafted and adopted in line with the Seveso requirements which may then also set lower thresholds regarding the storage of mercury non-waste as proposed by the authors of the EU study.	

Table 30. Article 11

Article 11 – Mercury Waste Management	
Description of Article:	
Succinct summary of provisions relevant to the country in question	· Use a definition of mercury waste consistent with Article 11.2; · Take measures to manage mercury wastes in an environmentally sound manner, taking into account guidelines developed under the Basel Convention and in accordance with COP requirements to be developed; · Prevent the import and use of mercury from primary mercury mining for artisanal and small-scale gold mining (ASGM); · Take measures to restrict mercury derived from the treatment or re-use of mercury waste to allowed uses under the Convention or environmentally sound disposal; · Require transport across international boundaries in accordance with the Basel Convention, or if the Basel Convention does not apply, consistent with international rules, standards, and guidelines.

32. See Study on EU Implementation of the MC, Draft Final Report (revised), page 227
33. See Study on EU Implementation of the MC, Draft Final Report (revised), page 228

Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Waste management code; Basel Convention; The Law on the Trans-boundary Movement of Hazardous Wastes, etc.	· No definition in national legislation; regulation of temporary storage and treatment of hazardous wastes, control of transboundary movement of hazardous wastes, including mercury wastes through customs department and the Ministry of Environment; · Plans for setting hazardous waste management system, including waste collection, transportation, temporary storage and treatment.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions (only in relation to binding provisions):	
· In Georgia, the new waste legislation system (see by law #145/2016 on Special Conditions for Collection and Treatment of Hazardous Waste) establishes legal provisions on temporary storage, transport and treatment of hazardous waste, which includes mercury waste. In addition, the landfill by-law (Governmental Decree #421/2015) sets hazardous waste landfill standards, which are based on EU landfill legislation. Insofar no further legislative action seems necessary. However, it is questionable if sufficient standards are in place for any potential waste recovery activities involving mercury waste – and if these are required or if such waste shall only be disposed of; · The transboundary transport of hazardous waste is regulated for all EU Member States in the Waste Shipment Regulation 1013/2006, which is complying with Basel Convention requirements (and partly going beyond). Where not prohibited, all exports of waste containing mercury above the thresholds to be determined under MC will most likely be subject to the notification procedure under Article 3 (1) of that EU Regulation. As soon as Georgian government adopts the new Basel law, the import of mercury waste will be prohibited as well as the export of hazardous and other wastes to countries, which are not a Party to the Basel Convention. All other exports will be done in accordance with the Notification procedure established by that law which is in full compliance also with MC requirements.	

Table31. Article 12

Article 12 – Contaminated sites	
Description of Article:	
Succinct summary of provisions relevant to the country in question	· Develop strategies for identifying and assessing mercury/mercury compound contaminated sites; · If risk reduction activities are taken at contaminated sites, they are taken in an environmentally sound manner, incorporating risk assessment where appropriate.
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Waste management code	· Requirement under Waste Management Code to inventory contaminated sites and come up with their management plan; plans to carry out inventories of contaminated sites.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions (only in relation to binding provisions)	
· It is recommended, but not mandatory by the MC to have a suitable legal basis in law for the development of appropriate strategies and actions. This should be incorporated into new soil protection legislation. Given the rather unclear wording of the provisions of the existing soil protection law of 1994 this law needs a revision anyway; · Bearing in mind that the Annex 4 of the Decree "on the adoption of technical regulation „Methodology of environmental damage assessment (calculation)" states when soil is considered heavily polluted, namely when the concentration of mercury in soil exceeds 10 mg/kg. This threshold could serve as benchmark for identification of polluted sites; · The methodology for identifying contaminated sites can be harmonized with recommendations provided by the Conference of Parties. The development of appropriate management plans for any contaminated sites will help towards the goal of protecting human health and the environment from impacts associated with these sites.	

Table 32. Article 13

Article 13 – Financial Resources	
Description of Article:	
Succinct summary of provisions relevant to the country in question	· Access domestic resources as may be needed to implement Convention obligations; · Access financial resources available under the Convention financial mechanism and other resources available from multilateral, regional, and bilateral funding sources.
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
None	
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions (only in relation to binding provisions):	
· It is critical to assess and mobilize domestic and international financial resources for implementation of Minamata Convention.	

Table 33. Article 16

Article 16 – Public Health	
Description of Article:	
Succinct summary of provisions relevant to the country in question	• Promote the development and implementation of strategies to identify and protect populations at risk, such as developing fish consumption guidelines; • Promote occupational exposure educational and prevention programs; • Promote prevention, treatment, and care services for affected populations.
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
The Law on Food/Feed Safety, Veterinary and Plant Protection; Technical regulation on the content of certain contaminants in food; The Law of Public Health Protection	· Limit values of mercury in sea food and food additives set out in relevant technical regulation; · Absence of specific occupational exposure educational and preventive programs; · Presence of relevant medical facilities to treat patients poisoned by hazardous chemicals.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions (only in relation to binding provisions):	
· As regards the development and implementation of strategies and programmes to protect population at risk it may rather be in the competence of the Ministry of Health to prepare such strategies/ programmes. To which extent additional or improved standards are required with respect to health aspects should also be decided by the Georgian Ministry of Health; · The Georgian Law on Product Safety and Free Movement Code provides a general structure for laws and regulations related to occupational exposure under which facilities are required to meet certain safety requirements. However, none of these requirements deal specifically with mercury exposure in the work place. Modifications to this law or other relevant labor regulations will help protect against occupational exposure; · Ministry of Health has the mandate but has not a programme. Thus, it is recommended to develop and implement public and occupational health and safety program.	

Table 34. Article 18

Article 18– Information Exchange/Awareness-Raising	
Description of Article:	
Succinct summary of provisions relevant to the country in question	· Collect and disseminate information on annual quantities of mercury and mercury compounds emitted, released, or disposed; and other information specified in Article 18; · Share information on the health and safety of humans and the environment as non-confidential, in accordance with Article 17.5; · Report to the COP on progress in implementing Convention obligations under Article 21.
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
On-going	
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions (only in relation to binding provisions):	
· Information exchange between Parties to the Convention can be facilitated by the Ministry of the Environment and Natural Resources Protection and should be communicated at the national level with other relevant stakeholders. There will be several opportunities for exchange between Parties, with the Conference of Parties serving as the primary, formal mechanism; · At the national level, the Ministry of Environment and the Environmental Information and Education Center are responsible for public awareness on hazardous chemicals and human and environmental health risks. Such efforts should be done in close collaboration with other national stakeholders including the Ministry of Health and the National Center for Disease Control; · Given the fact that Georgia is legally required to approximate its environmental legislation to key elements of the EU Directive 2004/107/EC it is advisable, that the newly planned "Law on Air Protection" will stipulate in line with the EU Directive requirements: - measure concentrations arsenic, cadmium, mercury, nickel and polyclinic aromatic hydrocarbons, and - regulate how the public shall be informed on concentrations on air pollutants by means of regular information and also warnings in case of pollution levels, which exceed specific alert thresholds.	

3.2 Institutional assessment

3.2.1 General institutional gap analysis

Necessary Institutional capacities for the implementation of the Article 3 of the Convention are related to the regulation of mercury supply sources and trade. In Georgia, given there is no primary mercury mining, including mercury mining for application in artisanal and small-scale gold mining (ASGM), presence of relevant legal-regulatory frameworks and institutions for phasing out existing mercury mining or the import of mercury for ASGM, as required by the Article 3 of the Convention is not directly relevant at present. However, since there are a number of mercury deposits in Georgia, as well there are artesian/small scale gold miners in north and north-west of the country preventive measures may be taken not to allow for operations of new mercury mines as well as mercury imports for ASGM. At present, there is no single regulation banning primary mercury mining.

There is no chlor-alkali production in the country, to ban the use of excess mercury from its decommissioning as required by the Article 3 of the Convention. Therefore, presence of relevant legal-regulatory frameworks and institutional setting is also irrelevant.

As for obtaining information on mercury stocks in excess of 50 MT or supply stream generating mercury stock exceeding 10 MT per year, so far mercury inventories are not part of national inventory system in the country. Thus, there is no institutional capacity in the country to regularly acquire information on mercury stocks. Besides, mercury stocks in excess of 50 MTs or in excess of 10 tons annually might not be present in the country since there is no officially known/registered/licensed ASGM or chlor-alkali production in the country, which are either major mercury sources or user industries. There are some small-scale gold mining activities in north-west mountainous areas (Svaneti), which are unlicensed. Future Hg inventories should investigate the method of how the gold is extracted in these areas and how widespread such activities are.

In Georgia, export-import and use of mercury and its compounds in the excess of 2 kg and not intended for laboratory and research purposes, other than mercury wastes and inorganic, mercury compounds used as pesticides, are not regulated in opposite to the requirements of the Article 3 of the Convention. Thus, both system (legislation) and institutional capacities for regulating export-import and use of mercury ad its compounds, other than mercury wastes, mercury-based pesticides and small amounts of mercury for research and educational purposes, are absent.

As for regulation of the export-import of mercury compounds used as pesticides,[34] they are banned in the country. Illegal import, production and use of such chemicals is controlled by the Customs Department and NFA under the Ministry of Agriculture. Institutional capacity gaps in this regard, as it was discussed in previous chapter are as follows:

- ✔ absent knowledge and capacities of the Customs Department for effective customs' control of illegal import of mercury-based pesticides;
- ✔ limited laboratory opportunities and capacities for state examination/expertise of unidentified chemicals or chemicals concerned, including mercury-based pesticides. The only authorized entity to examine chemicals concerned, based on a request of the Customs Office is Samkharauli Forensic Bureau, whose laboratory capacities are limited;
- ✔ weak capacities of NFA under the Ministry Agriculture together with relevant accredit laboratories for detecting illegal trade on local market with unallowed pesticides.

Necessary institutional capacities for implementation of the Article 4 of the Minamata convention are related to the regulation of mercury-added products listed in its Annex A. In Georgia, export-import and manufacture of mercury-added products specified by the Convention, except for mercury-based pesticides is not regulated. Thus, there are no system and institutional level mechanisms set for banning and controlling illegal import-export and trade with mercury-added products, other than mercury-based pesticides. Enhancing the capacity of Customs officials to identify mercury-added products should be an important component of future implementation activities.

For mercury-based pesticides, as it was discussed in previous paragraph, capacities for detection of smuggling with chemicals and falsifications in trade are very weak.

As for phasing-out dental amalgams, interviews with dental professionals and the Ministry of Health concluded that Hg-containing dental amalgams are not in use in the country.

Necessary institutional capacities for implementation of the Article 5 of the Convention are related to the ban of the mercury use in manufacturing processes listed in Part 1 of Annex B (chlor-alkali or acetaldehyde production) and restriction/phase out the use of mercury in manufacturing processes listed in Part 2 of Annex B (vinyl chloride, sodium or potassium methylate or eth-

34. By Rotterdam Convention and national legislation mercury based pesticides are considered as mercury compounds, while Minamata Convention treats mercury-based pesticides as mercury-added products regulated by the Article 4 of the Convention

ylate, polyurethane using mercury containing catalysts). In Georgia, the use of mercury in chemical production is not prohibited. Nor does any phase out programme exist for mercury-based catalysts used in chemical production. National mercury inventory revealed mercury or its compounds are not used in manufacturing processes listed in Minamata Convention.

Necessary institutional capacities for implementation of the Article 7 of the Convention are related to the ASGM. The national mining code does not provide an official definition of ASGM and there are no officially sanctioned ASGM activities in the country. Illegal small-scale activities do not take place close to the large gold and copper mining operations in Kazreti and Madneuli, Kvemo Kartli. However, there are some reports that certain small-scale uncontrolled gold mining activities occur in north-west part of the country. The national mercury inventory did not confirmed absence of Hg use within the ASGM sector in Georgia.

Necessary institutional capacities for implementation of the Article 8 of the Convention are related to the regulation (control or where feasible reduction) of air emissions of mercury and its compounds (referred as total mercury) from existing and new sources. In Georgia, emission limit values (ELVs) are to be set for all new industries subject to Environmental Impact Assessment (EIA) and Environmental Impact Permits (EIP), including those industrial facilities listed in Annex D of the Minamata Convention:

- ✔ Coal-fired power plants;
- ✔ Coal-fired industrial boilers;
- ✔ Smelting and roasting processes used in the production of non-ferrous metals;
- ✔ Waste incineration facilities;
- ✔ Cement clinker production facilities.

For those industries, not subject to EIA and EIP, default values or maximum allowable concentrations (MACs) in stack emissions are applied. For mercury, the MAC is equal to 0.0003 mg/m3. For minor and disperse sources of emissions having no stacks actual emission levels inventoried based on CorinAir emission factors, including those for mercury are estimated.

In fact, ELVs are not based on BAT/BEP and there is no catalogue/guideline for BAT/BAP in the country. Moreover, Georgia is obliged to transpose major provisions of the EU IPPC directive into national legislation that among others includes setting ELVs, based on BAT/BEP for certain industries including those regulated by the Minamata Convention, for which the Air Protection Service of the MoENRP does not have adequate capacity. This gap will be dealt by new Twinning project on IPPC capacity building that may also become a good opportunity for incorporating Minamata Convention-related BAT/BEPs into the project.

Concerning developing and implementing emission reduction programs/strategies for existing industries, there are no such policy mechanisms put in place.

As for emission inventories, they include mercury emissions that were added to the system in 2015. So far, mercury emission data are submitted to the Air Protection Service by thermoelectric power plants, steel plants, lass manufacturing and cement clinker plants. The problem with emission inventories lies on the poor quality control system of the information submitted, which is only double-checked though recalculations by the staff of the Air Protection Service. Capacities of environmental inspectors for spot and pre-planned inspections of existing facilities are very weak, particularly for stack measurements.

Necessary capacities for implementation of the Article 9 of the Convention are related to the regulation of water and land releases of mercury and setting and operations of mercury release inventories. In Georgia, in accordance with the Laws on Environmental Impact Permit and Water effluent discharge limit values are to be set for all new industries subject to EIA and Environmen-

tal Impact Permits, including those industrial facilities listed in Annex D of the Minamata Convention. Similar to air emission limit values, effluent discharge values are not based on BAT/BET, but on end-off-pipe approach and water dilution effects. Likewise, Water Resources Management and Chemicals and Waste Management Services of the MoENRP do not have capacities for setting BATs/BEPs for industries as per EU IPPC directive.

For wastewater discharges from water users not subject to EIA and EIP, effluent discharge limit values are not set for mercury. For wastewater sludge the limit for mercury content is 15 mg/kg of dry mass.

As for mercury release inventories, such systems are not set and operated by Water Resources Management and Waste Management Services, in charge of doing so.

Necessary institutional capacities related to the implementation of the Article 10 of the Convention are related to the interim storage of mercury or its compounds, other than mercury wastes in an environmentally sound manner and in accordance with guidelines developed under the Basel Convention or other relevant guidelines. In Georgia, interim storage of mercury and mercury compounds, other than wastes is not regulated. Hence, relevant system and institutional-level capacities for such actions are absent.

Necessary institutional capacities related to the implementation of the Article 11 of the Convention are related to the management of mercury wastes. In Georgia, for generation, transportation, storage and disposal of hazardous wastes, including mercury-containing wastes legal-regulatory and policy basis is created by the Waste Management Code, Technical Regulation on Specific Requirements for Temporary Storage, Treatment and Disposal of Hazardous Wastes as well as by Waste Management Strategy and Action Plan. However, these documents do not specifically address mercury issues. Moreover, technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds developed under the Basel Convention are not applied and there is no knowledge and capacity within the Chemicals and Waste Management Service in using this document.

Strategies and action plans for hazardous waste management are also absent identified as one of the priority actions under the National Waste Management strategy and Action Plan.

The largest problem is poor operational capacities, including infrastructure for collection, treatment, storage and disposal/elimination of hazardous wastes, particularly for mercury wastes. There are very few companies that deal with environmentally safe elimination of mercury wastes.

Necessary capacities for implementation of the Article 12 of the Minamata Convention are related to the management of contaminated sites, including developing and adopting strategies for inventory/identification, risk assessment and mitigation/remediation measures for contaminated sites. At present, relevant technical regulations are not developed for safe management of contaminated sites in general, and for sites contaminated with mercury. The inventory system for contaminated sites does not exist within the Chemicals and Waste Management Service of MoENRP. Relevant capacities for developing and implementing site inventory and cleanup/remediation strategies are absent/weak.

Necessary capacities for implementation of the Article 13 of the Minamata Convention are related to effective mobilization of domestic as well as international financial resources for implementation of the Convention. Since Georgia has not ratified the Convention, there is no earmarked state funding for implementation of various provisions of the Convention. However, in case of ratification of the document, the country has internal financial resources in the form of state budget allocated to various agencies for implementation of their duties and state programmes, funds of private businesses working in the field of hazardous chemicals and waste management, includ-

ing waste collection, transportation, storage and safe disposal/treatment. Moreover, the MoNRP and other relevant ministries have long-term successful experience in working with bi-lateral and multi-lateral donors, including UNDP, UNEP, FAO, UNIDO, USAID as well as Multi-Lateral Fund for the Montreal protocol and Global Environment Facility. Georgian NGOs are also very experience in mobilizing financial resources for implementation of environmental projects in general, and waste management projects in particular.

Necessary capacities for implementation of the Article 16 of the Minamata Convention are related to health aspects of mercury. In country, some state institutions exist in this area, including Ministries of Labor, Health and Social Affairs, Environment and Natural Resources Protection, Agriculture, Internal Affairs, Economy and Sustainable Development and the State Security Service. However, specific capacities for assessing and communicating health and environmental risks of exposure to mercury and its compounds, preventing, mitigating and providing early warnings for industrial/chemical emergencies and conducting effective response (rescue and recovery) measures during such accidents are weak. While health based ambient environmental quality standards for mercury exist for all environmental media as well as for many food products, including fish and its derivatives, monitoring, including laboratory analysis and law enforcement capacities of MoENRP, Ministry of Labor, Health and Social Affair and its National Center for Disease Control, National Food Agency under Ministry of Agriculture and Technical Supervision Service under the Ministry of Sustainable Economic Development are weak.

Awareness and educational programmes and materials on mercury related health and environmental risk and sound management on mercury are absent, due to the non-existent in-country institutional capacities within EIEC, NCDC or civic society organizations to develop and implement such measures due to the absent of the knowledge and/or interest within these institutions.

Necessary capacities for implementation of the Article 18 of the Minamata Convention are related to the public information, awareness and education. In-country institutional capacities to develop and implement awareness and educational programmers on mercury and its risks are absent.

As for mercury inventory and its availability to the public, such capacities within relevant authorities, including MoENRP, MoA, and MoLHSA are weak. Only data present on mercury are on industrial emissions. Other information, including that on mercury stock, storages, wastes, mercury-added products and ambient environment quality are absent. This is due to the absent legal obligation to set-up publicly open mercury inventory system. Such publicly open information system as PRTR is non-existent in the country.

Below are given summary tables for institutional gap analysis.

Table 35. Article 3

Article 3 - Mercury supply sources and trade	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)[35]	· Not allow new primary mercury mining; · Phase out existing primary mercury mining within 15 years; · Prevent the import and use of mercury from primary mercury mining for artisanal and small-scale gold mining (ASGM); · In accordance with Article 3.5(b), restrict the import and use of excess mercury from decommissioning chlor-alkali plants, and require environmentally sound disposal; · Obtain information on stocks of mercury or mercury compounds exceeding 50 metric tons (MT), and mercury supply generating stocks exceeding 10 MT/yr; · Not allow the export of mercury unless the importing country provides written consent, the mercury is for an allowed use or environmentally sound storage, and all other conditions of Article 3.6 are met; · Not allow the import of mercury without government consent, ensuring both the mercury source and proposed use are allowed under the Convention (and applicable domestic law).
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/entity or organization/business entity or ministry:	**Capacity in place. please describe:**
Customs Department	· Capacity only exists for customs control of illegal import-export of inorganic, Alkyloxyalkyl and aryl mercury compounds used as pesticides requiring PIC and prohibited in the country. Though, existing capacities are weak to effectively detect offences due to the absence of relevant knowledge, lack of qualified customs officers, absence of guidelines/SOPs for effective border control, relevant training programmes for customs officers and inadequate state examination/ expertise of chemicals. Furthermore, coordination of Customs Office with relevant agencies (DNAs) is weak. For primary mercury trade control, there is no relevant regulation and respectively, institutional mechanism.
MoENRP	· Absence of any regulatory and institutional mechanisms to regulate trade with mercury, other than mercury wastes.
NFA under MoA, accredited laboratories	· DNA for trade with pesticides subject PIC under the Rotterdam Convention and registration/authorization for placing allowed pesticides to market. Pesticides regulated under Rotterdam Convention are inorganic, Alkyloxyalkyl and aryl mercury compounds, which are banned in the country. Thus, the NFA is responsible for detection of offences - falsifications/illegal market sale of banned mercury compounds. Existing capacities are weak due to the limited laboratory analysis capacities of existing accredited laboratories and weak consumer/ business operator awareness to make complaints on violations.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met and priority rank	

35. National Resource Defend Council: https://www.nrdc.org/sites/default/files/int_15101301a.pdf

· Absence of laws/regulations and relevant implementation mechanisms for banning new mercury mines – Low priority (needs verification by stakeholders and mercury inventory); · Absence of any regulatory and institutional mechanisms for trade with mercury other than mercury-based pesticides regulated under Rotterdam Convention – medium priority (needs verification by stakeholders and mercury inventory); · Poor capacities (knowledge, qualified staff, SOPs, training programmers and laboratory analysis) of Customs Department and Samkharauli Forensic Investigation Bureau to effectively detect illegal import-export of mercury compounds banned in the country – High priority; · Poor capacities of NFA under the MoA and relevant accredited laboratories to detect falsifications/illegal market sale of banned mercury compounds – High priority; · Weak interagency coordination – High priority.

Table 36. Article 4

Article 4 – Mercury-added products	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	• Not allow the manufacture, import, and export of products listed in Part 1 of Annex A not otherwise excluded following the phase out date listed inthe Annex; • Phase down the use of dental amalgam through two or more measures listed in Part II of Annex A; • Take measures to prevent the incorporation of products listed in Part I of Annex A (i.e., switches and relays, batteries) into larger, assembled products; • Discourage the manufacture and distribution of new mercury product types.
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/ entity or organization/ business entity or ministry:	**Capacity in place. please describe:**
Customs Department	· Capacity only exists for customs control of illegal import-export of inorganic, Alkyloxyalkyl and aryl mercury compounds used as pesticides requiring PIC and prohibited in the country. Though, existing capacities are weak to effectively detect offences due to the absence of relevant knowledge, lack of qualified customs officers, absence of guidelines/SOPs for effective border control, relevant training programmes for customs officers and inadequate state examination/expertise of chemicals. Furthermore, coordination of Customs Office with relevant agencies (DNAs) is weak. For trade with mercury-added products other than mercury wastes and pesticides there is no relevant regulation and respectively, institutional mechanism.
MoENRP	· Absence of any regulatory and institutional mechanisms to regulate trade with mercury-added products listed in Annex 1 of the Convention, other than pesticides.
NFA under MoA, accredited laboratories	· DNA for trade with pesticides subject PIC under the Rotterdam Convention and registration/authorization for placing allowed pesticides to market. Pesticides regulated under Rotterdam Convention are inorganic, Alkyloxyalkyl and aryl mercury compounds, which are banned in the country. Thus, the NFA is responsible for detection of offences - falsifications/illegal market sale of banned mercury compounds. Existing capacities are weak due to the limited laboratory analysis capacities of existing accredited laboratories and weak consumer/business operator awareness to make complaints on violations.

Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met and priority rank
· Absence of any regulatory and institutional mechanisms for trade with mercury-added products other than mercury-based pesticides and mercury wastes regulated under Rotterdam and Basel Conventions – High priority (needs verification by stakeholders and mercury inventory); · Poor capacities (knowledge, qualified staff, SOPs, training programmers and laboratory analysis) of Customs Department and Samkharauli Forensic Investigation Bureau to effectively detect illegal import-export of mercury compounds banned in the country – High Priority; · Poor capacities of NFA under the MoA and relevant accredited laboratories to detect falsifications/illegal market sale of banned mercury compounds – High priority.

Table 37. Article 5

Article 5 - Manufacturing Processes in which mercury or mercury compounds are used	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	· Not allow the use of mercury or mercury compounds in the manufacturing processes listed in Part I of Annex B; · Restrict (as specified in the Annex) the use of mercury in the processes listed in Part II of Annex B; · Not allow new facilities from using mercury in the processes listed in Annex B, except facilities using mercury catalysts to produce polyurethane; · For facilities with processes listed in Annex B, identify and obtain information on mercury or mercury compound use; and control mercury emissions to air, and releases to land and water; · Discourage new uses of mercury in industrial processes; · Not allow the use of mercury or mercury compounds in the manufacturing processes listed in Part I of Annex B; · Restrict (as specified in the Annex) the use of mercury in the processes listed in Part II of Annex B.
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/entity or organization/business entity or ministry:	**Capacity in place. please describe:**
MoENRP	· Absence of any regulatory and institutional mechanisms for banning/ phasing out use of mercury in manufacturing processes. Absence of information on industries using mercury in technological processes, due to the absence of mercury inventory.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met and priority rank	
· Absence of any regulatory and institutional mechanisms for banning/phasing out use of mercury in manufacturing processes – medium priority (needs verification by mercury inventory and stakeholders); · Absence of information on industries using mercury in technological processes, due to the absence of mercury inventory – high priority (will be dealt by given project).	

Table 38. Article 7

Article 7 - Artisanal and small-scale gold mining	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	· Take measures to reduce, and where feasible, eliminate mercury and mercury compound use, emissions (to air), and releases (to land and water) associated with ASGM where ASGM activity is "more than insignificant"; · Establish coordinating mechanism and delineate agency roles for development/implementation of an ASGM National Action Plan (NAP); · Define and formalize or regulate ASGM consistent with the Convention; · Eliminate whole ore amalgamation, open burning of amalgam or processed amalgam, burning of amalgam in residential areas, and cyanide leaching of mercury-laden sediment, ore or tailings (the "worst practices"); · Set mercury use reduction goals or targets consistent with the timely elimination of the worst practices and other use reduction efforts; · Reduce mercury emissions, releases, and exposures associated with ASGM, and prevent mercury exposures of vulnerable populations (particularly women of child-bearing age and children).
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/entity or organization/business entity or ministry:	**Capacity in place. please describe:**
Not applicable	
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met and priority rank	
Not applicable[36]	

Table 39. Article 8

Article 8 – Air Emissions	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	· Require best available techniques/best environmental practices (BAT/BEP) or associated emission limit values (ELVs) for new (as defined in Article 8.2(c)) sources listed in Annex D (coal-fired power plants, coal-fired industrial boilers, non-ferrous metal smelting and roasting processes, waste incineration, and cement production; · Require one or more measures identified in Article 8.5 to control/reduce mercury emissions from existing sources listed in Annex D, which shall be operational at the source within 10 years; · Require monitoring/reporting and otherwise establish a mercury emissions inventory for sources listed in Annex D.
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/ entity or organization/ business entity or ministry:	**Capacity in place. please describe:**

36. The Georgia Mining Code does not officially recognize ASGM and therefore the Ministry is limited in its capacity to regulate/enforce any rules related to ASGM, including the use of Hg. There is no official inventory of the number of small-scale miners in the country, only anecdotal information about its presence

Air Protection Service, MoENRP, Environmental Supervision Department, Environmental Impact Permit Department	· ELVs are not based BAT/BEP and there is no catalogue/guideline for BAT/BAP in the country. Moreover, Georgia is obliged to transpose major provisions of EU IPPC directive into national legislation that among others includes setting ELVs, based on BAT/BEP for certain industries including those regulated by the Minamata Convention, for which the Air Protection Service of the MoENRP does not have adequate capacity. This gap will be dealt by new Twinning project on IPPC capacity building that may also become a good opportunity for incorporating mercury BAT/BEPs into the project; · As for emission inventories, they include mercury emissions that have been added to the system in 2015. So far, mercury emission data are submitted to the Air Protection Service by thermos power plants, steel plants, glass manufacturing and cement clinker plants. The problem with emission inventories lies on the poor-quality control system of the information submitted, which is only double-checked though recalculations by the staff of the Air Protection Service. Capacities of environmental inspectors for spot and pre-planned inspections of existing facilities are very weak, particularly for stack measurements.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met and priority rank	
· Absence of BAT/BEPs – High priority; · Absence of capacities for setting BAPs/BEPs or relevant emission values – High priority; · Absence of national strategies/programmes for controlling emissions from existing sources – Medium priority; · Absence of emission inventories of waste incineration facilities – High priority; · Poor quality control system of the information submitted, which is only double-checked though recalculations by the staff of the Air Protection Service. Capacities of environmental inspectors for spot and pre-planned inspections of existing facilities are very weak, particularly for stack measurements – High priority.	

Table 40. Article 9

Article 9 – Releases to land and water	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	· Require reporting or otherwise obtain information as needed to identify significant sources of mercury/mercury compound releases to land or water, and to maintain an inventory of releases from the sources identified; · Take one or more measures specified in Article 9.5 to control/reduce mercury and mercury compound releases to land and water from significant sources it identifies.
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/ entity or organization/ business entity or ministry:	**Capacity in place. please describe:**
MoENRP: Water Resources Management Service, Chemicals and Waste Management Service, Environmental Impact Permit Department, Environmental Supervision Department	· Effluent discharge values are not based on BAT/BET, but on end-off-pipe approach and water dilution effects. Water Resources Management and Chemicals and Waste Management Services of the MoENRP do not have capacities for setting BATs/BEPs for industries as per EU IPPC directive; · For wastewater discharges from water users not subject to EIA and EIP, effluent discharge limit values are not set for mercury; · As for mercury release inventories, such systems are not set and operated by Water Resources Management and Waste Management Services, in charge of doing so.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met and priority rank	

- Absence of BAT/BEPs – High priority;
- Absence of a pollutants release control programmes for existing sources – Medium priority;
- Absence of effluent discharge limit values water users not subject to EIA and EIP – Low priority;
- Absence of capacities for setting BAPs/BEPs or relevant release values – High priority;
- Absence of release inventories (technical methodology, system) – High priority.

Table 41. Article 10

Article 10 – Environmentally Sound interim storage of mercury, other than waste mercury	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	· Take measures to ensure interim mercury storage is conducted in an environmentally sound manner, taking into account guidelines to be developed by the Conference of the Parties (COP).
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/ entity or organization/ business entity or ministry:	**Capacity in place. please describe:**
MoENRP: Chemicals and Waste Management Service, Environmental Impact Permit Department, Environmental Supervision Department	· In Georgia, interim storage of mercury and mercury compounds, other than wastes is not regulated. Hence, relevant system and institutional-level capacities for such actions are absent.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met and priority rank	
· Absence of any regulation and relevant institutional mechanisms for regulation of interim storage of mercury and mercury compounds, other than mercury wastes – high priority (needs verification by mercury inventory and stakeholders).	

Table 42. Article 11

Article 11 – Mercury Waste Management	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	· Use a definition of mercury waste consistent with Article 11.2/Basel Convention; · Take measures to manage mercury wastes in an environmentally sound manner, taking into account guidelines developed under the Basel Convention and in accordance with COP requirements to be developed; · Take measures to restrict mercury derived from the treatment or reuse of mercury waste to allowed uses under the Convention or environmentally sound disposal; · Require transport across international boundaries in accordance with the Basel Convention, or if the Basel Convention does not apply, consistent with international rules, standards, and guidelines.
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/ entity or organization/ business entity or ministry:	**Capacity in place. please describe:**

MoENRP: Chemicals and Waste Management Service, Environmental Impact Permit Department, Environmental Supervision Department	· Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds developed under the Basel Convention are not applied and there is no knowledge and capacity within the Chemicals and Waste Management Service in using this document. Strategies and action plans for hazardous waste management are also absent identified as one of the priority actions under the National Waste Management strategy and Action Plan. The largest problem is poor operational capacities, including infrastructure for collection, treatment, storage and disposal/elimination of hazardous wastes, particularly for mercury wastes. There are very few companies that deal with environmentally safe elimination of mercury wastes.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met and priority rank	
· Absence of knowledge and capacity within the Chemicals and Waste Management Service and Environmental Supervision Department to apply technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds developed under the Basel Convention – High priority; · Absence of Strategies and action plans for hazardous waste management and implementation capacities – High priority; · Poor operational capacities, including infrastructure for collection, treatment, storage and disposal/elimination of hazardous wastes, particularly for mercury wastes – High priority.	

Table 43. Article 12

Article 12– Contaminated sites	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	· Develop strategies for identifying and assessing mercury/mercury compound contaminated sites; · If risk reduction activities are taken at contaminated sites, they are taken in an environmentally sound manner, incorporating risk assessment where appropriate.
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/ entity or organization/ business entity or ministry:	**Capacity in place. please describe:**
MoENRP: Chemicals and Waste Management Service, Environmental Impact Permit Department, Environmental Supervision Department; Business companies dealing with site remediation.	· Relevant technical regulations are not developed for safe management of contaminated sites in general, and for sites contaminated with mercury, in particular. The inventory system for contaminated sites does not exist within the Chemicals and Waste Management Service of MoENRP. Relevant capacities for developing and implementing site cleanup/remediation strategies are absent/weak. Nor does any strategy/methodology exist for identifying and assessing contaminated sites.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met and priority rank	
· Absence of strategy/methodology exist for identifying and assessing contaminated sites – High priority; · Absent/weak capacities for developing and implementing risk reduction strategies - High priority; · Absence of regulatory mechanisms for safe management of contaminated sites in general, and for sites contaminated with mercury, in particular – Medium to low priority in relations with Minamata Convention. Otherwise, this is high priority under the Waste Management Strategy and Action Plan; · Absence of inventory of contaminated sites – Medium to low priority; · Absence of risk reduction strategies – Medium to low priority.	

Table 44. Article 13

Article 13– Financial Resources	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	· Access domestic resources as may be needed to implement Convention obligations; · Access financial resources available under the Convention financial mechanism and other resources available from multilateral, regional, and bilateral funding sources.
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/ entity or organization/ business entity or ministry:	**Capacity in place. please describe:**
MoENRP and other Line Ministries; business companies, CSOs.	· Since Georgia has not ratified the Convention, there is no earmarked state funding for implementation of various provisions of the Convention. However, in case of ratification of the document, the country has internal financial resources in the form of state budget allocated to various agencies for implementation of their duties and state programmes, funds of private businesses working in the field of hazardous chemicals and waste management, including waste collection, transportation, storage and safe disposal/ treatment. Moreover, the MoENRP and other relevant ministries have long-term successful experience in working with bi-lateral and multi-lateral donors, including UNDP, UNEP, FAO, UNIDO, USAID as well as Multi-Lateral Fund for the Montreal protocol and Global Environment Facility. Georgian NGOs are also very experience in mobilizing financial resources for implementation of environmental projects in general, and waste management projects in particular.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met and priority rank	
· Absence of earmarked state funding for implementation of various provisions of the Convention – low priority (will become high priority after ratification of the convention).	

Table 45. Article 16

Article 16– Public Health	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	· Promote the development and implementation of strategies to identify and protect populations at risk, such as developing fish consumption guidelines; · Promote occupational exposure educational and prevention programs; · Promote prevention, treatment, and care services for affected populations.
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/ entity or organization/ business entity or ministry:	**Capacity in place. please describe:**

Ministries of Labor, Health and Social Affairs, Environment and Natural Resources Protection, Agriculture, Internal Affairs, Economy and Sustainable Development and the State Security Service	· In country, some state institutions exist in this area, including Ministries of Labor, Health and Social Affairs, Environment and Natural Resources Protection, Agriculture, Internal Affairs, Economy and Sustainable Development and the State Security Service to deal with food chemical safety, occupational and public health, emergencies. However, specific capacities for assessing and communicating health and environmental risks of exposure to mercury and its compounds, preventing, mitigating and providing early warnings for industrial/chemical emergencies and conducting effective response (rescue and recovery) measures during such accidents are weak/absent. Health based ambient environmental quality standards for mercury exist for all environmental media as well as for many food products, including fish and its derivatives, monitoring, including laboratory analysis and law enforcement capacities of MoENRP, MoLHSA, NFA under MoA and Technical Supervision Service under the MoESD are weak.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met and priority rank	
· Weak/absent specific capacities for assessing and communicating health and environmental risks of exposure to mercury and its compounds, preventing, mitigating and providing early warnings for industrial/chemical emergencies and effective response (rescue and recovery) measures – High priority; · Absent ambient environmental quality monitoring by the National Environmental Agency, MoENRP, due to the lack of knowledge, auxiliary equipment/devices for measuring mercury in water and soil and absent air quality measuring equipment for mercury – High priority; · Weak law enforcement, including laboratory testing capacities for food safety, due to poor QA/QC and inter-calibration of laboratories - High priority; · Absent law enforcement institution(s) for products' chemical safety, other than food safety - High priority.	

Table 46. Article 18

Article 18 – Public Access to Information/Awareness Raising and Education	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	· Collect and disseminate information on annual quantities of mercury and mercury compounds emitted, released, or disposed, and other information specified in Article 18; · Share information on the health and safety of humans and the environment as non-confidential, in accordance with Article 17.5.
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/ entity or organization/ business entity or ministry:	**Capacity in place. please describe:**

NCDC under the MoLHSA, EIEC under the MoENRP; NFA under the MoA, other Line Ministries; CSOs.	· Awareness and educational programmes on health and environmental risks of expose to mercury, its compounds and wastes and preparedness to industrial accidents are absent. More specifically, the Centre for Environmental Information and Education (EIEC) under the MoENRP, in charge of developing professional training, environmental awareness raising and education programs and carrying out capacity development and outreach activities does not have relevant knowledge and capacity to develop and implement professional training and public awareness programmes on mercury, its compounds and wastes. At present, its work is limited with professional training of MoENRP staff and environmental managers of business companies in integrated waste management, with a focus on municipal solid waste management and compliance to national legislation. Similarly, the National Center for Disease Control and Public Health (NCDC) under the Ministry of Health, National Food Agency under the Ministry of Agriculture and Emergency Management units of the Ministry of Internal Affairs have no evidence-based advocacy, awareness and education programmers and materials on health and environmental risks related to mercury and wastes, occupational safety and health risks related to industrial/chemical accidents; · There is also a lack of institutional capacities to collect, process, store and make publicly available data on mercury primary sources, including its stocks, mercury-added products, industrial uses of mercury, mercury wastes and contaminated sites as well as on environmental releases (air emissions and land and water discharges). First, there is no comprehensive system for chemicals registration, evaluation, testing and authorization/admission to the market like EU REACH system as well unified chemicals information management system. Second, national inventory systems for hazardous chemicals, hazardous wastes, contaminated sites and effluent discharges into surface waters are absent. Only air emission inventory system is at place within the Air Protection Service of the MoENRP, based on Corinair and Copert (software calculating air emissions from road transport) methodologies and software tools. Emission inventories also include inventories of air emissions of heavy metals from a number of industries. Based on inventory results, annual bulletins are prepared and posted on the web-site of the MoENRP at www.moe.gov.ge and the web-site of the Center for Environmental Information and Education at www.eiec.gov.ge. Third, such system as pollutants release and transfer registers – PRTR for the collection and dissemination of information on estimates of its annual quantities of hazardous chemicals and their compounds that are emitted, released or disposed through human activities does not exist. There was an effort to design and pilot PRTR in country in 2009-2012, but the system has never been applied in practice by the government.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met and priority rank	
· Absent in-country institutional capacities to develop and implement awareness and educational programmers on mercury and its risks - High priority; · Absent comprehensive system for chemicals registration, evaluation, testing and authorization/admission to the market like EU REACH system as well unified chemicals information management system – High priority; · Absent national inventory systems for mercury – High priority; · Absent PRTR system - High priority.	

Chapter IV:
Identification of Populations at Risks and Gender Dimensions

4.1 Preliminary review of potential populations at risk and potential health risks

Human health and environmental health are closely linked. In Georgia, the World Health Organization (WHO) estimated that 17% of the overall disease burden and 19% of all deaths could be attributed to environmental risk factors[37]. This health assessment did not specifically address potential health risks associated with occupational or dietary exposure to mercury in Georgia and specific information on mercury exposure in humans is nonexistent.

Fish consumption in Georgia is considered low with a fish meal being consumed approximately 1 day per week. According to 2013 data from the Food and Agriculture Organization, the primary fish consumed in Georgia is the European anchovy, harvested from the Black Sea[38]. Anchovies are generally considered to have a low body burden of mercury[39] and as such, it is likely that consumption of this popular species does not represent a significant risk to the Georgian population.

The Law on Food / Feed Safety of Georgia outlines a maximum allowable concentration of 0.5 milligrams per kilogram in fish for human consumption. However, there is no information on patterns of mercury concentrations in fish (freshwater or marine) from the country. This coupled with the lack of information on patterns of consumption of freshwater species or waterbodies where mercury may be accumulating in aquatic food webs, making it impossible to develop fish consumption advisories in Georgia. Identifying these patterns of consumption, including waterbodies where communities utilize the fishery as a protein source is an important first step in better understanding the potential risks associated with mercury exposure through fish consumption.

Information on occupational exposure to mercury in Georgia is also non-existent. The national mercury inventory developed as part of the MIA found that dental amalgams are not in use in Georgia. Therefore, it can be assumed that dental hygienists and others working in dental clinics are not at risk of mercury exposure through the processing of dental amalgams. Waste management practices (e.g., incineration, informal dumping) represents a significant pathway for mercury releases in Georgia and as such, workers that are involved in municipal waste collection, incineration, or landfill management where burning occurs may be at risk of exposure to mercury.

Cement production represents a significant source of mercury emissions to air in Georgia. Workers that are processing raw material in and around cement factories may be at risk of exposure to mercury that is released during manufacturing. While not determined to be a significant source of mercury, the mining sector is one of the most rapidly growing sectors in the Georgian econo-

37. Preventing disease through healthy environment, Towards the Estimate of the Environmental Disease Burden, WHO, 2006
38. Food and Agriculture Organization (2015), Fisheries and aquaculture software, FishStatJ – software for fishery statistical time series, in: FAO Fisheries and Aquaculture Department [online], Rome, Updated 23 June 2015.
39. Evers, D.C., Buck, D.G., Dalton, A.K., and Johnson, S.M. 2016, Understanding spatial patterns for biomonitoring needs of the Minamata Convention on Mercury, Biodiversity Research Institute. Portland, Maine, BRI Science Communication Series 2016-02. 20 pages

my. Mercury can be released during all life cycle phases of non-ferrous mineral mining (e.g., copper) and therefore represents a potential risk to miners and others living and working adjacent to these mining areas.

Public health surveys, coupled with assessments of mercury concentrations in environmental media are needed for Georgia to identify potential populations at risk of mercury exposure. Such surveys could be conducted in collaboration with WHO, the Georgian Ministry of Public Health and local researchers to establish a baseline of mercury exposure in the country.

4.2 Assessment of potential gender dimensions related to the management of mercury

The institutional gap analysis revealed that there is no mechanism to facilitate a unified chemicals information management system in the country. As a result, there is no mechanism to promote gender balance among stakeholders or participants. The Steering Committee overseeing the MIA development included mostly female participants. Future work on ratification and implementation of the Convention should ensure that participation in the process is gender balanced.

One of the most vulnerable segments of any population is women of childbearing age and the fetus. The most common pathway for exposure is through fish consumption and in Georgia there is little to no data available to determine the severity of risk that fish consumption represents.

There is a gender component to the risk associated with occupational exposure to mercury. For instance, waste collectors and landfill workers are likely to be predominantly male. The same is likely to be true for cement factory workers and miners. No information is available on the gender distribution of employees at laboratories where mercury-containing measuring devices may represent a potential occupational exposure risk.

In the event of breakage of any household item containing mercury (e.g., compact fluorescent lamps or thermometers), the risk of exposure will depend on who the primary care giver is at the home. In Georgia, there is a gendered division of household labor and such accidents may represent a disproportionate risk to women. Such accidental spills may also represent a significant risk of exposure to young children in the home.

Chapter V: Awareness/Understanding of Workers and the Public; and Existing Training and Education Opportunities of Target Groups and Professionals

Awareness regarding mercury and its risks is very low in Georgia, in general. The subject is new, not studied and researched before, thus the lack of information in the field is evident.

5.1 Awareness raising on Mercury and the Minamata Convention

During the MIA project in Georgia, a series of outreach and awareness raising efforts were initiated. These efforts employed a wide variety of outreach approaches including informational flyers, TV and radio announcements, newspaper articles, and seminars at local universities. Below is a summary of these activities.

- ✔ Information flyers (20.000 Georgian versions; and 5000 Russian version) on mercury and mercury related issues were prepared and circulated in schools and pharmacies. It contains information concerning: mercury related risks, main household goods containing mercury, recommendations how to avoid risky situations / reaction in cases of damage of mercury containing products;
- ✔ Promo kits were designed and disseminated in schools for schoolchildren and teachers: T-Shirts, pens, bags, and caps;
- ✔ TV programs on mercury and mercury related issues were launched in national TV programs with participation of project experts and a representative of Waste and Chemical Department of the Ministry of Environment and Natural Resources Protection of Georgia () including: The other Midday – Rustavi 2, The Doctors – Rustavi 2; and Imedi Day – TV Imedi;
- ✔ Informational clip on mercury related risks was produced. Clip contains practical tips on how to behave in situations of mercury pollution in domestic conditions and recommendations how to avoid them. 2 versions of clip were produced for TV placement (30 Sec. version) and for social media (60 Sec. version).
- ✔ As a Public Service Announcement, the placement of the clip was ensured at Public Broadcaster, TV Imedi, and Maestro TV;
- ✔ Articles including general information on mercury and mercury related issues, about the Minamata Convention as well as on the result of national mercury inventory were produced and placed on the following web-sites: Mshoblebi.ge, Mkurnali.ge, Ambebi.ge, News.ge, Kvirispalitra.ge, Info9.ge, Fintime.ge;
- ✔ Awareness raising seminars on environmental and health issues related to mercury and mercury containing products were held for students involving project expert. Information and awareness raising seminars were held in 8 universities across Georgia. This activity also including thesis competition on mercury theme and presentation of findings at the student conference; Conference was followed by awarding ceremony of best theses on mercury related issues.
- ✔ Awareness raising seminars on environmental and health risks related to Mercury for schoolchildren were held in eight regions of Georgia (Kvemo Kartli, Kakheti, Irmerti, Ajara, Guria, Samegrelo, Samtskhe-Javakheti and Tbilisi) covering up to 70 schools and 340 schoolchildren in total. This activity also included thesis competition on mercury theme and presentation of findings at the conference. Two conferences and respective awarding ceremonies for best theses were held for schoolchildren.
- ✔ Information meeting on mercury and mercury related issues was organized at Environmental Information and Education Center (Eco-Hub space) hosting students, teachers, lecturers

and others interested in mercury issues in December. Speech was delivered by project expert. Three stakeholder meetings were held within the project (23 March 2016, 19 December 2016, and 7 April 2017). Representatives from governmental entities, NGOs, academic sector and business were attended the meetings. One training workshop on UNEP's Toolkit for the Identification and Quantification of Mercury Releases

5.2 Future training needs for successful implementation of the Convention

Following one of the stakeholder meetings that were held during the MIA project, participants were asked to prioritize other training and capacity building exercises that would be beneficial for future implementation of the Convention. Respondents listed a variety of topics that can be summarized in four main topic areas[40] including:

- ✔ awareness raising about public health risks associated with Hg exposure;
- ✔ training for customs officials about hazardous waste;
- ✔ training on appropriate BAT/BEP standards;
- ✔ improved communication and coordination (within Georgia and with other countries)

The MIA project has conducted an extensive awareness raising campaign. Future efforts for awareness raising can be closely coordinated with the National Center for Disease Control and Public Health and the Ministry of Health. Topics to include in such training activities might include the management of household spills of Hg (e.g., breakage of thermometers or CFLs) as well as targeted training for specific occupations (e.g., waste management personnel and miners) about the risks associated with their fields of employment.

A 1-day workshop can be organized to provide stakeholders with an overview of environmentally sound management of Hg waste. Such a workshop could combine information summarized in the Practical Sourcebook on Mercury Waste Storage and Disposal (Sourcebook). Presentations can be delivered on topics that include (1) types and sources of Hg waste; (2) important concepts and approaches to the environmentally sound management of Hg waste; (3) appropriate interim storage of Hg waste; (4) recover, disposal and export of Hg waste; and (5) the management of sites contaminated with Hg waste. During this workshop, information can also be shared on techniques and approaches for identifying contaminated sites (as per Article 12 of the Convention). Such techniques would include abiotic and biotic sampling of environmental media as well as other approaches.

The institutional and legislative gap analyses conducted as part of the MIA project identified several legal instruments related to limiting the transboundary movement of waste in Georgia that were adopted in part because of Georgia's participation in the Basel Convention. There are several governmental and non-governmental organizations engaged in this topic. These include in the Ministry of Environment and Natural Resource Protection, Ministry of Health, and the *Clean Up Georgia* campaign[41]. A workshop organized around this topic of waste management would provide an opportunity for stakeholders to become more away of on-going activities in the country and the challenges that have been identified during the Clean Up Georgia project. In addition, new

40. Several respondents highlighted the importance of strengthening national capacity and improving legislation. Because these topics were covered in detail during the course of the MIA project, they are not highlighted here.
41. Project Clean Up Georgia: http://www.cleanup.ge/?lang=eng&go=project

technologies on environmentally sound management of Hg waste can be shared via a review of the Sourcebook. Such a workshop would also help to identify next steps needed to help ensure that Georgia can comply with the waste management provisions outlined in the Minamata Convention.

In addition to these above-mentioned topics, there will be long-term requirements for parties to the Convention related to reporting and effectiveness evaluation. This will include a combination of standard reporting related to obligations for specific articles of the Convention as well as monitoring related to the primary goal of reducing the risk of exposure to Hg in the environment. To this end, a 1 ½ day workshop can be organized to discuss topics related to effectiveness evaluation, reporting, and Hg monitoring. The workshop would provide an opportunity for existing information to be collated and summarized on Hg monitoring in the country. It would also help prepare stakeholders for the requirements associated with reporting and the short- and medium-term obligations of the Convention. A detailed discussion on biomonitoring would be included to inform stakeholders about current methods for sample collection and globally accepted risk assessment approaches.

Chapter VI: Priority areas for implementation of the Convention

The priority areas for successful implementation of the Minamata Convention on Mercury are derived from the major gaps in information identified during the institutional and legislative gap analysis and national mercury inventory. There exists potential synergies between the Minamata Convention and implementation strategies of other chemicals conventions (e.g., Basel) and it will be beneficial for future implementation efforts to take advantage of the overlapping needs of these conventions in order to enhance coordination of chemicals management efforts within the country. In addition, an effort should be made to identify priority areas that are similar across countries in the region as this will help to improve collaboration on issues such as trade and the transportation of waste and may also open greater opportunities for international funding to assist with these implementation efforts.

Objectives for Future Implementation

Objective 1 – Strengthening the Legal and Institutional Framework

The legal and institutional framework in Georgia requires updating and reinforcing to enable the country to implement the obligations of the Minamata Convention. It was determined that an overall, comprehensive view of existing legislation is required to ensure that Georgian law allows for full compliance with the Convention. Such a review would also provide an opportunity for Georgia to bring its legislation more in line with existing laws and regulations of the European Union (EU).

The national mercury inventory identified the use and disposal of Hg-added products as a significant source of Hg emissions and releases. In addition, there are no existing regulations that specifically address these products, their importation, use, or disposal. It is anticipated that updated legislation will assist with the implementation of Article 4 and will have a long-term benefit of reducing Hg emissions and releases.

In addition, it was recognized that there is an overall lack of coordination at the ministerial level related to chemicals management in general, and mercury specifically. There is a need to foster greater communication between ministries and to establish a coordinating mechanism that can facilitate activities related to the Minamata Convention and other multilateral environmental agreements that focus on chemicals management.

Objective 2 – Environmentally Sound Management of Hg-containing Waste

The environmental sound management (ESM) of Hg and Hg-containing waste requires that Hg waste not be mixed with or discarded in landfills. Not be incinerated with pollution control systems in place, and treated to immobilize mercury[42]. ESM encourages recovery and recycling of Hg

42. UN Environment and International Solid Waste Association, 2015. Practical Sourcebook on Mercury Waste Storage and Disposal, UN Environment, 88 pp.

and Hg-containing compounds and, in the cases where disposal is a viable option, the material must first be stabilized and/or solidified prior to being placed in a specially engineered landfill or permanent underground storage facility.

In Georgia, there is currently no facility with the capabilities for interim storage of Hg-containing waste. Nor is there a mechanism for sorting, collecting and/or recycling Hg-containing waste. The country is also a party to the Basel Convention and there has been some effort taken towards establishing a regulatory framework related to the movement of hazardous waste (e.g., the Law on Transboundary Movement of Hazardous Wastes). However, the legislative and institutional gap analysis as well as feedback from the Project Steering Committee identified waste management as an important area for further strengthening.

The proposed activities include the design and construction of an interim storage facility and the initiation of a producer responsibility program that incorporates sorting and recycling of Hg-added products.

Objective 3 – Education and Awareness Raising

During the MIA project in Georgia, extensive effort was given to awareness raising efforts (see Chapter V for details). These efforts were important to sensitize decision makers and the general public about mercury related health risks and pathways for exposure. These efforts should not cease with the end of the MIA project. A continued, consistent messaging related to mercury and the implementation of the Minamata Convention will facilitate the ratification process. A targeted education program on sorting Hg-containing waste will be an important component of the larger effort related to EMA of Hg-containing waste.

The renewed focus on education and awareness related to Hg should also include targeted training for Customs officials. Customs officers will play an important role in enforcing rules associated with the importation of Hg-added products and the movement of Hg-containing waste.

Objective 4 – Incorporation of BAT/BEP

Best Available Technologies and Best Environmental Practices (BAT/BEP) related to Hg emissions will provide Georgia with the necessary guidance related to emissions sources and approaches for reducing those emissions in a manner that is both economically viable and effective at reducing Hg emissions. It is recommended that a review of BAT/BEP be conducted. This should be coupled with an awareness raising and sensitization effort that is focused on the primary emission sources (e.g., cement). It will be important to foster collaboration with these industries to advance efforts towards emissions reduction.

Objective 5 – Research, Monitoring and Reporting

Research, monitoring and reporting will become an important component moving forward. The national mercury inventory was conducted using the inventory Level 1 approach and there is a need to expand and improve on this approach. During the inventory development, it became apparent that there is a general lack of information on Hg exposure in humans and there is also limited on Hg concentrations in environmental media (e.g., fish, birds) that are important for future effectiveness evaluation of the Minamata Convention. In addition, MENRP officials will be required to meet regular reporting requirements for the Convention.

Chapter VII:
Mainstreaming of Mercury Priorities

Meeting the obligations of the Minamata Convention will require an integrated approach to chemicals management that engages the public and private sector in all aspects of the implementation of the Convention. In Georgia, preparations have been made to begin mainstreaming the priority areas into the national development plans.

Some mercury issues are already mainstreamed in national plans and priorities including National Waste Management Action Plan (2016-2021) and draft National Environmental Action Plan (NEAP 3) covering the period of 2017-2021. These documents are based on country's development goals and reflect current and future steps country needs to take for sound chemicals management including mercury (see table 47).

Table 47. Mainstreaming mercury priorities into the national development

Title of Development Plan / Sector Plan/ Sector Strategy, etc.	Actual text included (incl. defined outcomes, outputs)	Time Frame	Priority mainstreamed
National Waste Management Action Plan (2016-2020)	**Objective 0.1; Target T 1.2** International Conventions fully transported and implemented · Situation analysis with respect to ratification of Minamata Convention to be conducted and involvement of relevant authorities ensued	2016-2017	Within the MIA situation analysis were conducted including review of policy, legal/regulatory and institutional frameworks; capacity of relevant authorities assessed and gaps identified; mercury in different source categories identified and assessed
Draft National Environmental Action Plan (NEAP - 3)	**Goal: To ensure that chemicals are managed in a sound and environmentally friendly manner** **Target 2: Improvement of management of certain chemicals such as POPs, ODSs, Mercury and Mercury compounds at national level** · Elaboration of the legislative basis for the management of Mercury and Mercury compounds · Carrying out Initial Assessment of Mercury sources	2018-2020 2017	A draft package of recommendations (conceptual, new legislation/legal clauses and amendments and supplements to the existing legislation as appropriate) in all relevant areas of the Minamata Convention to come into compliance with the Convention requirements and to improve mercury management in Georgia was prepared; Road map for the implementation of the Minamata convention was prepared. Initial assessment of mercury sources (October 2016-February 2017) was conducted in number of source categories using UNEP Level I toolkit methodology and relevant assessments were prepared.

ANNEX I: Stakeholder Engagement process/List of Stakeholders

List of Stakeholders

Name	Title	Organization
Nino Antadze	Energy and Environment Team Leader	UNDP
Nestan Khuntsaria	Programme Associate, Energy and Environment Portfolio	UNDP
Alverd Chankseliani	Head of Waste and Chemicals Service	Ministry of Environment & Natural Resources Protection of Georgia
Irma Gurguliani	Deputy Head of Waste and Chemicals Service/National Project Director	Ministry of Environment & Natural Resources Protection of Georgia
Ana Berejiani	Chief Specialist	Ministry of Environment & Natural Resources Protection of Georgia
Venera Metreveli	Chief Specialist	Ministry of Environment & Natural Resources Protection of Georgia
Nino Chikovani	Head of Land Resources Protection and Mineral Resources Service, UNCCD Focal Point	Ministry of Environment & Natural Resources Protection of Georgia
Marina Makarova	Water Management Service	Ministry of Environment & Natural Resources Protection of Georgia
Ketevan Kordzakhia	Head of Air Protection Service	Ministry of Environment & Natural Resources Protection of Georgia
Noe Megrelishvili	Chief Specialist	Ministry of Environment & Natural Resources Protection of Georgia
Neli Korkotadze	Chief State Inspector	Ministry of Environment & Natural Resources Protection of Georgia
Ia Papiashvili	Director	Environmental Information and Education Centre
Marine Arabidze	Head of Environmental Pollution Monitoring Department	National Environmental Agency

Nino Chanturishvili	Chief customs officer at non-tariff control unit of customs department	Customs Department, Revenue Service Agency, Ministry of Finance
Marina Gvinepadze	Head of plant protection and agro-chemical means unit	National Food Agency, Ministry of Agriculture
Nana Gagiladze	Chief Specialist	National Food Agency, Ministry of Agriculture
Salome Tchitchinadze	Specialist	Technical and Construction Supervision Agency, Ministry of Economics & Sustainable Department
Nana Gabriadze	Head of Environmental Health Unit	National Disease and Public Health Control Center, Ministry of Labor, Health and Social Affairs
Nino Mumladze	Full professor	Tbilisi Technical University, Environment protection and Engineer Ecology Department
Lia Todua	Consumers rights programme coordinator	Center for Strategic Research and Development of Georgia
Nino Chkhobadze	Chair	Greens Movement of Georgia/ Friends of Earth, NGO
Georgi Abulashvili	Director	Energy Efficiency Center
Khatuna Chikviladze	Advisor	Solid Waste Management Company, Ministry of Infrastructure and

ANNEX II:
UNEP TOOLKIT Calculation Spreadsheet

Inventory Level 1 – Executive Summary[43]

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 and impurities	General waste	Sector specific waste treatment / disposal	Total releases *3*4*5	
Coal combustion and other coal use	83.0	83.0	0.0	0.0	0.0	0.0	0.0	83	2%
Other fossil fuel and biomass combustion	47.3	47.3	0.0	0.0	0.0	0.0	0.0	47	1%
Oil and gas production	0.7	0.1	0.1	0.0	0.2	0.0	0.2	1	0%
Primary metal production (excl. gold production by amalgamation)	1,897.6	96.5	37.5	1,687.5	75.0	0.0	1.1	1,898	45%
Gold extraction with mercury amalgamation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0%
Other materials production*6	218.9	164.2	0.0	0.0	54.7	0.0	0.0	219	5%
Chlor-alkali production with mercury-cells	-	-	-	-	-	-	-	0	0%
Other production of chemicals and polymers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0%
Production of products with mercury content*1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0%
Application, use and disposal of dental amalgam fillings	-	-	-	-	-	-	-	0	0%
Use and disposal of other products	1,164.6	254.0	157.3	328.5	0.0	361.4	63.3	1,165	28%
Production of recycled metals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0%
Waste incineration and open waste burning*2	449.1	449.1	0.0	0.0	0.0	0.0	0.0	449	11%
Waste deposition*2	3,691.9	36.9	0.4	0.0	-	-	-	37	1%
Informal dumping of general waste *2*3	404.0	40.4	40.4	323.2	-	-	-	81	2%
Waste water system/treatment*4	933.7	0.0	840.3	0.0	0.0	93.4	0.0	93	2%
Crematoria and cemeteries	122.7	0.0	0.0	122.7	0.0	0.0	0.0	123	3%
TOTALS (rounded) *1*2*3*4*5*6	**3,990**	**1,170**	**240**	**2,140**	**130**	**450**	**60**	**4,200**	**100%**

*1 To avoid double counting of mercury in products produced domestically and sold on the domestic market (including oil and gas), only the part of mercury inputs released from production are included in the input TOTAL.
*2: To avoid double counting of mercury inputs from waste and products in the input TOTAL, only 10% of the mercury input to waste incineration, waste deposition and informal dumping is included in the total for mercury inputs. These 10% represent approximately the mercury input to waste from materials which were not quantified individually in Inventory Level 1 of this Toolkit. See Appendix 1 to the Inventory Level1 Guideline for more explanation.
*3: The estimated quantities include mercury in products which has also been accounted for under each product category. To avoid double counting, the release to land from informal dumping of general waste has been subtracted automatically in the TOTALS.
*4: The estimated input and release to water include mercury amounts which have also been accounted for under each source category. To avoid double counting, input to, and release to water from, waste water system/treatment have been subtracted automatically in the TOTAL
*5: Total inputs do not necessarily equal total outputs due to corrections for double counting (see notes*1-*3) and because some mercury follows products/metal mercury which are not sold in the same country or in the same year.
*6 To avoid double counting, fossil fuel mercury contributions to cement production was subtracted automatically in the TOTALS.

43. Mercury inventory spreadsheets are provided in a separate document

Useful Resources

- Minamata Convention Website:
  http://www.mercuryconvention.org/
- Minamata Convention Text
  http://www.mercuryconvention.org/Convention/tabid/3426/Default.aspx
- Materials developed by the interim secretariat of the Minamata Convention
  http://www.mercuryconvention.org/AwarenessRaising/Resources/tabid/3873/Default.aspx
  - Becoming a Party to the Minamata Convention on Mercury (FACT SHEET)
  - Minamata Convention on Mercury at a glance (FACT SHEET)
  - Overview of the negotiations process (PPT)
  - Overview of the Minamata Convention on Mercury (PPT)
  - Provision of the Convention on financial and technical support (PPT)
  - Practical steps of the ratification, acceptance, approval or accession processes and notifications under the Minamata Convention (PPT)
- Toolkit for Identification and Quantification of Mercury Releases (UNEP) http://www.unep.org/chemicalsandwaste/Metals/MercuryPublications/GuidanceTrainingMaterialToolkits/MercuryToolkit/tabid/4566/language/en-US/Default.aspx
- Mercury Learn Platform (UNITAR/UNEP)
  http://mercurylearn.unitar.org/
- List of Country Mercury Release Inventories (UNEP) http://www.unep.org/chemicalsandwaste/hazardoussubstances/Mercury/Informationmaterials/ReleaseInventories/tabid/79332/Default.aspx
- Checklist of legal authorities to implement Minamata Convention on Mercury [Natural Resources Defense Council - NRDC]
  http://docs.nrdc.org/international/files/int_15101301a.pdf
- Minamata Convention on Mercury - Ratification and Implementation Manual [Zero Mercury Working Group, Natural Resources Defense Council, Ban Toxics] http://www.zeromercury.org/phocadownload/Developments_at_UNEP_level/minamatamanual_eng_january%202015%20final.pdf
- Guidance for identifying populations at risk from mercury exposure (WHO/UNEP) http://www.who.int/foodsafety/publications/risk-mercury-exposure/en/
- Developing a National Action Plan to Reduce, and Where Feasible, Eliminate Mercury Use in Artisanal and Small Scale Gold Mining (UNEP, 2015) HTTP://WWW.UNEP.ORG/CHEMICALSANDWASTE/NATIONALACTIONPLAN/TABID/53985/DEFAULT.ASPX
- Chemicals Management: The why and how of mainstreaming gender (UNDP, 2007) http://www.undp.org/content/undp/en/home/librarypage/environment-energy/chemicals_management/chemicals-management-the-why-and-how-of-mainstreaming-gender.html
- Draft guidance on identification of individual stocks of mercury or mercury compounds exceeding 50 metric tons, as well as sources of mercury supply generating stocks exceeding 10 metric tons per year http://www.mercuryconvention.org/Portals/11/documents/meetings/inc7/English/7_4_e_stock.pdf
- UNDP Guidance Document “Chemicals Management – The Why and How of Mainstreaming Gender
  http://www.undp.org/content/undp/en/home/librarypage/environment-energy/chemicals_management/chemicals-management-the-why-and-how-of-mainstreaming-gender.html