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MINISTRY OF ENVIRONMENT AND GREEN DEVELOPMENT

NATIONAL IMPLEMENTATION PLAN FOR THE STOCKHOLM CONVENTION

MONGOLIA

2014

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AND GREEN DEVELOPMENT

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LIST ABBREVIATIONS

ABS	Acrylonitrile-butadiene-styrene
AFFF	Aqueous film forming foams
APCS	Air Pollution Control System
BAT	Best available techniques
BEP	Best environmental practices
BFRs	Brominated flame retardants
CDP	Continuous Dehalogenation Process
COP	Conference of the Parties
CRT	Cathode Ray Tube
c- DecaBDEs	commercial-Decabrominated diphenyl ethers
c- OctaBDEs	commercial-Octabrominated diphenyl ethers
c- PentaBDEs	commercial-Pentabrominated diphenyl ethers
DDT	1,1,1-trichloro-2,2-bis (4-chlorophenyl)ethane
EEEs	Electric and electronic equipment
EIA	Environmental Impact Assessment
ETFE	Ethylene Tetrafluoroethylene
EU	European Union
E-Waste	Electronic waste
GCA	General Customs Authority
GC-ECD	Gas chromatography- Electron Capture Detector
GC/MS MS	Gas chromatography–mass spectrometry mass spectrometry
gTEQ	gram Toxic Equivalency
GDP	Gross domestic product
GEF	Global Environment Facility
HBB	Hexabromobiphenyl
HBCD	Hexabromocyclododecane
HCB	Hexachlorobenzene
HCH	Hexachlorocyclohexane
IEC	International Electrotechnical Commission
IT	Imformation Thechnology
ISO	International Organization for Standardization
kWt	Kilowatt
LCD	Liquid-Crystal Display
LED	Light-emitting diode
MAS	Mongloian Academy of Science
MNS	Mongolian National Standard
Mcal/t	Mega calorie for ton
MEGD	Ministry of Environment and Green Development
MoIA	Ministry of Industry and Agriculture
MoED	Ministry of Education
MoH	Ministry of Health
MoM	Ministry of Mining
MoJ	Minstry of Justice
MoES	Ministry of Education and Science
MoE	Ministry of Energy
MoED	Ministry of Economic Development
MoF	Ministry of Finance
MoPDSW	Ministry of Public Development and Social Welfare
MoL	Ministry of Labour

MoRT	Ministry of Road and Transport
MoCUD	Ministry of Construction and Urban Development
MoFA	Ministry of Foreign Affairs
SSIA	State Specialized Inspection Agency
SEA	State Emergency Authority
NCSM	National Centre for Standardization and Metrology
NEMA	National Emergency Management Agency
NGO	Non-Governmental Organizations
OCP	Organochlorine pesticides
ODS	Ozone Depleting Substances
PAHs	Polyaromatic hydrocarbons
PBDEs	Polybrominated diphenyl ethers
POP-PBDE	Persistent Organic Pollutants - Polybrominated diphenyl ethers
PCBs	Polychlorinated biphenyls
PCDD	Polychlorinated dibenzo-p-dioxins
PCDF	Polychlorinated dibenzofurans
PeCB	Pentachlorobenzene
PFCs	Perfluorocarbons
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonic acid
PFOSF	Perfluorooctane sulfonyl fluoride
POPs	Persistent Organic Pollutants
	ppm parts per million
PUR	Polyurethane
PVC	Polyvinyl Chloride
SME	Small and medium-sized enterprises
SSIA	State Specialized Inspection Agency
TMTD-80	80% -Tetramethyl Thiuram Disulfide
TVs	Televisions
UNEP	United Nation Environment Programme
UNIDO	United Nation Industrial Development Organization
UPOPs	Unintentionally produced POPs
USA	United State of America
US EPA	United States Environment Protection Agency
WEEE	Electric and electronic equipment waste
WHO	World Health Organization
XRF	X-ray fluorescence

PREFACE

Mongolia ratified the Stockholm Convention on Persistent Organic Pollutants in 2004 and approved its National Implementation Plan in 2006.

Within the framework of the implementation of initial NIP, numerous actions have been taken, specifically on legislation and regulations for POPs activities, awareness raising activities and trainings for general public and target groups, development of curriculum and textbook and establishment of laboratory.

Initially, 12 POPs have been annexed to the Convention, being recognized as causing serious adverse effects on human health and the ecosystem that possess particular properties such as long degradation period, bioaccumulation and long range transport. The 4th and 5th Meetings of the Conference of Parties to the Stockholm Convention added 9 substances in 2009 and another one in 2011, respectively, to the Annexes and with this regard the Parties obliged to update the NIP within 2 years of the addition of the new chemicals.

With the financial support from the Global Environmental Facility, project GF/MON/12/002, entitled "Enabling Activities to Review and Update the National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants" started implementation in 2012and national inventory was conducted in 2013 on pesticides, industrial chemicals, dioxins and furans and PCBs to make situation analysis, after which set priorities and goals to update the NIP. The updated NIP was approved by the Government in 2014 by resolution #341.

I would like to express my sincere gratitude to the United Nations Industrial Development Organization and its expert Dr. Roland Weber for the administration and expertise contributed to the implementation of this project and updating the National Implementation Plan.

The Updated NIP encloses 52 actions within 11 activities under 5 objectives and 35% of which is for waste management improvement, 19% and 10% for air and soil pollution reduction. Successful implementation of this NIP will improve regulations on POPs containing products and wastes and reduce the use of POPs containing products.

Moreover, we expect to have management system for the collection, transport, recycling, storage and disposal of hazardous wastes and wastes from electric sand electronic equipment and end-of-life vehicles, as well as integrated registry and database of POPs sources and contaminated sites. Actions are planned to decontaminate the sites and reduce the release from sources.

In conclusion I would like to request for the exertion of endeavor and commitment for the implementation of this NIP and herewith I would also underline the importance of concerted efforts, cooperation and participation not only by the Ministry of Environment and Green Development, but also other ministries, agencies and businesses, as well as NGOs and public.

Minister of Environment and Green Development  S.Oyun

EXECUTIVE SUMMARY

Persistent organic pollutants are a group of substances that persist in the environment, bioaccumulate through the food web, and pose a risk of causing adverse effects to human health and the environment. With the evidence of long-range transport of these substances to regions where they have never been us In an effort to implement the Convention and meet the obligations, Mongolian Government approved the first National Implementation Plan on Persistent Organic Pollutants in 2006 and took certain measures within the framework of the plan. Mongolia has correlated its vision in managing POPs substance taking into account GEF 2020 Strategy, as well as the GEF-6 Strategy. Mongolia aims taking a more integrated and systemic approach based on the causal chain of environmental change, and identifying the key underlying drivers to tackle.

At the policy level, Mongolia is aiming to link and harmonize the different activities on chemical management (POPs, mercury, ozone depleting substances, SAICM) as well as climate change mitigation considering short-lived climate pollutants which for emission reduction has a range of links to unintentional POPs reduction including open burning. Also, due to a large overlap of reduction of unintentional POPs and mercury in a range of industrial sectors, Mongolia will aim to harmonize the implementation of these two conventions where appropriate. Moreover, the waste management and the destruction of hazardous chemicals need to be addressed in a holistic manner and should address all type of hazardous chemical wastes and their destruction, where appropriate, securing the co-funding in implementation.

It is Mongolia's view that dealing with the POPs issues in an integrative manner, as part of country's framework action plans (chemical management, waste management, contaminated sites etc.), will end up in an effective implementation of the issues, bringing in the same time confidence to and attracting the international donors.

For the purpose of regulating POPs related activities, banned use of 18 substances listed in the Convention Annexes and limited the use of PCB. Already at the national level came into force the Regulation on Registration, Collection, Transportation, Storage, Disposal, Import, Export and Transboundary Movement of Polychlorinated Biphenyls (PCBs). Acts on banning the use and import of POPs pesticides have been in effect, too. Also, specific provisions have been added to the Law on Waste and Law on Environmental Impact Assessment, and POPs reference values, as well as several analytical methods have been standardized nationally.

The 4th and 5th Meetings of the Conference of Parties to the Stockholm Convention added 9 new substances in 2009 and another one in 2011, respectively, to the Annexes and with this regard the Parties were required to update the NIP within 2 years of the addition of the new chemicals.

Along with the obligations, national inventory was conducted in 2013 on pesticides, industrial chemicals, including dioxins and furans and PCBs, and situation analysis was made, after which the priorities and goals to update the NIP were set. The updated NIP was approved by the Government on 18 October 2014 by resolution No341.

This NIP gives an overview of Mongolia's current level of compliance with the Stockholm Convention requirements in respect to "initial POPs" listed in the Convention Annexes, as a proof of Mongolia's commitment in reducing/eliminating the POPs substances. And it gives an overview on the situation of the new listed POPs in Mongolia and how Mongolia is planning to address the new listed POPs in an integrated manner.

The overall objective of this NIP is to protect the environment and human health from the harms of POPs and implement the actions under following 5 key-objectives:

1. Strengthening Regulatory and Implementation Mechanism of the Stockholm Convention;
2. Reduction of POPs release in environment and further reduction of adverse effects on human health through the establishment of proper management of collection, recycling and environmentally sound disposal of wastes containing new industrial POPs chemicals;
3. Reduction of PCDD/F Releases from Unintentional Sources;
4. Identification and Remediation of Sites Contaminated by POPs Pesticides;
5. "PCB-Free Country".

Activities and actions reflected in the POPs NIP will be implemented in two phases. In Phase I (2014-2020) activities and actions for the improvement of legislation, establishment of the management for collection, recycling and environmentally sound disposal of wastes, including hazardous waste, especially POPs containing wastes and build laboratory capacity to determine POPs chemicals will be implemented.

In Phase II (2020-2030) activities and actions for phasing out the use of POPs containing products, dispose of stockpiles, decontamination of contaminated sites and reduction of releases will be implemented.

For the priority NIP action on Polychlorinated Biphenyls, specifically, phase out the use of PCB-containing equipment by 2020 and treat wastes and contaminated sites, capacity for the environmentally sound management and disposal of PCBs has been built and conducted detailed inventory and developed database. PCBs decontamination workshop was established at the National Electricity Transmission Grid State-Owned Company and decontaminated around 600 tons of PCBs equipment by the end of 2014 and retrofilling cleaned fluids. The technology was proven to be effective (both environmentally and economically) as expanding life-span of electrical equipment by 10 to 20 years.

Translated and distributed methodologies and guidance for the application of Best Available Techniques and Best Environmental Practices (BAT/BEP) in unintentionally produced POPs sources and the first demonstration project was implemented in Power Plant #4.

In order to strengthen POPs monitoring, analytical and research capacity, the Ministry of Environment and Green Development in cooperation with the Mongolian Academy of Science established a POPs laboratory, which furnished with equipment for PCBs and PCDD/Fs analyses and for determination of fluoride, chlorine, bromine in polymers, as well as air sampling equipment. Personnel for the laboratory had also been trained.

Trainings, workshops and awareness raising activities have been organized for target groups, disseminated references and guidance and broadcasted short movies for public. Prepared a textbook on POPs for curriculum of higher educational institutes and translated the "Green Stove" training material, developed by UNIDO, and started using in education.

Estimated funding required for the NIP implementation for the 16 years period is 885 billion Tugriks (520 million USD) and, beside national funds allocated, financial and technical assistance from the Global Environmental Facility, international organizations and donors should be attracted. It's preferred to have synergies and cooperation between other programs and projects in the implementation of actions and measures set forth in NIP.

By implementing the NIP, improved regulation of activities related to POPs containing products and wastes and reduced use of the products is expected. Also, management system for hazardous wastes and the waste of electric and electronic equipment, as well as of the end-of-life vehicles will be established along with, the database of POPs sources and contaminated sites; moreover, decontamination and emissions reduction measures will be taken. As a final result, the utmost goal is improving the environment quality and public living conditions.

1. INTRODUCTION

1.1. STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS

Ability of existence of any chemical substances in the environment depends on their chemical and physical properties and quality of the environment. Whereas, molecular structure of the substance and its atoms define the chemical and physical properties of the molecule. Thus, the chemical and physical properties can change depending on the molecular structure. There are substances that are easily degradable, less toxic and nottransportable and these substances do not pose serious threats to human health and environment with low pollution and poisoning. On the contrary, there are substances which are persistent (not easily degraded), toxic and transportable in long distance, i.e. substances that still can maintain their toxicity even in long distance travel. These are the group of substances that called persistent organic pollutants.

Persistent Organic Pollutants (POPs) are polyhalogenated hydrocarbons, usually contain chlorine, bromine and fluorine. POPs include pesticides, industrial chemicals, as well as substances produced unintentionally during some industrial and combustion processes. They possess the following particular properties, including:

- Long degradation period, meaning remains intact in environment for decades;
- Bioaccumulation and biomagnification in human and animal;
- Long range transport in air, water and living organisms (reaches far distances from the place of origin);
- Seriously toxic to human health and living organisms (UNEP, 2005).

POPs are characterized by low water solubility and high lipid solubility, which leads together with their persistence to bioaccumulation in fatty tiisues.

Being aware that POPs pose major and increasing threats to human health and environment, the world community adopted the Stockholm Convention on Persistent Organic Pollutants to protect human health and environment from the adverse effects of POPs in May 2001 and the convention entered into force in 2004. As of 2014, number of Parties to the Convention reached 179.

Initially, 12 POPs have been recognized as causing adverse effects on humans and the ecosystem *(Aldrin, Chlordane, DDT, Dieldrin, Endrin, Heptachlor, Hexachlorobenzene, Mirex, Toxaphene, Polychlorinated biphenyls (PCBs), Polychlorinated dibenzo-p-dioxins (PCDD), Polychlorinated dibenzofurans (PCDF))*. At its 4th meeting, the Conference of the Parties held in 2009, added 9 new chemicals *(α-hexachlorocyclohexane, β-hexachlorocyclohexane, Chlordecone, Hexabromobiphenyl, Hexabromodiphenyl ether and heptabromodiphenyl ether, Lindane, Pentachlorobenzene, Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride andTetrabromodiphenyl ether and pentabromodiphenyl ether)*; at its 5th meeting, the Conference of the Parties, in 2011, added *Technical endosulfan and its related isomers*, and at its 6th meeting, held in 2013, added *Hexabromocyclododecane;* summing of 23 substances listed in Annexes A, B and C of the Convention.

Annex A of the Convention lists substances of which the production and use should be “eliminated”; Annex B lists the substance of which the production and use for specific exemptions/acceptable purposes under strict control should be “restricted” and Annex C lists those substances of “unintentional production”.

Table 1: Chemicals listed in the Annexes of the Stockholm Convention on Persistent Organic Pollutants

Elimination(Annex A)	Restriction (Annex B)	Unintentional Production (Annex C)
1. Aldrin 2. α-Hexachlorocyclohexane 3. β-Hexachlorocyclohexane 4. Chlordane 5. Chlordecone 6. Dieldrin 7. Endrin 8. Heptachlor 9. Hexabromobiphenyl 10. Hexabromodiphenylether and heptabromodiphenyl ether 11. Hexachlorobenzene 12. Lindane 13. Mirex 14. Pentachlorobenzene 15. Tetrabromodiphenyl ether and pentabromodiphenyl ether 16. Toxaphene 17. Endosulfan 18. Polychlorinated biphenyl (PCB) 19. Hexabromocyclododecane (HBCD)	1. DDT 2. Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride	1. Hexachlorobenzene 2. Pentachlorobenzene 3. Polychlorinated biphenyls (PCB) 4. Polychlorinated dibenzodioxins (PCDD) 5. Polychlorinated dibenzofurans (PCDF)

1.2. OBJECTIVE

Article 1 of the Convention states that "the objective of this Convention is to protect human health and the environment from persistent organic pollutants".

1.3. OBLIGATIONS

Parties to the Convention shall:

1. Prohibit and/or take the legal and administrative measures to eliminate production, use, import and export of Annex A substances;
2. Restrict its production and use of the chemicals listed in Annex B;
3. Take measures to reduce, where feasible, eliminate the total releases derived from anthropogenic sources of each chemicals listed in Annex C, and for this purpose, promote the use of best available techniques and best environmental practices (BAT/BEP);
4. Take measures to dispose of stockpiles consisting of or containing chemicals listed either in Annex A or Annex B and wastes, including products and articles in a manner protective of human health and the environment and clean contaminated sites;

Stop the use of polychlorinated biphenyls in equipment (e.g. transformers, capacitors, breakers) by 2025 and eliminate the use by 2028 in an environmentally sound manner.

New POPs

At its 4th meeting held in 2009, the Conference of the Parties of the Convention adopted amendments to Annexes to list 9 new chemicals, namely α-hexachlorocyclohexane, β-hexachlorocyclohexane, Chlordecone, Hexabromobiphenyl, Hexabromodiphenyl ether and heptabromodiphenyl ether, Lindane, Pentachlorobenzene, Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride and Tetrabromodiphenyl ether and pentabromodiphenyl ether.

Table 2: Nine New POPs Listed in Annexes A, B and C of the Convention

Chemicals	Annex	Specific Exemptions/Acceptable Purposes
α-Hexachlorocyclahexane*	A	Production: None Use: None
β-Hexachlorocyclahexane*	A	Production: None Use: None
Chlordecone♣	A	Production: None Use: None
Hexabromobiphenyl♦	A	Production: None Use: None
Hexabromodiphenyl ether and heptabromodiophenyl ether (commercial octabromodiphenyl ether)♦	A	Production: None Use: Articles in accordance with the provisions of Part IV of Annex A
Lindane♣	A	Production: None Use: Human health pharmaceutical for control of head lice and scabies as second line treatment
Pentachlorobenzene♣♦*	A andC	Production: None Use: None
Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride ♦	B	Production: For the use below Use: Acceptable purposes and specific exemptions in accordance with Part III of Annex B. **Acceptable purpose:** In accordance with Part III of thisAnnex for the following acceptable purposes, or as an intermediate inthe production of chemicals with the following acceptable purposes: • Photo-imaging • Photo-resist and anti-refl ectivecoatings for semi-conductors • Etching agent for compound semiconductorsand ceramic fi lters • Aviation hydraulic fl uids • Metal plating (hard metal plating)only in closed-loop systems • Certain medical devices (suchas ethylene tetrafl uoroethylene copolymer (ETFE) layers andradio-opaque ETFE production, in-vitro diagnostic medicaldevices, and CCD colour fi lters) • Fire-fi ghting foam • Insect baits for control ofleaf-cutting ants from *Atta spp.* and *Acromyrmex spp.* **Specifi c exemption:** For the following specifi c uses,or as an intermediate in the production of chemicals withthe following specifi c uses: • Photo masks in thesemiconductor and liquid crystal display (LCD) industries • Metal plating (hard metal plating) • Metal plating (decorative plating) • Electric and electronic partsfor some colour printers andcolour copy machines • Insecticides for control of redimported fi re ants and termites • Chemically driven oil production • Carpets • Leather and apparel • Textiles and upholstery • Paper and packaging • Coatings and coating additives • Rubber and plastics
Tetrabromodiphenyl ether and pentabromodiphenyl ether (commercial pentabromodiphenyl ether)♦	A	Production: None Use: Articles in accordance with the provisions of Part IV of Annex A

♣- pesticide, ♦- industrial chemical, *-by-product

1.4 NIP DEVELOPMENT METHODOLOGY

The Mongolian NIP review process was triggered by the changes in the obligations arising from amendments to the Convention or its annexes, according to paragraph 7 of the annex to decision SC-1/12.

The NIP update process has followed the guidance provided by the SC Guidance for Developing a National Implementation Plan (updated in 2012 to include the POPs listed in 2009 and 2011). Also during the NIP updating process the following guidance were taken on board by the NIP update country team:

- Guidance for the review and updating of national implementation plans;
- Guidance on calculation of action plan costs for specific POPs (updated in 2012);
- Guidance on Socio-Economic Assessment for National Implementation Plan Development and Implementation under the Stockholm Convention (2007) (not revised);
- Guidance for the inventory of perfluorooctane sulfonic acid (PFOS) and related chemicals listed under the Stockholm Convention on POPs (Draft, 2012) (new);
- Guidance on best available techniques and best environmental practices for the use of perfluorooctane sulfonic acid (PFOS) and related (Draft, 2012) (new);
- Guidance for the inventory of polybrominated diphenyl ethers (PBDEs) listed under the Stockholm Convention on POPs (Draft, 2012) (new);
- Guidance on best available techniques and best environmental practices for the recycling and waste disposal of articles containing polybrominated diphenyl ethers (PBDEs) listed under the Stockholm Convention on POPs (Draft, 2012) (new);
- Guidance for the control of the import and export of POPs (Draft, 2012) (new);
- Labelling of products or articles that contain POPs-initial considerations (Draft, 2012) (new).

Moreover the following SC and BC available resources have been consulted:

- Step-by-step companion guide to the review and updating of the National Implementation Plans – 2011;
- Lessons learned and good practices in the development of national implementation plans for the Stockholm Convention on Persistent Organic Pollutants, 2006;
- New POPs – Publications;
- PCBs – Guidance documents on PCBs;
- BAT/BEP – Guidelines on best available techniques and provisional guidance on best environmental practices;
- Toolkit – Standarized toolkit for Identification and Quantification of Dioxins and Furan Releases;
- Waste and Stockpiles •Training tool;
- POPs Waste;
- Technical guidelines adopted under Basel Convention;
- E-Waste.

The update process of the National Implementation Plan (NIP) to manage and phase-out persistent organic pollutants was initiated in November 2012 by nominating the National Chemicals Management Council, Ministry of Environment and Green Development as the responsible implementing agency within the Government. UNIDO has been the executing agency. The main funding source has been the Global Environment Facility, (GEF). The practical work started in January 2013 by assessing the current situation of PCBs management. The specific inputs, duly reported, in the process are as follows:

- Inventory report for Pesticides and action plan;
- Inventory report for PCB and action plan;
- Inventory report for PBDE and action plan;
- Inventory report for PFOS and action plan;
- Inventory report for unintentional POPs and action plan;

1.4.1. Socio-Economic Assessment

There is a growing body of information and data on the links between pollution and health and this demonstrates more and more strongly the scale of the impacts of current pollution release, contaminants from indoor exposure (including heating/cooking, chemicals used in buildings and consumer products) as well as contaminated sites having the same or even higher impact on diseases in developing and transition countries compared to major diseases like HIV, malaria[1],[2]. The numbers of people affected worldwide are now estimated to be of the order of 200 million1. POPs, POPs-like chemicals[3] and otherwise toxic chemicals (including e.g. heavy metals or endocrine disrupting chemicals[4],[5]) play a crucial role. This highlights that a more critical assessment of the social burdens of pollution from industrial production and releases as well as chemical exposure is needed.

References to socio-economic assessment can be found throughout the text of the Stockholm Convention[6]. These references indicate the importance of a socio-economic assessment when implementing the obligations under the Convention and when developing the NIP. Furthermore GEF 2020 long-term strategy suggests aligning global environmental objectives with national and global socioeconomic development priorities. This can be considered where appropriate also on national scale.

Annex F of the Stockholm Convention on information on socio-economic considerations, provides an indicative list of items to be taken into consideration by Parties when undertaking an evaluation regarding possible control measures for chemicals being considered for inclusion under the Convention. The preamble to Annex F states that: "An evaluation should be undertaken regarding possible control measures for chemicals under consideration for inclusion in [the Stockholm Convention], encompassing the full range of options, including management and elimination. For this purpose, relevant information should be provided relating to socio-economic considerations associated with possible control measures to enable a decision to be taken by the Conference of the Parties".

The Conference of the Parties, in its decision SC-1/12 requested the Secretariat of the Stockholm Convention, in collaboration with other relevant organizations and subject to resource availability, to develop among others, additional guidance on social and economic assessment, and in doing so to take into consideration the particular circumstances of developing countries and countries with economies in transition. In response to that request, the Secretariat developed the draft guidance on socio-economic assessment for national implementation plan

1 Global Alliance on Health and Pollution (http://www.gahp.net/new/)

2 Other studies see these disearses as the major reason for death (Institute for Health Metrix & Evaluation; http://www.healthdata.org/gbd/publications)

3 Scheringer, M., Strempel, S., Hukari, S., Ng, C.A., Blepp, M., Hungerbühler, K. (2012) How many Persistent Organic Pollutants should we expect? Atmospheric Pollution Research, 3, 383–391..

4 UNEP & WHO (2013) State of the Science of Endocrine Disrupting Chemicals – 2012.

5 Many POPs are at the same time endocrine disrupting chemicals.

6 UNEP (2007) Draft guidance on socio-economic assessment for national implementation plan development and implementation under the Stockholm Convention. UNEP/POPS/COP.3/INF/8.

development and implementation under the Stockholm Convention.

According to the guidance, the Socio-Economic Assessment (SEA) is a systematic appraisal of the potential social impacts of economic or other activities such as the management of POPs on all sectors of society (including local communities and groups, civil society, private sector and government). It is a means of analyzing and managing the intended and unintended social impacts, both positive and negative, of planned interventions (policies, programs, plans and projects) and any social change processes invoked by those interventions. Social impacts are the changes to individuals and communities that come about due to actions that alter the day-to-day way in which people live, work, play, relate to one another, organize to meet their needs and generally cope as members of society.

In May 2014 a socio-economic assessment of POPs in Mongolia was performed with UNIDO's support. The exercise comprised of a stakeholders brainstorming session regarding sociological, technological, economical and political (STEP) circumstances in which POPs management operates in Mongolia. The session was included within the "National objective section and objective setting workshop", held within the NIP development process, on 22.04.2014 in Ulaanbaatar.

The results of the session are provided in the Table 3 below, and can be summarized as following:

- Regarding sociological circumstances of POPs management, the stakeholders pointed out the poor knowledge of the population regarding POPs containing products and wastes, as well as not awareness of population of the POPs effects. They identify three important issues for this situation: lack of POPs awareness rising activity, low level of the social responsibility of the business sector and not participatory role of the mass media.
- Regarding technological circumstances, they identified the lack of expertise, the lack of laboratory for POPs analysis and not existence of capacity for POPs containing waste management, as the most important issues.
- Regarding economical circumstances, the stakeholders stressed the dualismbetween the limited financial resources of the country and the expensive activities of the POPs management.
- Regarding political circumstances of POPs management, the stakeholders pointed outthe lack of knowledge of the decision making bodies about POPs and their reluctance to allocate funds on environment issues.
-

Table 3: STEP environment of the POPs management in Mongolia

Sociological	**Technological**
- Poor knowledge of population about POPs containing products and wastes; - Poor knowledge of population regarding the effects of POPs is low; - Lack of POPs awareness rising activity; - Social responsibility of the business people is low; - Mass media is likely to make sensations about unconfirmed information about chemical hazards;	- Lack of laboratory for analysis of POPs; - Not existence of capacity for POPs containing waste management; - Lack of expertise;

Economical	Political
- State budget is limited; - POPs management activities are expensive	- Lack of knowledge of the decision making bodies about POPs; - Decision makers are reluctant to allocate funds on environment issues.

Source: Stakeholders brainstorming session using STEP tool, Workshop in Ulaanbaatar (22.04.2014).

1.4.1.1. Socio-economic impacts of dioxin and furans

In general, Mongolia is faced with broad specter of socio - economic impacts from dioxin and furans, as deterioration of the health of population, decrease of the living standard, reduction of the income and creation of the costs for businesses and public sector to prevent, manage or control the impacts.

It is important to note that the adverse health effects in humans from the exposure of the POPs are then reflected in the economic sphere of social existence of the individuals, as some combination of the following impacts:

* loss of income due to death in family;
* reduced income due to limited work capacity (influenced by illness); and
* medical expenses due to illness.

In addition, there are socio-economic impacts on the business sector and public sector. These impacts could include, but are not limited to:

* loss or reduction of human capital;
* costs associated with health or social allowances;
* investments to introduce measures for prevention and control of emissions of POPs;
* increase of the fees for municipal waste management in order to establish sustainable integrated waste management;
* Cost to strengthen institutional capacities of competent authorities of municipal and regional level.

1.4.1.2. Socio - economic impacts of new industrial POPs

The problem of the old vehicles is created by those produced until 2004, because until that year new industrial POPs chemicals had been used. These vehicles creates different types of negative socio - economic impacts, related with pollution of the environment, deterioration of the human health, reduce of incomes of the citizens and companies, from the following reasons:

* Higher fuel consumption in comparison with the new vehicle;
* Much higher emissions of NOx, CO2, PM10 in comparison with the new vehicles;
* There is great insecurity driving these vehicles for drivers and passengers;
* More frequent replacement of lubricating oils and service interventions in comparison with new vehicles;
* Air pollution and reduction of air quality especially in urban areas;
* Affect respiratory diseases and allergies as a result of air pollution; and
* Generate large amounts of waste.

It should be noted that the general government budget have positive impacts from import of the old vehicles in terms of additional income collected by import duties. However, this positive budget is significantly lower than the short and long term negative effects that are

created by the usage of these vehicles.

The main consequences from usage of the EEE are consisted of:

* pollution of the environment, due to not adequate waste management;
* deterioration of human health, due to presence of POPs. This problem is especially serious in Mongolia because of wide spread usage of old computers in schools among childrens.

In Mongolia there are no studies that document the impact of PBDE and PFOS persistent organic pollutants on human health. However, it should be expected that the problems negative socio - economic impacts of this types of POPs will increase in the future if the policy makers do not undertake adequate actions.

1.4.1.3. Socio-economic impacts of POPs pesticides

POPs pesticides have negative impacts on soil, water, air, animals and human beings. Pesticides in the soil may remain unchanged and retain their toxicity for a several years before breaking down.

In addition, they destroy the microorganisms and nutrients and therefore lead to lower agricultural production and make the soil vulnerable to desertification. The contamination of underground water, as well as surface water, with POPs pesticides may result in: change in the properties of water (odor, taste); death of living organisms; negative effects on the water ecosystems; long term negative impacts transmitted along food chains and accumulated in food products; and direct or indirect toxic effect through change in the chemical composition of the water. The harm of living species is done through: reproductive disorders, metabolic changes and behavioral changes. The effect of the POPs pesticides on human health may include: cancer, reproductive and developmental toxicity, endocrine disruption and cholinesterase inhibition. However, as in the previous types of POPs, there are no documented medical cases of the influences of POPs on human health in Mongolia due to not existence of the capacity for analysis and awareness of the policy makers.

The social impacts of POPs pesticides are result of further development of environmental and health problems. The receivers of these impacts could be segment in three parts.

The first part is consist of the population which is direct user of the pesticides, such as farmers. This part of the population is faced with two opposed impacts. From the one side, deterioration of their health produce medical expenses and make reduction of their incomes due to limited working capacity. From the other side, they are faced with increased costs due to need of usage of newer methods of production. Therefore the state policy should provide educational and financial support to this segment in order situation to be overcome.

The second segment is consists of population which is exposure to the POPs pesticides through consummation of contaminated products, breathing polluted air, or drinking contaminated water. This segment of population has only negative effects on its well beings, resulting from different types of illnesses, the need for medical expenses, decreased work capacity and reduced income etc. It is important to note that the risk for exposure of POPs for this second segment is very high due to not existence of the access to sanitation facilities or adequate water sources for significant number of population.

The third segment is limited to the state authorities, which is faced with the consequences of the social impacts of previous two segments. For the state deterioration of the health of population means lower productivity and reduction of human capital. Also, it creates needs for increase of health financing and social support.

1.4.1.4. Socio-economic impacts of potential hot‑spots

In regard with the possible socio‑economic impacts, three hot‑spots were identified in the country: (i) Storage in Amgalan, Bayanzurh District; (ii) Former Transformer Maintenance Facility in Ulaanbaatar, and (iii) Main waste landfill in Ulaanbaatar. All of them are located in Ulaanbaatar ‑ the city with highest population density in Mongolia.

1.4.1.5. Socio-economic indicators for the monitoring and evaluation of National Implementation plan in Mongolia

Four socio‑economic indicators for the monitoring and evaluation of the National Implementation Plan in Mongolia are identified:

Improved water source (% of population with access), Improved sanitation facilities (% of population with access), Poverty headcount ratio at national poverty line (% of population), Import of the used cars. The first three indicators are published by the World Bank, the last should be provided by Mongolian national statistics. This indicators could be seen as proxy of the risk of exposure of the Mongolian population on POPs.

1.4.2. Gender policy in NIP development and implementation

Efforts to ensure sound management of chemicals, including POPs have important gender dimensions, because in daily life, men, women, and children are exposed to different kinds of chemicals in varying concentrations. Biological factors, notably size and physiological differences between women and men and between adults and children, influence susceptibility to health damage from exposure to toxic chemicals. Also social factors, primarily gender-determined occupational roles, also have an impact on the level and frequency of exposure to toxic chemicals, the kinds of chemicals encountered, and the resulting impacts on human health.[7].

It is important that these gender dimensions to be reflected at both site and policy level interventions for sound chemical management. The gender analysis is used to identify, understand, and describe gender differences and the impact of gender inequalities on a sector or program at the country level. Gender analysis is a required element of strategic planning and is the basic foundation on which gender integration is built. Gender analysis examines the different but interdependent roles of men and women and the relations between the sexes. It also involves an examination of the rights and opportunities of men and women, power relations, and access to and control over resources. Gender analysis identifies disparities, investigates why such disparities exist, determines whether they are detrimental, and if so, looks at how they can be remedied[8].

Consistent with the GEF Policy on Gender Mainstreaming and the GEF-6 approach on gender mainstreaming, GEF projects funded under this strategy will not only acknowledge gender differences within their design but determine what actions are required to promote both women and men's roles in chemical management, disproportionate chemical exposure and vulnerability, as well as sustainable alternatives. For the NIP update project two task team leaders (for PCBs and for PBDEs) where woman. Also the teams where gender balanced ensuring that different gender perspectives where considered in the inventory development and in the action plan development.

7 United Nation Development Programme, Gender Mainstreaming. A Key Driver of Development in Environment and Energy, Energy and Environment Practice. Gender Mainstreaming Guidance Series;

8 United States Agency for International Development (2011), Tips for Conducting a Gender Analysis at the Activity and Project Level. Additional Help for ADS Chapter 201;

1.4.3. Consistency with NIP update guidance

The NIP structure is consistent with the GEF initial guidelines for enabling activities for the Stockholm Convention on POPs, and the interim guidance for developing a NIP (UNEP and The World Bank Group), including strategies required under articles 5 and 6 of the Convention. The process of developing the NIP was supported financially by the GEF and UNIDO.

1.4.4. Further considerations

1.4.4.1. GEF strategies and visions

As the Global Environment Facility is one of the main financial donor in dealing with POPs, in the current NIP Mongolia has correlated its vision in managing POPs substances taking also into account GEF 2020 Strategy, as well as the GEF-6 Strategy.

Mongolia aims taking a more integrated and systemic approach based on the causal chain of environmental change, and identifying the key underlying drivers to tackle. This approach matches with Mongolia's future development plans and can contribute to overcome the many challenges such as the transition to a free market economy with deep recession, poverty, lack of access to the water sources or lack of sanitation facilities for the population.

1.4.4.2. Considering forward looking information and strategy

Policymakers need knowledge about possible future developments to inform their decision-making in order to avoid taking unsustainable decisions also concerning chemicals production and management which can lead to negative consequences on human health and the environment. Therefore, the updated NIP needs to consider the precaution approach and needs forward looking information for sustainable long-term planning to avoid failures on chemicals management and their consequences including problems in recycling and waste management. A knowledge base for Forward-Looking Information and Services developed by the European Environment Agency[9] aim to support such long-term planning and can be considered during NIP implementation where appropriate.

1.5. NIP STRUCTURE

The current NIP is structured according to the NIP update guidance.

9 European Environmental Agency (2011) Knowledge base for Forward-Looking Information and Services (FLIS) A platform to support long-term decision-making

2. COUNTRY BASELINE INFORMATION

2.1. COUNTRY PROFILE

2.1.1. Geography, population and official language

Mongolia is a landlocked country situated in the centre of Asia, lying between latitudes 41° – 52°N and longitudes 87° and 120°E at the average altitude of 1,580m above sea level (Capital Ulaanbaatar city – at 1.350m a.s.l.). It is bordered by Russia to the north (3,543km) and by China to the south (4,709km). At 1,564,116 km^{2}area, Mongolia is 19th largest country.

Figure 1. Geographical location of Mongolia

Mongolian climate is extreme continental with 4 distinct seasons. Most of the country is hot in summer and extremely cold in winter. The most wind and storm occur in April and May, and the coldest month is January (-16-35°C) and the hottest in July (15 - 25°C). Annual average precipitation is 200-350 mm, higher in the north with up to 600 mm and lower in the south, averaging 100-200 mm, only.

As of 2012, Mongolia's total population was estimated at 2,867,700 people with population growth rate of 2.0%. Sex ratio is 48.6% male and 51.4% female. Average life expectancy is 68.7 years – 64.9 for males and 74.3 for females.

With low population density, 62.3% of Mongolian population lives in Ulaanbaatar city and provincial centres and remaining 37.4% in countryside, which keep nomadic or semi-nomadic lifestyle.

Ethnic Mongols account for about 85% of population and consist of dominant Khalkhas. Official language is Mongolian.

2.1.2. Politics and Administrative Division

Mongolia is a parliamentary republic. The supreme legislative body is the State Great Hural and the Government of Mongolia is the supreme executive body in Mongolia.

Mongolia is divided into 21 provinces (aimags) and the Capital city, which are in turn divided into districts and *soums* and into *horoos* and *bags* (smallest administrative units).

Table 4: Administrative Division (by regions, provinces and Capital city, as of 2012)

Provinces Capital city	Number of Soums and Districts	Number of Bags and Horoos	Territory, throusand km^2	Population density (population per km^2)
TOTAL			1,564,1	1,77
Provinces	330	1,588	1,559,4	0,98
Western Region				
Sub-Total	91	466	415,3	0,86
Bayan-Ulgii	13	86	45,7	1,93
Govi-Altai	18	83	141,4	0,38
Zavhan	24	114	82,5	0,78
Uvs	19	92	69,6	1,07
Hovd	17	91	76,1	1,03
Hangai Region				
Sub-Total	99	531	384,3	1,37
Arhangai	19	99	55,3	1,54
Bayanhongor	20	104	116,0	0,67
Bulgan	16	75	48,7	1,11
Orhon	2	22	0,8	112,45
Uvurhangai	19	106	62,9	1,63
Huvsgul	23	125	100,6	1,17
Central Region				
Sub-Total	95	373	473,6	0,96
Govisumber	3	10	5,5	2,55
Darhan-Uul	4	26	3,3	28,52
Dornogovi	14	60	109,5	0,55
Dundgovi	15	66	74,7	0,51
Umnugovi	15	58	165,4	0,39
Selenge	17	56	41,2	2,40
Tuv	27	97	74,0	1,15
Eastern Region				
Sub-Total	45	218	286,2	0,67
Dornod	14	64	123,6	0,57
Suhbaatar	13	66	82,3	0,64
Hentii	18	88	80,3	0,84
Capital City				
Ulaanbaatar	9	152	4,7	261,87

Source: Mongolian Statistical Yearbook 2012

Number of household is 768,300, 41.3% of which or 317,100 households live in Ulaanbaatar. Number of households divided by provinces and Capital city are shown in Table 5.

Table 5: Number of Households (by regions, provinces, Capital city and urban and rural)

Thousand households

Provinces and Capital City	2009		2010		2011		2012	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Total	440,4	276,1	463,7	278,6	483,6	276,3	489,4	278,9
Western Region								
Sub-Total	28,9	68,8	29,6	66,9	30,8	66,0	30,5	65,1
Bayan-Ulgii	6,8	14,4	7,0	13,7	7,5	13,5	7,3	13,4
Govi-Altai	4,7	10,9	5,0	10,7	5,1	10,4	4,9	10,3
Zavhan	4,5	16,2	4,3	15,8	4,6	15,4	4,5	15,4

Uvs	6,1	13,9	6,2	13,5	6,4	13,4	7,0	12,8
Hovd	6,8	13,4	7,1	13,2	7,2	13,3	6,8	13,2
Hangai Region								
Sub-Total	57,4	99,5	58,9	99,7	60,5	99,6	61,6	98,3
Arhangai	4,9	20,7	5,5	21,0	5,5	20,9	5,6	20,9
Bayanhongor	7,6	15,4	7,8	15,4	8,0	15,3	8,4	15,3
Bulgan	4,0	12,7	4,0	12,8	4,1	13,0	4,3	12,9
Orhon	22,8	1,6	23,0	1,4	23,3	1,4	23,5	1,4
Uvurhangai	7,0	25,4	7,3	25,3	7,9	25,0	8,3	23,8
Huvsgul	11,1	23,7	11,3	23,8	11,7	24,0	11,5	24,0
Central Region								
Sub-Total	57,3	74,0	57,9	76,7	59,5	77,6	56,6	79,4
Govisumber	2,4	1,7	2,6	1,7	2,7	1,8	2,7	1,9
Darhan-Uul	22,4	4,8	23,4	4,9	23,1	4,9	21,0	5,3
Dornogovi	10,3	6,9	10,7	7,1	10,7	7,7	10,4	7,5
Dundgovi	2,8	10,4	2,9	10,2	3,1	10,1	3,2	10,0
Umnugovi	5,4	9,9	5,6	10,5	6,3	10,8	6,4	11,4
Selenge	8,9	19,3	8,2	20,2	8,3	20,7	8,4	21,0
Tuv	5,1	21,0	4,5	22,1	5,3	21,6	4,5	22,3
Eastern Region								
Sub-Total	23,6	33,8	22,9	35,3	26,0	33,1	23,6	36,1
Dornod	11,4	9,9	11,7	9,9	11,9	10,0	12,0	9,9
Suhbaatar	4,1	11,1	4,3	11,2	4,5	11,3	4,6	11,4
Hentii	8,1	12,8	6,9	14,2	9,6	11,8	7,0	14,8
Capital City								
Ulaanbaatar	273,2	-	294,4	-	306,8	-	317,1	-

Source: Mongolian Statistical Yearbook 2012

2.1.3. Membership to International and Regional Organizations

Mongolia joined several international multilateral legal instruments, including 49 instruments of the United Nations, 4 instruments on diplomatic and consular relationships, 1 on law of treaties, 44 on human rights, 22 on international security and non-proliferation and prohibition of weapons, 6 on humanity, 26 on crime,32 on international trade and development, 13 on transport, communications and customs cooperation, 21 on intellectual property, 22 on marine, 14 on civil aviation, 5 on space, 23 on environmental protection, and 4 on arbitration, which all total at 287 legal instruments.

The following are multilateral environmental agreements for the protection of human health and the environment from toxic and hazardous chemicals Mongolia joined, including:

* United Nations Framework Convention on Climate Change (1993);
* The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal(1996);
* The Vienna Convention for the Protection of the Ozone Layer (1996);
* The Montreal Protocol on Substances that Deplete the Ozone Layer (1996);
* The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (1999);
* The Stockholm Convention on Persistent Organic Pollutants (2003).

2.1.4. Socio-Economic Status

Working age population constitutes 63.5% of the total population in Mongolia and the unemployment rate is 8.2%.

Table 6: Employment

	2009	2010	2011	2012
Total number of population, thousand persons.	2716.3	2761.0	2811.6	2867.7
Annual population growth, %	1.81	1.77	1.74	2.00
Employment rate, %	88.4	90.1	92.3	91.8
Unemployment rate, %	11.6	9.9	7.7	8.2
Average monthly salary of employees, thousand Tugriks	300.5	341.5	424.2	557.6

Source: Mongolian Statistical Yearbook 2012

The country's economy has stabilized relatively and since 2010, the Gross Domestic Product (GDP) has been increasing with 12.3% growth in 2012, amounting to 13,944,2 billion Tugriks. GDP per capita reached 4,910,400 Tugriks i.e. 3,335 US$ by the World Bank Atlas method.

Industrial composition of GDP from main sectors in 2012 was as following: 21.4% from mining and quarrying; 14.8% from agriculture, forestry and fishing; and 8% from manufacturing.

Production of major commodities of the mining and quarrying sector stood as following in 2012: 29.9 million tonnes of coal; 347.6 thousand tonnes of copper concentrate with 35%; 3,636.0 thousand barrels of crude oil; and 4,050.0 tonnes of molybdenium concentrate with 47%.

Major commodities of the manufacturing sector in the same year was 349.4 thousand tonnes of cement and 44.5million pieces of bricks made from clay.

Number of livestock in was 40.9 million and sown area was 379.8 thousand hectars, from which cropped 479.3 thousand tonnes of cereals, 344.8 thousand tonnes of potatoes and vegetables and 67.2 thousand tonnes of fodder and technical crops. Total turnover of foreign trade was 11,123.0 million USDollars.

Mongolia's general government revenue reached 4,952.2 billion Tugriks in 2012, compared to 4,468.2 billion in 2011.

Table 7: Economic Indicators

	2009	2010	2011	2012
GDP growth, %	-1.3	6.4	17.5	12.3
Annual average inflation rate, %	8.0	10.1	9.2	14.3
GDP per capita, Tugriks	2449.0	3072.5	3979.3	4910.4
Investment, billion Tugriks	2146.2	3845.8	8387.9	8594.1
Consumer Price Index, 1991-1-16=100	22850.6	25821.2	28455.0	32438.7

Source: Mongolian Statistical Yearbook 2012

2.2. INSTITUTIONAL, POLICY, AND REGULATORY FRAMEWORK

2.2.1. State policy and management of environment

The Ministry of Environment & Green Development (MEGD) is the state central organ in charge of environmental issues and is responsible for the development of legislation, policy and programs on environment and green development and implement ecological policy and the Government action plan.

Mission of the Ministry of Environment & Green Development is to maintain the environmental equilibrium in relation to economic development and ecosystems, to encourage green development through the sustainable use of natural resources and assurance of natural restoration and rehabilitation of ecosystems and to ensure human health and safety living environment through inspiration of cooperation, participation and efforts of government, individuals, organizations and businesses to sustainable development activities.

MEGD Strategic Actions are:

1. Development and submission for approval the legislation, policies, strategies and programs for the environment and green development in line with the country's sustainable development, creation of a favorable legal, economic and social atmosphere to support the development, and provision of financial administration and coordination to the environmental sector;
2. Sustaining the state administration and human resources leadership, strengthening the good environmental governance, improvement of the legal environment and expansion of international cooperation;
3. Implementation, coordination, professional guidance and consulting on the policies, legislation, programs and measures for the reduction of environmental pollution and degradation and sustainable and appropriate use, protection and rehabilitation of natural resources with public participation and supervision;
4. Management, coordination, professional and methodological guidance and consulting on the implementation of legislation, policy and programs on forest and water;
5. Management, coordination, professional and methodological guidance and consulting on the implementation of legislation, policy and programs on special protected areas;
6. Control, inspection, monitoring and auditing of the policy implementation and issuance of effectiveness evaluations and recommendations, and assurance of public access to the information and data on the policy implementation and activities of natural resources' users.

2.2.2. Roles and Responsibilities of Government Agencies on POPs

1. Ministry of Environment & Green Development/National Chemicals Management Council

- Develop and implement national policy and programs for the implementation of the Stockholm
- Convention and coordinate stakeholders' cooperation and participation;
- Draft additions and amendments to Annexes of the Convention;
- Prepare reports on the Convention implementation and to submit to the Secretariat;
- Draft amendments and changes on POPs import, export, use, disposal and emissions to the associated laws and regulations and submit them for approval;
- Make amendments and changes to the list of prohibited and limited to use chemicals in Mongolia;
- Approve and implement procedures and regulations on POPs-containing products and wastes

and on reduction and control of their releases;
- Manage introduction and application of Best Available Techniques and Best Environmental Practices (BAT/BEP) in the sources of unintentionally produced POPs;
- Appropriate management of hazardous waste;
- POPs inventory and database;
- Monitoring and research of POPs chemicals;
- Implement projects with international organizations and regional countries;
- Provide information to individuals, organizations and businesses;
- Information exchange with international organizations, and
- Trainings and awareness raising activities.

2.Ministry of Health

- Develop and implement national policy on the protection of human health from POPs risks;
- Study and make assessment of POPs substances' effects on human health, especially, on women, children and reproduction, as well as of cancer cases;
- Study occupational diseases and take measures for the prevention;
- List classifications and amount of disinfection hygienic substances to be used in Mongolia and coordinate use and import, and
- Organize trainings and awareness raising activities.

3. Ministry of Industry and Agriculture

- Develop and implement a national policy on the coordination of import, trade, use and production of pesticides used in agricultural sector and on the monitoring of pesticide residues in foodstuffs;
- Test and register pesticides and set the amount of pesticides to be used in Mongolia;
- Strengthen the national capacity for determining and monitoring POPs in foodstuffs;
- Develop and implement policy on the introduction and application of Best Available Techniques and Best Environmental Practices (BAT/BEP) in the sources of unintentionally produced POPs, and
- Take measures for the disposal of obsolete pesticides and determination of contaminated sites and decontamination.

4. Ministry of Economic Development

- Support the funding and investment for the building of hazardous waste facility, and
- Support to reflect projects and programs related to POPs in the economic cooperation, loan and assistance policyand supervise the implementation.

5. Ministry of Finance

- Support reflecting fundings required for the POPs NIP implementation in the state budget;
- Control over the implementation of joint projects and programs, realized with international organizations and donor countries;
- Draft a proposal for adding POPs-containing products in the list of products banned and limited through Mongolian border andsubmit for approval, and
- Along with related legislation and regulations, to propose tax exemption and facilitation on equipment and goods purchased through projects purposes.

6. Ministry of Public Development and Social Welfare

- Ensure the implementation of the 4th National Program on Improving Labour Security and Hygiene.

7. Ministry of Labour

- Reflect references and norms of POPs chemicals in the "Labour Security and Hygiene. Hygienic Requirement for Work Places. MNS 4990-2000" standard and ensure the standards adherence.

8.Ministry of Road and Transport

- Register and inspect vehicles and make database;
- Take measures for environmentally sound recycling of end-of-use vehicles, and
- Create legal environment for the coordination of used import vehicles.

9. Ministry of Construction and Urban Development

- Implement a policy on ceasing the use of POPs chemicals used in construction materials production and encouraging the use and production of alternatives, and
- Develop and implement a policy on the reduction of POPs releases from the production of construction materials.

10. Ministry of Foreign Affairs

- Coordinate the cooperation and relationships between international and national organizations in relation to the implementation of the Stockholm Convention, and
- Cooperate with international organizations and countries for experience and information exchange.

11. State Specialized Inspection Agency

- Ensure the realization of international and national legislation and acts on POPs;
- Implement the border control over POPs chemicals and products containing them;
- Inspect and monitor security and quality of the environment, food and work places, and
- Inspect and monitor the releases and wastes from sources.

12. State Emergency Authority

- Maintain the database of all types of fires;
- Determine POPs contamination caused by disasters and accidents and take measures to eradicate the aftermath, and
- POPs inspection and monitoring on fire-resistant materials and products with such additives.

13. General Customs Authority

- Customs inspection and monitoring on POPs and POPs-containing products;
- Report on the import information of POPs-containing products to related bodies;
- Border control over illegal import and export of POPs;
- Improve knowledge and qualification of customs officers on POPs, and
- Experience sharing with counterparts in other countries on border monitoring of POPs.

14. National Centre for Standardization and Metrology

The center is the state central organ in charge of standardization and conformity and is responsible for the development of state policy and program on standardization and conformity and ensures the implementation; develop regulations, procedures and guidelines; render informative and professional assistance to related agencies and organizations; and coordinate daily activities of technical committees of standardization.

The National Standardization Council:

- Approves annual national standards and standardization programs and shall be chaired by the Director of the center.
- Reflect references of POPs chemicals in the national standards for the environment, labour security and waste;

•Reflect upper limits of POPs chemicals in the food stuff quality standards, and
•Approve international analytical standards for POPs.

2.2.3. Laws and Regulations for the Environment and Chemicals Management

2.2.3.1. Multilateral Environmental Agreements

Mongolia ratified the following multilateral environmental agreements: The Vienna Convention for the Protection of Ozone Layer in 1996, the Montreal Protocol on Substances that Deplete the Ozone Layer in 1996, the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal in 1997, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade in 1998, and the Stockholm Convention on Persistent Organic Pollutants in 2003.

2.2.3.2. Fundamental Environmental Laws

Article 16.2 constitutes "the citizens of Mongolia shall enjoy the following fundamental rights and freedoms … the right to a healthy and safe environment, and to be protected against environmental pollution and ecological imbalance" and Article 38.2 provides the Government shall exercise the powers "to undertake measures on the protection of the environment and on the rational use and restoration of natural resources", the latter provision is the fundamental principle of laws and regulations for the management of chemicals and wastes.

Environmental Protection Law of Mongolia

Ratified in 1995 and revised 2012, the Environmental Protection Law of Mongolia is devoted to regulate relations between the State, citizens, business entities and organizations in order to guarantee the human right to live in a healthy and safe environment, an ecologically balanced social and economic development, the protection of the environment for present and future generations, the proper use of natural resources and the restoration of available resources.

Economic entities and organizations shall strictly adhere to environmental standards, norms and regulations, to register the emissions and releases of toxic substances, hazardous physical effects and wastes and to reduce and prevent adverse effects to the environment at their own expenses and shall recompense all the direct costs due to damage and harms to the environment and its resources caused by their illegal operations and activities.

Law on Water

The Law on Water was ratified in 1995 and revised in 2012. The law regulates the protection, proper use and restoration of water through 6 provisions, namely, the general provision; rights and obligations of government and other organizations in water relations; protection of water resources; restoration of water bodies; water use and water facilities; and liabilities for violation.

The law authorizes the state central administrative organ in charge of environment to approve the list of water polluting substances. The law also prohibits discharge or dump wastes, store petroleum and chemicals in natural mineral springs and their buffer zones, and discharge or dump radioactive and chemical substances, infective agents, other wastes and effluents in and around water bodies.

Law on Air

Adopted in 1995 and revised in 2012, the law regulates the protection and proper use of the atmosphere, prevention from pollution and reduction and control of air polluting substances

and emissions through 5 provisions, including general provision; quality control; information and rights and obligations; measures on air protection; and liabilities for violation.

The law authorizes the state central administrative organ in charge of environment to approve the list of air polluting substances.

The law prohibits any productions, operations and services that release air polluting substances in air quality improvement zones.

Local administrative organs shall be responsible for providing inventory and information on air quality, emissions and their sources to professional bodies.

The Law on Air Pollution Fees was ratified in 2010 and regulates relations to impose fees on air polluters and paying the fees.

The law describes levying of fees on raw coals excavated, organic solvents produced and imported, auto vehicles and self-propellers, and largest stationary sources of air pollution for the emissions to air.

Law on Soil Protection and Prevention of Desertification

Mongolian Law on Soil Protection and Prevention of Desertification was ratified in 2012 to regulate interrelations of protecting soil from degradation, rehabilitation and preventing from desertification.

The law authorizes the state central administrative organ in charge of environment to approve the list of soil polluting chemicals and their reference values.

2.2.3.3. Other Laws

Law on Environmental Impacts Assessment

The law was promulgated in 1998 and revised in 2012. Purpose of this law is to regulate relations concerning protection of the environment, prevention of the ecological misbalance, the use of natural resources, assessment of the environmental impact and decision-making on the start of a project.

As described in the law, the project implementer shall request to conduct environmental impact assessment and the report of the detailed environmental impact assessment shall reflect recommendations on introducing Best Available Techniques and Best Environmental Practices (BAT/BEP) into the project operation to reduce and prevent potential adverse impacts on environment.

Law on Licensing

Ratified in 2001, the law regulates relations with respect to issuing, suspending and revoking a license to conduct certain business activities that may negatively affect public interest, human health, environment and national security and that require specific conditions and expertise.

The businesses described in the law shall be conducted under a license and the business activities include importing, selling or using ozone-depleting substances or products containing such substances; producing toxic and dangerous chemicals other than explosives; importing, exporting, transboundary movement, using, selling and disposing of toxic and hazardous chemicals; importing and selling plants protection substances; and servicing with substances to fight and disinfect household insects and rodents.

Law on Forests

Effective since 1995 and revised in 2012,the law regulates the protection, proper use, restoration of forests and prevention from fires with 7 provisions, including general provision; rights and obligations of citizens and organizations; protection of forest zones and forest;

restoration; use; and liabilities for violations.

The law prohibits using chemicals other than approved by the state central administrative organ in charge of environment in combating forest insects and diseases.

Law on Plants Protection

Adopted in 2007, this law regulates relations with regard to the protection of pasture and agricultural plants from diseases, harmful insects, rodents and weeds, to combat, quarantine and control.

The law authorizes the state professional inspection body shall be responsible for the control and inspection of production, import, storage, transportation, selling and usage of plants seeds, seedlings and plants protection substances.

Law on Food

Ratified in 2012 to regulate relations with regard to the sustainable and sufficient provision of quality, nutritious and safe food to the population, and food production and services.

The law prohibits the use of pesticides, chemical fertilizers, insecticides, rodenticides, disinfecting and hygienic products other than stated in Provision 6.1.3 of the Law on Toxic and Hazardous Chemicals in the production, servicing and other operations of food and foodstuffs.

2.2.3.4. Laws and Regulations on Toxic and Hazardous Chemicals

The first law on the regulation of chemical substances was adopted in 1995, named "Law on Protection of Toxic Chemical Substances" and revised in 2006, renaming it to "Law on Toxic and Hazardous Chemicals". The revised law regulates the relations on export, import, transboundary movement, production, storage, selling, transportation, usage, disposal and control of toxic and hazardous chemicals. The law authorizes the state central administrative organ in charge of environment to coordinate activities related to toxic and hazardous chemicals and to ensure the enforcement of the law and regulations.

Cross-sectoral coordination is executed by the National Chemicals Management Council, chair of which is the Minister of Environment & Green Development. The day-to-day activities of the Council are carried out by the Office and Experts team was set up at the Office, comprised of officers and researchers in charge of chemical management from related ministries, agencies, research institutes and higher educational institutes.

The Government nominates the border ports for import of toxic and hazardous chemicals and for the time being, there are 6 major ports – Zamyn-Uud in Dorno-Gobi province, Altanbulag and Suhbaatar in Selenge province, Chingis Haan International Airport in Ulaanbaatar city, Bayanhoshuu in Dornod province and Bichigt in Suhbaatar province.

As specified in the Law on Toxic and Hazardous Chemicals, chemical substances are divided as toxic and hazardous given the characteristics and effects on human, environment and livestock health. A Joint Decree 04/04 of 2008 of the Minister of Environment and Minister of Health approved the classification of toxic and hazardous chemicals, which was developed based on the UN Globally Harmonized System of Classification and Labeling of Chemicals.

For the first time in Mongolia in 1990, use of 12% hexachlorocyclohexane mix, which is POPs pesticide, was banned by a Joint Decree issued by the Minister of Environment and the Minister of Food and Agriculture.

List of banned and limited use toxic and hazardous chemicals is approved by the Government, too, and the first list was approved in 1997. The list was renewed in 2007 (resolution 95), which banned 83 chemicals and limited 28. New chemicals had been added to the list in 2008, 2010, 2011 and 2012, respectively, and presently banned 126 chemicals and limited 31 chemicals.

Table 8: POPs Chemicals Listed in Banned and Limited Use Chemicals of Mongolia

№	Chemicals	Banned/Limited
1	Aldrin	Banned in 1997
2	Chlordane	Banned in 1997
3	Dieldrin	Banned in 1997
4	DDT	Banned in 1997
5	Endrin	Banned in 1997
6	Heptachlor	Banned in 1997
7	Hexachlorobenzene	Banned in 2007
8	α-Hexachlorocyclohexane	Banned in 1990
9	β- Hexachlorocyclohexane	Banned in 1990
10	Lindane(-Hexachlorocyclohexane)	Banned in 1990
11	Mirex	Banned in 2007
12	Toxaphene	Banned in 1997
13	PCB	Limited in 2007
14	Hexabromodiphenyl ether and heptabromodiphenyl ether	Banned in 2012
15	Chlordecone	Banned in 2012
16	Tetrabromodiphenyl ether, Pentabromodiphenyl ether	Banned in 2012
17	Endosulfan	Banned in 2012
18	Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride	Banned in 2012
19	Pentachlorobenzene	Banned in 2012

The National Chemicals Management Council issues "Assessment on Usage" paper and the Ministry of Environment & Green Development issues permit for usage for limited use chemicals to be used for industrial purposes in Mongolia.

The banned chemicals can be only used for scientific purposes after the expert opinion by the National Chemicals Management Council. Export, import, transboundary movement and production of toxic and hazardous chemicals is regulated under the Joint Order 334/104 of the Minister of Environment and the Minister of Foreign Affairs on "Regulation on Export, Import, Trans-boundary Movement, Production and Trade of Toxic and Hazardous Chemicals" of 2009, and storage, transportation, usage and disposal of toxic and hazardous chemicals is regulated under the Joint Order 151/126/52 of the Minister of Environment, the Minister of Health and the Minister of Emergency on "Procedure for Storage, Transportation, Usage and Disposal of Toxic and Hazardous Chemicals" of 2007.

Since the approval of the Law on Protection of Toxic Chemical Substances in 1995, licensing system was established for chemicals and the Ministry of Environment has been issuing the license for import, export, transboundary movement, usage, transportation, trade and disposal since 2007, pursuant to the Law on Licensing.

The Law on Toxic and Hazardous Chemicals provided that "…citizens, businesses and organizations that produce, store, use and dispose of toxic and hazardous chemicals shall apply for risk assessment of the chemicals pursuant to the Law on Environmental Impact Assessment…" and the guidance and methodology to conduct risk assessment of chemicals is approved by the joint order A-50/378/565 of 2012 by the Minister of Environment, Minister of Health and the Chairperson of the General Emergency Authority.

Another Joint Order 63/67/87 of 2009 "Regulation on Testing and Using of Pesticides,

Chemical Fertilizers, Insecticides, Rodenticides, Hygienic and Disinfection Substances" by the Minister of Environment, Minister of Food and Industry and the Minister of Health regulates activities for testing, using and listing of pesticides and substances to be used for plants protection and veterinary purposes. According to the procedure, new pesticides to be used in Mongolia shall be tested and assessed by professional expertise, after which shall be listed as a pesticide to be used next year. License to import, use and trade is issued only for the pesticides in the list.

The list and volume of pesticides to be used for plants protection and veterinary purposes, chemical fertilizers for agriculture, insecticides and rodenticides and hygienic and so infection substances is updated annually by Joint Order of the Minister of Environment, Minister of Food and Agriculture and the Minister of Health. The list does not include POPs pesticides.

The Law on Toxic and Hazardous Chemicals was revised in 2011 with addition of the following provision, saying "State central administrative organs in charge of environment and in charge of health shall jointly approve the procedure for registration, collection, transportation, storage, disposal, import, export and transboundary movement of chemicals listed in the banned and limited use chemicals in Mongolia". The provision allows developing special procedures for each of the chemicals listed in Stockholm Convention Annexes.

Based on the provision mentioned above, the first procedure to regulate POPs related activities was approved by the Joint Order A 17/16 in 2012 of the Minister of Environment and the Minister of Health, named "Regulation on Registration, Collection, Transportation, Storage, Disposal, Import, Export and Transboundary Movement of Polychlorinated Biphenyls (PCBs)".

The procedure pointed out that owners of PCB-containing equipment and wastes shall, prior to 31 December 2013, ensure their equipment and waste to be inventoried and registered in the database, and equipment and waste that is detected to be containing PCBs at the volume of more than 50 ppm shall be decontaminated or disposed of before 31 December 2019. In addition, it is banned to import and tranboundary move the equipment and products, which contain oil with more than 2 ppm of PCBs. This procedure on PCBs regulates labeling, analyzing and labor protection requirements, too.

2.2.3.5. Laws and Regulations on Waste

The first law to regulate waste was approved in 2000. The "Law on Prohibition of Importing, Transit and Export of Hazardous Waste" (2000), "Law on Household and Industrial Waste" (2003) and "Law on Prohibition of Use and Import of Some Plastic Bags" (2009) have been approved. In 2012, as part of the environmental laws revision package, these 3 laws had been integrated as the "Law on Waste". Purpose of this law is to eradicate and prevent adverse effects from waste on human health, to save natural resources through re-use and recycle of wastes and to introduce 3R principles for the improvement of waste management. The law also created the coordination for separation of waste at the source, which is one of the key elements of 3R principle.

The law also provides to separate wastes in accordance with international norms and to make lists of waste sources and corresponding waste types and reference values of the wastes' toxicity, as well as a list of hazardous wastes, which are the precursors of waste management system and allows waste payment system. Economic incentives are also envisaged in the law, to encourage citizens and businesses that introduced zero-waste or waste recycling technology, implemented waste generation reduction techniques and practices, or deal with waste re-use, collection, transportation or disposal operations.

Government is authorized to approve rules and regulations for making waste

classifications, harmful to human health and environment, and coordination of related activities with this regard, and banned hazardous wastes to be exported to or transit through Mongolia. Liabilities for violations of rules and regulations on waste had been strengthened in this law. For instance, an individual who practiced open burning of waste shall be fined the amount of minimum remuneration of labor and businesses twice that amount, illegal waste dumping by individuals shall be fined the amount of minimum remuneration of labor and businesses 3-4 times the amount.

2.2.3.6. Programs

The Government of Mongolia developed and approved the following programmes for the protection of environment and human health, reduction of environmental pollution and improvement of chemicals and waste management:

1. Mongolian Action Plan for The 21st Century /1998/
   Chapter 20. Ecological Management of Toxic Chemicals
   Chapter 21. Waste Management
2. "National Programme on Waste Reduction" /Resolution #50, 1999/

Purpose –to create safe and healthy environment for population, dispose of waste in environmentally harmless ways and to reduce waste through source separation and increase the involvement of the government, citizens, businesses and organizations in these activities /1999-2010/. The programme completed and the new programme is under development by the Ministry of Environment and Green Development.

3. National Programme on Protection of Ozone Layer. /1999/

Purpose–to phase out the use of ozone depleting substances, moreover to stop, and replace ozone-depleting substances with non-ozone depleting alternatives

4. National Programme on Environmental Health. /Government Resolution #245. 2005/

Purpose – to decrease the factors adversely affecting the environment, facilitate activities regarding the improvement of environmental health, and create conditions for safe and healthy life and work for the population, improving the inter-sectoral coordination and cooperation.

5. National Programme on Persistent Organic Pollutants. /Government Resolution # 99. 2006/

Purpose–to protect the environment and human health from harmful effects of POPs.

6. The 4th national programme on "The Improvement of Occupational Safety and Hygienic Condition", approved by the Government on 25 April 2012, calls for the solution on the prevention from diseases caused by asbests, mercury and polychlorinated biphenyls, reduce their use or prohibit, and to encourage the implementation of the "Regulation on Inventory, Labeling, Collecting, Transporting, Storing, Disposing, Import, Export and Transboundary Movement of Polychlorinated Biphenyls".

2.2.3.7. Standards

The Environmental Protection Law provides that the standardization organization shall set the reference values of toxic and hazardous substances in air, water and soil and permissible levels of toxic and hazardous substances to be discharged and emits to the environment. Following are the national standards of Mongolia on persistent organic pollutants.

1/ Air Quality. General Technical Requirements. MNS 4585:2007

POPs chemicals are not reflected in this standards.

2/ Acceptable Concentration of Pollutants in the Air. General Technical Requirements. MNS 5885:2008

24-hour average of dioxin (2,3,7,8, converted to tetrachlorodibenzo-1,4) is 0,5pg/m^3.

3/ Soil Quality.Soil Pollutant Elements and Substances. MNS 5850:2008

Table 9: Soil Quality. Soil Pollutant Elements and Substances MNS 5850:2008

Substances	Permissible Limit	Action Limit
Polychlorinated Biphenyls (PCBs), mg/kg	0,1	2,0
Dioxin/furan (PCDD/F), mg/kg	0,001	0,01

4/ "Water Quality. Permissible Limits of Underground Substances and Elements that Pollute Water MNS 6148:2010 (refer to Table 10)

Table 10: Water Quality. Permissible Limits of Underground Substances and Elements that Polluting Water. MNS 6148:2010

Substances	CAS Number	Unit	Permissible Limits
Dioxin/Furans	1746-01-6	mg/l	0,00000012
Polychlorinated Biphenyls	1336-36-3	mg/l	0,00002
Pesticides			
Aldrin	309-00-2	mg/l	0,000002
α-hexachlorocyclohexane	319-84-6	mg/l	0,000006
β- hexachlorocyclohexane	319-85-7	mg/l	0,00002
γ- hexachlorocyclohexane	58-89-9	mg/l	0,00003
Chlordane	57-74-9	mg/l	0,00001
DDT	50-29-3	mg/l	0,0001
Dieldrin	60-57-1	mg/l	0,0001
Endosulfan	115-29-7	mg/l	0,04
Endrin	72-20-8	mg/l	0,002
Heptachlor	76-44-8	mg/l	0,000008
Mirex	2385-85-5	mg/l	0,0001
Toxafen	8001-35-2	mg/l	0,0000002

5/ Drinking Water. Hygienically Requirements, Assessment of the Quality and Safety. MNS 900: 2011 (Refer to Table 11)

Table 11: Drinking Water. Hygienically Requirements, Assessment of the Quality and Safety. MNS 900: 2011

Substances	Upper Limits, mg/l
Lindane, mg/l	0,002
Endrin, mg/l	0,00006

6/ *Air Quality – Permissible Limits of Some Air Polluting Substances in Smokes and Gases Released to Air from Hazardous Waste Incinerators. MNS 6342:2012* (Table 12)

Table 12: Air Quality – Permissible Limits of Some Air Polluting Substances in Smokes and Gases Released to Air from Hazardous Waste Incinerators. MNS 6342:2012

Substances	Average Measurement Duration	Unit	Incinerator capacity	
			Less than 1 ton/hour	1 ton/hour or more
			Permissible Limit	
Persistent Organic Pollutants /PCDDs and PCDFs/	Average of 6-8 hours	ng/nm³	0.1	0.1

2.2.3.8. Reflection of the Stockholm Convention Provisions in Mongolian Laws and Regulations

Table 13: Reflection of the Stockholm Convention Provisions in Mongolian Laws and Regulations

Stockholm Convention		**Mongolian Laws and Regulations**
Article	Provision	Laws, Regulations & Acts
3	Measures to reduce or eliminate releases from intentional production and use. 1. (a) Prohibit and/ or take the legal and administrative measures necessary to eliminate: (i) Production and use of the chemicals listed in Annex A subject to the provisions of that Annex (Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Mirex, Toxaphene, DDT, Hexabromodiphenyl ether and Heptabromodiphenyl ether, Chlordecone, Tetrabromodiphenyl ether, Pentabromodiphenyl ether, Perfluorooctane sulfonic acid, its salts and Pperfluorooctane sulfonyl fluoride, Endosulfan, Pentachlorobenzene)	**1. Law on Toxic & Hazardous Chemicals** *1.1. Periodically update the list of banned and limited toxic and hazardous chemicals and report to international organizations;* *1.2. The list of banned and limited use chemicals, specified in 1.2, shall be approved by the Government.* **2. Law on Waste** *Hazardous wastes shall be disposed of in specifically designed facilities, which meet the requirements and standards.* **3. Government Resolution # 95 of 2007 on Approving the List** *Annex 1. List of Toxic and Hazardous Chemicals Banned to Use in Mongolia* *Annex 2. List of Toxic and Hazardous Chemicals Limited to Use in Mongolia* **4. Regulation on Storage, Transportation, Use and Disposal of Toxic and Hazardous Chemicals** Joint Order # 28/40/29 of 2009 by the Minister of Environment, Minister of Health and the Chairperson of General Emergency Authority/ *Specified the general requirements on issuing license for the disposal and requirements on disposal practices of toxic and hazardous chemicals.* **5.Regulation on Inventory, Labeling, Collecting, Transporting, Storing, Disposing, Import, Export and Transboundary Movement of Polychlorinated Biphenyls**/Joint Order # A-17/16 of 2012 by the Minister of Environment and the Minister of Health/ *PCBs Decontamination and Disposal* *5.1. Decontamination and disposal of PCBs shall be practiced by the economic entities and organizations, specially licensed by the central administrative organ in charge of environment.* *5.2. PCBs decontamination and disposal technologies shall meet international standards and requirements of Best Available Techniques and Best Environmental Practices.* *5.3. Equipment containing PCBs with concentration of 50 ppm and up shall be decontaminated to the limit down to 20 ppm and below.* *5.4. Equipment and waste containing PCBs with concentration of 50 ppm and up shall be decontaminated or disposed of properly by 31 December 2019.*
	(ii) Import and export of the chemicals listed in Annex A in accordance with the provisions of paragraph 2;	**6. Law on Toxic & Hazardous Chemicals** *License for producing and using toxic and hazardous chemicals shall be issued as specified in the Law on Licensing.* **7. Law on Licensing** *7.1. Special license required for the following businesses in environmental sector:* *7.2. Import, export, transit transport, use, trade and disposal of toxic and hazardous chemicals other than explosives* **8. Law on Waste** *8.1. License for export of hazardous waste shall be issued by the state central administrative organ in charge of environment based on the experts' assessment by specialized agency.* *8.2. Prohibit importing hazardous waste into Mongolia for purposes of use, storage and interim storage.* *8.3. Prohibit transboundary movement of hazardous waste through Mongolia.* **9. "Regulation on Export, Import, Trans-boundary Movement, Production and Trade of Toxic and Hazardous Chemicals"**/Joint order #334/104 of 2009 by the Minister of Environment and the Minister of Foreign Affairs/ *Regulates licensing for export, import and transboundary movement of toxic and hazardous chemicals and requirements for the practices.*

		10.Regulation on Registration, Collection, Transportation, Storage, Disposal, Import, Export and Transboundary Movement of Polychlorinated Biphenyls (PCBs) /Joint order #A 17/16 of 2012 by the Minister of Environment and the Minister of Health/ *Import, Export and Transboundary Movement of PCBs* *10.1. Prohibits individuals, businesses and organizations to run the following activities:* *10.2.Import and transboundary movement of PCB-containing equipment and products containing PCB oil with concentration of 2 ppm and up;* *10.3. Import oil, lubricants and oil-containing equipment without PCBs analyses.* *10.4. Import oil, lubricants and oil-containing equipment, basing on the laboratory analyses made in certified PCBs laboratory.* *10.5. Importer shall bear all the costs and expenses related to the decontamination and disposal for the attempt to import PCB-containing equipment and products containing PCB oil with concentration of 2 ppm and up.* *10.6. The state central administrative organ in charge of environment shall issue a permit for exporting PCB-containing waste, basing on the analyses results by certified laboratory, on the following conditions:* *- Importing Party expressed the acceptance of the waste;* *- Contract is made with the facility or organization that specialized in and licensed to decontaminate and or dispose of PCB-containing waste in environmentally sound methods.* *10.7. Businesses and organizations, which intend to export PCB-containing waste, shall apply for a license in written form and shall attach the following documents in the application:* *10.8.Contract made with the Importing Party;* *10.9. Permit for importing PCB-containing waste from the authorized body of the Importing Party.*
	(b) Restrict production and use of the chemicals listed in Annex B in accordance with the provisions of that Annex	
	2. Each Party shall take measures to ensure: (a) That a chemical listed in Annex A or Annex B is imported only: (i) For the purpose of environmentally sound disposal as set forth in paragraph 1 (d) of Article 6; or (ii) For a use or purpose which is permitted for that Party under Annex A or Annex B;	Banned the import of Annex A and B chemicals under the following laws and regulations. **11. Law on Waste** *11.1. License for export of hazardous waste shall be issued by the central administrative organ in charge of environment based on the expert's assessment by specialized agency.* *11.2. Prohibit importing hazardous waste into Mongolia for purposes of use, storage and interim storage.* *11.3. Prohibit transboundary movement of hazardous waste through Mongolia.* **12. Government Resolution # 95 of 2007 on Approving the List** *Annex 1. List of Toxic and Hazardous Chemicals Banned to Use in Mongolia* *Annex 2. List of Toxic and Hazardous Chemicals Limited to Use in Mongolia*

	(b) That a chemical listed in Annex A for which any production or use specific exemption is in effect or a chemical listed in Annex B for which any production or use specific exemption or acceptable purpose is in effect, taking into account any relevant provisions in existing international prior informed consent instruments, is exported only: (i) For the purpose of environmentally sound disposal as set forth in paragraph 1 (d) of Article 6; (ii) To a Party which is permitted to use that chemical under Annex A or Annex B; or (iii) To a State not Party to this Convention which has provided an annual certification to the exporting Party. Such certification shall specify the intended use of the chemical and include a statement that, with respect to that chemical, the importing State is committed to: a. Protect human health and the environment by taking the necessary measures to minimize or prevent releases; b. Comply with the provisions of paragraph 1 of Article 6; and c. Comply, where appropriate, with the provisions of paragraph 2 of Part II of Annex B. (c) That a chemical listed in Annex A, for which production and use specific exemptions are no longer in effect for any Party, is not exported from it except for the purpose of environmentally sound disposal as set forth in paragraph 1 (d) of Article 6;	**13. "Regulation on Export, Import, Trans-boundary Movement, Production and Trade of Toxic and Hazardous Chemicals"**/Joint order #334/104 of 2009 by the Minister of Environment and the Minister of Foreign Affairs/ *13.1. Export Permit* *13.2.Businesses and organizations that intend to obtain export permit shall provide the following materials in addition to the documents and materials required under 2.1.3 of this Regulation:* *13.3.Rationale of international and/or bilateral trade of the substance/s, and testimony of answering the requirements set forth in international conventions, treaties or agreements on transboundary movement of toxic and hazardous materials;* *13.4.Original copy of contract made between exporter, importer and transporter and official translation in Mongolian, and other relevant materials and documents.* **14. Law on Waste** Hazardous Waste Export *14.1. Individual and legal bodies may export hazardous wastes.* *14.2. License for export of hazardous waste shall be issued by the state central administrative organ in charge of environment based on the experts assessment by specialized agency on the following conditions:* *14.3. if there is no facility, techniques and or equipment to recyle and or dispose of the hazardous wastes;* *14.4. Import of the hazardous waste is allowed in the Importing Party.* *14.5. Exporter shall attach the following documents in their application for export permit of hazardous wastes:* *14.6. Contract made with the Importing Party and written request by the Importing Party;* *14.7. Permit for importing hazardous waste from the authorized body of the Importing Party.* **15. Regulation on Registration, Collection, Transportation, Storage, Disposal, Import, Export and Transboundary Movement of Polychlorinated Biphenyls (PCBs)** /Joint order #A 17/16 of 2012 by the Minister of Environment and the Minister of Health/ *15.1. The state central administrative organ in charge of environment shall issue a permit for exporting PCB-containing waste, basing on the analyses results by certified laboratory, on the following conditions:* *- Importing Party expressed the acceptance of the waste;* *- Contract is made with the facility or organization that specialized in and licensed to decontaminate and/or dispose of PCB-containing waste in environmentally sound methods.* *15.2. Businesses and organizations, which intend to export PCB-containing waste, shall apply for a license in written form and shall attach the following documents in the application:* *15.3.Contract made with the Importing Party;* *15.4. Permit for importing PCB-containing waste from the authorized body of the Importing Party.*

	3. Each Party that has one or more regulatory and assessment schemes for new pesticides or new industrial chemicals shall take measures to regulate with the aim of preventing the production and use of new pesticides or new industrial chemicals which, taking into consideration the criteria in paragraph 1 of Annex D, exhibit the characteristics of persistent organic pollutants. 4. Each Party that has one or more regulatory and assessment schemes for pesticides or industrial chemicals shall, where appropriate, take into consideration within these schemes the criteria in paragraph 1 of Annex D when conducting assessments of pesticides or industrial chemicals currently in use.	**16. Law on Toxic & Hazardous Chemicals** *16.1.The list and volume of pesticides to be used for plants protection and veterinary purposes, chemical fertilizers for agriculture, insecticides and rodenticides and hygienic and disinfection substances shall be updated annually by joint order with the state central administrative organs in charge of food and agriculture and in charge of health;* *16.2. Regulations on testing and using the substances specified in 16.1. of this Law shall be approved together with the state central administrative organs in charge of food and agriculture and in charge of health;* **17. Regulation on Testing and Using of Pesticides, Chemical Fertilizers, Insecticides, Rodenticides, Hygienic and Disinfection Substances**/Annex to the joint order 63/67/87 of 2009 by the Minister of Environment, Minister of Food and Industry and the Minister of Health/ *One. Requirements for Testing Plants Protection Substances* *17.1. Meeting of the Academic Council of the Institute shall decide the sector, laboratory, research worker, methodology and location of testing plants protection substances.* *17.2. The establishment or organization to test the plants protection substances shall determine the appropriate duration, dose and using methods of each and every substance through field and laboratory tests, not less than 2 times each tests.* *17.3. During the test, amount of potential residues in water, soil and plants shall be detected through certified laboratory analyses.* *17.4. The Academic Council of the Institute shall debate the test results, recommended methods, dosages and instructions and decide on whether to recommend the substance for listing or not.* *17.5. Administration of the Institute, basing on the decision made by the Academic Council, shall introduce the report on test to respective councils for approval.* *17.6. The respective council, basing on the physical and chemical characteristics of the substances, test reports and laboratory reports, shall decide on if listing the substance for the future use or not.* *17.7. Information on plants protection substances to be tested shall be notified to and approved by the state central organ in charge of agriculture* *17.8. When applying for permit for importing plants protection substances for testing, the following documents and materials shall be provided:* *17.8.1. Name and formula of the substance;* *17.8.2. Commercial and technical name;* *17.8.3. CAS number;* *17.8.4. Area to use, purpose, duration and quantity;* *17.8.5. Physical-chemical properties, material safety datasheet;* *17.8.6. Emergency measures;* *17.8.7. Identification, sampling and analyzing methods;* *17.8.8 Disposal methods, transport and storage requirements of the substance and its mixtures, packages and wastes.* *Two. Requirements for Listing Pesticides and Chemical Fertilizers* *17.2. Pesticides and chemical fertilizers shall be registered in case of meeting the following conditions:* *17.2.1. Detailed report of tests and experiments submitted;* *17.2.2. Techniques and methods to use and store the substances are recommended and approved;* *17.2.3. Reactive substances and compounds, their portions and mixtures, as well as formula is determined;* *17.2.4. Shelf life, dose limit, adverse effects and action shall be approved through laboratory and field tests;* *17.2.5. The production requirements shall meet international and national industrial standards and requirements;* *17.2.6. If the production is local, technological instructions, standards and or technical conditions shall be developed;*

		17.2.7. Registered at internationally recognized producer countries and used in practice for minimum of 2 years. *Three. Requirements for Registering Hygienic and Disinfecting Substances* *17.3.1. Hygienic and disinfecting substances shall be registered in case of meeting the following conditions :* *17.3.2. Accompanied certificates,* *17.3.3. MSDS with information on commercial and technical names, CAS number, properties, quality, risks, doses, instructions, store and disposal instructions;* *17.3.4. Test results from certified laboratories;* *17.3.5. Based on the laboratory analyses results, experts' conclusion from the state professional inspection office.* *17.3.6. Sub-committee under the state central administrative organ in charge of environment, basing on the physical-chemical properties and other relevant materials, decide on whether or not to register the substance.* *Four. Requirements for Registering Pesticides, Chemical Fertilizers, Hygienic and Disinfecting Substances* *17.4.1. The institute shall be in charge of submitting plants protection substances which meet the requirements under provision 2 and 3 of this regulation to sub-committee for opinions and conclusions.* *17.4.2. The economic entities shall be in charge of submitting hygienic and disinfecting substances which meet the requirements under provision 4 of this regulation to sub-committee for opinions and conclusions.* *17.4.3. The related state central administrative organ (in charge of food and agriculture, or health) shall be responsible for including the substances in the list and approve annually, basing on the opinions and conclusions by the sub-committee.* *17.4.4. The state central administrative organs in charge of agriculture and in charge of health shall be in charge if detailed registration of the listed substances.*
	5. Except as otherwise provided in this Convention, paragraphs 1 and 2 shall notapply to quantities of a chemical to be used for laboratory-scale research or asa reference standard.	**18. "Regulation on Export, Import, Transboundary Movement, Production and Trade of Toxic and Hazardous Chemicals"** *Experts'assessment required for chemicals to be used for laboratory-scale research or as a reference standards, specifically for the standard solutions and substances included in the "List of Toxic and Hazardous Chemicals Banned to Use in Mongolia" and chemicals included in the "List of Toxic and Hazardous Chemicals Limited to Use in Mongolia"*;
	6. … For exempted uses or acceptable purposes that involve intentional release into the environment under conditions of normal use, such release shall be to the minimum extentnecessary, taking into account any applicable standards and guidelines.	**19. Regulation on Inventory, Labeling, Collecting, Transporting, Storing, Disposing, Import, Export and Transboundary Movement of Polychlorinated Biphenyls**/Joint Order # A-17/16 of 2012 by the Minister of Environment and the Minister of Health/ ***Prohibition*** *19.1. PCBs with the following concentration shall not be disposed to environment directly:* *- Liquid containing PCBs 2 ppm and up;* *- Solid materials containing PCBs 50 ppm and up.* *19.2. Prohibits draining PCB-containing oil from equipment for the purpose of re-using.* *19.3. Prohibits using PCB-containing oil and waste except for the purposes provided in 6.1 and 6.2 of this regulation.* *19.4. Prohibits transferring, selling and purchasing equipment and waste containing PCBs with concentrations of more than 50 ppm and up.*

4	Register of specific exemptions. A Register is here by established for the purpose of identifying the Parties that have specific exemptions listed in Annex A or Annex B. The Register shall be maintained by the Secretariatand shall be available to the public.	
5	Measures to reduce oreliminate releases from unintentional production. Each Party shall at aminimum take the following measures to reduce the total releases derived from anthropogenic sources of each of the chemicals listedin Annex C, with the goal of their continuing minimization and, where feasible, ultimate elimination: **(a)** Develop an action plan or, where appropriate, a regional or subregional action plan within two years of the date of entry into force of this Convention for it, andsubsequently implement it as part of its implementationplanspecified in Article 7, designed to identify, characterize and address the release of the chemicals listed in Annex C and to facilitate implementation ofsubparagraphs (b) to (e).	**20. Law on Toxic and Hazardous Chemicals** *Article 16. Setting the reference values for toxic and hazardous chemicals* *20.1. Reference values of toxic and hazardous chemicals for the effects to environment and human health shall be set through standards.* **21. Environmental Protection Law** *Businesses and organizations that engaged in environmentally adverse productions and services shall allocate funds in their annual budget for the reduction of adverse effects, environmental protection and rehabilitation works.* **22. Law on Air** *Rights and obligations of economic entities, organizations, and individuals:* *22.1.Comply with the air protection regulations, procedures, and standards and limit the emission of air pollutants;* *22.2.Equip facilities with controlling and measuring devices when running a major production and service stationary facilities that emit air pollutants;* *22.3.. In the event of a discharge of air polluting substances by a stationary source of an economic entity or organization where the negative physical impacts prove to be greater that the established limits and the circumstances become dangerous to human health and environment, state health and environmental inspectors may limit or suspend the activities of the responsible economic entity or organization until the disturbance is totally eliminated.* *22.4. Environmental and health inspectors may submit to authorized agencies a recommendation to stop or change the industrial operation of an economic entity or organization which repeatedly neglects permissible limits of air polluting substances, negative physical impacts, conditions, and requirements stated in the permit. The authorized organization shall review and make an appropriate decision on the recommendation within 30 days.* *22.5. It is prohibited to throw or burn waste in public spaces or in places other than specifically designated areas or to carry out other activities that do not meet standard requirements of waste disposal..* **23. Law on Water** *23.1.Prohibits allowing areas where productions and activities using environmentally harmful technology for water use for individuals, businesses and organizations.* *23.2.Prohibits dump wastes and store chemicals in natural spring zones.* *23.3.Prohibits dumping and storing radioactive and toxic chemical substances, infectants, wastes and discharge waters and wash and clean cars and dirts in water reserve zones.* **24. Land Law** *24.1 Land possessors and users shall meet the following requirements on efficient and rational land use and protection:* *24.2.At their expense, preserve land characteristics and quality, as well as prevent the reduction of soil fertility, overgrazing of vegetation cover, soil erosion, degradation, drought, saturation, salinization, pollution, and chemical pollution caused by nature or human activities,* *24.3. Shall not run activities with potential adverse impacts to the environment on the land possessed or used by others.*

		25. Law on Waste *25.1. Shall not open burn wastes;* *25.2. Dispose of hazardous wastes at hazardous waste facilities or specifically designed sites;* *25.3. Individuals who violated 9.2.9 of this law shall be fined the amount equivalent to the minimum remuneration of labour and businesses and organizations shall be fined twice the amount.* **26. Law on Environmental Impact Assessment** *26.1. Report of the detailed environmental impact assessment shall reflect the following:* *26.2. Recommendations on introducing Best Available Techniques and Best Environmental Practices (BAT/BEP) into the project operation to reduce and prevent potential adverse impacts on environment;*
6	Measures to reduce or eliminate releases from stockpiles and wastes. 1. In order to ensure that stockpiles consisting of or containing chemicals listed either in Annex A or Annex B and wastes, includingproducts and articles upon becoming wastes, consisting of, containing orcontaminated with a chemical listed in Annex A, B or C, are managed in a mannerprotective of human health and the environment, each Party shall: **(a)** Develop appropriate strategies ...	**27. Law on Waste** *The Government shall approve a regulation on licensing individuals, businesses and organizations for hazardous waste collection, packing, temporary storage, transportation, disposal, recycling and storage activities.* *(not approved, yet)*
	2. The Conference of the Parties shall cooperate closely with the appropriate bodies of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal…	*Mongolia ratified the Basel Convention in 1997.*
7	Implementation plan. 1. Each Party shall: (a) Develop and endeavour to implement a plan for the implementation of its obligations under this Convention;	*The Government approved the National Implementation Plan for POPs in 2006 with Resolution # 99.*
8	Listing of chemicals in Annexes A, B and C. A Party may submit a proposal to the Secretariat for listing a chemical in Annexes A, B and/or C. The proposal shall contain the information specified in Annex D.	

9	Information exchange. Each Party shall facilitate or undertake the exchange of information … through the Secretariat.	**28. Law on Toxic and Hazardous Chemicals** *28.1. Share information on toxic and hazardous chemicals with international organizations and provide the public with information on physical and chemical properties, toxicity and hazards of such chemicals, measures to be taken in the event of accidents and risks involving such chemicals, methods of destruction and transport of such chemicals and their mixtures and waste;* *28.2. Within its delegated authority, implement the international treaties on toxic and hazardous chemicals to which Mongolia is a signatory;*
10	Public information, awareness and education	**29. Environmental Protection Law** *Article 56. Ecological Education and Awareness* *29.1. The Government shall adopt and organise the implementation of a programme of ecological training and education and the development of environmental protection methods and skills within the framework of formal and informal educational systems.* *29.2. Activities on ecological training and education shall be organised in the following ways:* *1) the teaching of basic courses and skills on environmental protection at pre-school education institutions and secondary schools;* *2)the teaching of scientific and legal courses on environmental protection and proper use of natural resources at colleges, universities, institutes and vocational training schools, taking account of their professional orientation;* *3) the publication in the mass media of ecological education, traditions and customs related to environmental protection and environmental legislation.*
11	Research, development and monitoring	**30. Environmental Protection Law** *30.1.The term "environmental monitoring" shall mean written evaluations based on continual observation, measurement and research on the State of and changes to the environment, and the development of measures for the termination and rectification of any adverse changes discovered.* *30.2. To regularly conduct surveys on the level of physical, chemical, and biological changes to the environment and of pollution, and to establish and assess the extent of environmental changes.* *30.3.. Environmental research and funding:* *30.3.1. Research to establish the potential for State and regional development, the restoration, breeding and raising of endangered animals and plants, protection of soil, water, and air, and for humans to live in a healthy and safe environment shall be funded by State and local budgets.* *30.3.2.The central State administrative body and relevant Governors shall request the appropriate certified organisations to conduct environmental research, and develop proposals and shall fund this by means of the Science and Technology Fund and relevant budgets, and shall encourage interested citizens, business entities, and organisations to conduct research at their own expense.*
12	Technical assistance	
13	Financial resources and mechanism. 2. The developed country Parties shall provide new and additional financial resources to enable developing country Parties and Parties with economies in transition to meet the agreed fullincremental costs ofimplementing measures which fulfill their obligations under this Convention as agreed between a recipient Party and an entity participating in the mechanism described in paragraph 6.	

14	Interim financial arrangements	
15	Reporting. 2. Each Party shall provide to the Secretariat: (a) Statistical data on its total quantities of production, import and export of each of the chemicals listed in Annex A and Annex B or a reasonable estimate of such data; and (b) To the extent practicable, a list of the States from which it has imported each such substance and the States to which it has exported each such substance.	**31. Law on Toxic and Hazardous Chemicals** *31.1. Share information on toxic and hazardous chemicals with international organizations and provide the public with information on physical and chemical properties, toxicity and hazards of such chemicals, measures to be taken in the event of accidents and risks involving such chemicals, methods of destruction and transport of such chemicals and their mixtures and waste;* *31.2. Within its delegated authority, implement the international treaties on toxic and hazardous chemicals to which Mongolia is a signatory;*

2.3. ASSESSMENT OF THE POPS SITUATION IN THE COUNTRY

2.3.1. Assessment of POPs Pesticides (Annex A, Part I chemicals)

2.3.1.1. General

Fifteen of the 23 POPs chemicals, listed in Annexes of the Stockholm Convention are placed in the category of pesticides, which had been used and some of them are still in use for agriculture and health sectors.

Table 14: Persistent Organic Pollutant Pesticides

№	Name	Usage
1	Aldrin	A pesticide applied to soils to kill termites, grasshoppers, corn rootworm, and other insect pests, aldrin can also kill birds, fish, and humans. In one incident, aldrin-treated rice is believed to have killed hundreds of shorebirds, waterfowl, and passerines along the Texas Gulf Coast when these birds either ate animals that had eaten the rice or ate the rice themselves. In humans, the fatal dose for an adult male is estimated to be about five grams. Humans are mostly exposed to aldrin through dairy products and animal meats. Studies in India indicate that the average daily intake of aldrin and its byproduct dieldrin is about 19 micrograms per person.
2	Chlordane	Used extensively to control termites and as a broad-spectrum insecticide on a range of agricultural crops, chlordane remains in the soil for a long time and has a reported half-life of one year. The lethal effects of chlordane on fish and birds vary according to the species, but tests have shown that it can kill mallard ducks, bobwhite quail, and pink shrimp. Chlordane may affect the human immune system and is classified as a possible human carcinogen. It is believed that human exposure occurs mainly through the air, and chlordane has been detected in the indoor air of residences in the US and Japan.
3	Dieldrin	Used principally to control termites and textile pests, dieldrin has also been used to control insect-borne diseases and insects living in agricultural soils. Its half-life in soil is approximately five years. The pesticide aldrin rapidly converts to dieldrin, so concentrations of dieldrin in the environment are higher than dieldrin use alone would indicate. Dieldrin is highly toxic to fish and other aquatic animals, particularly frogs, whose embryos can develop spinal deformities after exposure to low levels. Dieldrin residues have been found in air, water, soil, fish, birds, and mammals, including humans. Food represents the primary source of exposure to the general population. For example, dieldrin was the second most common pesticide detected in a US survey of pasteurized milk.
4	Endrin	This insecticide is sprayed on the leaves of crops such as cotton and grains. It is also used to control rodents such as mice and voles. Animals can metabolize endrin, so it does not accumulate in their fatty tissue to the extent that structurally similar chemicals do. It has a long half-life, however, persisting in the soil for up to 12 years. In addition, endrin is highly toxic to fish. When exposed to high levels of endrin in the water, sheepshead minnows hatched early and died by the ninth day of their exposure. The primary route of exposure for the general human population is through food, although current dietary intake estimates are below the limits deemed safe by world health authorities.
5	Heptachlor	Primarily used to kill soil insects and termites, heptachlor has also been used more widely to kill cotton insects, grasshoppers, other crop pests, and malaria-carrying mosquitoes. It is believed to be responsible for the decline of several wild bird populations, including Canadian Geese and American Kestrels in the Columbia River basin in the US. The geese died after eating seeds treated with levels of heptachlor lower than the usage levels recommended by the manufacturer, indicating that even responsible use of heptachlor may kill wildlife. Laboratory tests have also shown high doses of heptachlor to be fatal to mink, rats, and rabbits, with lower doses causing adverse behavioral changes and reduced reproductive success.Heptachlor is classified as a possible human carcinogen. Food is the major source of exposure for humans, and residues have been detected in the blood of cattle from the US and from Australia.

6	Toxaphene	This insecticide is used on cotton, cereal grains, fruits, nuts, and vegetables. It has also been used to control ticks and mites in livestock. Toxaphene was the most widely used pesticide in the US in 1975. Up to 50% of a toxaphene release can persist in the soil for up to 12 years.For humans, the most likely source of toxaphene exposure is food. While the toxicity to humans of direct exposure is not high, toxaphene has been listed as a possible human carcinogen due to its effects on laboratory animals. It is highly toxic to fish; brook trout exposed to toxaphene for 90 days experienced a 46% reduction in weight and reduced egg viability, and long-term exposure to levels of 0.5 micrograms per liter of water reduced egg viability to zero.
7	Mirex	This insecticide is used mainly to combat fire ants, and it has been used against other types of ants and termites. It has also been used as a fire retardant in plastics, rubber, and electrical goods. Direct exposure to mirex does not appear to cause injury to humans, but studies on laboratory animals have caused it to be classified as a possible human carcinogen. In studies mirex proved toxic to several plant species and to fish and crustaceans. It is considered to be one of the most stable and persistent pesticides, with a half life of up to 10 years. The main route of human exposure to mirex is through food, particularly meat, fish, and wild game.
8	Chlordecone	Chlordecone is a synthetic chlorinated organic compound, which was mainly used as an agricultural pesticide. It was first produced in 1951 and introduced commercially in 1958. Currently, no use or production of the chemical is reported.
9	Alpha hexachloro-cyclohexane (α-HCH)	Although the intentional use of alpha-HCH as an insecticide was phased out years ago, this chemical is still produced as unintentional by-product of lindane. For each ton of lindane produced, around 6-10 tons of the other isomers including alpha- and beta-HCH are created. Large stockpiles of alpha- and beta-HCH are therefore present in the environment.
10	Beta - hexachloro-cyclohexan (β-HCH)	Although the intentional use of beta-HCH as an insecticide was phased out years ago, this chemical is still produced as unintentional by-product of lindane. For each ton of lindane produced, around 6-10 tons of the other isomers including alpha- and beta-HCH are created. Large stockpiles of alpha- and beta-HCH are therefore present in the environment.
11	Lindane (γ-HCH)	Lindane has been used as a broad-spectrum insecticide for seed and soil treatment, foliar applications, tree and wood treatment and against ectoparasites in both veterinary and human applications. The production of lindane has decreased rapidly in the last few years and only few countries are still known to produce lindane.
12	Hexachloro-benzene	First introduced in 1945 to treat seeds, HCB kills fungi that affect food crops. It was widely used to control wheat bunt. It is also a byproduct of the manufacture of certain industrial chemicals and exists as an impurity in several pesticide formulations.When people in eastern Turkey ate HCB-treated seed grain between 1954 and 1959, they developed a variety of symptoms, including photosensitive skin lesions, colic, and debilitation; several thousand developed a metabolic disorder called porphyria turcica, and 14% died. Mothers also passed HCB to their infants through the placenta and through breast milk. In high doses, HCB is lethal to some animals and, at lower levels, adversely affects their reproductive success. HCB has been found in food of all types. A study of Spanish meat found HCB present in all samples. In India, the estimated average daily intake of HCB is 0.13 micrograms per kilogram of body weight.
13	Pentachloro-benzene	PeCB was used in PCB products, in dyestuff carriers, as a fungicide, a flame retardant and as a chemical intermediate e.g. previously for the production of quintozene. PeCB might still be used as an intermediate. PeCB is also produced unintentionally during combustion, thermal and industrial processes. It also present as impurities in products such as solvents or pesticides.

14.	DDT	DDT was widely used during World War II to protect soldiers and civilians from malaria, typhus, and other diseases spread by insects. After the war, DDT continued to be used to control disease, and it was sprayed on a variety of agricultural crops, especially cotton. DDT continues to be applied against mosquitoes in several countries to control malaria. Its stability, its persistence (as much as 50% can remain in the soil 10-15 years after application), and its widespread use have meant that DDT residues can be found everywhere; residual DDT has even been detected in the Arctic.Perhaps the best known toxic effect of DDT is egg-shell thinning among birds, especially birds of prey. Its impact on bird populations led to bans in many countries during the 1970s. Although its use had been banned in many countries, it has been detected in food from all over the world. Although residues in domestic animals have declined steadily over the last two decades, food-borne DDT remains the greatest source of exposure for the general population. The short-term acute effects of DDT on humans are limited, but long-term exposures have been associated with chronic health effects. DDT has been detected in breast milk, raising serious concerns about infant health.
15	Endosulfan	According to the risk management evaluation on endosulfan, adopted by the POPRC, endosulfan is an insecticide that has been used since the 1950s to control crop pests, tsetse flies and ectoparasites of cattle and as a wood preservative. As a broad-spectrum insecticide, endosulfan is currently used to control a wide range of pests on a variety of crops including coffee, cotton, rice, sorghum and soy.A total of between 18,000 and 20,000 tons of endosulfan are produced annually in Brazil, China, India, Israel and South Korea. Colombia, the United States of America and several countries in Europe that used to produce endosulfan have stopped its production.The largest users of endosulfan (Argentina, Australia, Brazil, China, India, Mexico, Pakistan and the United States) use a total of about 15,000 tons of endosulfan annually. An additional 21 countries report using endosulfan. The use of endosulfan is banned or will be phased out in 60 countries that, together, account for 45 per cent of current global use.

2.3.1.2. Import

Mongolia is a country of traditional livestock husbandry and started using insecticides since late 1950s to combat parasites and diseases of animals. The ambitious movement for bringing virgin lands under cultivation, which started in 1958, successfully paved its way nationwide and the agricultural sector boomed, and started using pesticides for plants protection.

Mongolia used pesticides first in 1958 in animal husbandry. The Soviet Union (Russian Federation) was the main provider of pesticides; between 1958-1980, HCH (12%) had been imported from this country; between 1970-1980 α-HCH and between 1980-1985 HCH emulsion (16%) have been imported from this country. In 1990, the Ministers of Environment and Food & Agriculture banned the use of HCH 12% mixture powder by joint order, which was the first ever ban on the use of pesticides in Mongolia.

The Government of Mongolia approved the "List of Banned and Limited to Use Substances in Mongolia" in 1997, which banned the use and import of 10 POPs pesticides, namely, aldrin, chlordane, dieldrin, DDT, Alpha hexachlorocyclohexane, Beta hexachlorocyclohexane, lindane, heptachlor, toxaphene and endrin. This list was reviewed and renewed in 2007 into the "List of Banned and Limited to Use Toxic and Hazardous Chemicals", adding hexachlorobenzene and mirex in 2007 and endosulfan, chlordecone and pentachlorobenzene in 2012.

In 1999, the tripartite joint order by the Ministers of Environment, Health and Food & Agriculture enacted new procedure to list the name and volume of pesticides, disinfection and sterilization substances on an annual basis and since 2007 the Ministry of Environment has been issuing the import permit for pesticides in the approved list and in approved volume.

Until 1990s, Mongolia imported pesticides from the Soviet Union and as the country shifted to the free market economy, the imports of pesticides diversified with more markets such as China, Korea, Japan and Germany.

2.3.1.3. Production and Export

Notwithstanding the production of a petty volume of biopesticides, Mongolia does not produce pesticides and in no occasion pesticides export has been reported in Mongolia.

2.3.1.4. Use

Hexachlorocyclohexane congeners:

From the POPs pesticides, hexachlorocyclohexane (HCH) has been used in Mongolia widely under a common name of "Dust". HCH and α-HCH (12%) and HCH emulsion (16%) had been used from 1958-1985 as an insecticide in livestock ectoparasites (for mites, scabs, ticks, bloodsuckers etc.), as well as for disinfecting animal shelters and ordure. HCH in powder form was mainly spread over small animals by hand and big animals and cattles driven into a cubicle where they smoked with HCH by burning.

Table 15: Hexachlorocyclohexane (HCH) Use

№	Province	Soum Village	Duration of Usage	Amount Used (ton)
1	Arhangai	Hashaat	1958-1990	8,3
		Ih Tamir	1972-1986	0,3
		Erdene Mandal	1969-1985	6,5
		Tsetserleg	1964-1993	5,8
		Tuvshruuleh	1985-2000	0,1
		Total		**21,0**
2	Bayan-Ulgii	Bayannuur	1970-1989	20
		Deluun	1982-1987	
		Sagsai	1970-1989	6
		Nogoon Nuur	1982-1987	4
		Altantsogts	1960-1980	4
		Bugat	1960-1978	15
		Ulaanhus	1989-1990	4
		Tsengel	1968-1990	20
		Buyant	Until 1996	4 tons a year
		Ulgii	1994-1990	0,1
		Tolbo	Until 1991	
		Altai	Until 1997	
		Total		**113,1**
3	Bayanhongor	Bayanbulag	1980-1990	0,45
		Jargalan	1980-1990	
		Buutsagaan	1960-1990	
		Jinst		
		Total		**0,45**
4	Govi-Altai	Tugrug	1970-1991	3
		Jargalant	1970-1991	2
		Bayan-Uul	1960-1970	-
		Chandmani	1971	0,02
		Tonhil	1960-1993	2
		Taishir	1970	0,08
		Darhan auxiliary farm	1978-1986	0,228
		Total		**5,325**
5	Dornod	Bayantumen	-1970	0,18
		Halh Gol	-1974	0,91
		Bulgan	-1970	0,15
		Bayan-Uul	1980-1997	1,5
		Hulunbuir	-1975	0,15
		Sergelen	1999	0,005
		Total		**2,895**

6	Dornogovi	Altanshiree	1997	+
		Mandah	1980-1990	5,0
		Urgun	1958-1988	19,0
		Huvsgul	1972-1990	0,35
		Erdene	1960-1985	12,5
		Dalanjargalan	1975-1990	0,5
		Ihhet	1975-1997	7,2
		Total		**44,55**
7	Dundgovi		1970-1980	6 tons a year
		Total		**60**
8	Darhan-Uul	Orhon	1970-1990	
		Darhan	1978-1986	0,225
		Total		**0,225**
9	Zavhan	Telmen	1960-1992	2,9
		Aldarhaan	1980-2001	3,5
		Erdenehairhan	1969-1973	3,5
		Tes	1959-1991	5,0
		Tudevtei	1960-1993	30,0
		Tosontsengel	1970-1998	7,0
		Uliastai	-1999	0,024
		Total		**51,924**
10	Uvurhangai	Harhorin		
		Hujirt	1987-1990	150
		Taragt	1981-1991	100
		Arvaiheer	1987-1990	75
		Hairhandulaan	1988-1991	100
		Zuunbayan Ulaan	1987-1988	50
		Tugrug	1985-1988	50
		Sant	1986-1988	75
		Guchin Us	1987-1988	25
		Taragt		
		Bayangol	1988-1991	75
		Bayan-Undur	1985-1988	150
		Uyanga	1987-1988	50
		Total		**900,0**
11	Umnugovi	Hanhongor	1950-1990	30,0
		Tsogttsetsii	-1964	1,0
		Total		**31,0**
12	Tuv	Jargalants		
		Lun	1975-1990	0,2
		Bayandelger	1970-1992	5,0
		Erdene	1970-1990	10,0
		Bayan	1970-1990	8,0
		Ugtaal	-1987	0,05
		Tseel	-1976	1,21
		Mungunmorti	1960-1990	2,0
		Batsumber	1980-2000	12,0
		Total		**38,46**

13	Selenge	Hushaat	1987-1995	
		Bayangol	1968-2003	2,62
		Baruun Buren		
		Orhon soum	1967-1990	
		Orhontuul		
		Huder		
		Shaamar		
		Sant	1970-	
		Saihan	1989-1995	2,2
		Yeroo	1976-1990	5
		Mandal	1960-1990	90,0
		Yeroo	1976-2000	5,0
		Total		**104,82**
14	Suhbaatar	Suhbaatar	1960-1970	5
		Dariganga	1999	0,5
		Halzan	-1972	0,35
		Asgat	1960-1990	0,25
		Munhhaan	1959-2000	12
		Tumentsogt	1977-1989	7
		Tuvshinshiree	1960-1990	0,06
		Total		**25,16**
15	Hovd	Throughout the Province (16 soum villages)	1960-1990 (for combating animal ectoparasites)	1440
		Duut, Must, Munhhairhan, Tsetseg	1970-1985 (for combating grasshoppers)	562,5
		Total		**2002,5**
16	Hentii	Norovlin	1985-1990	0,05
		Total		**0,05**
17	Huvsgul	Bayanzurh	1960-1989	24,0
		Tosontsengel	1985-1990	0,2
		Tarialan (for animals, plants)	1971-1984	28,0
		Tsagaan-Uul	1965-1990	12,5
		Total		**64,7**
18	Uvs	Naranbulag	1965-1985	15,0
		Total		**15,0**
19	Orhon	Bayan-Undur	1978-1993	0,9
		Jargalant	1978-1993	1,0
		Total		**3,8**
20	Bulgan	Bureghangai		
		Bugat		
		TOTAL		**3484,96**

Source: Inventory of POPs pesticides.2012.

Washing animals with HCH solution, prepared by dissolving HCH emulsion with 16% concentrate into a hot water, was also a common practice. The solution poured into a pit (so-called bathtub), dug in the ground, and threw animals in it to wash. Therefore, serious contamination can be found in such places called "bathtub".

HCH has also been used for combating grasshoppers from 1965-1989 at the ratio of 8-10 kg per hectare, spraying manually or using sprinkles.

The inventory results show that HCH (imported from Russia) had been used in all provinces from 1959-2000 as an insecticide in livestock and vegetable plantations, and used in Hovd and Uvurhangai provinces for combating grasshoppers, from 1965 to 1987 in the years ending in odd numbers. The use of HCH by each provinces and soum villages is presented below in Table 15.

Use of Other POPs Pesticides

Out of POPs pesticides, use of hexaclorobenzene, chlordane, aldrin, dieldrin and heptachlor from 1969-2003 was reported in the inventory (Table 16):

- Hexachlorobenzene (C_6CL_6) – 5983.6 liters were used in 17 soum villages of 9 provinces from 1970-2003.
- Chlordane ($C_{10}H_6CL_6$) – 311.5 liters were used in 6 soums of 6 provinces from1973-2003.
- Aldrin ($C_{12}H_8CL_6$) – 61 liters were used in 4 soums of 3 provinces from 1990-2003.
- Dieldrin ($C_6H_8CL_00$) – 162.5 liters were used in 1 soum of 1 province as an insecticide.
- Heptachlor ($C_5H_5CL_6$) – 564.5 liters were used in 6 soums of 3 provinces from 1972-2003.

Table 16: Use of POPs Pesticides

№	Province and Soum	Volume (kg, l)	Duration, in years
Hexachlorobenzene (C_6CL_6)			
1	Arhangai Ih Tamir soum	320	1970-1980
2	Bayan-Ulgii Tsengel soum	1000	1970
3	Uvurhangai Yesun Zuil soum	15	1970
4	Dornod Bayandun(in vegetables)	-	1980-1987
5	Selenge Mandal Dulaanhaan	250 500	1990-1992 1992-1997
6	Suhbaatar Ongon Munhhaan Dariganga Halzan(in cow farm)	20 40 30 150	1999-2003 1990 - 1970
11	Tuv Lun Ugtaal Jargalant	250	1989 1987 -

14	Hovd Hovd(in vegetables) Myangad Must	3400	1972-1982 1969-1989 1970-1990
15	Darhan-Uul Sharyn Gol	8	2002-2003
17 soums in 9 provinces		**5983**	
Chlordane($C_{10}H_6CL_6$)			
1	Bayanhongor Baatsagaan	70	-
2	Dornogovi Hatanbulag	1,5	2003
3	Govi-Altai Tugrug	85	1973-1990
4	Selenge Sant	5	1976-1990
5	Suhbaatar Ongon	150	1999-2003
6	Huvsgul Shine Ider	+	2003
6 soums in 6 provinces		**311, 5**	-
Aldrin(C_{12} H_8CL_6)			
1	Zavhan Uliastai Telmen(in vegetables)	10 10	1990 2003
2	Selenge Huder	1	-
3	Huvsgul Jargalant	40	2001
4 soums in 3 provinces		**61**	
Dieldrin ($C_6H_8CL_60$)			
1	Suhbaatar Tumentsogt	162,5	1982-1995
	1soum in 1province	**162,5**	
Heptachlor ($C_6H_5CL_7$)			
1	Bayanhongor Baatsagaan	100	-
2	Bayanhongor Bayan-Ovoo	20	
3	Bayanhongor Galuut	25	
4	Bayanhongor Jinst	19	
5	Hovd Hovd soum	400	1972-1982
6	Huvsgul Shine-Ider	0,5	2003
6 soums in 3 provinces		**564,5**	

Source: Inventory of POPs pesticides.2012.

2.3.2. Assessment of PCB (Annex A, Part II chemicals)

2.3.2.1. General

Polychlorinated biphenyls or PCBs are a subset of the synthetic organic chemicals known as chlorinated hydrocarbons. The chemical formula for PCBs is $C_{12}H_{(10-n)}Cl_n$, where n is a number of chlorine atoms within the range of 1-10. The class includes all compounds with a biphenyl structure (i.e., two benzene rings linked together) that have been chlorinated to varying degrees. Theoretically, a total of 209 possible PCB congeners exist, but only about 130 of these are likely to occur in commercial products. Commercial PCBs are a mixture of 50 or more PCB congeners. PCB characteristics include fire resistance, low electrical conductivity, high resistance to thermal breakdown, high degree of chemical stability, and resistance to many oxidants and other chemicals and these useful physical and chemical properties led to their widespread use. First commercial production was in 1929 in the United States of America and countries that have manufactured PCBs include Austria, China, Czechoslovakia, France, Germany, Italy, Japan, the Russian Federation, Spain and the United Kingdom. Most countries ceased the production since 1983, however, the Soviet Union or the Russian Federation stopped it since 1993. These countries manufactured PCBs under different tradenames (Table 16) for the following applications, including:

- Insulating fluids (for transformers, capacitors, breakers, power cables etc.);
- Hydraulic fluids (fixatives in microscopy, braking system etc.);
- In carbonless copy paper;
- In Lubricating materials;
- Additives to to paint, adhesives, sealants etc. for stabilizing and flexibility;
- For furnitures and wall finishes;
- De-dusting agents;
- Asphalt;
- Natural gas pipes;
- Flame retardants;
- Vacuum pump fluids.

Table 17: Tradenames of PCBs

Aceclor (т)	Cloresil	Montar
Adkarel	Clorphen (т)	Nepolin
ALC	Delor (Czechoslovakia)	Niren
Apirolio (т,к)	Diaclor (т,к)	No-Famol
Aroclor (т,к) (USA)	Dialor (к)	No-Flamol (т,к) (USA)
Aroclor 1016 (т,к)	Disconon (к)	NoFlamol
Aroclor 1221 (т,к)	Dk (т,к)	Nonflammable liquid
Aroclor 1232 (т,к)	Ducanol	Pheneclor
Aroclor 1242 (т,к)	Duconol (к)	Phenoclor (т,к) (France)
Aroclor 1254 (т,к)	Dykanol (т,к) (USA)	Phenochlor
Aroclor 1260 (т,к)	Dyknol	Phenochlor DP6
Aroclor 1262 (т,к)	EEC-18	Plastivar
Aroclor 1268 (т,к)	Electrophenyl T-60	Pydraul (USA)
Areclor (т)	Elemex (т,к)	Pyralene (т,к) (France)
Abestol (т,к)	Eucarel	Pyranol (т,к) (USA)
Arubren	Fenchlor (т,к) (Italy)	Pyrochlor
Asbestol (т,к)	Hexol (Russia)	Pyroclor (к) (USA)
ASK	Hivar (к)	Saf-T-Kuhl (т,к)
Askarela (т,к) (USA)	Hydol (т,к)	Saft-Kuhl
Bakola	Hydrol	Santotherm (Japan)
Bakola 131 (т,к)	Hyvol	Santotherm FR
Biclor (к)	Inclor	Santoterm
Chlorextol (т)	Inerteen (т,к)	Santovac
Chlorinated Diphenyl	Kanechlor (KC) (т,к) (Japan)	Santovac 1
Chlorinol (USA)	Kaneclor	Santovac2
Chlorobiphenyl	Kaneclor 400	Siclonyl (к)
Clophen (т,к) (Germany)	Kaneclor 500	Solvol (т,к) (Russia)
Clophen-A30	Keneclor	Sovol
Clophen-A50	Kennechlor	Sovtol (Russia)
Clophen-A60	Leromoll	Therminol (USA)
Clophen Apirorlio	Magvar	Therminol FR
	MCS 1489	

For the applications of PCBs, they're divided into "closed", "partially closed" and "open" systems. Open systems are applications in which PCBs are in direct contact with their surroundings and thereby may be easily transferred to the environment. Open applications of PCBs include plasticizers like pubber materials, paints and dyes, oils, some types of papers, sealers, filling material in construction and adhesives for the purposes of flame-retardants and flexibility additives. Some of the products in open application have relatively long service lives, therefore PCBs in the application still persist, i.e. still released to the surroundings.

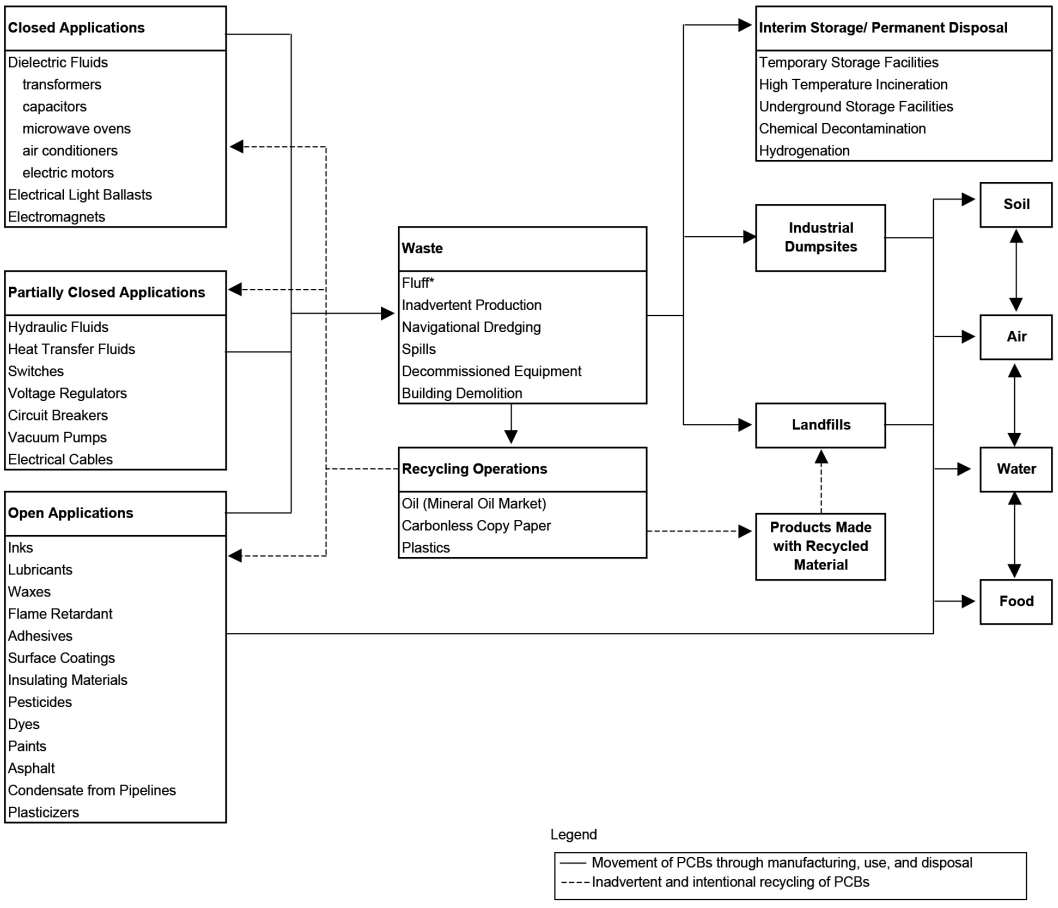
A closed PCB application is one in which the PCBs are held completely within the equipment. Under ordinary circumstances, no PCBs would be available for exposure to the user or the environment. However, PCB emissions may occur during equipment servicing/repairing and decommissioning, or as a result of damaged equipment.The most significant example of closed application is transformers. Closed applications of PCBs except for the oil-containing equipment in electricity transmission and distribution companies are motor start capacitors in washing machine, hair dryers, lighting ballasts etc., but, stopped these applications since 1989.

Although the manufacture, processing, distribution, and use of PCBs are widely prohibited by the Stockholm Convention, there still exist a host of different activities that generate PCB wastes, including: exemptions givento certain uses of PCBs; the incidental production of PCBs; recycling operations; and quantities held within equipment still in service. Following are some activities that generate PCB waste, including:

- Out-of service equipment that used PCB-containing fluids and lubricants;
- Waste oil collected from these equipment or applications;
- Through the following operations PCBs find their way out to the environment – during repair and servicing of PCB-containing equipment, cleaning of insulating fluids and overheating of transformers and capacitors;
- Large amount of waste are produced through the demolition of buildings. Of this waste, PCBs are to be found in filling material for joints of concrete structures, flame-retardant coatings on ceiling boards (or tiles), fluorescent light ballasts, coatings on furnishings, surface treatments for textiles, adhesives for waterproof wall coatings, paints, insulatingmaterials, sealant putties, and large and small capacitors (found in appliancesand electrical devices);
- Of the PCBs that have already been disposed, most have likely been deposited in landfills, including municipal, industrial, and sewage sludge landfills. However, PCBs may be released from these landfills by volatilization into theatmosphere and leaching into groundwater.

Fluids containing more than 50 ppm of PCB concentration is considered as PCB-contaminated and if it exceeds 500 ppm, it's pure PCB.

PCB Movement in the Environment



* Fluff is waste in the form of upholstery, padding, and insulation materials produced from the shredding of appliances and automobiles that become saturated with PCB-containing oils and fluids.

Figure 2. PCB application and movement in the environment

Effects on Human Health and the Environment

PCBs are insoluble in water, but dissolve easily in fats, hydrocarbons, and other organic compounds, and are persistent and bioaccumulate. PCBs reach to human and bioaccumulate by contaminating soil, water, air and animals through the applications mentioned above and wastes.

Acute exposures to high levels of PCBs have been associated with skin rashes, itching and burning, eye irritation, skin and fingernail pigmentation changes, disturbances in liver function and the immune system, irritation of the respiratory tract, headaches, dizziness, depression, memory loss, nervousness, fatigue, and impotence.

Effects of frequent low-level PCB exposures reported include liver damage, reproductive and developmental effects, and possibly cancer. The US Department of Health and Human Services as well as the International Agency for Research on Cancer (IARC) consider PCBs to be probable carcinogens in humans.

2.3.2.2. Inventory

Preliminary inventory of PCBs was conducted in 2005 and detailed inventory is ongoing since 2009, involving electric equipment with insulating oil. Presently, Mongolia limits its activities towards the reduction of PCBs only with closed applications, specifically, PCBs in insulating oil in electrical equipment. For other applications, Mongolia does not have any information on the use and no inventory and research works have been done so far.

According to the preliminary inventory, it can be summarized that 4,637 transformers, 3,847 liquid filled breakers, 83 capacitors, 17 reactors, 4,525 electrical cables are registered throughout the country.

About 35 types of transformers, manufactured in Russia, China, Bulgaria, Japan, Romania, Korea, Germany, Czechoslovakia and Hungary, are now in use in Mongolia and almost 90% of the transformers in use are manufactured in the former USSR during 1968-1980 and most of them are fairly worn at present.

Power plants, electricity distribution and transmission grids are using breakers of MKP, KHBU, K, S, BT, BMPE, U, BKE, HL, BMT, BMG and BMUE types manufactured in Russia, Czechoslovakia and Bulgaria. All breakers, except 3 are manufactured during 1962-2005 in Russia.

In addition, reactors and turbines of RTM, RTD, RZDCOM types manufactured in 1975-2000 in Russia and power cables, manufactured in 1974-1980.

All the aforementioned oil-containing equipment use fluids of types GK (TU38-101-1025-85, TU381011025-85-1-4), TKP (GOST982-80), TM-1500, Sovtol-10, TK-750, TK-1500 (GOST 98268), JIS C2320, TC-1500, TP-22 , amounting to 5,518.3 tons, of which 2595.4 tons (47.3%) in transformers, 2472.7 tons (44.81%) in breakers, 7.5 tons (0.14%) in capacitors and remaining 442.7 tons (8.02%) in other equipment. So, 87.18% of the fluids used in energy sector and the remaining is used in other sectors, including industry, railway, civil aviation etc.

The central region holds 5,353,239 tonnes (97%) when other parts uses only 3% - 96.766 tons (1.75%) in eastern and south east region and 68.34 tonnes (1.24%) in western region.

2.3.2.3. Production

Mongolia does not and have never produced PCBs.

2.3.2.4. Import

Mongolia has begun to produce electrical energy for the first time in 1930 and the

energy system of Mongolia has founded in 1968. Until 1990 Mongolia has imported most of transformers, breakers and other electrical equipment from Soviet Union and a small numbers from China, Bulgaria, Japan, Romania, Korea, Germany, Czechoslovakia and Hungary. The majority of transformers, almost 70% of all transformers in use, were imported during 1970-1990, which coincides with the period of progressive development of production and industry in the country.

Since 1990, after the transition to the market economy the import countries has been increased such Russia, China, Japan, Korea, Canada, USA, Czechoslovakia, Singapore, Australia, Germany, Finland, France and Spain. But, for the last 10 years, import has been made mainly from China.

Considerable number of equipment imported was used and until 2013 when the "Regulation on Registration, Collection, Transportation, Storage, Disposal, Import, Export and Transboundary Movement of Polychlorinated Biphenyls (PCBs)" approved, there had been no border control over PCBs in import equipment and fluids. The regulation now requires upper limits of PCBs in fluids and equipment to be below 2 ppm and all the import shall be validated by accompanying documents and laboratory analyses.

2.3.2.5. Detailed inventory

Detailed inventory of PCBs started in September 2009 in participation of the Ministry of Energy and Energy Authority (former) through PCBs inventory methodology, involving power plants, state-owned electricity transmission and distribution companies and owners of oil-congtaining equipment, including, but not limited to:

- National Electricity Transmission Grid State-Owned Company, including all its sub-stations and distribution networks in Ulaanbaatar city and provinces;
- Ulaanbaatar Electricity Distribution Network State-Owned Company, including its Western Distribution Centre, Eastern Distribution Centre, Nalaih Distribution Centre and Zuun-Mod Distribution Centre;
- Western Region Electricity Transmission Network, Western Region Energy Network, Uvs, Hovd and Bayan-Olgii Electricity Distribution companies under the Energy Authority;
- Erdenet-Bulgan Electricity Transmission Network Company;
- Eastern Region Electricity Transmission Network Company;
- Ulaanbaatar Railway Energy and Water Supply Sub-Units 1 and 2;"Erdenet" mining company, "MCS Energy Resource" company, Civil Aviation Authority, "Petro China Dachin Tamsag" oil refinery, "Oyu-Tolgoi" mining etc.

Samples taken from equipment and waste oil and analysed using quick test Dexsil L2000 apparatus and later GC ECD for detailed analyses. Every equipment sampled has been assigned with an inventory number, recorded and labeled accordingly.

Online databse was developed (www.pcb.gps.mn) with information and data on every equipment inventoried, including general information on the equipment, location, oil leakage, area of contaminated spots and PCBs analyses results before and after decontamination.

2.3.2.6. Inventory results

As of the end of 2013, 4,118 samples taken from 3,246 electrical equipment, with a total weight of 16,806.9 tonnes, containing 5,554 tonnes of oil, analysed, and was detected that 7.92% of all equipment inventoried contained more than 50 ppm PCBs. These are 188

transformers, 66 breakers and 2 waste oil tanks, total weight of which is 663.6 tonnes with 207.1 tonnes of fluid.

Table 18: PCB Equipment

Description		Q,ty	Oil weight (kg)	Total weight (kg)
Total quantity of oil-containing electrical equipment (as of 2005)		8,501	Including, 4,637 transformers, 3,847 breakers and 17 reactors.	
Inventoried equipment		3,246	5,554,487.0	16,806,853.5
Analyzed equipment		3,246	5,554,487.0	16,806,853.5
Equipment containing more than 50ppm PCBs	Transformers	188	77,979.0	289,917.0
	Breakers	66	119,772.0	336,820.0
	Other	2	8,650.0	34,300.0
	Total	**257**	**207,111.0**	**663,582.0**

Source: Detailed inventory of PCBs

2.3.3. Assessment of POP-PBDEs (Annex A, Part IV and Part V chemicals) and HBB (Annex A, Part I chemicals)

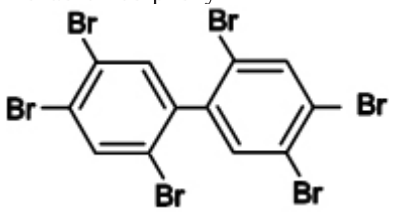
2.3.3.1. New POPs – Industrial chemicals

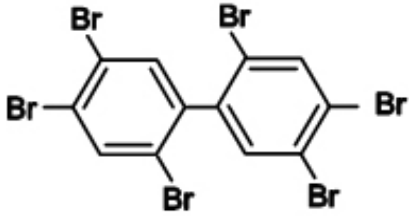
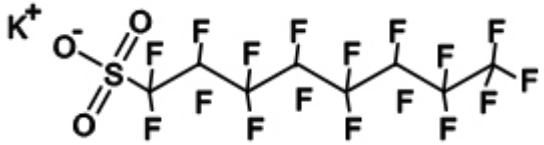
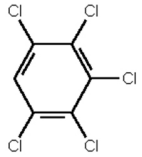
Five of the newly added chemicals to the Annexes of the Stockholm Convention are called new POPs industrial chemicals and these substances widely used and being used as additives and fire retardants in the production of electric and electronic equipment and vehicles, fire fighting foams, furnitures, textiles and construction materials.

These New POPs industrial chemicals are:

- Hexabromobiphenyl (HBB)
- Hexabromodiphenyl ether and heptabromodiphenyl ether (commercial-Octa-BDE)
- Tetrabromodiphenyl ether and pentabromodiphenyl ether (commercial-PeBDE)
- Pentachlorobenzene (PeCB)
- Perfluorooctane sulfonate (PFOS).

Annex A of the Convention includes hexabromobiphenyl, polybrominated biphenyl, Hexabromodiphenyl, polybrominated diphenyl ethers(hexabromodiphenyl ether, heptabromodiphenyl ether, tetrabromodiphenyl ether, pentabromodiphenyl ether), pentachlorobenzen and Annex B includes perfluorooctane sulfonate.

№	POPs	Production	Use	Adverse effects
11	Hexabromobiphenyl  CAS No: 36355-01-8 Trade name: FireMaster BP-6, FireMaster FF-1	Hexabromobiphenyl is an industrial chemical that has been used as a flame retardant, mainly in the 1970s. Main producers were USA, Great Britain, France and Russia and USA stopped production in 1979, Great Britain in 1977 and France in 2000. Some developing and transition economies are still producing the substance. In USA alone, 5 million tonnes was produced and used in 1970-1976.	Used as fire retardant in plastic and polymer materials and products and mainly in acrylonitrile-butadiene-styrene (ABS) thermoplastics, which is used for household and industrial electric and electronic equipment (radios, TVs), and in the production of paints and lacquers. Added in PUR foam for automobile upholstery.	Classified as a possible human carcinogen even at low exposure and has other toxic effects on endocrine and reproductive systems. Affects hormone system.
22	Hexabromodiphenyl ether and Heptabromodiphenyl ether  CASNo: 68631-49-2 CAS No: 207122-15-4 CAS No: 446255-22-7 CAS No: 207122-16-5	They are the main components of commercial octabromodiphenyl ether and was produced in the Netherlands, France, USA, Japan and Israel and since 2004 it's no longer produced in EU, USA and the Pacific Rim. There is no information that indicates it is being produced in developing countries. The amount of total world production is not clear, however, it's considered to be around 180,000 tonnes.	OctaBDEs in general are used as flame retardants of the additive type. In Europe, it is primarily used in acrylonitrile-butadiene-styrene (ABS) polymers and typically used for coatings of office equipment and business machines. Other minor uses include polystyrene, polybutylene terephthalate and polyamide polymers as an additive to use in electronic equipment and automobiles. Other uses that have been reported for octabromodiphenyl ether include nylon and low density polyethylene, polycarbonate, phenol-formaldehyde resins and unsaturated polyesters and in adhesives and coatings and used at12-18% weight loadings in the final product.	Affects thyroid, liver and nervous system.

33	Tetrabromodiphenyl ether and Pentabromodiphenyl ether  CAS No: 5436-43-1 CAS No: 60348-60-9	They are the main components of commercial pentabromodiphenyl ether and and was produced in EU, USA, Japan, Israel and China. Since 1990 it's no longer produced in Japan, since 1997 in EU and since 2004 USA. It's estimated that 1.3-1.5 million tonnes had been produced in USA in 1970-2005.	36% of the toal produced PentaBDEs had been used in automobile upholstery and foam insulation production and about 60% in furniture production. Minor uses include textile, EEEs, insulation foam, cable casings, conveyer belts, lacquer etc.	Affects reproductive system and nervous system and thyroid hormones.
44	Perfluoroctane sulfonic acid  Perfluorooctane sulfonic acid (CAS No: 1763-23-1), its salts perfluorooctane sulfonyl fluoride (CAS No: 307-35-7)	Perfluorooctane sulfonic acid (PFOS) related substances had been produced and used for over 50 years in various productions. The largest producer was 3M and completely ceased production in 2003. It is believed that except 3M, there are several producers supply PFOS to the global market. Of these, 6 plants are in Europe, 6 in Asia, (of which 4 are in Japan) and one in Brazil.	Perfluorinated substances with long carbon chains, including PFOS, are both lipid-repellent and water-repellent. Therefore, the PFOS-related substances are used as surface-active agents indifferent applications. Historical uses include coatings (frying pan etc.), textiles/upholstery like water resistance materials etc. In addition, used in fire fighting foam, paper and packaging, industrial and household cleaning products, metal plating, hydraulic fluids, photographic industry, insecticides and pesticides and in EEEs.	Carcinogenic, and affects fetus development and even may lead to death.
55	Pentachlorobenzene (PeCB)  1,2,3,4,5-Pentachlorobenzene (CAS No: 608-93-5)	PeCB was not produced anymore within Europe and North America. PeCB is also produced unintentionally during combustion, thermal and industrial processes. It also present as impurities in products such as solvents or pesticides.	PeCB was used in PCB products, in dyestuff carriers, as a fungicide, a flame retardant and as a chemical intermediate e.g. previously for the production of quintozene. PeCB might still be used as an intermediate..Also used as a byproduct in the production of Pentachloronitrobenzene.	Bioaccumulates, highly toxic to human health and water living organisms

2.3.3.2. PBDEs

Polybrominated diphenyl ethers were produced in large amounts for commercial purposes with 3 different degrees of bromination: c-PentaBDE, c-OctaBDE and c-DecaBDE. Commercial PentaBDE, the homologue "tetrabromodiphenyl ether and pentabromodiphenyl ether" as well as c-OctaBDE, "hexabromodihenyl ether and heptabromodiphenyl ether" are listed under the Stockholm Convention. However, c-DecaBDE does not contain POP-PBDE.

Commercial PentaBDE and c-OctaBDE are a mixture of PBDEs homologues.

Polybrominated diphenyl ethers are a group of industrial aromatic organobromine chemicals that have been used since the 1970s as additive flame retardants in a wide range of - mainly - consumer products, including polymer materials in electronic appliances, vehicles, furnitures and textiles. Major uses of the total produced PBDEs were polyurethane foam and plastics in transport (36%), furnitures (60%) and in other articles, including PUR foam construction, synthetic carpet, polymers in EEEs, cable sheets, dyestuffs, lacquers and drilling oils (4%).

In EEEs, PBDEs have been used mainly in CRT televisions and monitors as flame retardants and production dropped since 2007 as LCD panels were introduced. However, there is a possibility that PBDEs may be contained in products manufactured from recycled polymers.

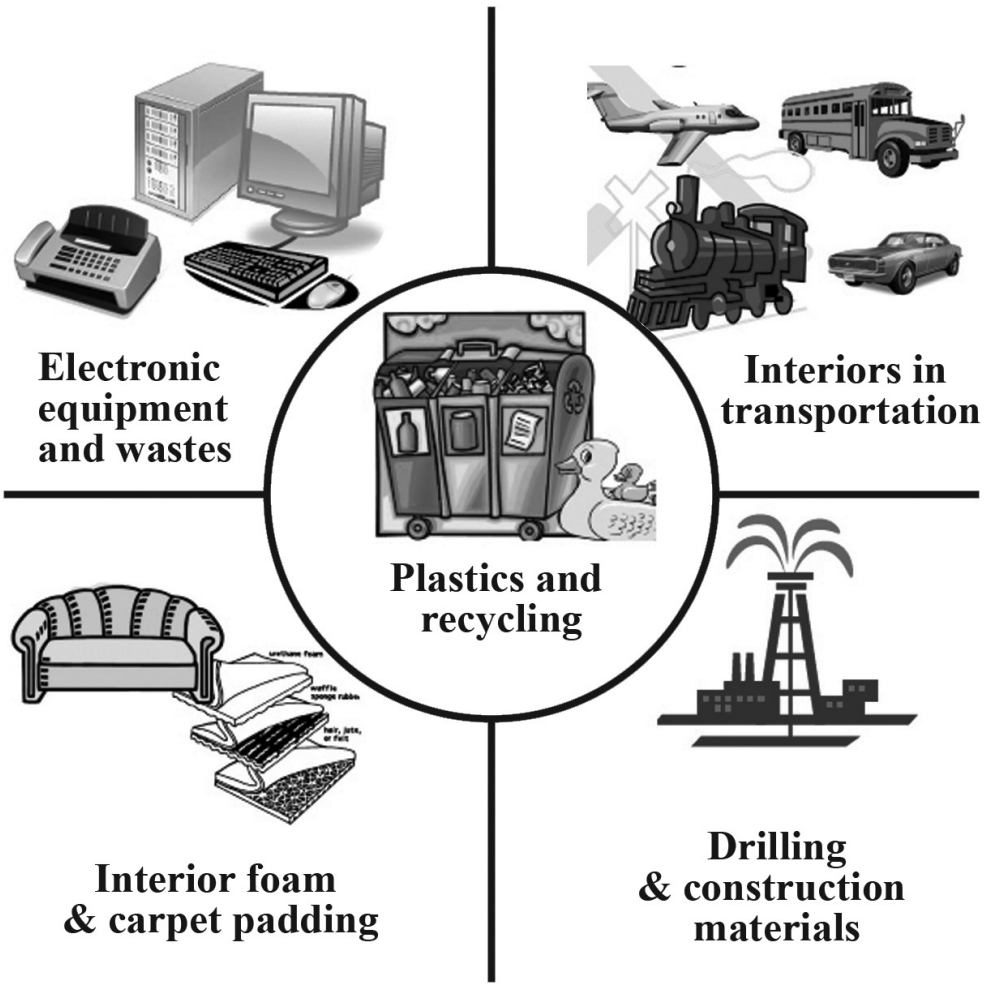


Figure 3. Products and articles containing POP-PBDEs

2.3.3.3. Inventory of PBDEs in Electrical and Electronic Equipment (EEEs) and Wastes

Before 1990s, Mongolia imported EEE solely from the Soviet Union (Russian Federation). Volume of import and its composition changed dramatically as the country shifted to the free market economy, and the EEEs have been imported mainly from manufacturers (China, Republic of Korea, Japan, Malaysia, Taiwan etc.). Under the name of aid, considerable amount of second-hand EEEs had been brought to the country from developed countries due the difficult period of transition in the country, but this has been reduced significantly in recent years. Companies, that bring EEE parts and accessories to the country to assemble final products have been emerging. In contradiction of the growing volume of EEE import and use, no WEEE collection, separation and recycling system is in place yet and it was impossible to calculate the volume of WEEE produced in the country. Consumers usually get rid of their used EEEs in a way by donating it to others or sell as spare parts, or just dispose of it together with household wastes. Due to the lack of disposal facility, large stock of used EEEs or WEEEs had been accumulated in government agencies. For the first time in Mongolia, inventory of POP-PBDEs was conducted in 2013 in accordance with the "Guidance for the inventory of polybrominated diphenyl ethers (PBDEs) listed under the Stockholm Convention on Persistent Organic Pollutants".After collecting data of EEEs, we separated the number of CRT televisions and monitors and determined PBDEs contents in them.

2.3.3.4. Production and Recycling

Mongolia has never produced PBDEs. No WEEE recycling is done in Mongolia, only dismantling parts to use in repair shops.

2.3.3.5. Detailed inventory

Detailed PBDEs inventory was made based on the data of EEE/WEEE collected per instruction on the *Guidance for PBDEs Inventory* and calculated content of POP-PBDEs in imported, in-use and out-of-use EEE/WEEEs. There's no WEEE management system in Mongolia and inventory of EEE/WEEE has never been conducted before. Inventory of POP-PBDEs was conducted using the *Guidance for PBDEs Inventory*, identifying stakeholders and preparing questionnaire for each stakeholders. Information and data collected through questionnaire from the following stakeholders:

-National Statistical Office,
- General Customs Authority,
- Importers and
- Consumers.

The questionnaire tried to collect information, including but not limited to general information on respondents, awareness of EEE/WEEE, number of EEEs and if they are in use or in stock/stored, turnover of goods, duration of storing, where they have been purchased or procured and whether EEEs were new or second-hand. All the districts in the Capital city and 21 provinces were involved in the inventory and for the sake of accuracy of data, classified households into urban and rural categories with sub-categories of central area or suburban (for urban households) and province centre, soum centre and *bag*-smallest administrative unit (for rural households). Institutional consumers were divided into public and private sectors and tried to involve both large and small businesses.

2.3.3.6. Import

Majority of EEEs in Mongolia is imported and locally assembled equipment comprise slight part. EEEs imported in 2000-2012 into Mongolia (data from the General Customs Authority) was classified in 4 categories and the total number and weight calculated.

Table 19: Imported EEEs /2000-2012/

№	EEE Categories	Weightkg*	2000		2001		2002		2003		2004		2005	
			Q,ty Pcs	Weight t	Q,ty Pcs	weight t	Q,ty Pcs	weight t	Q,ty Pcs	weightt	Q,ty Pcs	weightt	Q,ty Pcs	weightt
Large household appliances/Category 1/														
1	Fridge	35	8066	282.3	9227	323	13986	489.5	25892	906.2	39783	1392.4	29941	1047.9
2	Washing machine	65	5799	376.9	8262	537	13888	902.7	14354	933	23462	1525	23101	1501.6
3	Electric heater	5	1695	8.5	4633	23	6320	31.6	3906	19.5	2036	10.2	8878	44.4
Small household appliances /Category 2/														
4	Iron	1	146309	146.3	8655	8.7	18769	18.8	17129	17.1	29408	29.4	11712	11.7
5	Kettle	1	2287	2.3	4016	4	1921	1.9	882	0.9	14408	14.4	1466	1.5
6	Microwave oven	15	765	113.5	1270	19	1293	19.4	1940	29	1551	23.3	168	2.5
7	Hair dryer	1	4842	4.8	14136	14	12353	12.4	13506	13.5	18470	18.5	23142	23
8	Vacuum cleaner	8	12459	99.7	16648	133.2	14942	119.5	11073	88.6	25527	204.2	25970	207.8
9	Oven, rice cooker, fryer	-	8223		18501		26675		18918		34696		34789	
10	Water purifier		31051		110785		150970		177288		211286		191688	
11	Cable wires		1115		2153		6420		1933		397		8129	
12	Solder		2361		2069		873		3483		2474		14278	
13	Electric haymower, scythe		53		46		47		478		242		148	
IT and telecommunications equipment /Category 3 /														
14	Desktop computer	9.9	25742	254.8	43892	434.5	60589	600	64631	640	75715	750	114008	1128.7
15	Mobile phone	0.1	193881	19.4	62914	6.3	174511	17.4	102231	10.2	36982	3.7	34269	3.4
16	Copier, printer, fax machine	6.5	1402	9.1	778	5.1	957	6.2	276	1.8	17181	111.7	1463	9.5
Consumer equipment /Category 4/														
17	Television, monitor	4.7-14.1	25519	239.8	22516	211.6	34250	322	36729	345.3	49846	468.5	41397	389
18	DVD& cassette player	5	2147	10.7	2892	14.5	3684	18.4	2749	13.7	2739	13.7	2692	13.5
19	Camera	-			4169		4522		1808		2187		2028	

Source: Inventory of PBDEs listed in the Stockholm Convention

Table 19 (cont.): Imported EEEs /2000-2012/

№	EEE Categories	Weight	2006		2007		2008		2009		2010		2011		2012	
			Q,ty Pcs	weightt	Q,ty Pcs	weightt	Q,ty Pcs	weightt	Q,ty Pcs	weightt	Q,ty Pcs	weightt	Q,ty Pcs	weightt	Q,ty Pcs	weightt
Large household appliances/Category 1/																
1	Fridge	35	29192	1021.7	54975	1924	75592	2645.7	41363	1447.7	68147	2385	102935	3602.7	93884	3286
2	Washing machine	65	31493	2047	41507	2697.9	58250	3786.2	37171	2416	51029	3316.8	69411	4511.7	56954	3702
3	Electric heater	1	3841		10461		17475		8375		12561		24821		31513	
Small household appliances /Category 2/																
4	Iron	1	20499	20.5	23853	23.8	31479	31.5	13602	136.6	29658	29.6	41677	41.7	42842	42.8
5	Kettle	1	2172	2.2	3793	3.8	4212	4.2	3086	3.1	2396	2.4	4357	4.4	5461	5.5
6	Microwave oven	15	281	4.2	501	7.5	8880	133.2	6356	95.3	14525	217.9	20527	307.9	22571	338.5
7	Hair dryer	1	24067		24487		26311		22632		33788		44360		46326	
8	Vacuum cleaner	8	21860	174.8	24905	199.2	28449	227.4	19900	159.2	34294	274.3	57384	459	59818	478.5
9	Oven, rice cooker, fryer	-	40448		58865		95311		59999		81694		102579		106950	
10	Water purifier	-	215401		263016		398262		262406		482922		662914		775227	
11	Cable wires	-	3383		305949		356617		237630		1263819		2140459		3050825	
12	Solder	-	8465		15398		6793		9879		9799		32187		42826	
13	Electric haymower, scythe	-	447		304		1180		711		705		1215		5038	
IT and telecommunications equipment /Category 3 /																
14	Desktop computer	9.9	224695	2224.5	89652	887.5	105714	1046.6	57094	565.2	102355	1013.3	131628	1303	751480	7439.6
15	Mobile phone	0.1	37627	3.8	151224	15.1	357680	36.7	231263	23.1	243327	34.1	403401	40.3	611659	61.2
16	Copier, printer, fax machine	6.5	1120	7.3	48329	314.1	98255	638.7	62998	409.3	76255	495.7	121086	787.1	106665	693.3
Consumer equipment /Category 4/																
17	Television, monitor	4.7-14.1	224695	2112	89652	842.7	105714	993.7	57094	536.7	102355	962	131628	1237.3	751480	7064
18	DVD& cassette player	5	37627	188.1	151224	456.1	357680	1788.4	231263	1156.3	243327	1216.6	403401	2017	611659	3058.2
19	Camera	-	1120		48329		98255		62998		76255		121086		106665	

**EEE Category: Large household appliances/Category–1/; Small household appliances /Category–2/; IT and Telecommunications equipment /Category–3/; Consumer equipment /Category–4/*

Source: Inventory of PBDEs listed in the Stockholm Convention

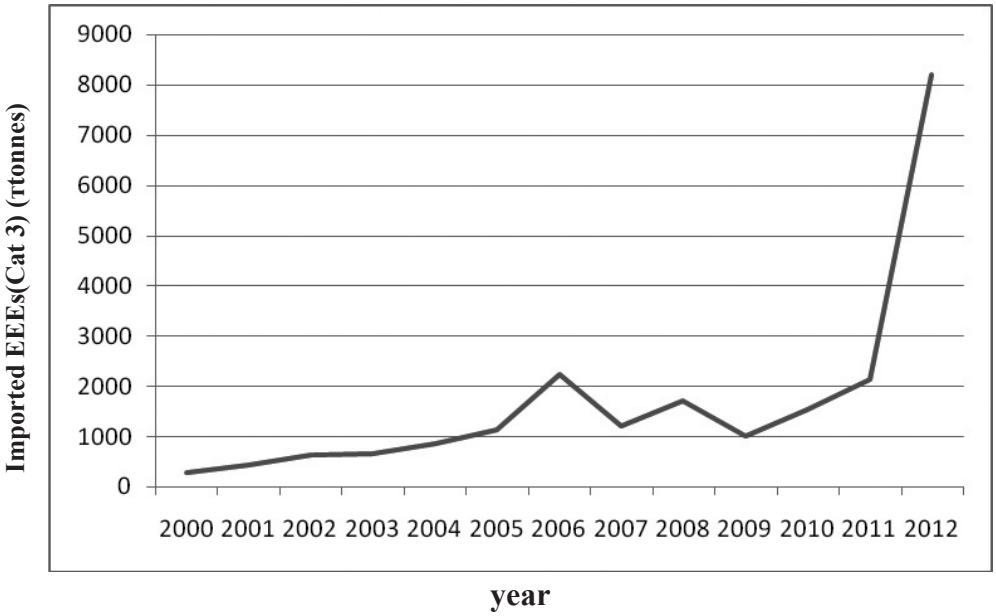


Figure 4. Import of IT & Telecommunications Equipment, by year (Category 3)

As shown in Figure 4, import of IT & telecommunications equipment had been stable until 2005, but from 2006 to 2011 the import has been increasing together with the economic stability. Import escalated sharply in 2012 due to the growth in economy. In 2012 alone, the most of the 8,194 tonnes of equipment was imported into Mongolia.

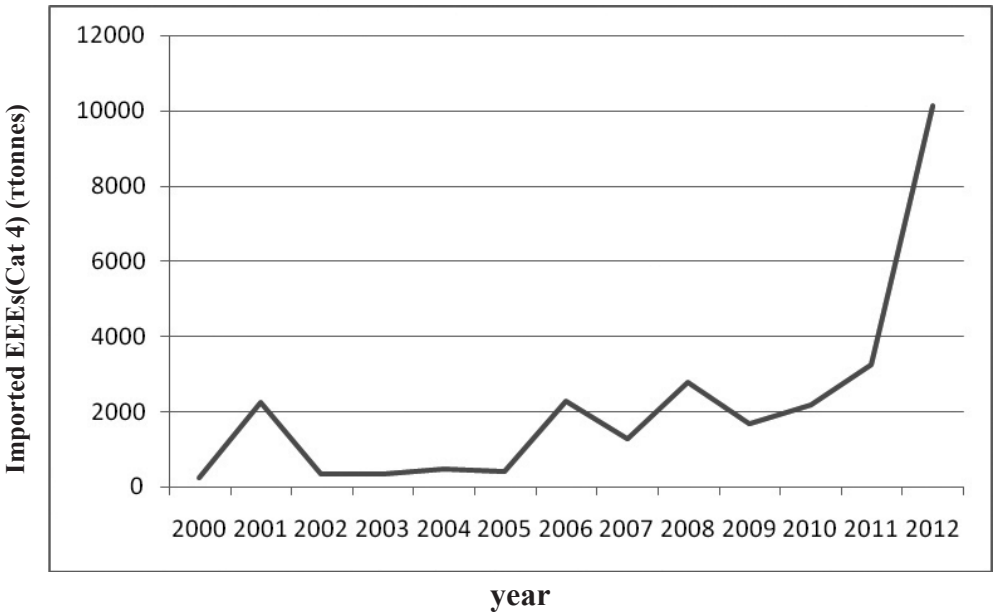


Figure 5. Import of IT & Telecommunications Equipment, by year (Category 4)

Same picture can be seen in Figure 5 as in Category 3 equipment import, 2012 being the peak period for import of consumer equipment which totaled 10,122 tonnes.

In the customs clearance process for import EEEs, the products are not classified as new, second-hand, CRT or LCD, LED etc. and all products are cleared under the same harmonized system codes, thus made it difficult to make in-depth inventory. So, televisions and desktop computers imported before 2007 (when LCD was put on sale first) was considered to contain c-OctaBDE, 50% of imports in 2007 was considered to be second-hand and contain c-OctaBDE

and another 50% considered to be new and does not contain c-OctaBDE, and the subsequent years was estimated with 10% reduction each year.

Mongolia imported Category 3 and 4 EEEs with total weight of 47,741.1 tonnes in 2000-2012, including 15,724.6 tonnes of televisions (1,672,875 units) and 18,287.7 tonnes of desktop computer (1,847,195 units). Of the total imported EEEs, 3,834.5 tonnes was CRT, which contained 7.04 tonnes of c-OctaBDEs, as calculated. Non-CRT weighted 1,014.8 tonnes, which contained 0.192 tonne c-OctaBDEs.

Table 20: Imported EEEs in 2000-2012 that contain c-OctaBDE (Category 3 and 4) weight, tonnes

Total weight (tonnes) of imported EEEs	Polymer fraction, t		c-OctaBDE content, kg	
	CRT	Non-CRT	CRT	Non-CRT
47,741.10	3,834.50	1014.8	7,042.10	192.2
	4,849.30		7,234.25	

Source: Inventory of PBDEs listed in the Stockholm Convention

2.3.3.6. Use

For the inventory purpose, consumers were divided into 3 groups as following and information and data were collected through questionnaire:

- Households,
- Institutional consumers,
- Corporate consumers

a) Households

The total population of Mongolia was 2,760,600 (Statistical Yearbook. 2012) and 65.9% lives in urban areas and 34.1% in rural area. The number of households was 768,300 and through Questionnaire survey, we collected data from 18,422 (2.4%) households. Used data from 2,340 households including, 1,996 households of 7 soums in Hentii province, 21 households of Orhon soum in Darhan-Uul province, 122 households of 3 soums in Tov province, 201 households of 6 districts in Ulaanbaatar city in the inventory and calculated average number of EEEs per household basing on this data.

Table 21: Number and Weight of Category 1 and 2 EEEs in Households /2,340 households/

In-use	Large household appliances /Category 1/				Small household appliances /Category 2/			
	Fridge	Air-conditioner	Washing machine	Electric heater	Iron	Vacuum cleaner	Rice cooker	Fan
quantity	3033	176	1995	461	2091	1392	1759	985
weight, tonne	106	-	129.7	2.3	2.1	11	-	-
Number per household, pcs	1.3	0.1	0.9	0.2	0.9	0.6	0.8	0.4

Source: Inventory of PBDEs listed in the Stockholm Convention

Table 21 (cont.): Number and Weight of Category 3 EEEs in Households /2,340 households/

In-Use	IT & Telecommunications Equipment /Category 3/							
	Computer	CRT	LCD	Laptop computer	Mobile phone	Telephone	Printer	Modem
quantity	832	291	520	332	12989	529	336	213
weight, tonne	8.2	4.1	2.4	1.2	1.3	0.5	2.2	
Number per household, pcs	0.36	0.12	0.22	0.14	5.55	0.23	0.14	0.09

Source: Inventory of PBDEs listed in the Stockholm Convention

Table 21 (cont.):.Number and Weight of Category 4 EEEs in Households /2,340 households/

In-Use	Consumer Equipment /Category 4/				
	CRT television	LCD television	Receiver	Projector	DVDplayer
quantity	919	1154	463	27	1118
weight, tonne	29	17.3	1	-	5.6
Number per household, pcs	0.39	0.49	0.20	0.01	0.48

Source: Inventory of PBDEs listed in the Stockholm Convention

Table 21 shows the number and weight of EEEs in 2,340 households, which uses 31,615 pieces or 310.8 tonnes of EEEs and 33.1 tonnes is CRT televisions and computer monitors. All EEEs being used in Mongolian households contain a total of 3,462 kg c-OctaBDE, including 990 kg in CRT screen and 2,471 kg in CRTtelevision.

b) Institutional and Corporate Consumers

As of 2012, 90,540 organizations and economic entities registered in Mongolia (Statistical Yearbook 2012). Dividing into regions, in the western region 5,711; Hangai region 7,711; central region 8,873; eastern region 2,658; and in Ulaanbaatar city 65,587 organizations and economic entities.

Centralization of organizations and businesses depend on population distribution and infrastructure and over 80% of businesses and orgnizations is located in the central region (including Ulaanbaatar city).

A total of 1,151,100 is economically active population, including 1,056,400 employed. Of the total employees, 162,769 are public servants (Statistical Yearbook 2012).

The data was collected from large users of Category 4 EEEs through questionnaire. A total of 1,287 establishments (organizations and businesses) or 1.4% of total establishments in the country responded to the questionnaire, from 21 provinces and Ulaanbaatar city, out of which 908 were public organizations and 379 were private businesses.

In relation to the massive use of CRT monitors and televisions in rural area than in Ulaanbaatar city, tried to involve as much as rural establishments in the inventory. Institutional consumers included government ministries and agencies, research institutes, higher educational institutes, secondary schools, kindergartens and hospitals etc., while the corporate consumers included banks, hotels, communication and service companies etc.

A total of 61,485 units of EEEs or 453.4 tonnes was used in 908 institutional consumers, involved in the inventory and if divided into Categories:

- 2,182 units or 60 tonnes of Category 1 EEEs (weight of air-conditioners not included);
- 798 units or 3.7 tonnes of Category 2 EEEs (weight of water purifiers not included);
- 54,121 units or 323.1 tonnes of Category 3 EEEs (weight of modem not included), including 4,343 units or 61.2 tonnes of CRT computers;
- 4,384 units or 66.6 tonnes of Category 4 EEEs (weight of projector not included), including 1,518 units or 48 tonnes of CRT televisions.

379 corporate consumers responded to the questionnaire. A total of 41,457 units or 154 tonnes of EEEs registered and divided by Categories as following:

- 2,272 units or 32 tonnes of Category 1 EEEs (weight of air-conditioners not included);
- 592 units or 2.2 tonnes of Category 2 EEEs (weight of water purifiers not included);
- 38,349 units or 91.4 tonnes of Category 3 EEEs (weight of modem not included), including 690 units or 9.7 tonnes of CRT screens;
- 1,798 units or 28.4 tonnes of Category 4 EEEs (weight of projector not included), including 525 units, 16.6 tonnes of CRT televisions.

Based on the data of institutional and corporate consumers, involved in the inventory, by calculated the number of EEEs per employee and then multiplying by the number of employees, the national data was calculated. EEEs being used nationwide is as following: institutional consumers – 19,851 pcs or 279.9 tonnes and corporate consumers – 28,433 pcs or 400.9 tonnes CRT computers (Table 22); institutional consumers – 6,938 pcs or 219.3 tonnes and corporate consumers – 21,634 pcs or 683.6 tonnes CRT televisions. These EEEs contain 4,216.3kg c-OctaBDEs, including 1,509.4 kg in CRT computer monitors and 2,706.9 kg in CRT televisions (Table 23).

Table 22: Weight and Number of Category 3 & 4 EEEs by Institutional and Corporate Consumers

EEE	Institutional Consumer				Corporate Consumer			
	Number per employee, pcs	Total number of public servants in the country	EEE number	EEE weight, t	Number per employee, pcs	Total number of employees in private sector	EEE number	EEE weight, t
Desktop computer	0.40	162,769	65,560.1	649.0	0.20	893,631	179,088.83	1,772.98
Laptop computer	0.19		31,566.5	110.5	0.20		174,638.39	611.23
CRT monitor	0.12		19,851.3	279.9	0.03		28,433.34	400.91
LCD monitor	0.23		37,051.5	174.1	0.17		151,562.06	712.34
Printer	0.23		37,408.1	243.2	0.13		115,546.50	751.05
CRT television	0.04		6,938.6	219.3	0.02		21,634.06	683.64
LCD television	0.03		4,506.9	67.6	0.03		29,669.57	445.04
Total			**202,883.0**	**1,743.6**			**700,572.75**	**5,377.20**

Source: Inventory of PBDEs listed in the Stockholm Convention

Table 23: Amount of POP-PBDE and the Number of CRT Equipment in Mongolia

CR Tequipment	Household			Institutional Consumers			Corporate Consumers			Nationwide		
	Number, pcs	Weight, t	Amount of c-Octa BDE (kg)	Num-ber, pcs	Weight, t	Amount of c-Octa BDE (kg)	Number, pcs	Amount of c-Octa BDE (kg)	Num-ber, pcs	Number, pcs	Weight, t	Amount of c-Octa BDE (kg)
CRT monitor	92,196.0	1,300.0	990.6	19,851.3	279.9	213.3	28,433.3	400.9	305.5	**140,480.6**	**1,980.8**	**1,509.4**
CRT television	299,637.0	9,468.5	2,471.3	6,938.6	219.3	57.2	21,634.1	683.6	178.4	**328,209.7**	**10,371.5**	**2,706.9**
Total	**391,833.0**	**10,768.5**	**3,461.9**	**26,789.9**	**499.2**	**270.5**	**50,067.4**	**1,084.6**	**483.9**	**468,690.3**	**12,352.2**	**4,216.3**

Source: Inventory of PBDEs listed in the Stockholm Convention

c) EEE Waste

The total amount of calculated waste from CRT computer monitors is 276.9 tonnes and from CRT televisions is 1,154.3 tonnes, as calculated by the Inventory Guidance. The estimated content of c-OctaBDE in waste CRT computer monitors was 211 kg and in CRT televisions 301.3 kg, a total of 12,352.3 tonnes of waste is produced, which contain 512.3 kg c-OctaBDE.

Table 24: Amount of Waste from CRT Computer, (as of 2013)

	Household	Institutional Consumers	Corporate Consumers	Nationwide total
CRT computer monitor in use and stored, tonne	1,300.0	279.9	400.9	1,980.8
Average lifespan of CRT monitor, year	10.0	6.0	4.0	
CRT computer monitor entering the waste stream, tonne	**130.0**	**46.7**	**100.2**	**276.9**

Source: Inventory of PBDEs listed in the Stockholm Convention

Table 25: Amount of Waste from CRT Television, (as of 2013)

	Household	Institutional Consumers	Corporate Consumers	Nationwide total
CRT television in use and stored, tonne	9,468.5	219.3	683.6	10,371.5
Average lifespan of CRT television, year	10.0	6.0	4.0	
CRT television entering the waste stream, tonne	**946.9**	**36.6**	**170.9**	**1,154.3**

Source: Inventory of PBDEs listed in the Stockholm Convention

Table 26: Amount of c-OctaBDE in Waste

EEE Category		Waste generation, tonne (a)	Fraction of polymer (%) (b)	Content of c-OctaBDE in the polymer fraction, kg/t (c)	Content of c-OctaBDE in waste (kg) a x b x c
3	CRTmonitor	276.9	30%	2.54	**211.0**
4	CRTtelevision	1,154.3	30%	0.87	**301.3**
	TOTAL				**512.3**

Source: Inventory of PBDEs listed in the Stockholm Convention

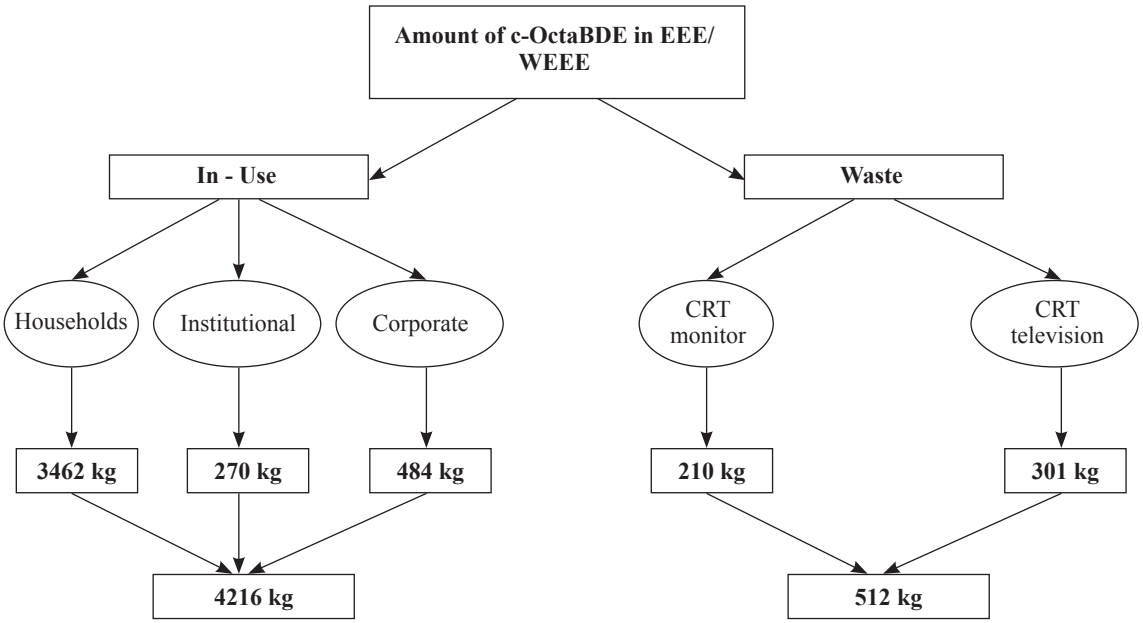


Figure 6. Amount of c-OctaBDE in EEE/WEEE

d) WEEE Recycling

In Mongolia, there are no operations of WEEE collection, separation and recycling and no import is made for recycling purposes, too.

Calculating the Amount of POP-PBDE from c-OctaBDE

Amount of POP-PBDEs was calculated from the amount of c-OctaBDE, which was calculated with *Table 2.2 in the Guidance* in the inventory (Table 27).

Table 27: Amount of POP-PBDEs* in EEE and WEEE, kg

Homologue	Homologue distibution in c-OctaBDE	POP-PBDE in imported EEEs	POP-PBDE in in-use and stockpiled EEEs	POP-PBDE in WEEE	Total
c-OctaBDE inventoried		7,234.3	4,216.3	512.3	11,962.9
HexaBDE	**11%**	**795.8**	**463.8**	**56.4**	**1,316**
HeptaBDE	**43%**	**3,110.7**	**1,813.0**	**220.3**	**5,144**

*OctaBDE, nonaBDE and decaBDE are not listed as POPs and therefore do not need to be included in the inventory.
Source: Inventory of PBDEs listed in the Stockholm Convention

2.3.3.7. Inventory of PBDEs in Transport Sector

C-PentaBDE in PUR foam fraction used in transport (automotive seating, head rests, car ceilings and acoustic management systems, back-coating of textiles used on car seats, steering wheels, dashboards and door panels) has been applied to 0.5-1% by weight. Only transport means produced in 1975-2005 contain c-PentaBDE and it's estimated that about 37% of the approximately 100,000 tonnes c-PentaBDE production (approximately 37,000 tonnes) had been used only in the transport sector.

Except c-PentaBDE, other flame retardants such as phosphorous flame retardants had been used. Depending on the national/regional production patterns, suggested the potential a regional adjustment factor for c-PentaBDE impact, and a factor of 0.05 (5% of cars produced in the region between 1975 and 2004 are estimated to be impacted by POP-PBDE) is suggested for Europe and Asia, where 0.5 for America.

Content of c-PentaBDE in vehicles are different and considered as following:

- Cars: approximately 16 kg of PUR foam contain approximately 160 g c-PentaBDE. Therefore, 160 g per car.
- Trucks: estimated to be similar as for cars – 160 g c-PentaBDE per impacted truck.
- Buses: an average PUR foam use is estimated at approximately 100 kg and estimated to contain 1 kg c-PentaBDE. For the countries that use mini-buses, the content shall be reduced.

Collected data for the inventory from the Road and Transportation Control and Registration Department of the Road and Transportation Authority and the General Customs Authority and used instructions in the *Inventory of POP-PBDEs in the Transport Sector*.

2.3.3.8. Amount of POP-PBDEs of In-Use Vehicles

According to the data from the Road and Transportation Control and Registration Department of the Road and Transportation Authority, a total of 519,025 vehicles which were manufactured from 1975 to 2013 in 23 different countries were registered. Of which 369,297 passenger cars, 4,870 buses, 122,667 trucks and 22,191 special purpose vehicles. 71.1% of vehicles is passenger cars, 23.6% is trucks, 4.3% is special purpose vehicles and 0.9% is buses.

There are 444,184 cars and other vehicles in current use in Mongolia is registered as of 2013, which manufactured in 1975 to 2004, including 321,549 passenger cars, 3,574 buses, 108,350 trucks and 10,711special purpose vehicles.

By the year of manufacture, major part of the vehicles manufactured from 1975 to 2004 was made in 1994-2003 and a few percent was manufactured in 1975-1990 (Figure 7) .

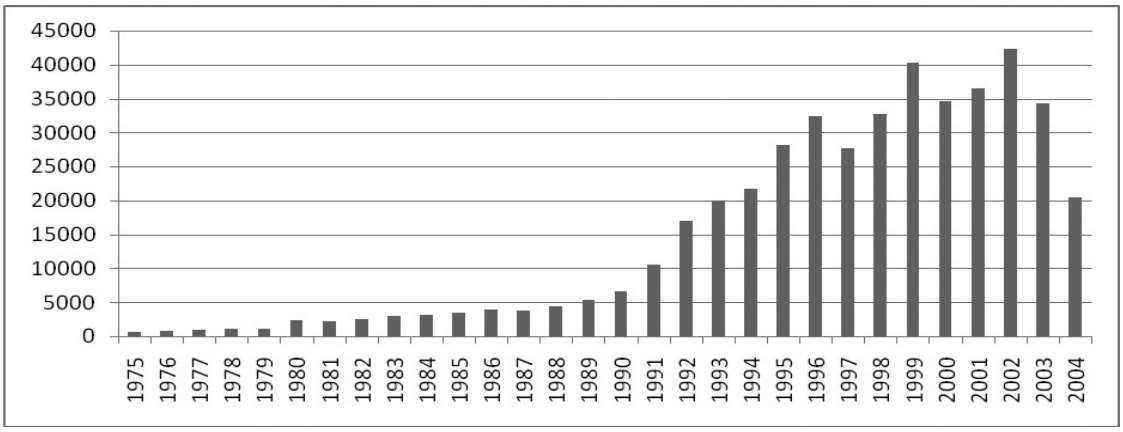


Figure 7. Number of Vehicles Manufactured in 1975-2004, by year

By regions of manufacture of the vehicles in-use, produced in 1975-2004, 80.9% were manufactured in Asia, 18.4% in Europe and 0.7% in America.

Vehicles produced between 1975 and 2005 have been treated with POP-PBDEs and therefore, content of c-PentaBDE was calculated based on classifications and regions. The total amount of c-PentaBDE was 58.1 tonnes in 321,549 passenger cars, 119,061 trucks and 3,574 buses (Table 30).

2.3.3.9. Amount of POP-PBDEs in Imported Vehicles

The data taken from the Customs Authority on vehicles imported in 1975 to 2012 was used. The vehicles were classified as new and used for inventory purpose. The vehicles produced from 2010 to 2012 were considered as new and those produced before 2010 as used.

New vehicles produced in 2010-2012:

- Imported 8,593 vehicles produced in 2010, including 3,719 passenger cars, 503 buses and 4,731 trucks:
- Imported 10,887 vehicles produced in 2011, including 5,054 passenger cars, 698 buses and 5,135 trucks:
- Imported 5,019 vehicles produced in 2012, including 2,548 passenger cars, 553 buses and 1,918trucks:

81% of new imported vehicles are produced in Asia, 16% in Europe and 3% in USA/North America and most imports are from China, Japan and Korea. By year of manufacture, the most vehicles have been produced in 2011 with 10,887 units (Figure 8).

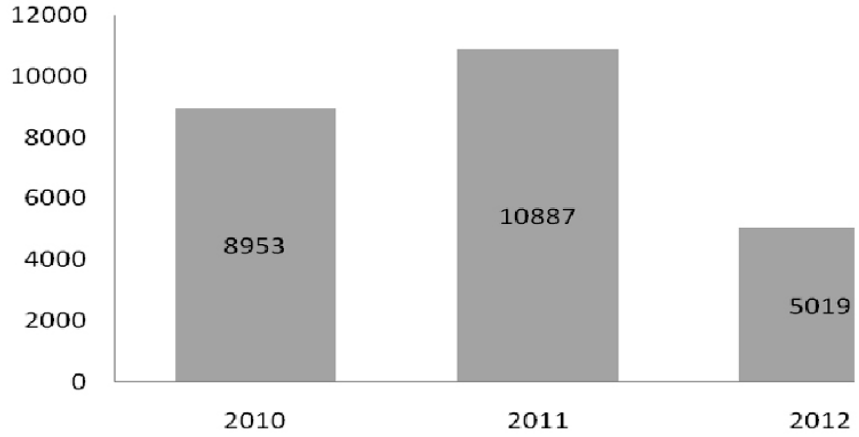


Figure 8. New Import Vehicles

Used Vehicles Produced in 1970-2009:

According to the import data taken from the Customs Authority, a total of 167,639 used vehicles produced in 1970-2009 have been imported, including 117,023 passenger cars, 4,981 buses and 45,635 trucks (Figure 10). Majority of the vehicles had been produced in 2001-2004 (Figure 9).

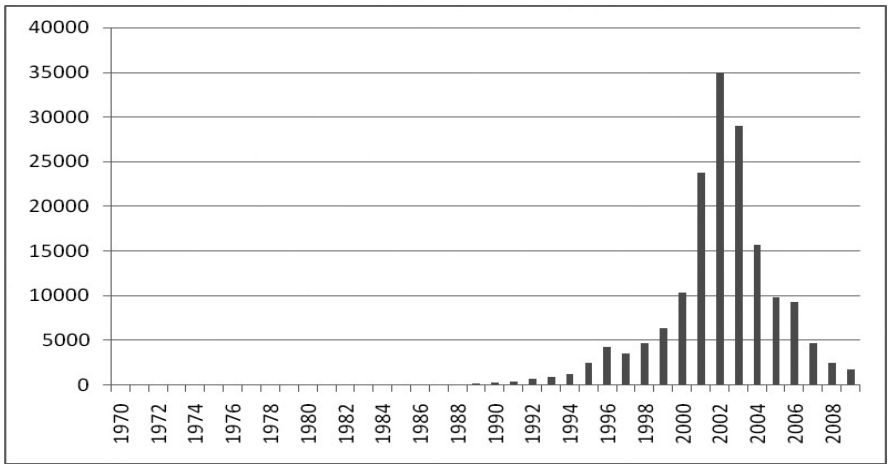


Figure 9. Number of Used Vehicles Imported (by year of manufacture)

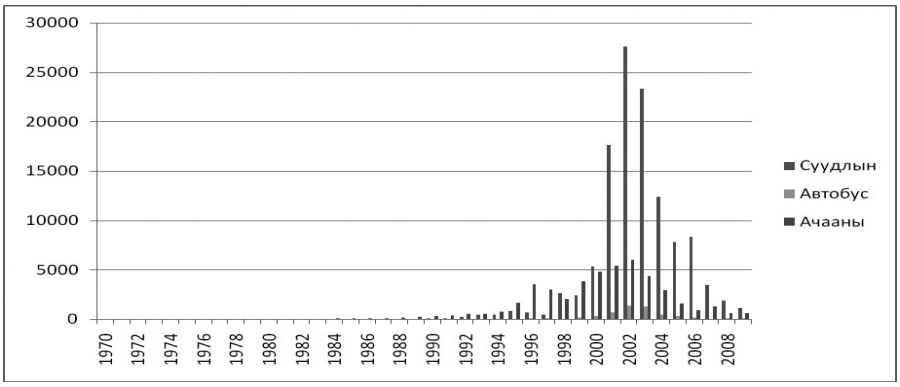


Figure 10. Used Imported Vehicles (by category and year)

As vehicles produced in 1975-2004 can contain c-PentaBDE, the number of vehicles produced these years and regions of production are given below (Table 28).

Table 28: Imported Vehicles (by regions of production)

Region	Asia		Europe		USA	
	1975-2004	2005-2009	1975-2004	2005-2009	1975-2004	2005-2009
Passenger	92018	20757	1949	1088	594	609
Bus	4419	518	20	17	7	-
Truck	39894	4818	616	126	75	92
Total	**1363351**	**26093**	**2585**	**1231**	**676**	**701**

Source: Inventory of PBDEs listed in the Stockholm Convention

Classifying all imported vehicles (192,498 vehicles) as new and used, 12.9% was new and 87.1% was used. By categories, 8.8% of passenger cars was new and 91.1% was used, 26% of buses was new and 74% was used, 20.5% of trucks was new and 79.5% was used.

Table 29: Consolidated Table of New and Used Imported Vehicles

Category	Quantity		Ratio – new and used, %
Passenger cars	New	11321	8.8
	Used	117023	91.2
Buses	New	1754	26.0
	Used	4981	74.0
Trucks	New	11784	20.5
	Used	45635	79.5
Total	New	24859	12.9
	Used	167639	87. 1
TOTAL		**192,498**	

Source: Inventory of PBDEs listed in the Stockholm Convention

The amount of c-PentaBDE in used imported vehicles by categories and regions was calculated, and the passenger cars and trucks, produced in 1975-2004, was estimated to contain 94.9 tonnes and buses contained 0.23 tonne, totaling 94.8 tonnes of c-PentaBDE (Table 30).

2.3.3.10. Amount of POP-PBDEs in End-Of-Use Vehicles

According to the data from the Road and Transportation Authority, in 2010-2012 a total of 1,171 vehicles had been deregistered, including 389 passemger cars, 132 buses and 650 trucks.

By the year of deregistration:

- In 2010: 36 passenger cars, 6 buses and 57 trucks;
- In 2011: 115 passenger cars, 46 buses and 219 trucks;
- In 2012: 238 passenger cars, 80 buses and 374 trucks.

The c-PentaBDE amount in the end-of-use vehicles deregistered in 2010-2012 was calculated. A total of 15.5 kg POP-PBDE was disposed together with the 1,171 vehicles (Table 30).

Table 30: Amount of c-PentaBDE in Vehicles, kg

	In current use			Imported			End-of-Use		
	Passenger	Truck	bus	Passenger	Truck	bus	Passenger	Truck	bus
Quantity	321549	119061	3574	94561	40585	4445	389	650	132
Total	444184			139591			1171		
Amount of c-PentaBDE, kg	57945.3		184.4	94891.1		225.5	8.9		6.6
	58129.7			95116.6			15.5		
Total	153,261.8								

Source: Inventory of PBDEs listed in the Stockholm Convention

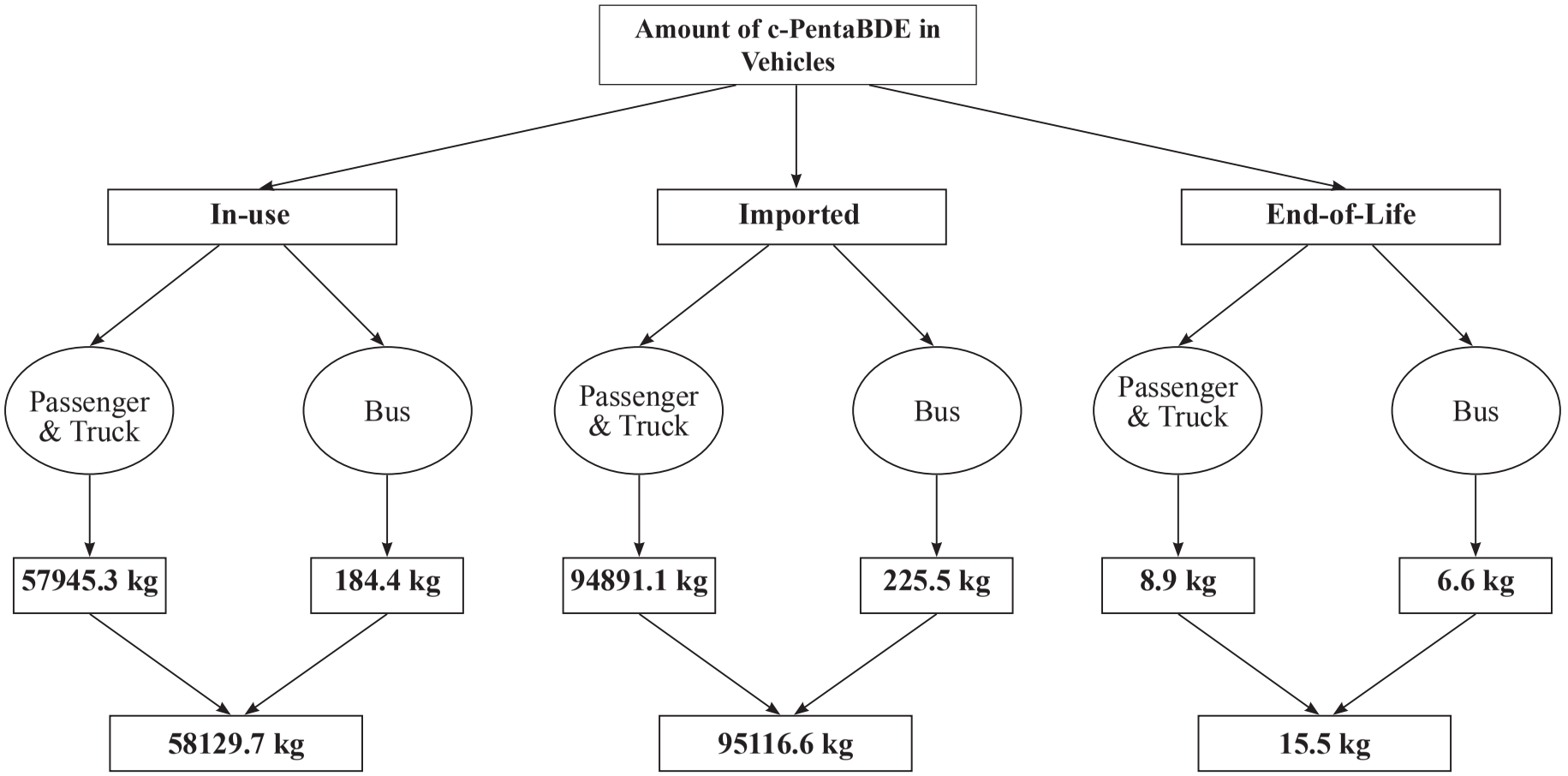


Figure 11. Amount of c-PentaBDE in Vehicles

Table 31 below shows the amount of POP-PBDEs distributed by different congeners.

Table 31: Amount of POP-PBDEs in Vehicles, kg

	Distribution homolues c-PentaBDE	POP-PBDEs, kg			
		In current use	Imported	End-of-Life	Disposal Sites
Inventoried c-POP-PBDE		58129.7	95116.6	15.5	-
TetraBDE	33%	19182.8	31388.5	5.1	-
PentaBDE	58%	33715.2	55167.6	9.0	-
HexaBDE	8%	4650.4	7609.3	1.24	-
HeptaBDE	0.5%	290.6	475.6	0.08	-

Source: Inventory of PBDEs listed in the Stockholm Convention

2.3.3.11. Amount of POP-PBDEs in Disposed Wastes from Vehicles

There is no sites to dump and collect end-of-life vehicles in Mongolia. Parts of end-of-life vehicles, which can not be recycled and re-used, are dumped at household waste sites and landfills.

2.3.3.12. Amount of POP-PBDEs from End-of-Life Vehicles Recycling

No facilities for recycling end-of-life vehicles operate in Mongolia. End-of-life vehicles are usually dismantled and some parts e.g. metal parts are sold to scrap metal collectors. Some parts that can not be re-used such as plastics and foams are disposed together with household wastes.

2.3.3.13. Inventory of POP-PBDEs in Other Uses

a) Furnitures and Mattresses

Mongolia does not produce PUR foam for furnitures, only imports materials and ready-made products to use it in furniture and mattress production. Furnitures and mattresses are mainly imported from China, Russia, EU, Korea, Malaysia and Hong Kong. Waste materials from furnitures and mattresses such as PUR foam and mattresses are disposed together with household wastes.

b) Textile Production

Mongolia produce knitted products, clothes and carpets from sheep and camel wool and cashmere. These products do not contain synthetics and usually made from natural materials and do not apply flame retardants. Information to this regard was taken from producers through official letters.

c) Construction Materials

Insulation materials (foam) for construction are imported and there are also some productions using imported raw materials. No information received so far if these productions use PBDEs or Hexabromocyclododecane (HBCD).

2.3.4. Assessment with respect to DDT (Annex B, Part II chemicals)

Archive materials and information from ex vets and plants protection researcher, working since 1950s, showed that Mongolia has never used DDT. Analyses results of samples from old pesticide storages and sites proved it, too. The samples were sent to the National Institute of Agriculture for analysis, in which no DDT was revealed, but only hexachlorocyclohexane α-,

β-, δ-, γ-isomers (α-HCB, β- HCB, δ- HCB, γ- HCB-lindane).

2.3.5. Assessment of PFOS, its salts and PFOSF POPs (Annex B, Part III chemicals)

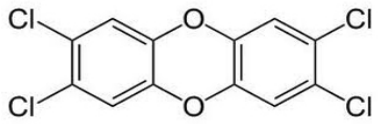
These substances might be used in fire-extinguishers and carpet and hide/skin productions. No information recorded and received in the registration of chemicals used in carpet and hide/skin industries and from the entrepreneurs.

The Emergency Authority registers fire-extinguishers used in Mongolia and looking through the registration, it was found out that 2 types of fire-extinguishers, used in the Mongolian airline MIAT, contained PFOS (0.3% AFFF and 6% synthetic foam). It was impossible to identify whether PFOS is contained or not from the documents accompanying fire-extinguishers imported from China and Russia. Therefore, samples had been sent to the laboratory of the Tsinghua University in China (Stockholm Convention regional center). It was revealed by HPLC-MS/MS analysis that no PFOS was present in the measured fire fighting foams.

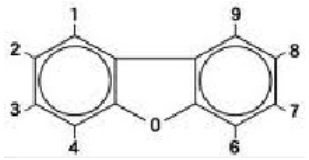
2.3..6. Assessment of releases of unintentional produced chemicals (Annex C chemicals)

2.3.6.1. General

Dioxins (polychlorinated dibenzo-*p*-dioxins (PCDD)) and furans (polychlorinated dibenzofurans (PCDF)) are tricyclic, aromatic compounds formed by two benzene rings connected by two oxygen atoms in PCDD's and by one oxygen atom and one carbon-carbon bond in PCDF's.There are 75 PCDD congeners and 135 PCDF congeners.



Dioxins



Furans

Dioxins and furans are Persistent Organic Pollutants (POPs) and are unintentionally formed and released from thermal processes involving organic matter and chlorine as a result of incomplete combustion or chemical reactions. These chemicals are very stable and resistant to chemical and biological breakdown. They are persistent in the environment and can be detected long after releases have ceased. Dioxins and furans have potential for long-range environmental transport through air, water or migratory species, and are known to bio accumulative in the fatty tissues of exposed animals and humans.

Dioxins and furans are likely to be a cancer causing substance to humans. In addition, people exposed to dioxins and furans have experienced changes in hormone levels. High doses of dioxin have caused a skin disease called chloracne. Animal studies show that animals exposed to dioxins and furans experienced changes in their hormone systems, changes in the development of the fetus, decreased ability to reproduce and suppressed immune system. According to WHO study, the most well-known member and the most toxic of the dioxins/ furans family is 2,3,7,8 TCDD.

Pollution (dioxins and furans) released from coal fired power plants, boilers, cement kiln, lime and brick plants, metallurgical industry, hide and skin processing plants, sewage treatment plants, automobiles and uncontrolled burning (open burning of wastes, fires etc), and waste incinerators reaches food chain through air, water and soil. Human can be exposed to dioxins and furans by eating contaminated food, especially those originated from livestocks and animals. Cases of direct exposure through air and soil is relatively low, however, once they reached to food chain, through air to soil, soil to plants, plants to animals etc. will cause

exposure to the contamination. Therefore, identification of dioxin/furans releases and reduction of the release has vital importance.

2.3.6.2. PCDD/Fs Releases

Inventory of potential formation and release of polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran, listed in Annex C of the Stockholm Convention on Persistent Organic Pollutants was conducted in 2005 and 2013, using emission factors provided in the "Toolkit for Identification and Quantification of Releases of Dioxins, Furans and Other classified sources" into 10 groups and estimated potential releases in each groups and categories, as well as in each routes, including air, water, land, products and residue. Table 32 shows the overview of potential PCDD/PCDF releases per year in Mongolia in gTEQ and in percentages.

Table 32: PCDD/PCDF Releases in Groups, a year

Group	Source Groups	Annual Release, gTEQ/year					Annual Release, %					Total releases, %
		Air	Water	Land	Product	Residue	Air	Water	Land	Product	Residue	
1	Waste Incineration	41.1	0.0	0.0	0.0	0.2	29.56	0.00	0.00	0.00	0.15	**29.71**
2	Ferrous & Non-Ferrous Metal Production	2.2	0.0	0.0	0.0	1.9	1.56	0.00	0.00	0.00	1.35	**2.91**
3	Heat and Power Generation	7.8	0.0	0.0	0.0	3.6	5.64	0.00	0.00	0.00	2.56	**8.21**
4	Production of Mineral Products	2.7	0.0	0.0	0.0	0.0	1.93	0.00	0.00	0.00	0.00	**1.93**
5	Transportation	0.2	0.0	0.0	0.0	0.0	0.16	0.00	0.00	0.00	0.00	**0.16**
6	Open Burning Processes	56.7	0.0	2.6	0.0	0.0	40.76	0.00	1.85	0.00	0.00	**42.61**
7	Production of Chemicals and Consumer Goods	0.0	0.0	0.0	10.7	0.0	0.00	0.00	0.00	7.66	0.00	**7.66**
8	Miscellaneous	0.1	0.0	0.0	0.0	0.3	0.05	0.00	0.00	0.00	0.20	**0.25**
9	Disposal	0.0	1.3	0.0	0.0	7.9	0.00	0.91	0.00	0.00	5.65	**6.56**
10	Hot-Spots				0.0		0.00	0.00	0.00	0.00	0.00	**0.00**
1-10	**TOTAL**	**110.8**	**1.3**	**2.6**	**10.7**	**13.8**	**79.7**	**0.9**	**1.8**	**7.7**	**9.9**	
GRAND TOTAL		**139**					**100**					

Source: Dioxin and Furan Inventory report

As seen from the Table 32, potential annual releases in Mongolia is 139 gTEQ, which was calculated using inventory data made in 2012. Of the total releases, 42.6% from open burning processes, 29.7% from medical waste incineration, 6.6% from waste disposal. In other words, 78.8% of the total releases is associated with waste management. Heat and power generation account for 8.2%, production of chemicals and consumer goods - 7.7%, ferrous and non-ferrous metal production and minerals production–about 2% each.

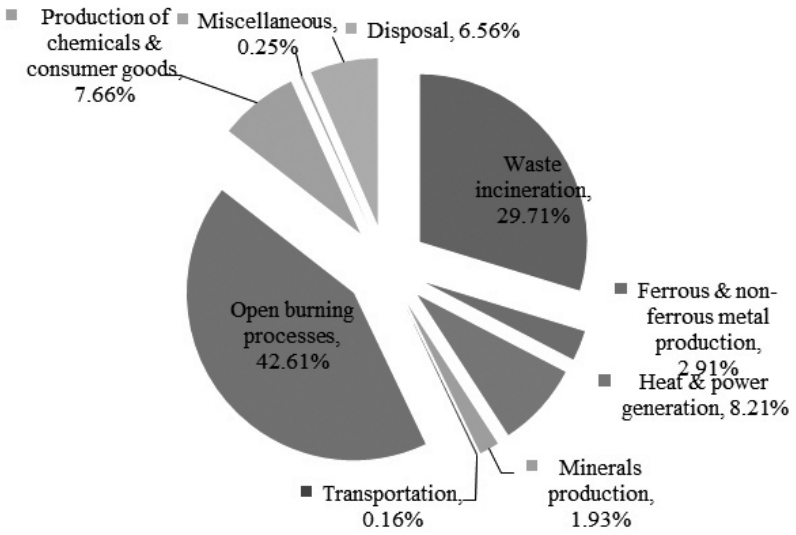


Figure 12. PCDD/F Releases from Sources

In respect of environmental matrices, 79.7% are releases to air, 2% to land, 1% to water, 9.9% in waste when about 7.7% is released in products.

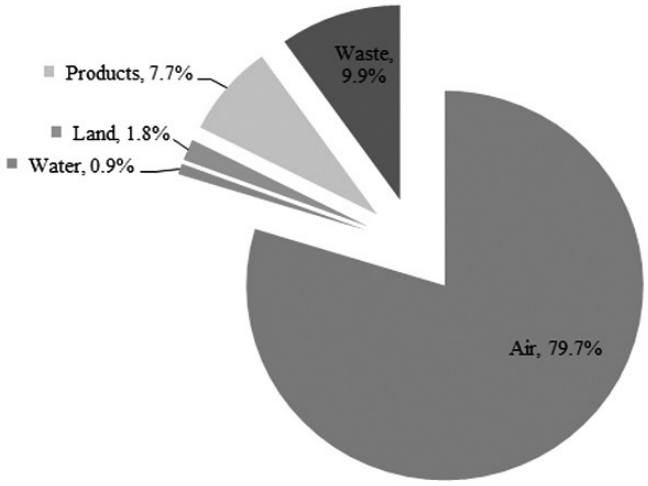


Figure 13. PCDD/F Releases to Environment

No estimation was made for Source Group 10, "Identification of Potential Hot-Spots", due to the uncertainty of data and information. Though big accidental fire cases (e.g. fire in food market) and effluents from hid/skin processors could have been estimated as hot-spots, information was not clear and their annual frequency was different.

a) Waste Incineration

Estimation of PCDD/PCDFs released from waste incineration in specifically designed incinerators is described in this section. In Mongolia, medical wastes are processed in specifically designed incinerators. There are no incinerators existing except for medical wastes, and designing of a household waste incineration facility is being discussed. Medical waste incinerators are used in most of provinces and are basically hand-made and simple in design. These incinerators are described as specifically designed; however, practically all of them have no APCS installed.

Approximately 1,061 tonnes of medical waste is incinerated annually in Mongolia, out of which 1,025 tonnes or 96.6% is incinerated in uncontrolled incinerators. Release rate is varying

in provinces and the highest volume of medical waste incineration is in Gobi-Altai province at 166 tonnes and the other provinces incinerate 30-45 tonnes of medical waste per year on the average. Also, release of PCDD/PCDFs from medical waste incineration is relatively higher in Ulaanbaatar city and Bayanhongor province. In Ulaanbaatar, 10-12% of medical wastes are incinerated and the remaining 88-90% is autoclaved for landfill.

29.7% (41.3 g TEQ) of the total releases in Mongolia is produced from medical waste incineration where 99.5% is released to air, which is considerably high indicator. Therefore, it is recommended to install sophisticated medical waste incinerators with APCS in hospitals and in applicable places.

Though, other types of wastes such as animal carcasses are produced every year, they are basically not processed through incineration method.

Table 33. PCDD/PCDF Release from Waste Incineration

Group	Production, t/a	Annual Release, gTEQ					
		Air	Water	Land	Products	Fly ash	Bottom ash
Uncontrolled batch combustion (no APCS)	1,025	41.000				0.000	0.205
Controlled, batch (no or minimal APCS)	36	0.107				0.000	0.001
Waste Incineration		**41.107**	**0**	**0**	**0**	**0.000**	**0.206**

Source: Dioxin and Furan Inventory report.2012

b) Ferrous and Non-Ferrous Metal Production

In this group, Mongolia has two productions – coke production and foundries and iron roll production. The only plant that produces coke is ENK Co., LTD, which operates in Bayan-Ovoo soum, Umnugovi province, and since 2005 has been doing research for processing coal to produce metallurgical coke, flammable gas, coke tar and coked coal. The plant has a capacity of 1,200,000 tonnes/year gravity concentration of coal and 300,000 tonnes/year metallurgical coke production.

There is a number of scrap metal processing and iron cast and rolls manufacturers. The largest metallurgical industry operating is Darhan Metallurgical Plant with the capacity of 100,000 tonnes. Technological renovation is planned for upgrading the industry capacity up to 500,000 tonnes.

Iron ore sintering plant is also planned with capacity of 4.5 million tonnes a year in the Sainshand industry complex. Feasibility study is being done for copper melting and coke production.

For the time being, Mongolia produces about 300,000 tonnes of coke, 68,000 tonnes of iron cast and 57,000 tonnes of iron rolls. Release of PCDD/PCDF from this sector is 2.91% (4.1 g TEQ) of the total release and more than a half is releases to air and the remaining (46%) in residue.

Table 34: Ferrous and Non-Ferrous Metal Production

Group	Production, t/a	Annual Release, gTEQ				
		Air	Water	Land	Products	Residue
Coke production, no gas cleaning	305,000	0.915	$5.5*10^{-8}$	0	0	0
Iron and steel production (dirty scrap, scrap preheating, limited controls)	125,000	1	0	0	0	1.875
Ferrous and Non-Ferrous Metal Production		**2.165**	**0.000**	**0.000**	**0.000**	**1.875**

Source: Dioxin and Furan Inventory report.2012

c) Heat and Power Generation

One of the major sources that release PCDD/PCDFs is heat and power generators, as well as boilers. In addition, household stoves, which are abundant in number in Mongolia, are considered to be PCDD/PCDF emitters, too. These household stoves usually burn coal and firewood, thus, inventory of these stoves are important. Heat and power generators are classified bycapacity of up to and above 100kWt.

According to recent inventory, number of stoves up to 100 kWt capacity is 489,257 pieces nationwide, including 136,553 stoves in Ulaanbaatar city (67,103 in gers, 67,418 in small houses and 2,032 in businesses and organizations in off-grid areas from central power system) and 352,704 in provinces (of which 121,761 stoves in provincial centres). Heat and power generators with capacity of up to 100 kWt in Ulaanbaatar included stoves used in families (both live in traditional gers and small houses), in small shops and workshops like tire fixers, guard booths, shoe-repairs, indoor car parking etc.

Heat and power generators with capacity of above 100kWt include thermal power plants, heating boilers (steam and water heating), and technological and special purpose generators. A total of 3,134 heat and power generators were counted nationwide including 255 in Ulaanbaatar (100kWt to 1000kWt generators – 174 and above 1000kWt – 81). In provinces, 2,620 water heating boilers over 100 kWt capacity, 145 technological and special purpose generators and 114 heat and power generators with capacity of over 1000 kWt were identified.

Power and heat generators in Ulaanbaatar over 100 kWt capacity used 4,454,596 tonnes of coal, oil and diesel a year for the production of power, heating and steam.

Of the water heating boilers, 50% is operating up to 5 years, 34% up to 5-10 years, and the remaining is used over 10 years. Also, 32% of the water heating boilers installed additional pollutant abatement system and annual consumption of coal is 269,434 tonnes. Annual coal consumption of power plants in Ulaanbaatar is 4,184,842 tonnes, including 4,158,772 tonnes are crude coal, incinerated in state-owned companies, namely, Power Plant 2 (4%), Power Plant 3 (25.5 %), Power Plant 4 (69%), and only 26,070 tonnes were used in other boilers.

Except for coal, considerable volume of wood is used for water heating boilers and in households throughout Mongolia, which produces significant amount of PCDD/PCDFs. According to statistics, a total of 777,132.5 tonnes of wood and 930,273.9 tonnes of coal burned in households in 2012, emitting a total of 11.41 gTEQ PCDD/PCDFs. This accounts for 8.21% of total releases. In the estimation, was used the coal calorie at 22,000 Mcal/t and fire wood calories at 15,000 Mcal/t, as well as ash production at approximately 15%.

Table 35: Heat and Power Generation

Group	Production, t/a	Annual Release, gTEQ				
		Air	Water	Land	Products	Residue
Fossil fuel power plants	128,809	1.288	0	0	0	1.8
Household heating and cooking – Biomass	14,019	1.402	0	0	0	0.0
Domestic heating – Fossil fuels	51,592	5.159	0	0	0	1.8
Heat and Power Generation		**7.849**	**0**	**0**	**0**	**3.6**

Source: Dioxin and Furan Inventory report.2012

d) Production of Mineral Products

This section gives information on the inventory results of PCDD/PCDFs emissions from high temperature minerals production processes. There are probabilities of PCDD/PCDFs emissions from any stages of the processes of minerals production as the raw materials or fuel used may contain chlorine in some way. But, the technology requires high temperature for processing and the duration of fuel or raw materials stay in the kiln relatively longer. Therefore, emissions of PCDD/PCDFs from minerals production is considerably lower. In the minerals production sector, cement, lime, brick and asphalt mixing plants operate in Mongolia.

There are 3 cement plants in Mongolia for the time being. Data shows that "Erel Cement" plant has capacity to produce 150,000 tonnes, "Hutul Cement & Lime" to produce 300,000 tonnes and "Nalaih" cement plant to produce 100,000 tonnes a year, making up in total 550,000 tonnes of cement. Over 1 million tonnes have to be imported from China.

Production extensions and new projects are being planned with dry kiln technology in the near future, including 1 million tonne a year capacity for "MAC" plant and 500,000 tonnes a year capacity for "Monpolymet" plant.

There are 13 lime productions operating in Mongolia. The largest is "Sylicat", which produces 100 tonnes/day and 360,000 tonnes/year high quality lime. Another plant at Huh Tsav lime deposit of "AK" company has a capacity to produce 50,000 tonnes/year.

Another production in this category is brick production and there are 45 large and small scale producers. Almost all of the productions are located in cities and operating with outdated technologies, which release substantial amount of particulate matters to the atmosphere. One of the largest brick production is "Erel Brick" (since 1926), with annual capacity of 45 million pieces.

Minerals production releases 2.68 gTEQ dioxin a year, which is 1.93% of the total annual releases in Mongolia.

According to the 2012 statistics, a total of 388,627 tonnes of cement produced, emitting 2g TEQ PCDD/PCDFs into air, which comprises 77% of the minerals production releases.

Over 20 % of PCDD/PCDFs releases of the minerals production is from lime production. But, the brick production (about 44 million pieces a year) and ashpalt mixing (437,000 tonnes) account for minor percent in the emission from minerals production.

Table 36: Production of Mineral Products

Group	Production, t/a	Annual Release, gTEQ				
		Air	Water	Land	Products	Residue
Cement kilns (old wet kilns, ESP temperature>300 °C)	388,627	1.943	0	0	0	0
Lime(cyclone/no dust control, contaminated or poor fuels)	68,200	0.682	0	0	0	0
Brick (no emission abatement, contaminated fuels)	121,000	0.024	0	0	0.007	0.002
Asphalt mixing, no gas cleaning	437,200	0.031	0	0	0	0.000
Production of Mineral Products		**2.680**	**0**	**0**	**0**	**0.002**

Source: Dioxin and Furan Inventory report,2012

e) Transport

The number of motor-vehicles increased by 36.9% as of 5 January 2012 (counted 426,398 vehicles), compared to 311,375 in 2010, according to census of vehicles. In Ulaanbaatar only, the number increased by over 100,000 with 273,547, of which 77% was passenger cars, 19% was trucks and the remaining 4% was public transport and special purpose vehicles. According to fuel type classification, 64% was gasoline, 33% diesel, 2% gas and 1% was electric.

Table 37: Number of AutoVehicle in Mongolia

Purpose, class	Number of motor-vehicles in Mongolia		Variation
	As of 01 January 2010	As of 5 January 2012	
Passenger	177,720	300,405	122,685↑
Truck	56,437	99,534	43,097↑
Public	16,910	8,768	8,142↓
Special Purpose	5,932	8,133	2,201↑

Source: Dioxin and Furan Inventory report.2012

For the age of vehicles, 72% are used more than 10 years and 19.7% for 4-9 years, when in Ulaanbaatar city 79.4% aged more than 10 years and 16.9% for 4-9 years. For the manufacturers, majority is coming from industries of Japan, Republic of Korea and Russia.

For the volume in the cylinder of engine, 116,618 was up to 1,500cm^3 (42.6%), 84,016 was in 1,501-2,500cm^3 (30.7%), 36,935 was 2,501-3,500cm^3 (13.5%), 13,937 was 3,501-4,500 cm^3(5.1%) and 22.041 was over 4,501cm^3 (8.1%).

In 2012, a total of 389,000 tonnes of gasoline and 715,500 tonnes of diesel was imported to Mongolia, where the consumption of diesel fuel is 64.8% and gasoline 35.2%. In the estimation the import data for the total consumption of fuel was used. However, it was difficult to find out the portion of consumption, specifically how much motor fuels used by 4-stroke and how much used by 2-stroke engines. But, data from rural areas suggested that approximately 50,000 tonnes of gasoline was consumed by 2-stroke engines. So, out of the total imported fuel, which was 1,104,500 tonnes, 340,000 tonnes were consumed by 4-stroke engines and 49,000 tonnes by 2-stroke engines.

Release estimate of PCDD/PCDFs is 0.228 gTEQ a year and this constitutes 0.162% of

total releases.

What's intriguing in the result is that 54% of the release from transport is emission from 2-stroke engines, when the fuel consumption was only 4.4%.

Table 38: Transport

Group	Production, t/a	Annual Release, gTEQ				
		Air	Water	Land	Products	Residue
4-stroke engines(unleaded fuels without catalyst)	340,000	0.034	0.000	0.000	0.000	0.000
2-stroke engines (unleaded fuel)	49,000	0.123		0	0	0
Diesel engines (typical)	715,500	0.072	0.000	0.000	0.000	0.000
Transport		**0.228**	**0**	**0**	**0**	**0**

Source: Dioxin and Furan Inventory report.2012

f) Open Burning

Significant amount of PCDD/PCDFs releases during open burning processes, which are uncontrolled and no containment or abatement and cleaning are in place. Forest and steppe fires and burning of waste are included in this group.

Forest and steppe fires and burning of waste are common practices in Mongolia and, potential PCDD/PCDFs release can be higher.

In release estimation, was calculated the total area of fires. Then, for the forest fire, it was assumed 150 tonnes of trees per hectare and for steppe fires 5 tonnes of biomass per hectare.

As of 2012, registered fire cases covered 35,600 hectares of forest and 117,500 hectares of grassland. According to the estimation, a total of 36,500 hectares of area or 5,350,849 tonnes forest trees was caught by fire, releasing 5.351 g TEQ PCDD to air and 0.803 g TEQ to land. Also, grassland fires releases 0.294 g TEQ dioxin to air and 0.088 gTEQ to land.

Except for a few small-scale businesses that collect and recycle papers, plastic bottles and bags, Mongolia does not have any waste treatment and incineration facility, as well as hazardous waste treatment facility.

All solid wastes are collected at waste dumps. In Ulaanbaatar, a designated landfill at Narangiin Enger and 2 open dump sites at Morin Davaa and Tsagaan Davaa are operating. No combustion or open burning occur at the landfill as the wastes collected are compacted and covered with soil, however, open burning was frequent in 2 dump sites.

Every provinces and soums has open dump sites, where solid wastes are collected. Most of the sites practice intentional burning of waste, usually twice a year in spring and fall, in an effort to reduce the waste volume.

Annually, 1,500,000 tonnes of waste is generated and if presuming 20% is burned, or precisely 300,000 tonnes of waste is burned (presuming half is burned in compacted form), it releases 52.65 g TEQ dioxin.

This source group also includes house and vehicles fire, with estimated release of 0.07 g TEQ in 2012.

So, the PCDD/PCDFs release from open burning processes is 59.25 g TEQ, which is 42.6% of the total releases. Release to air is 56.7 g TEQ or 95.6% and to land is 2.6 g TEQ.

Table 39: Open Burning Processes

Group	Production, t/a	Annual Release, gTEQ				
		Air	Water	Land	Products	Residue
Biomass Burning:	**5,938,521**	**5.645**	**0**	**0.891**	**0**	**0**
Forest Fire	5,350,849	5.351		0.803		
Steppe Fire	587,673	0.294		0.088		
Waste Burning, Accidental Fires:	**300,258**	**51.042**	**0**	**1.675**	**0**	**0**
Fires at waste dumps (compacted,wet, high organic content)	150,000	45.000		1.500		
Accidental Fires in Houses, Factories	54	0.022		0.022		
Open Burning of Domestic Waste	150,000	6.000		0.150		
Accidental Fires in Vehicles(per vehicles)	204	0.020		0.004		
Open Burning Processes		**56.687**	**0**	**2.566**	**0**	**0.000**

Source: Dioxin and Furan Inventory report.2012

g) Production of Chemicals and Consumer Goods

This source group estimates potential formation and release of PCDD/PCDF during chemicals and consumer goods production and use. During these productions, some forms of chlorine is used to some extent and if used PCDD/PCDF formation takes place and potentially released. In Mongolia, wool, cashmere and leather productions are included in this group.

As of 2012, a total of 40.9 million heads of livestock counted and the Government gives priority to encourage local processing of raw materials from animal husbandry, such as wool, cashmere, hide and skin. In Ulaanbaatar, 56 wool washing industries are operating with over 800 employees and in rural area, 201 home, small and medium enterprises are operating, which process 16,400 tonnes or over 90% of wools are processed.

Mongolia produces about 6,000 tonnes of cashmere a year and presently, there are 130 cashmere processors, including 13 complex plants of preliminary processing (wool washing and teasing) and final product manufacturing (textile or knitted products) capacity, and 44 knitting plants. Over 70 of the processors are located in Ulaanbaatar city.

In hide and skin processing sector, there are 35 large and SME processing plants and 178 final products producers. Annually, 10.3 million pieces of hide and skin is prepared in the country and only 25.8% is processed locally and the remaining 74.2% is exported to China after preliminary processing. Out of the processed materials, 40% is exported to over 10 countries including Italy, Spain, Turkey and Republic of Korea and 60% is processed further by local productions for manufacturing products for local demand such as military uniforms, boots, gloves, purses and bags, small articles and souveniers.

The inventory results show that annual release from this source is 10.65 g TEQ, which is 7.7% of the total release. Majority of PCDD/Fs releases from this source group is released with the products with minor emissions to air, land, water and residue.

Table 40: Production of Chemicals and Consumer Goods

Group	Production, t/a	Annual Release, gTEQ				
		Air	Water	Land	Products	Residue
Textile Plants (per tonne products)(poor technology)	16,400	**0.0**	**0.0**	**0.0**	**1.6**	**0.0**
Leather Plants:	**35,000**	**0.0**	**0.0**	**0.0**	**9.0**	**0.0**
Poor technology	8,750				8.750	
Medium technology	26,250				0.263	
Production of Chemicals and Consumer Goods		**0.000**	**0.000**	**0.000**	**10.653**	**0.000**

Source: Dioxin and Furan Inventory report.2012

h) Miscellaneous

This category includes processes that could not be placed in other source groups and comprises of 4-5 processes, including drying of biomass, crematoria, smoke houses, dry cleaning and tobacco production. In Mongolia, biomass drying is not common practice and the other processes do exist in small scale.

Crematoria is an incineration process and is considered to be a source of PCDD/PCDF emission. Especially, when the incineration process is uncontrolled i.e. the combustion air flow or without air pollution control system, considerable amount of PCDD/PCDF can be released to air. “Ulaanbaatar Buyan” is the first ever crematoria in the country.

Smoking food for preservation is a common practice in many countries and commonly uses wood as fuel. Nationwide, over 8 million livestock and produce 200,000 tonnes of meat. Smoked sausages production includes processes of salting and smoking.There are over 70 entities operating to produce only sausages. It was not clear, because no data available for what portion of total sausages produced was smoked and what amount of wood was used for smoking. Therefore, for the purpose of calculation, it was considered 50% of 2 million tonnes sausages as smoked. Also, we used approximate mass of 1kg wood to be used in smoking of 100 kg sausages.

Cleaning of garments and textiles with chemicals, not washing with water, is dry cleaning process. Mainly uses organic solvents, namely perchloroethylen, with a trade name of PERC. Dry residue from the cleaning process contains chemical compounds, water, dirt, and hydrocarbon and other non-volatile substances. During the dry cleaning process, PCDD/PCDF are extracted from the textiles and it can be considered one of PCDD/PCDF sources. One of the largest dry cleaning services in the country is MetroExpress.

Tobacco smoking produces PCDD/PCDF as any other combustion process. Cigarettes mostly imported and the first tobacco producer is “Mongol Tamhi Co” and currently the company provides 47% of the demand in the country.

According to 2012 national statistics, Mongolia imported 2,138,000,000 cigarettes and produced 7,024,000 blocks of cigarettes. In calculation, when one block is approximately 200 grams, the potential emission of PCDD/PCDF from tobacco smoking was very low.

The PCDD/PCDF release from this source group is 0.35 g TEQ, including 0.075 g TEQ to air and the remaining 0.275 g TEQ in residue. Majority of the emissions in this group, precisely 74%, is from smoking process of sausage plants, where crematoria releases 0.015 g TEQ and negligible amount from tobacco and dry cleaning process.

Table 41: Miscellaneous

Group	Production, t/a	Annual Release, gTEQ				
		Air	Water	Land	Products	Residue
Crematoria, no control (per cremation)	164	0.015	0	0	0	0.000
Smoke houses (clean fuel, no afterburner)	10,000	0.060	0	0	0	0.200
Dry cleaning residues	1,500	0	0	0	0	0.075
Tobacco smoking (per million cigarettes)	3,542	0.0004	0	0	0	0.00035
Miscellaneous		0.075	0	0	0.000	0.275

Source: Dioxin and Furan Inventory report.2012

i) Disposal/Landfill

Non-thermal waste disposal processes are addressed in this source group. One resident of Ulaanbaatar city generates 270-900 grams of waste a day. Daily, 2,000-2,300 tonnes and yearly 730,000-840,000 tonnes of waste are transported to 3 landfill and dump sites in the city to be buried by landfill technology. About 30% of the municipal waste is recyclable i.e. papers, plastic containers, cans and bottles. In 2010, 25,800 tonnes of waste or 7.6% of total waste generated was exported as a secondary raw material. Approximately, 1.5 million tonnes of solid waste is generated annually nationwide and about 10% is burned in open places.

Central sewage treatment facility in Ulaanbaatar is the largest facility in the country and receives household and pre-processed industrial sewage from the city and treates through mechanical and biological methods and capacity upgraded up to 90-92% treatment of 200,000m^3 a day.

In provincial centres and largest cities,there are 133 sewage treatment facilities registered. In Mongolia, a total of 118.33 million m^3 household sewage is treated per year. The Central Treatment Facility treats 56.8 million tonnes of sewage annually, from which 328,500 m^3 sludge is generated. Calculating the volume of the sludge in dry mass, it's 17,750 tonnes of sludge per year and releases 0.355 g TEQ PCDD/PCDF, of which 0.024 g TEQ is released to water.

This source group releases about 9.12gTEQ PCDD/Fs a year, which is 6.56% of the total release.

Table 42: Disposal/Landfill

Group	Production, t/a	Annual Release, gTEQ				
		Air	Water	Land	Products	Residue
Landfills, Dumps:	**1,575,000**	**0.000**	**0.113**	**0.000**	**0.000**	**11.250**
Mixed wastes	75,000		0.038			3.750
Domestic waste	1,500,000		0.075			7.500
Household and industrial sewage treatment (with sludge removal)	17,750	0.000	0.024	0.000	0.000	0.355
Open water dumping (urban and suburban)	0	0.000	0.792	0.000	0.000	0.000

Source: Dioxin and Furan Inventory report.2012

2.3.6.3. Update the baseline inventory for year 2005 using the 2013 Toolkit

Results of baseline inventory from 2005 are re-calculated, using the 2013 Toolkit, which estimated the potential PCDD/PCDFs emissions in Mongolia at 32.9 g TEQ per annum. The radical decrease (22 times) in the annual release caused by,

- 1st, less utilization of PCDD/Fs sources
- 2nf, emission factor reduced and
- 3rd, due to mistakes made during the baseline inventory.

The errors had been corrected during the re-calculation. Tables 1.1-1.10 show the annual releases.

1. Estimation of the release from medical waste incineration was much lower as we calculated it with perception that the incinerators installed filtering systems. But in re-calculation we estimated it without the filtering system and the total release is 1.654 g TEQ.

2. For releases from ferrous and non-ferrous metal production, estmate result was same as previous with 1.5 g TEQ.

3. Heat and power generation releases were re-calculated. Total consumption of coal was wrong and considered co-burning of biomass in previous estimations, which showed quite higher release rates. According to the new Toolkit, the release is 4.676 g TEQ.

4. For the production of mineral products, annual release remained intact and the release is approx. 0.116 g TEQ.

Table 43. Integrated inventory table

Group	Source Groups	Annual Releases (g TEQ/a)				
		Air	Water	Land	Product	Residue
1	Waste Incineration	1.65	0.00	0.00	0.00	0.01
2	Ferrous and Non-Ferrous Metal Production	0.60	0.00	0.00	0.00	0.90
3	Heat and Power Generation	2.84	0.00	0.00	0.00	1.83
4	Production of Mineral Products	0.11	0.00	0.00	0.00	0.00
5	Transportation	0.62	0.00	0.00	0.00	0.00
6	Open Burning Processes	17.45	0.00	0.58	0.00	0.00
7	Production of Chemicals and Consumer Goods	0.00	0.00	0.00	6.05	0.00
8	Miscellaneous	0.00	0.00	0.00	0.00	0.00
9	Disposal	0.00	0.01	0.00	0.00	0.19
10	Identification of Potential Hot-Spots				0.00	0.00
1-10	**Total**	**23.3**	**0.0**	**0.6**	**6.1**	**2.9**
	Grand Total	**32.9**				

5. Following mistakes were made during the estimation of releases from transportation sector. Conversion from micrograms to gram was inaccurate (dividing by 100,000 instead of 1,000,000), which resulted in 10 times more release. The emission factor for heavy oil engines was reduced 2 times, i.e. from 4 µg TEQ/t to 2µg TEQ/t. The error was corrected and the result is 0.622 g TEQ release from the transportation.

6. Emission factor of the uncontrolled combustion processes changed significantly in the new Toolkit and the potential release from these processes reduced duly down to 18.033 g TEQ.

7. Production of chemicals and consumer goods remained same as in previous estimates, at 6.05 g TEQ.

8. No changes after re-calculation for the remaining groups.

9. Waste disposal accounted for 86.7% of total release, according to the baseline inventory. Miscalculated with inaccurate figures on sludge generation, which resulted in extremely high release, and this error was corrected. Only 0.375% of sludge generated from total treated water and the sludge has 96% of humidity, where sludge volume was re-calculated as dried mass in new Toolkit. Also for the calculation of sludge, the category "Urban and industrial inputs" was used instead of "Mixed domestic and industrial inputs". Potential release of PCDD/PCDFs, according to the new Toolkit, is only 0.21 g TEQ.

2.3.7. Information on the state of knowledge on stockpiles, contaminated sites and waste, identification, likely numbers, relevant regulations, guidance, remediation measures, and data on releases from sites

2.3.7.1. POPs Stockpiles

a) Pesticides

According to information in the inventory on HCH congeners and lindane, a total of 99 kg HCH is being stored in Jargalant of Tuv province, Davst of Uvs province, Harhorin of Uvurhangai province and in Dundgovi province veterinary. A stockpile of 5 tonnes HCH, which was kept in the procurement yard of Hovd province, was removed from the site and buried adjacent to waste dump site (named Elsen Tolgoi) in the province centre in 2005 (Table 43).

Obsolete hexachlorobenzene, weighing 0.6 liter, is being stored in Ugtaal and Jargalant soums of Tuv province.

Samples taken from a substance (2 kg), which was being kept at Mr. Dambii, resident of Herlen soum, Hentii province, sent for analyses to the Tsinghua University, China. As result of the analyses, it was detected that the substance was pure HCH, which contained α-HCH – 65.9%, β-HCH – 1.0%, γ-HCH – 27.6% and δ-HCH – 5.5%.

Table 44: HCH Stockpiles

№	Province	Soum	Volume/kg
1	Tuv	Jargalant	43
2	Uvs	Davst	40
3	Dundgovi	Province centre (Vet)	13,5
4	Uvurhangai	Hujirt	2,5
5	Hovd	Hovd	5,000
	Total	**7 sites**	**5099,6**

Source: Dioxin and Furan Inventory report.2012

On top of the POPs pesticides, there are other obsolete pesticides that requires proper disposal, including, over 10 tonnes TMTD-80 (80% tetramethylthiuram disulfide) in Arvaiheer soum, Uvurhangai province (Photo 1), 108,300 liters of Chinmix (2.5% concentrate) at the

Ulaanbaatar Railway Custom-Bonded Yard (Photo 2). All the substances are being stored under inappropriate conditions. In 1980s, some source say, various pesticides (name and volume uncertain) had been dumped into a burrow, which historically was a jail even before 1921, in Amgalan, Bayanzurh District, Ulaanbaatar city (coordinates: N-47.54.41.8; E-108'59.89,4).

b) PCBs

From the closed application of PCBs in electric equipment, 2 types of waste is generated – used fluid and end-of-life equipment.

Electricity transmission and distribution companies usually do mechanical cleaning in the fluids with low impurity with a conventional equipment, however, they sell fluids with high impurity to companies and individuals. The purchased oil is used in different applications such as in heavy machinery and tractors, casting and moulding for construction, as well as in power plants boilers as fuel. End-of life equipment is stored in inappropriate places or after draining the fluid sold to scrape metal collectors. This practices or uncontrolled applications pose potential risks of spreading the PCBs contamination.

Since 2013, started decontaminating PCBs (fluid and equipment) using CDP technology (continuous closed loop dehalogenation process) from the Sea Marconi s.a.s., Italy, and this technology has advantages, not only decontaminating PCBs, but also improves the overall quality of the insulating fluid. Thus, no need to refill new oil and increases average life span of the equipment by 10-15 years, which is economical benefit of this technology, but also it's environmentally sound process.

The technology is able to decontaminate PCBs in insulating fluids with content of up to 50,000 mg/kg, however, not for dehalogenation of pure PCBs. About 3 tonnes of pure PCBs with tradename "Sovtol" is being stored in the "Erdenet" copper mining company, which Mongolia can not decontaminate in the country, using the CDP process.

c) POPs-PBDEs

c-1) WEEE

In contradiction of the growing volume of EEE import and use, no WEEE collection, separation and recycling system is in place yet and it was impossible to calculate the volume of WEEE produced in the country.

Consumers usually get rid of their used EEEs in a way by donating it to others or sell as spare parts, or just dispose of it together with household wastes. Due to the lack of disposal facility, large stock of used EEEs or WEEEs had been accumulated in government agencies.

c-2) Transport sector

There is no sites to dump and collect end-of-life vehicles in Mongolia. Parts of end-of-life vehicles, which can not be recycled and re-used, are dumped at household waste sites and landfills.

No facilities for recycling end-of-life vehicles operate in Mongolia. End-of-life vehicles are usually dismantled and some parts e.g. metal parts are sold to scrap metal collectors. Some parts that can not be re-used such as plastics and foams are disposed together with household wastes.

c-3) Other uses

Waste materials from furnitures and mattresses such as PUR foam and mattresses are disposed together with household wastes.

2.3.7.2. POPs Contaminated Sites

a) *Pesticides*

Potential contaminated sites may include several soums in Hovd and Uvurhangai provinces, where HCH had been used for combating grasshoppers for pastureland protection from 1965 to late 1980s. The substance was sprayed by hand or by plane at the ration of 8-10 kgs per hectare of area.

Similarly, the "bathtubs", in which washed livestocks with HCH emulsion with 16% concentrate can be potential sites of contamination. Some of the pits, which just dug in the ground and which has no inner protective lining, give out significant smells, say reports from several provinces.

No proper store places exist in the country, thus obsolete pesticides, which had been used for veterinary and plants protection purposes, had been stored in inappropriate places, such as the venetrinary storage, animal shed and in many cases kept in open places. Therefore, these places can also be a potential source of contamination. List of potential contaminated sites are given in Table 45.

Table 45: Contaminated Sites

№	Province	Soum	Contaminated Sites
1	Bayan-Ulgii	Bayannuur	Storage soil
		Deluun	Veterinary storage soil
		Sagsai	Veterinary storage soil
		Nogoonnuur	Veterinary storage soil
		Altantsogts	Veterinary storage soil
		Buyant	Storage soil of Altain Orgil cooperative
		Altai	Storage soil
2	Hentii	Herlen	1. South of Baga Ulziit 2. North-West of Baga Ulziit 3. West of Tsuvraa
		Tahilt village	1. Aduutyn Uzuur(15 kms from Tahilt village) 2. Biluutiin Uzuur (22 kms north-east to Tahilt village) 3. Chuluutyn Eh (25 kms north of Tahilt village)
3	Bayanhongor	Jinst	5 hectares of area
4	Uvurhangai	Harhorin	960 hectares of area, where fodder planted (gives out smell after rain)
5	Hovd	Throughout the province	Procurement yard (stored 5 tons of HCH until 2005)

6	Selenge	Yeruu	1. Handgait animal washing site "bathtub" (coordinate: N642680.5, S5516522) 2. Soum and farms storages (N620061.973, S5513793.728)
		Orhon	1. Nilchin 2. Havtsal 3. Saihany Am 4. Soum centre (N4908774, S10523369), (N4908801, S10523800)
		Sant	1. Soum centre Veterinary pharmacy 2. Yamaa Maildag 3. Teld 4. Zalardag Garam
		Bayangol	1. Zagdal Gol river (N4853132, S10604285) 2. Sharyn Gol Saldag (N4901585, S1060327.2) 3. Tariat (N490629.3, S1062034.6) 4. Old Veterinary (N48552.8, S1060554.6)
		Orhontuul	1. Gants Hailaast (adjacent to Bordoo)/ 2. Noyonbulag 3. Vanny Am (bathtub) 4. Jargalant Bulgiin Am 5. Har Usan Tohoi
		Baruunburen	1. Hujiin bathtub (N4926733, S10503775) 2. Shiveetiin bathtub (N4919141, S10444413) 3. Old centre bathtub (N4915548, S10444638) 4. Botgon Gatsaany bathtub 5. Nomgony Uvur bathtub 6. Uliin Uvur bathtub
		Shaamar	1. Undur Hailaas 2. Ereen Hailaas 3. Railway Stop 49
		Hushaat	1. Old centre 2. Bugatyn Am

Source: POPs pecticide Inventory report

b) PCBs

The highest contamination of PCBs was detected in the spot where transformer repair workshop of the Ulaanbaatar Electricity Distribution Network Company operated, after doing some study in suspected pilot sites of PCBs contamination. The contamination penetrated down to underground water and the content was 27.5 mg/kg in top soil, 3.1 mg/kg in 2 meters, 0.2 mg/kg in 3 meters, which was 2-275 times higher than the reference set in Mongolian standard.

In the "Erdenet" copper mining company's electricity workshop yard, detected contamination in top soil layer, with content of 0.5 mg/kg in top soil layer of 0.5 meters and 0.02 mg/kg in 2.5 meters.

PCBs content was less than 0.02 mg/kg in the soil of Uliastai sub-station yard, which is located in the drinking water supply area of Ulaanbaatar city and in sediments of Tuul river around the Songino area.

It can be concluded that PCBs contamination can potentially exist in former transformer repair places and in future, it's required to study such sites, as well as hot-spots where accidents of electrical equipment registered.

c) ***POP-PBDEs***

All wastes and effluents from households and services goes to landfill and dump sites, where the wastes may contain POP-PBDEs, thus, these sites can potentially be contaminated.

d) Dioxin Hot-Spots

Potential hot-spots existence is less probable in Mongolia as chemicals industry is not developed, however, some hot-spots possible in places where stored and used pesticides and accidental fires in large objects such as shopping centers. For example, from the POPs pesticides, Mongolia used hexachlorocyclohexane (HCH) in most amounts in 1958 to 1985. Powder HCH had been used on livestock by hand and or smoking in shelters by burning HCH. These places are abundant in gobi region where more population of camels were raised.

As of last 5 years, a few accidental fires in large objects registered and it's possible that considerable dioxin contamination was generated. A few of the fire cases to mention are the Bumbugur shopping centre (September 2009), Narantuul flea market (August 2013) and headquarter of Mongolian People's Party (July 2008). Wide variety of goods and articles, which contain chlorine and carbon, including electric and electronic products, leather goods, cosmetic products, detergents, table salts, salted foodstuffs and plastic packages and bags were exposed to the fires. New construction was erected at the ruins of the Bumbugur shopping centre and the headquarter, before which all the debris and wastes removed, and it can not be denied that the debris and waste are still polluting the environment.

2.3.7.3. Measures, Methodologies and Regulations for Decontamination of POPs Stockpiles and Wastes

a) PCBs

Significant part of the electrical equipment being used nationwide for the production of energy is exceeded their in-service time and malfunctions and breaks down. According to the inventory made in 2005, it was registered over 13,000 equipment, containing 5,500 tonnes of oil, over 90 percent of which was imported from the Soviet Union. About 70% was manufactured before 1990. Renovation of equipment is somehow lagging due to the economic capacity and investment in the energy sector.

Almost all the equipment detected to be contaminated with PCBs are in use and most of them have no replacements, which means not allowed to stop idle for long time, thus making decontamination difficult. In addition, it's financially limited to transport the large equipment frm countryside to Ulaanbaatar, given the vast territory of Mongolia.

Taking into consideration the situation, a portable and non-combustion PCBs disposal technology together with the equipment was purchased from the Italian "Sea Marconi Technologies s.a.s." company through the GEF/UNIDO "Project for Capacity Building for Environmentally Sound Management and Disposal of PCBs in Mongolia", after a thorough study of PCB technologies.

Sea Marconi is the developer and patent owner of the CDP (continuous dehalogenation process) technology, with patents *CEE n. 0675748; USA 5.663.7479*, and the chemical method has also been approved as the Best Available Technique by the Italian Ministry of Environment, Territory and Marine Protection. The technology operates at low temperatures (80°C – 100°C), using proprietary solid reagent, and dechlorinates and dehalogenate PCBs. This is internationally accepted technology to the extent of environment and human health and one of the leading methods on the world.

The closed loop continuous dehalogentaion process:

- Can be used both as mobile and stationary unit.
- On-site treatment without even drainage of the equipment in closed circuit.
- Uses patented solid reagent for PCBs destruction and the reaction develops in columns with filters.
- Capable of re-establishing chemical-physical features and quality of the fluid to the same conditions of new oil, in addition to eliminate PCBs completely.Prolongs the transformer life.
- Has fully automated system for controlling the process and safety.
- No risk of fire as it operates at low temperatures.
- Fully meets the labor ptotection and safety requirements as it operates in closed circuit and has automated control system.

The technology is being used in Mongolia as mobile unit in warm seasons and as stationary in cold seasons. Refurbished and equipped with international standards the transformer maintenance workshop at the Tuul sub-station of the National Electricity Transmission Grid Company in 2012 for PCBs destruction purposes and used the technology here as stationary unit.The workshop was equipped with 80 tonnes capacity overhead crane and procured special truck for the technology to be used as mobile unit.

Two engineers and 2 electricians work in the workshop on a full-time basis for PCBs decontamination and 2 of them had been recruited in a full scale on-site training in Italy and Mongolia. Technical and operational guidlines were developed for the technology.

The Ministry of Environment and Green Development and Ministry of Energy and Mineral Resources signed a memorandum and agreed to select the National Electricity Transmission Grid state-owned company as an executor of the PCBs decontamination operation.

Decontamination process was launched in March 2013 and treated 77 electrical equipment with total weight of 402.6 tonnes, containing 120.5 tonnes of fluids as of August 2014.

Table 46: PCBs Detected and Decontaminated

	No	Fluid weight (kg)	Total weight (kg)
PCBs detected (equipment)	257	207,111	663,582
Decontaminated	77	120,524	402,627

Source: Inventory report

b) <u>Other POPs</u>

Lack of analytical capacity to determine POPs pesticides, new industrial POPs chemicals and PCDD/Fs obstructs necessary research works on contaminated soil and water and on contamination degrees and moreover, to develop or identify appropriate methods and technologies for treating the contamination. No decontamination or treatment has been done.

There is no regulation on POPs, except adding references to a few standards, including MNS 5850 : 2008 Soil quality. Soil pollutants elements and substance, MNS 6148:2010 Water Quality. Permissible Limits of Underground Substances and Elements that Pollute Water", MNS 900: 2011 Drinking water. Hygienically requirements, assessment of the quality and safety and MNS 6342:2012 Air Quality – Permissible Limits of Some Air Polluting Substances in Smokes and Gases Released to Air from Hazardous Waste Incinerators.

2.3.8. Summary of future production, use, and releases of POPs – requirements for exemptions

Mongolia is not a producer of POPs chemicals, but it still use it. As set forth in the Stockholm Convention, the Parties are obliged to phase out the use of PCBs by 2025 and dispose of properly by 2028. Mongolia set a goal to phase out the use and dispose by 2020. Regulation for PCBs import, use and treatment is in place now and analytical and decontamination capacity is built to achieve the goal.

Mongolia does not use POPs pesticides and the substances are listed as prohibited. Another obligation by the Parties to the Convention is to reduce import and use of products containing new industrial POPs chemicals such as hexabromodiohenyl ether and heptabromodiphenyl ether, tetrabromodiphenyl ether and pentabromodiphenyl ether and dispose of wastes environmentally sound methods by 2030. Therefore, Mongolia shall take measures for the implementation of this obligation.

It's necessary to standardize reference values for dioxins and furans at sources and application of BAT/BEP in emissions reduction activities.

Since there are not sufficient information and database availabe on PFOS usage in Mongolia at the time of this NIP publication, the country may request for exeption if needed.

2.3.9. Existing programmes for monitoring releases and environmental and human health impacts, including findings

Notwithstanding the PCBs, Mongolia does not have analytical capacity to determine POPs releases and their effects on the environment and human health and therefore, no monitoring plans.

PCBs laboratory was established by the Ministry of Environment and Green Development at the Institute of Chemistry and Chemicals Technology, Mongolian Academy of Science, in 2011, through funding of GEF and support from UNIDO and trained the staff for PCBs analyses at internationally accredited laboratories.

The laboratory does analyses using GC ECD 7890A from Agilent with IEC 61619: Insulating Liquids – Contamination by polychlorinated biphenyls (PCBs) – Method of determination by capillary column gas chromatographyand MNS ISO 10382:2012: Soil Quality – Determination of organochlorine pesticides and polychlorinated biphenyls with GC ECD.

It's also possible to do analyses in water using MNS ISO 6468:2011: Water Quality – Determination of certain organochlorine insecticides, polychlorinated biphenyls and chlorobenzenes – Gas chromatographic method after liquid-liquid extraction.

The laboaratory was stregthened with Thermo Scientific TSQ 8000 (Triple Quadrupole GC-MS/MS) and accessories for PCDD/Fs analyses and extended the laboaratory as POPs laboratory in 2013, by Joint Order A-280/156 of the Minister of Environment and Green Development and the President of the Mongolian Academy of Science.

Mongolia is part of the Environmental Monitoring Program of Persistent Organic Pollutants in East Asian Countries, through which air samples were taken in background sites 3 times. Results showed the POPs pesticides pollution was lower in comparison to other regional countries.

2.3.10. Current level of information, awareness, and education among target groups; existing systems to communicate such information to the various groups

Trainings and workshops were and are organized for target groups (energy, environment,

customs, specialized inspection and health sectors, as well as educational institutes), as well as for general public through activities of projects "Capacity Building for Environmentally Sound Management and Disposal of PCBs in Mongolia" and "Demonstration of BAT/BEP in Fossil Fule Fired Utilities and Industrial Boilers". However, information and awareness of general public is insufficient.

Textbook "Toxic and Hazardous Chemicals and POPs" was developed and published for the purpose of adding the subject on POPs in curriculum of higher educational institutes. The textbooks had been donated to public and educational libraries and organized a training for professors and educators on the subjects reflected in the textbook.

Information on POPs can be obtained from the website of the National Chemicals Management Council (www.mne.mn/chemical).

PCBs online database (www.pcb.gps.mn) was developed and data and information on details of equipment inventoried, including but not limited to the owner, location, leakage, area of contaminated site, analyses results before and after decontamination etc are included.

The database administrator is the Ministry of Environment and Green Development and owners of inventoried equipment can also have access.

2.3.11. Mechanism to report under Article 15 on measures taken to implement the provisions of the Convention and for information exchange with other Parties to the Convention

Mongolia prepared reports on the implementation of the Stockholm Convention in 2006 and 2011 respectively and submitted to the Secretariat of the Convention.

2.3.12. Relevant activities of non-governmental stakeholders

Mongolia does not have non-governmental organizations specialized in POPs. But, many other NGOs is working for environment, chemicals and wastes and are invited on permatent basis to workshops and meetings organized by the Ministry of Environment and Green Development, and sometimes the ministry and NGOs is jointly organizing workshops on specific thematics.

2.3.13. Overview of the technical infrastructure for POPs assessment, analysis, alternatives and prevention measures, management, research and development – linkage to international programmes and projects

Mongolia is a member of the "Introduction of BAT/BEP methodology to demonstrate reduction or elimination of unintentionally produced POPs in East and South-East Asia" Forum and took part in the development of several regional projects, e.g. "Demonstration of BAT/BEP in Fossil Fule Fired Utilities and Industrial Boilers", "Introduction of BAT/BEP in Thermal Processing of Metallurgical Plants" and "Demonstration of BAT and BEP in open burning activities in response to the Stockholm Convention on POPs". Regional project on "Demonstration of BAT/BEP in Fossil Fule Fired Utilities and Industrial Boilers" is being implemented and another project on "Demonstration of BAT and BEP in open burning activities in response to the Stockholm Convention on POPs" is commencing soon.

Research workers of the Institute of Chemistry and Chemical Technology of the Mongolian Academy of Science has implemented a small scale project on "PCBs Pollution in Soil and Water and Decontamination Technology Options" for 3 years since 2011.

Although these projects had contributed to the strengthening of the national capacities in the field of POPs management, Mongolia still needs to build up capacities in the environment sector in general, and chemicals and wastes management sector in special. Also, this is the

case with the technical infrastructure for POPs assessment and analysis, where Mongolia lack of laboratory equipment and expertise. Moreover, the research and development area should be further developed to provide scientific support for informed decision-making in the area of POPs and, chemicals and wastes in general. In this sense the actions and measures foreseen in chapter 3 of this plan are meant to overcome these problems. Of course, for these purposes appropriate funding from internal and external sources needs to be provided.

2.3.14. Details of any relevant system for the assessment and listing of new chemicals

Mongolia have never submitted a proposal for listing a chemical in Annexes of the Convention.

2.3.15. Details of any relevant system for the assessment and regulation of chemicals already in the market

"Procedure and Guidilines for Risk Assessment in Toxic and Hazardous Chemicals" was approved in 2012, by Joint Order A-50/378/565 by the Minister of Environment and Green Development, Minister of Health and Chairperson of the National Emergency Authority and using this procedure and guidlines, now it's possible to make risk assessment on POPs and contaminated sites.

In 2011, amendment was made to the Law on Toxic and Hazardous Chemicals, allowing to develop individual procedures to regulate each substances included in the list of prohibited and limited chemicals, including POPs chemicals.

In addition, the amendment assigned the state central organ in charge of environment, in cooperation withe state central organ in charge of health, shall be responsible for determining sectors where chemicals in the list of prohibited and limited to use chemicals can be used or shall not be used, as well as the amount to be used. This provision in the amended law made is feasible to make decision on POPs chemicals, where it can be used or which sector the use should be phased out.

2.3.16. NIP implementation status

Mongolia signed the Stockholm Convention on Persistent Organic Pollutants in 2002 and ratified in 2004 by the State Great Khural (Parliament).

The implementing agency in Mongolia is the Ministry of Environment and Green Development and the Convention Implementing Unit is the Council's Office of the National Chemicals Management Council.

The National Program on Persistent Organic Pollutants was approved by the Government resolution No 99 of 2006 and planned to implement the first phase in 2006 – 2010 and the second in 2011 – 2020.

As result of the actions and measures taken for the implementation of Stockholm Convention and the National Program, the following outcomes and outputs produced, including:

2.3.16.1. Activity 1. Strengthening Regulatory and Implementation Mechanism of the Stockholm Convention:

Law

By adding the 9 new POPs chemicals, listed to the Stcokholm Convention, to the List of Chemicals Banned to Use in Mongolia, import and use of these chemicals stopped. Polychlorinated biphenyls were added to the List of Chemicals Limited to Use in Mongolia and the use is being regulated.

Amendment was made to the Law on Toxic and Hazardous Chemicals and approved by the State Great Khural on 06 October 2011. The amendment reads as following: "the state central organs in charge of environment and health shall approve the procedure and regulation on registration, collection, transport, storage, treatment, import, export and transboundary movement of each chemicals, which are banned and limited to use by this law and sectors and volume of use of these chemicals shall also be determined by the organs".

The above provision in the law allows coordination of the listed chemicals, especially POPs chemicals, creating a legal environment for developing regulations for the activities related to each and every chemicals and POPs. Thanks to this amendment, the first ever regulation on a POPs chemical was approved jointly by the Ministers of Environment and Health in 2012, namely the "Regulation on Registration, Collection, Transport, Storage, Treatment, Import, Export and Transboundary Movement of PCBs".

Revision of Law on Waste was approved on 17 May 2012 with additional regulations on approving lists of hazardous wastes and waste management, on licensing hazardous waste treatment activities and prohibition of waste open burning practices. This is serves as a proper mechanism for regulating the actions and plans on the reduction of unintentional POPs from various incineration processes, which stipulated in Annex C of the Convention.

Parties to the Convention shall take measures for promoting the use of Best Available Techniques and Best Environmental Practices (BAT/BEP) for the reduction or elimination releases from unintentional production and for this purpose a provision "the detailed environmental impact assessment report shall include recommendations on application of BAT/BEP in reduction of potential adverse effects from the project"was added in the Law on Environmental Impact Assessment in 2012.

Standards

Adopted the following international standards for PCBs analyses:

- Water Quality–Determination of certain organochlorine insecticides, polychlorinated biphenyls and chlorobenzenes – Gas chromatographic method after liquid-liquid extraction. MNS ISO 6468:2011
- Soil Quality – Determination of organochlorine pesticides and polychlorinated biphenyls with GC ECD.MNS ISO 10382:2012
- Insulating Liquids – Contamination by polychlorinated biphenyls (PCBs) – Method of determination by capillary column gas chromatography. MNS CEI EN 61619:2011

Upper limits of some POPs chemicals are included in the following standards:

- Soil Quality– Upper limit of soil pollutant elements and substances.MNS 5850: 2008
- Acceptable concentration of pollutants in the air– General Technical requirements. MNS 5885: 2008
- Water Quality - Permissible level for ground water polluting substances. MNS 6148:2010
- Air Quality– Maximum permissible level of some air pollutants in flue gas from the hazardous waste incinerator. MNS- 6342 :2012

Program

Added a provision in the 4th National Program on Occupational Safety and Hyginenic Condition, which was approved on 25 April 2012, to intensify implementation of the "Measures for prevention from occupational diseases from asbest, mercury and PCBs, reduction and elimination of use" and "Regulation on import, export, transboundary movement, production, trade, use, storage and treatment".

2.3.16.2 Activity 2. Cease the use of PCB-Containing Equipment and Disposal of Wastes by 2020:

The NIP priority action was to "Stop usage of PCB-containing equipment, eliminate their stockpiles and wastes in environmentally sound manner and decontaminatepolluted sites".

With the target of 2020 for this priority action in NIP, started project for "Capacity Building for Environmentally Sound PCBs Management and Disposal in Mongolia" in 2009 through GEF funding UNIDO support.

Through the project, nationwide inventory of PCBs is ongoing and established PCBs database.

Refurbished a transformer servicing and maintenance shop at the "Tuul" sub-station of the National Electricity Transmission Network State-Owned Company for PCBs decontamination through international standards and requirements and 4-men strong PCBs unit started working for decontamination, using PCB decontamination of mineral insulating oil in electrical equipment technology from Sea Marconi Technologies s.a.s., Italy. Presently, over 600 tons of PCB equipment had been decontaminated. The CDP process is economically efficient, not only decontaminates PCBs, improves other necessary parametres of insulating oil, too, and offers advantage of re-using processed oil and extending life of electrical equipment.

2.3.16.3. Activity 3. Reduction of PCDD/F Releases from Unintentional Sources:

The Ministry of Environment and Green Development has been taking active part in the "Introduction of BAT/BEP methodology to demonstrate reduction or elimination of unintentionally produced POPs (UPOPs) in East and South-East Asia", initiated by UNIDO in 2007and presently implementing several regional projects.

Seven of the BAT/BEP Guidelines had been translated into Mongolian and published, as well as uploaded to a website. Workshops and awareness activities on BAT/BEP are ongoing.

Through the "Demonstration of BAT/BEP in Fossil Fule Fired Utilities and Industrial Boilers"project, with participation of 6 regional countries, a demo project is being implemented to introduce BAT/BEP in boiler #8 of the Power Plant 4.

2.3.16.4. Activity 4. Identification and Remediation of Sites Contaminated by POPs Pesticides

No specific actions have been taken and no significant achievements have been reached with regard to this activity for the identification of contaminated sites with POPs pesticides and decontamination due to insufficient laboratory and personnel capacity.

2.3.16.5. Activity 5. National Framework for Propaganda, Training and Information

Online database of PCBs and PCB-containing equipment was developed.

Trainings and workshops are organized for general public and target groups (energy, environment, customs, specialized inspection and health sectors, as well as educational institutes).

Printed out brochures and guidances on POPs and their effects on human health and the environment and on the protection and prevention from harmful effects of POPs. Produced two short movies and broadcasted national TV channels and distributed through CDs.

Textbook "Toxic and Hazardous Chemicals and POPs" was developed and published for the purpose of adding the subject on POPs in curriculum of higher educational institutes. The textbooks had been donated to public and educational libraries and organized a training for professors and educators on the subjects reflected in the textbook. "Green Stove" training

material, developed by UNIDO, was translated and will be used future trainings and workshops.

Involved personnels in study tours and training programs for POPs management, advanced techologies and analytical methods.

2.3.16.6. Activity 6. POPs Monitoring and Analytical Capacity Building

In order to strengthen monitoring and analytical capacity, MEGD in cooperation with the Mongolian Academy of Science established POPs laboratory and providing equipment and training personnel.

Presently, the laboratory is doing analysis to determine PCBs in insulating fluids, soil and water with international standards.

The laboratory is also equipped with air samplers and GC/MS MS for dioxin and furan analyses and X-ray fluorescent spectroscopy for determination of fluorine, chlorine and bromine in polymer materials.

As part of the project for "Environmental Monitoring of POPs in East and South East Asian Countries", initiated and funded by the Government of Japan, POPs monitoring is being made in ambient air in background sites.

3. STRATEGIES AND ACTION PLANS OF THE NATIONAL IMPLEMENTATION PLAN

3.1. OVERALL OBJECTIVE

To protect human health and the environment from Persistent Organic Pollutants.

3.2. POLICY STATEMENT

By ratifying the new constitution in 1992, Mongolia transited to the democratic system with market orientation. The new basic law constitutes that every citizens of Mongolia enjoy the rights to healthy and safe environment and to be protected against environmental pollution and ecological imbalance and this provision is the foundation of developing laws and acts for the regulation of activities related to environmental protection and chemicals and wastes.

The State Great Khural (Parliament) of Mongolia ratified the Law on Environmental Protection, Law on Water, Law on Air, Law on Forest and Law on the Protection from Toxic Chemicals for the first time in 1995 and the first law on waste was adopted in 2000, named, Law on Prohibiting Import and Transboundary Movement and Export of Hazardous Wastes. Later, in 2003, Law on Household and Industrial Waste was entered into force.

In relation to the change in socio-economic situation and in consequential response to the need of strengthening the requirements for environmental protection and improving obligations and monitoring structure, environmental laws had been revised and amended in 2012.

Mongolian Government approved The Mongolian Action Programme for the 21st Century (MAP 21) in 1998 and the Comprehensive National Development Strategy, based on the Millennium Development Goals, in 2008, respectively in an effort to implement the goals set forth by the Rio Declaration on Environment and Development and Agenda 21 from the Earth Summit in 2002.

The Government of Mongolia raised a goal "Socio-economic and development strategies should be in harmony with the green development strategy to provide safe and ecologically balanced environment to live and work" and prioritized the green development as one the key development strategies, which made the Ministry of Environment and Green Development as the line ministry to ensure environmental issues are given precedence to economic development activities.

Mongolia joined numerous international treaties on chemicals security and taking measures for the realization of the obligations and decisions. The multilateral agreements Mongolia joined, including but not limited to, are the Vienna Convention for the Protection of the Ozone Layer, the Montreal Protocol on Substances that Deplete the Ozone Layer, the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticidesand the Stockholm Convention on Persistent Organic Pollutants. In 2014, Mongolia signed the Minamata Convention on Mercury.

Achievement and implementation of the goals obligations of the above mentioned strategies and conventions, as well as the realization of laws and acts are insufficient due to inadequate financial resources and poor technical and human capacity.

In particular, lack of technologies and facilities for environmentally sound recycling and final disposal of hazardous wastes results in disposal of hazardous wastes and WEEEs at undesignated sites, moreover adverse effects on the environment and human health. Through the improvement of overall waste management, not limited by the hazardous wastes only, it will be possible to reduce open burning of wastes and subsequently reduce emissions, including unintentional POPs and greenhouse gases.

Strengthening analytical capacity i.e. for analyzing toxic and hazardous chemicals and products and wastes containing the substances, as well as for environmental monitoring, is important step in the limitation and reduction of using products that contain toxic chemicals and emissions.

The Government is paying attention to and taking certain measures for health problems caused by increased urban air pollution due to the country's climate condition and intensification of urbanization and industrialization. However, the effectiveness of the measures are not satisfactory. Therefore, it's requisite to encourage practices of waste minimization at the sources, re-using and recycling to reduce air pollution and environmental pollution and application of BAT/BEP to reduce the emissions and releases. These measures and actions usually require high cost through investments in technologies, trainings and awareness raising programmes.

Synergies between the implementation of actions and measures reflected in national programmes, namely, the "National Implementation Plan on Persistent Organic Pollutants", "National Programme on Waste Management Enhancement", "Mid-Term Target Programme – New Upbuilding", "National Programme on Climate Change" and "National Programme on Ozone Layer Protection"are important in ways of cost effectiveness and efficiency of emissions reduction to the environment. Essentially important is the activity and initiatives by the Ministry of Environment and Green Development, as well as participation, partnership, cooperation and coordination of stakeholders and public. Specially, decision-makers should focus on general public to improve their awareness and knowledge and their mindset and recognition of on environmental protection duties.

Financial and technical assistance and support from donors, international organizations and developed countries will greatly contribute to implement the strategies and achieve the goals.

3.3. IMPLEMENTATION STRATEGY

3.3.1. Objectives and Priorities

Objectives are to improve environmental quality and protect human health from POPs harms through the establishment of proper management of waste, especially hazardous wastes, reduction of POPs release from sources to the environment, cleaning contaminated sites and decreasing the use of POPs-containing products.

Implementing bodies and stakeholders of the Stockholm Convention in Mongolia had been introduced to the results of POPs preliminary inventory and discussed the country's situation, after which set priorities according to the need and importance of activities for the protection of human health and the environment from POPs. The following key-objectives had been suggested:

Key-objective 1.Enhancement of Legislation that Regulates POPs activities through amendments and additions to laws and regulations on POPs chemicals and through revising analytical standards and reference values, as well as adopt new standards as required.

Key-objective 2.Reduction of POPs release in environment and further reduction of adverse effects on human health through the establishment of proper management of collection, recycling and environmentally sound disposal of wastes containing new industrial POPs chemicals*, which can be achieved by* establishing management of collecting, recycling and environmentall sound disposal of wastes containing new industrial POPs;reducing import and use of products containing new industrial POPs;building laboratory capacity and train

specialized personnel to determine and research new industrial POPs chemicals.

Key-objective 3. Reduction of unintentional POPs release from sources, *achieved through* reducing dioxins and furans releases from open burning of wastes;reducing dioxins and furans releases from medical waste incineration;introducing BAT/BEP for the reduction of dioxins and furans releases from power plants, heating boilers and household stoves.

Key-objective 4. Identification of sites contaminated with POPs and take measures for decontamination, *which can be achieved by* identifying sites contaminated with POPs and to take measures for decontamination.

Key-objective 5. "PCB-Free Country", achieved through phasing out the use of PCB-containing equipment by 2020 and finish decontaminating PCB-containing equipment and waste by 2020 with environmentally sound methods; identifying PCBs in open applications.

3.3.2. Implementation Phases

Activities and actions reflected in the POPs NIP will be implemented in 2 phases.

PHASE I (2014-2020) - Activities and actions for the improvement of legislation, establishment of the management for collection, recycling and environmentally sound disposal of wastes, including hazardous waste, especially POPs containing wastes and build laboratory capacity to determine POPs chemicals will be implemented in this phase.

PHASE II (2020-2030) - Activities and actions for phasing out the use of POPs containing products, dispose of stockpiles, decontamination of contaminated sites and reduction of releases will be implemented.

3.3.3. Management and Coordination

The state central organ in charge of environment shall be responsible for the nationwide management, coordination and monitoring of the programme implementation.

3.3.4. Financial Resources

Funding required for the programme implementation shall be provided from the following sources:

a) State and local budget;
b) Environmental Protection Fund ;
c) Global Environmental Facility (GEF) funding;
d) Financial and technical assistance and technology transfer from international organizations and donors;
e) Agencies and businesses and,
f) Other

3.3.5. Expected Outcomes of the Programme

Expected outcomes of the programme implementation are as following:

1. Improved laws and acts to regulate POPs-containing products and wastes;
2. Established management system for collecting, transporting, recycling, storing and treating hazardous wastes, waste electric and electronic equipment and end-of-life vehicles;
3. Reduced use of POPs-containing products and materials;
4. Reduced emissions and releases of unintentionally produced POPs from sources through application of Best Available Techniques and Best Environmental Practices (BAT/BEP);
5. Established information database of POPs sources and contaminated sites;

6. Decontaminated sites that polluted by POPs;
7. Phased out the use of PCB-containing equipment and completed environmentally sound decontamination;
8. Capacity built for laboratory, monitoring and biomonitoring of POPs chemicals and
9. Improved living environment for people.

3.3.6. Reporting

Submits to the Secretariat of the Convention reports on:

1. The Convention and NIP implementation in every 4 years;
2. Progress of PCBs decontamination actions in every 5 years.

Submits to the Government of Mongolia reports on:

1. NIP implementation progress semi-annually and annually;
2. NIP effectiveness evaluation in each phases of implementation.

3.3.7. Monitoring and Effectiveness Evaluation

The state central organ in charge of environment shall be responsible for the nationwide NIP management, coordination and monitoring.

3.4. ACTIVITIES, STRATEGY AND ACTION PLANS

3.4.1. Activity: Enhancement of legislation that regulates POPs and revise and adopt analytical and reference standards:

Strengthening institutional and regulatory mechanisms to manage, monitor and control POPs is fundamental to address national POPs issues. However, the basic assessment of the legal and institutional framework on POPs has identified several gaps and limitations which restrict proper POPs management, as presented in Table 47 below. The goal of the action plan on institutional and regulatory framework strengthening measures is to develop and enforce a legal framework for the proper management of POPs, including newly added substances to the Annexes of Stockholm Convention.

Table 47: Institutional and Regulatory Strengthening Action Plan

№	Actions	Expected Results	Implementation Period	Funding Sources	Implementing Agency
1	Create legal environment for the regulation of collection, disassembling, segregation, recycling, export, import and disposal of WEEEs and end-of-use vehicles, taking into consideration of ODS pollutants (CFC), climate change gases, (HFCs HCFC) and mercury and other heavy metals	Legal environment is created	2014-2020		MEGD, MoRT
2	Set reference values for new industrial POPs chemicals to be contained in import and produced EEEs and other products	Reference standards are set	2015		MEGD, NCSM

3	Create legal environment for limiting import of used EEEs and used vehicles	Import of used EEEs and vehicles decreased			MEGD, MRT, MoJ, MoF, GCA
4	Make a national harmonized system code for the registration of used import EEEs and to register new and used items separately	Registration of used import goods improved			MEGD, MoF, GCA
5	Approve international analytical standards of new industrial POPs chemicals as national standards	Analytical standards are in place	2017-2025	Environmental Protection Fund	MEGD, MAS, NCSM
6	Establish institutional framework and legal environment for implementation of the national programme on "Set of Measures for Plants Protection"	State policy on pesticides developed	2015-2016	State budget	MoIA
7	Approve and start using standards for the general requirements on trade of plants protection substances	Standards approved and used	2015-2016	Environmental protection fund	MoIA, MEGD, MoH

3.4.2. Activity:Identification of sites contaminated with POPs pesticides and take measures for decontamination

From the POPs pesticides, hexachlorocyclohexane (HCH) has been used in Mongolia widely under a common name of "Dust" as an insecticide in livestock ectoparasites (for mites, scabs, ticks, bloodsuckers etc.), as well as for disinfecting animal shelters and ordure.

Sites could have been potentially contaminated, specially at sites where HCH had been used for combating grasshoppers, spraying manually or using sprinkles, livestock washing places and pesticide storages. Analyses made in samples taken from some of the sites proved it. In particular, old pesticide storages and veterinaries usually located in settled areas, which have a potential risk to exposure.

There are considerable amount of stockpiles of obsolete pesticides in the country. For only HCH alone, over 5 tonnes are being stored in non-designated places.

In addition, though no production of POPs pesticides and their import and use is prohibited, trade of endosulfan and lindan is still going at international level. Taking this into account, it's also important to strengthen the capacity to control over import pesticides.

Table 48: Environmentally friendly decontamination of sites contaminated with POPs pesticides and disposal of obsolete pesticides

№	Actions	Expected Results	Implementation Period	Funding Sources	Implementing Agency
Key-objective: Environmentally friendly decontamination of sites contaminated with POPs pesticides and disposal of obsolete pesticides					
Activity: Identification of sites contaminated with POPs pesticides and take measures for decontamination (Compliance with the Stockholm Convention: Article 6, Annex A)					
1	Analytical capacity building for determining pesticides in food products and pollution of soil and water	Analytical capacity is built	2015-2018	State budget, international organizations and donors	MoIA, MEGD, MoES, SSIA
2	Detailed survey of contaminated sites with POPs and other pesticides in every provinces and soums and make database	Contaminated sites database	2015-2020	Science and Technology fund, Environmental protection fund	MEGD, MoIA, SSIA
3	Measures for environmentally sound disposal of POPs and other obsolete pesticides	Complete disposal of obsolete pesticides	2018-2024	State budget, international organizations and donors	MEGD, MoIA, Governor's Offices of Capital city and province, NEMA
4	Measures for decontamination of contaminated sites with POPs and other pesticides environmentally friendly methods	Complete decontamination of contaminated sites	2018-2030	State budget, international organizations and donors	MEGD, MoIA, MoES, SSIA, NEMA
5	Encourage biopesticides use and reduce the use of chemical pesticides through the national programme on "Set of Measures for Plants Protection" and projects	Use of chemical pesticides decreased, food security improved and environmental pollution reduced	During the NIP implementation	State budget, international organizations, donors, Science and technology fund, funding from economic entities	MEGD, MoIA
6	Organize trainings, workshops and awareness raising activities on specifications, actions and use of plants protection substances for individuals and businesses of agricultural sector	Public awareness raised and appropriate use is encouraged	During the NIP implementation	GEF, "Clean Air" fund, Environmental protection fund	MoIA, MEGD, MoH

3.4.3. Activity: Phasing out the use of PCB-containing equipment by 2020 and complete decontaminating PCB-containing equipment and waste by 2020 with environmentally sound methods

Capacity to environmentally sound management and disposal of PCBs-contaminated equipment is built in the country, it's potential to carry on decontamination actions step by step until 2020. MoE implements the actions under supervision by MEGD.

Table 49: "PCB-Free Country"

№	Actions	Expected Results	Implementation Period	Funding Sources	Implementing Agency
Key-objective: "PCB-Free Country"					
Activity: Phasing out the use of PCB-containing equipment by 2020 and complete decontaminating PCB-containing equipment and waste by 2020 with environmentally sound methods (Compliance with the Stockholm Convention: Article 3, Annex A PartII)					
1	Complete decontamination of PCB-containing equipment and wastes through environmentally sound methods by 2020	Decontamination of PCB-containing equipment and wastes completed	2015-2020	Funding from economic entities	MoE, MEGD
2	Study on products and materials potentially contaminated with PCBs	Information is available on potential products and materials contaminated with PCBs	2020-2024	Environmental protection fund, Science and Technology fund	MEGD
3	Guidelines on collection and disposal of PCB-containing products and materials, as well as products and materials potentially contaminated with PCBs	Guidelines are available	2024-2026	Environmental protection fund	MEGD
4	Organize trainings and awareness raising activities on handling PCB-containing products and materials, as well as products and materials potentially contaminated with PCBs	Public awareness raised	During the NIP implementation	GEF, international organizations, donors, Environmental protection fund	MEGD

3.4.4. Activity: Identification of sites contaminated with PCBs and measures for decontamination

Originated from oil, these lubricating materials are liquid, not soluble in water and contain different additives depending on their applications. Due to its high penetration quality, it seeps through cement and concrete floorings and bases, moreover reaches to the soil and underground water. It's considered that one kilogramme of oil pollutes 1,000 tonnes of water.

Exposure pathways of PCB-containing oil to humans and animals are soil and water through drinking water and food. Evaporation from contaminated sites can be another exposure route through inhalation.

Studies done previously showed that places where electric transformer maintenance and servicing workshop, waste oil storing wells and end-of-use equipment storage yards are potentially contaminated with high concentration. In addition, it's reasonable to survey and study sites or sub-stations where considerable oil spill due to accidents. These places might have dioxins pollution except for PCBs.

Table 50: Identification of sites contaminated with PCBs and measures for decontamination

№	Actions	Expected Results	Implementation Period	Funding Sources	Implementing Agency
Key-objective: "PCB-Free Country"					
Activity: Identification of sites contaminated with PCBs and measures for decontamination (*Compliance with the Stockholm Convention*: Article 6, Annex A)					
1	Study PCB-contaminated sites and develop database	Database of contaminated sites available	2016-2020	Environmental protection fund, Science and technology fund	MEGD, MAS
2	Measures for decontamoination of contaminated sites	Complete decontamination of the sites	2020-2030	State budget, international organizations, donors	MEGD, MAS, SSIA

3.4.5. Activity: To establish management of collecting, recycling and environmentall sound disposal of wastes containing new listed industrial POPs-PBDEs.

The Parties to the Stockholm Convention shall take measures to reduce import and use of new industrial POPs chemicals, namely, Hexabromodiphenyl ether and Heptabromodiphenyl ether, Tetrabromodiphenyl ether and Pentabromodiphenyl ether (PBDE), and eliminate their wastes by 2030 in an environmentally sound manner through BAT/BEP waste management and recycling of wastes and stockpiles.

Results of EEEs inventory, made through the PBDEs preliminary inventory, shows that use of EEEs in Mongolia was relatively high (per household – 0.9 television, 1.3 refrigerator, 0.9 washing machine, 0.6 vacuum cleaner, 0.4 computer and 5.5 mobile phones; for institutional consumers – 0.4 computer and 0.23 printer per employee; for corporate consumers – 0.2 computer and 0.1 printer per employee) and consequently WEEEs would be high, too. In the wake of phasing out of CRT televisions and monitors and transition of the national broadcasting system to digital system, Mongolia is expecting a considerable volume of PBDE-containing wastes in near future.

Another worrying result from the preliminary inventory is the number of vehicles in use, manufactured in 1975 to 2004, which constitutes 85.6% of total number of vehicles in the country, i.e. large number of end-of-use vehicles will be adding up to the waste volume in near future.

Therefore, establishment of management system for collecting, recycling and disposing of hazardous wastes, including WEEEs and end-of-use vehicles, is important to prevent and reduce environmental pollution and to protect human health from harmful impacts of toxic chemicals such as PBDEs, heavy metals like mercury and ozone depleting substances (in coolants, air-conditioning equipment etc.)

In addition, the establishment of management system for WEEEs and end-of-life vehicles can potentially reduce the consumption of raw materials from natural resources, thus it has double benefit of reducing greenhouse gas emissions.

Potential use of PFOS is not denied in fire foams, carpet and leather industries in Mongolia. PFOS content was detected in a type of fire foam used in Mongolia, as revealed by the preliminary inventory. Therefore, it's recommended to do more research on products and processes that may use PFOS and take measures for the replacement of alternatives, which do not contain PFOS.

Table 51: To establish management of collecting, recycling and environmentall sound disposal of wastes containing new listed industrial POPs-PBDEs

№	Actions	Expected Results	Implementation Period	Funding Sources	Implementing Agency
Key-objective: Reduction of POPs release in environment and further reduction of adverse effects on human health through the establishment of proper management of collection, recycling and environmentally sound disposal of wastes containing new industrial POPs chemicals					
Activity.To establish management of collecting, recycling and environmentall sound disposal of wastes containing new listed industrial POPs-PBDEs(Compliance with the Stockholm Convention: Article 3, Annex A)					
1	Build designated sites in every soums and districts for the collection of WEEEs and oversized wastes	Every soums and districts have designated points for the collection of WEEEs and oversized wastes	Ulaanbaatar: 2015-2018 Rural area: 2018-2020	Local budget, funding from economic entities	Governor's Offices of the Capital city, soums and districts, MEGD
2	Build designated landfills in Ulaanbaatar and rural areas on regional basis for WEEEs and end-of-life vehicles and other hazardous wastes which can not be further recycled or thermally recovered	Designated landfills for hazardous wastes will be built	Ulaanbaatar: 2015-2018 Rural area: 2018-2025	Local budget, funding from economic entities	Governor's Offices of the Capital city, soums and districts, MEGD, MoCUD
3	Develop promotion mechanism for businesses to handle collection, disassembling, segregation, recycling, export, import and disposal of WEEEs and end-of-use vehicles	Businesses or economic entities will be established for handling collection, disassembling, segregation, recycling, export, import and disposal of WEEEs and end-of-use vehicles	2014-2020		MEGD, MoF
4	Build a factory to recycle end-of-use vehicles and their parts	International standard factory is built	2015-2020	funding from economic entities, state budget	MoRT, MEGD, MoIA
5	Organize trainings and awareness raising activities on wastes containing new industrial POPs chemicals and their impacts on human health and environment	Awareness raised for policy makers, businesses (importers and retailers) and public	During the NIP implementation	GEF, international organizations, donors, Environmental protection fund	MEGD, MoH, MoES

3.4.6. Activity: To reduce import and use of products containing new industrial POPs chemicals.

POP-PBDEs had been produced and used in 1975 – 2004 and main applications wereas flame retardants in plastic and polymer materials in particular PUR foam in automobile upholstery. Minor uses include small amount of addition to automobile seat cover materials (textile) and plastic materials such as steering wheel, dashboard and doors etc. Added to polymer materials of CRT television and monitors for the same purpose.

Data from the customs reveals that 12.9% of imported vehicles was new and the remaining 87.1% was used. Import of used computers and televisions have been decreasing in recent years, however, still bringing in as donation and assistance.

It's believed that EEE manufacturing countries use recycled polymer materials in the production of EEEs and toys, therefore, it's necessary to control import plastic products for POP-PBDEs an other pollutants.

Table 52: Reduction of import and use of products containing new industrial POPs chemicals

№	Actions	Expected Results	Implementation Period	Funding Sources	Implementing Agency
Key-objective: Reduction of POPs release in environment and further reduction of adverse effects on human health through the establishment of proper management of collection, recycling and environmentally sound disposal of wastes containing new industrial POPs chemicals					
Activity. To reduce import and use of products containing new industrial POPs chemicals (Compliance with the Stockholm Convention: Article 3, Annex A)					
1	Improve controlling capacityof customs and border specialized inspection	Border control is improved	2016-2018	State budget	MEGD, GCA, SSIA
2	POPs phase out and alternatives assessment and implementation in the frame of sustainable production and consumption.	For the applications where POPs are used or have been in products or processes, the alternatives are assessed and the most sustainable alternatives be promoted in the use.	2015-2030	-	
3	Organize trainings and awareness raising activities on new industrial POPs chemicals, their effects on human health and the environment for importers and traders, for inspection agencies and public	Public awareness is raised	During the NIP implementation	GEF, international organizations, donors, Environmental protection fund	MEGD, MoH

3.4.7. Activity: Building laboratory capacity and training specialized personnel to determine and research new industrial POPs chemicals.

Exposure to EEEs, synthetic carpets, furnitures and toys that contain new industrial POPs chemicals at home may lead to indoor exposure and associted health effects. It has been shown that especially toddlers are more likely to expose[1].

Though, developed countries stopped adding new industrial POPs chemicals to the abovementioned products and vehicles, developing countries are still using them. Also, new products manufactured with recycled polymer materials contain POP-PBDEs.

Laboratory capacity is important to improve the control and monitoring of new industrial POPs and to allow to do research works.

Table 53: Building laboratory capacity and training of specialized personnel to determine and research new industrial POPs chemicals

№	Actions	Expected Results	Implementation Period	Funding Sources	Implementing Agency
Key-objective: Reduction of POPs release in environment and further reduction of adverse effects on human health through the establishment of proper management of collection, recycling and environmentally sound disposal of wastes containing new industrial POPs chemicals					
Activity. Building laboratory capacity and training specialized personnel to determine and research new industrial POPs chemicals (Compliance with the Stockholm Convention: Article 11, Annex A)					
1	Establish new industrial POPs chemicals laboratory and train personnel including international cooperations	Laboratory capacity is built	2016-2018	State budget	MEGD, MoES, MAS
2	Contamination study of new industrial POPs chemicals	Study is done in soil, water and air quality with potential contaminated sites as a target	2016-2018	Environmental Protection Fund, Science and Technology Fund	MEGD, GCA, SSIA
3	Capacity building for new industrial POPs biomonitoring	Will have a possibility to research human exposure to new industrial POPs chemicals	2020-2030	State budget, international organizations, donors, Science and Technology Fund	MoH, MoES, MEGD, MAS
4	Human health impact assessment of new industrial POPs chemicals	Research is done on exposure to new industrial POPs in human body and assessment is done on human health impact	2020-2030	State budget, international organizations, donors, Science and Technology Fund	MoH, MEGD, MoES, MAS

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3.4.8. Activity: Reduction of Dioxins and Furans Releases from Open Burning of Waste

All types of solid wastes are collected in waste dumps and landfills. In Ulaanbaatar, 1 engineering facility and 5 conventional landfills are operating, and 2,391 illegal open dumps, while in rural area, there are 220 conventional landfills and 221 open dumps. Except the engineered landfill in Ulaanbaatar, open burning occur in all other landfills and dumpsites. In rural areas – provinces, soums and settled areas – intentional burning of waste is executed twice a year, in spring and autumn, to reduce the waste volume. Of the total annual dioxins and furans release in Mongolia, release from open burning accounts for 42.6% and to reduce this emission it's necessary to take measures for the improvement of waste management, especially hazardous waste management, reduction of waste generation through promotion of segregation, recycling and re-using practices and application of environmentally friendly waste disposal technology and practices. This will not only reduce the dioxins and furans emissions but also emissions and releases of other substances that affect the global climate change such as methane and carbonic acid.

Table 54: Reduction of Unintentional POPs Release from Sources

№	Actions	Expected Results	Implementation Period	Funding Sources	Implementing Agency
Key-objective: Reduction of U-POPs Releases from Sources					
Activity: Reduction of Dioxins and Furans Releases from Open Burning of Waste (Compliance with the Stockholm Convention: Article 5, Annex C)					
1	Improve the source separation, collection and transport mechanism of waste	Waste recycling and re-using practices are increased	2015-2025	State and local budget, funding from economic entities	Governor's Offices of the Capital city and provinces, MEGD
2	Develop support and promotion mechanism and economic incentives for the individuals and business, which handle waste recycling and re-using	Volume of waste to be disposed is decreased	2015-2020	State and local budget	MEGD, MoF, Governor's Offices of the Capital city and provinces
3	Transfer the Capital city and provincial dumpsites to sanitary landfills and to provide with required equipment and machinery	Open burning of waste is reduced	2015-2025	State and local budget, funding from economic entities, international organizations and donors	Governor's Offices of the Capital city and provinces, MEGD, MoCUD
4	Transfer soum and settled areas dumpsites to sanitary landfills and to provide with required equipment and machinery	Open burning of waste is reduced	2020-2040	State and local budget, funding from economic entities	Provincial and Soum Governor's Offices, MEGD, MoCUD
5	Clean open dumps and abaondoned dumps and take measures to prevent from waste accumulation in these sites		2015-2018	Local budget	Provincial and Soum Governor's Offices, MEGD, MoCUD
6	Organize trainings and awareness raising activities on adverse effects of waste on human health and the environment and on waste management	Public awareness is raised	During the NIP implementation	GEF, international organizations, donors, Environmental protection fund	MEGD, MoH

3.4.9. Activity: Reduction of Dioxins and Furans from Medical Waste Incineration

Medical waste incinerators are usually primitive and handmade and almost all of them have no gas abatement systems installed. Annually, about 1,061 tonnes of medical waste is incinerated nationwide, 1,025 tonnes of which or 96.6% is burned in uncontrolled incinerators.

About 10-12% of medical wastes in Ulaanbaatar is incinerated and the remainder is autoclaved and landfilled, when all medical wastes are burned in rural areas. One province incinerates average 30-45 tonnes of medical waste a year. Emissions from the medical waste incineration makes up 29.7% total dioxins and furans emissions in the country, 99.5% of which is released to the air.

The major factor to reduce the emissions from this sector is to disinfect possible wastes through non-incineration methods.

In addition, application of hi-tech specifically designed incinerators not only for medical wastes, but also for hazardous waste is useful for the proper waste management and subsequently for the reduction of adverse effects on human health and the environment.

Table 55: Reduction of Dioxins and Furans from Medical Waste Incineration

№	Actions	Expected Results	Implementation Period	Funding Sources	Implementing Agency
Key-objective: Reduction of U-POPs Releases from Sources					
Activity: Reduction of Dioxins and Furans from Medical Waste Incineration (Compliance with the Stockholm Convention: Article 5, Annex C)					
1	Step by step measures to transfer to non-incineration technology of medical waste disposal	Volume of medical waste to be incinerated is reduced	2015-2025	State budget	MoH
2	Build BAT hazardous waste incineration facility	Hazardous waste incineration facility operated	2015-2020	State budget, funding from economic entities	MEGD, MoED MoH
3	Improve medical waste collection, transportation and disposal mechanisms	Medical waste management is improved	2020-2030	State and local budget	MoH, MEGD, Governor's Offices of the Capital city and provinces
4	Integrated information database and network of medical wastes		2015-2018	State budget	MoH, MEGD, Governor's Offices of the Capital city and provinces
5	Organize trainings, workshops and awareness raising activities	Awareness of public and medical workers increased	During the NIP implementation	State budget, international organizations, donors, Environmental protection fund	MoH, MEGD, Governor's Offices of the Capital city and provinces

3.4.10. Activity: Introduction of BAT/BEP for the reduction of UPOPs (PCDD, PCDF, PCB, PeCB and HCB) releases from coal fired power plants, heating boilers and household stoves.

Mongolia has cool climate and has rich resources of coal, which is widely used for energy production and heating.

According to an inventory, number of stoves up to 100kWt capacity were 489,257 pcs and heat and power generators with capacity above 100kWt were 3,134 pcs, all of which burn 7.4 million tonnes of coal, 78.6% of which is burned for heating and power generation and the remainder in household stoves. In addition to coal, 77.7 thousand tonnes of firewood was burned.

All the power plants operating in Mongolia has electrostatic filters for particulate matter abatement (PM10) and 32% of steam boilers has gas abatement systems installed.

Total dioxins and furans release from this source is 11.4g TEQ a year, which account for 8.21% of total release.

It's necessary to apply BAT/BEP in the source to reduce dioxins and furans emissions, specifically in the improvement of fuel quality, increasing combustion efficiency, improvement of cleaning system of gas from combustion and pollution control and monitoring system.

On the other side, improvement of combustion efficiency and application of BAT/BEP in power plants at the same time lead to improved energy effciency and reduction of CO_2 emissions, as well as UPOPs.

Coal fired power plants are also a significant source of mercury emission and the abatement of UPOPs can potentially contribute to the reduction of mercury releases.

In addition, proper management of ashes generated from coal combustion is crucial for controlling environmental pollution.

Table 56: Introduction of BAT/BEP for the reduction of UPOPs (PCDD, PCDF, PCB, PeCB and HCB) releases from coal fired power plants, heating boilers and household stoves

№	Actions	Expected Results	Implementation Period	Funding Sources	Implementing Agency
Key-objective: Reduction of U-POPs Releases from Sources					
Activity: Introduction of BAT/BEP for the reduction of UPOPs (PCDD, PCDF, PCB, PeCB and HCB) releases from coal fired power plants, heating boilers and household stoves (Compliance with the Stockholm Convention: Article 5, Annex C)					
1	Step by step measures to introduce BAT/BEP in power plant furnaces and heating boilers	Energy efficiency is increased and air pollution and UPOPs and Mercury emissions are reduced	During the NIP implementation	State budget, GEF, "Clean Air" Fund	MoE, MEGD
2	Automatic control system in all power plants to control combustion regime and emission	Fuel consumption and air pollutants reduced	During the NIP implementation	State budget	MoE, MEGD

3	Reduction of raw coal consumption	Air pollution reduced	2015-2020		MEGD, MoM, MoIA, MoE, Governor's Offices of the Capital city and provinces
4	Monitoring capacity building in coal fired power generators to control emissions	Monitoring in dioxin emissions is in place	2015-2020	State budget, "Clean Air" Fund, Environmental Protection fund	MEGD, MoES
5	Add reference values of dioxins, furans and mercutyto the Standards of Reference Values of Some Substances in the Gas from Power Plants and Thermal Plants Emitted to Atmosphere During Steam and Heating Boilers Operation	Will necessitate measures for the reduction of air pollution through the standards	2020		MEGD, MoH, NCSM
6	Measures for promoting, advertising and apllying energy efficient technology	Increased energy efficiency leads to the reduction of coal consumption, air pollution, CO_2 release, dioxinsand mercuryemissions	During the NIP implementation	State budget, international organizations, donors	MoE, MEGD
7	Organize trainings and awareness raising activities on BAT/BEP	Awareness on BAT/ BEP raised	2015-2020	GEF, international organizations, donors, Environmental protection fund	MEGD, MoE, MoCUD, Governor's Offices of the Capital city and provinces
8	Add "Green Stove" programme to curriculum of higher educational institutes, which prepare personnel for energy sector	Curriculum updated	2015	GEF, Environmental protection fund	MEGD, MES
9	Awareness raising activities for public on use of clean fuel and harms of burning wastes in house stoves	Public awareness raised and air pollution reduced	During the NIP implementation	GEF, "Clean Air" fund, Environmental protection fund	MEGD, MoH, Governor's Offices of the Capital city and provinces
10	Build biomonitoring capacity of dioxins and furans, mercury and other pollutants from power plants	Study on dioxins exposure of Mongolians is done	2020-2030	State budget, international organizations, donors, Science and technology fund	MoH, MoES