

PCB: A FORGOTTEN LEGACY?

2028: FINAL ELIMINATION OF PCB

UN 
environment
United Nations
Environment Programme

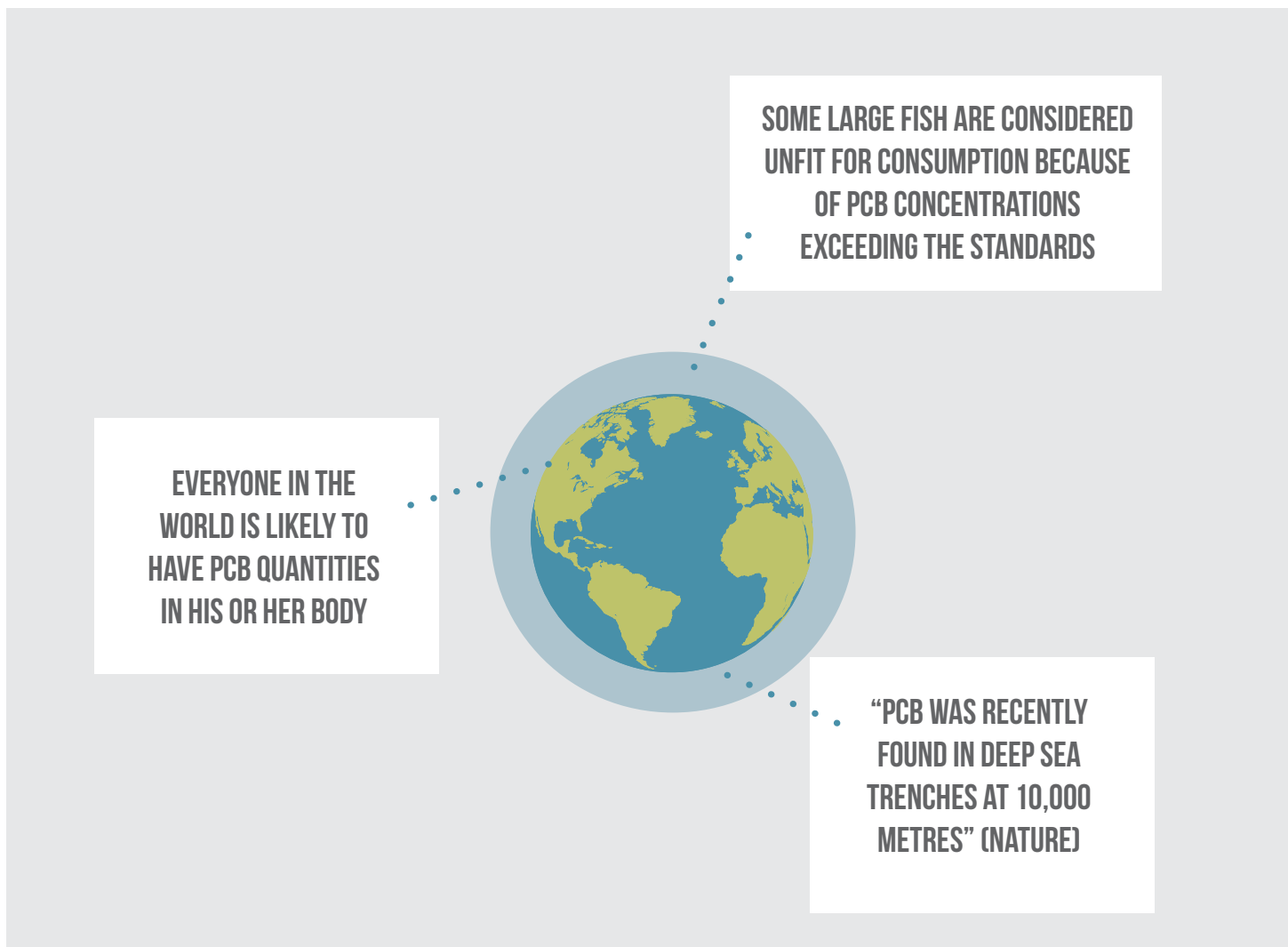

unitar
United Nations Institute
for Training and Research

Photo by Anil Sookdeo / Global Environment Facility

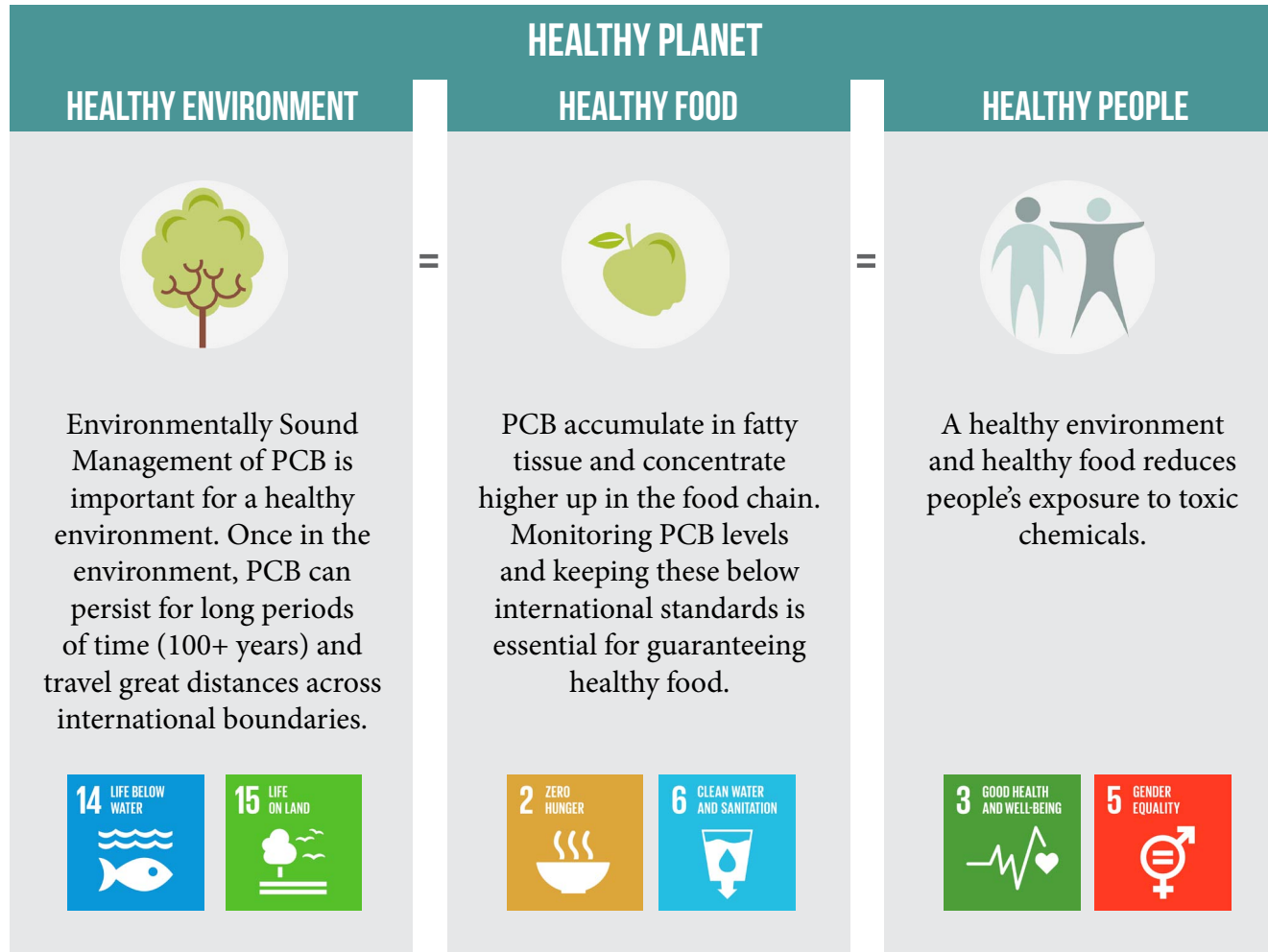
PCB: A FORGOTTEN LEGACY?

INTRODUCTION TO PCB

PCB, or polychlorinated biphenyls, are chemicals that have dangerous effects on the environment and human health. PCB have been used in many industrial applications such as transformers and capacitors. Although they are no longer allowed to be produced, they can still be found everywhere around us.



WORKING TOGETHER TOWARD ELIMINATION OF PCB IS KEY FOR A SUSTAINABLE FUTURE.



The PCB Elimination Network (PEN) is a global multi-stakeholder network under the Stockholm Convention that promotes and encourages the environmentally sound management of PCB with a view to attaining the 2025 and 2028 goals.

The PEN addresses four key themes:



Country Specific Diagnoses

PCB INVENTORIES

Handling, Maintenance, Transportation and Interim Storage

PCB MANAGEMENT

Toward a Sustainable Future

ELIMINATION OF PCB

Chemicals in the Everyday Environment

PCB IN OPEN APPLICATIONS

The Stockholm Convention is a global treaty that aims to protect the environment and human health from PCB and other chemicals, called Persistent Organic Pollutants. It requires Parties to phase out the use of PCB in equipment by 2025 and ensure elimination of PCB by 2028.

TOWARD A SUSTAINABLE FUTURE

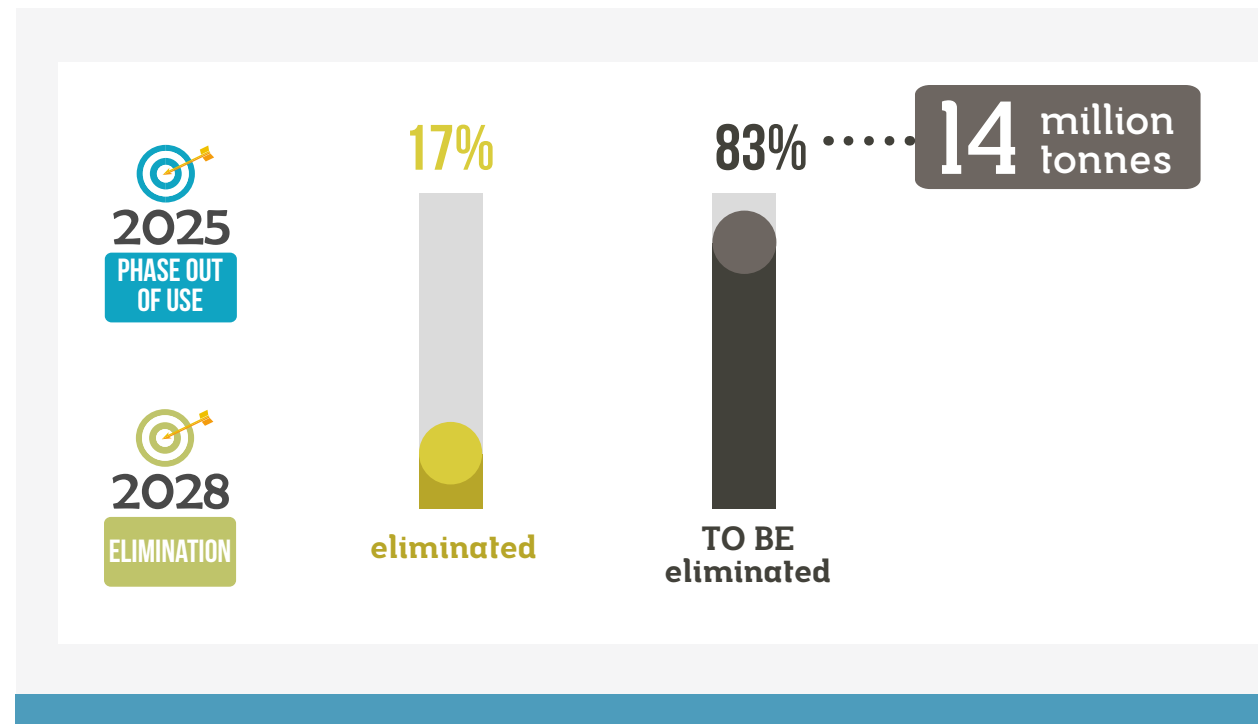
ELIMINATION OF PCB

83% of the total amount of PCB in the world remains to be eliminated.

The Stockholm Convention requires Parties to phase out the use of PCB in equipment by 2025 and ensure elimination of PCB by 2028. UN Environment's Chemicals and Health Branch, as the Secretariat of the PCB Elimination Network, reviewed progress in eliminating PCB.

HOW FAR DID WE GET?

Parties are currently not on track to achieve the 2025 and 2028 goals. So far, only 17% of the total amount of PCB has been eliminated; 83%, which corresponds to 14 million tonnes, remains to be eliminated.

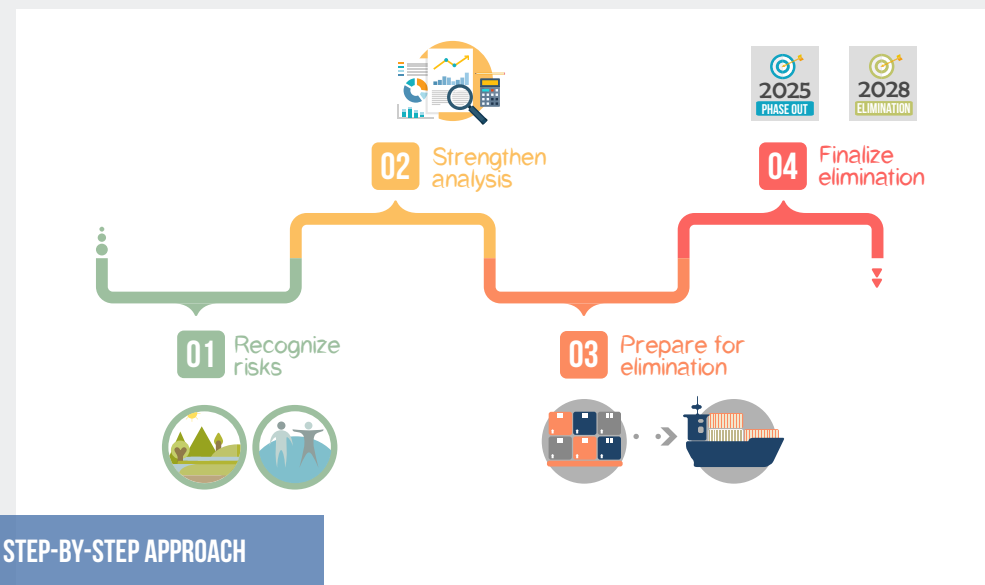


ACHIEVING THE GOALS

A systematic approach and careful planning are essential to achieve the goals. Parties should:

- 1 Recognize once more the risks PCB pose to the environment and human health
- 2 Strengthen the analyses of their PCB situation
- 3 Prepare for elimination of PCB, taking into account, maintenance, handling, transportation, and interim storage
- 4 Finalize the elimination process to achieve the 2025 and 2028 goals

Additionally, throughout the entire process, countries facing challenges should seek assistance.



CROSS-CONTAMINATION

The dissemination of PCB occurs mainly through cross-contamination. For example, retro-filling transformers can result in the newly introduced oil becoming contaminated with PCB. Due to cross-contamination, the mass of liquids and equipment containing or contaminated with PCB is much larger than the amounts of PCB produced. A single tonne of PCB can generate multiple tonnes of PCB wastes.

Data on elimination of PCB is often incomprehensive, outdated, and incomplete.

Environmentally Sound Management of PCB is key for a healthy planet. A healthy environment and healthy food reduces people's exposure to toxic chemicals.

3 GOOD HEALTH AND WELL-BEING



COUNTRY SPECIFIC DIAGNOSES

PCB INVENTORIES

*Locating, testing, and labelling
equipment containing or
contaminated with PCB.*

Systematic and harmonized PCB inventories of equipment containing or contaminated with PCB are key to achieving the 2025 and 2028 goals of the Stockholm Convention. An inventory includes detailed information on the total PCB mass eliminated to date and to be eliminated in the future.

AN IDEAL INVENTORY

The following elements comprise an ideal inventory:



The type of equipment
(transformer, capacitor, other)



Status (in or out of use,
waste, storage, planned for
destruction)



Number of units, origin
(country, year)



Source of information



The total mass, including details
on solid mass, liquid/oil mass,
PCB mass (in tonnes)

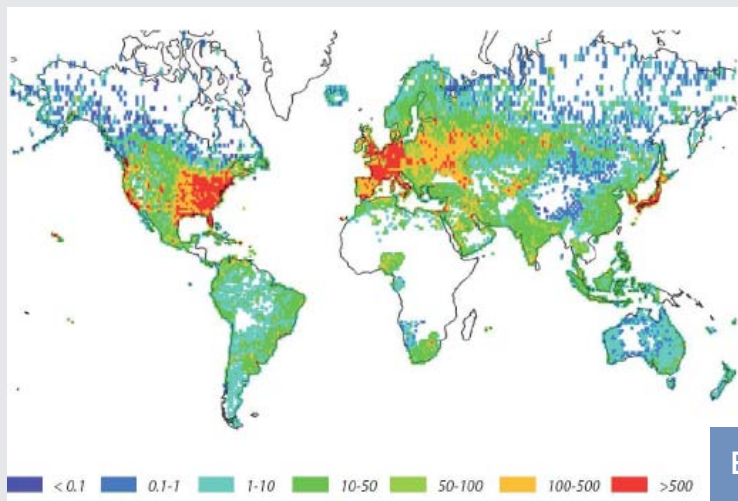


Comments and other
available details



PCB concentration
(in oil, parts per million)

It is important to take into account that setting up a national PCB inventory is a dynamic process as it needs to be regularly updated to reflect changes in stocks. It is also important to include information on the complete lifecycle of the equipment.



The figure shows an estimate of the global distribution of equipment containing or contaminated with PCB. The majority was produced in industrialized countries, but exported to countries across the world.

THE WAY FORWARD

The undertaking of a detailed inventory is a prerequisite for the achievement of the 2025 and 2028 goals. The following elements are key for the way forward:

- Awareness and stakeholder participation
- Adequate inventory approaches
- PCB sampling and testing
- Addressing cross-contamination

GUIDANCE

“The PCB Inventory Guidance” (PEN, 2016) provides details on how to prepare and update a comprehensive and complete PCB inventory by following a systematic and harmonized approach, focusing on sampling, analysis, and labelling.

The PCB Inventory Guidance can be found on our website.

To date, inventories have focused on PCB in closed applications, such as transformers and capacitors.

HANDLING, MAINTENANCE, TRANSPORTATION AND INTERIM STORAGE

PCB MANAGEMENT

*Safe management
of toxic chemicals.*



PCB FROM TRANSFORMERS BEING COLLECTED FOR PROPER DISPOSAL

Source: Photo by Anil Sookdeo / Global Environment Facility

The PCB Management Guidance provides information on maintenance, handling, transportation, and interim storage of liquids containing PCB and equipment contaminated with PCB to facilitate elimination of PCB by 2028.

The guidance is based on collected experiences and lessons learned from experts, countries and companies, existing guidelines on inventories and handling of PCB, and relevant regulations, taking into account regional variations. The guidance explains relevant technical guidelines, outlines important procedures, and provides practical recommendations for implementation.

A. PCB INVENTORIES



Inventories need to be undertaken in a systematic and harmonized manner, include information on the lifecycle of equipment, and should be regularly updated to reflect changes in stocks.

The PCB Management Guidance provides a categorized list of concerned equipment to facilitate identification, such as equipment for electricity generation, agriculture, industry, mining, and buildings.

D. TEMPORARY STORAGE



The main objective of proper storage of PCB liquids and waste before their treatment or elimination is to prevent contamination of the environment and to avoid human exposure. The storage process necessarily involves the implementation of safety and security measures to reduce the risks of spills and fires, including through natural disasters.

For proper storage, an appropriate location should be selected, equipment should be isolated under safe conditions, and the site must have appropriate safety equipment.

B. HANDLING



Some important appropriate and precautionary measures for handling include identification of equipment, labelling, isolation, and testing by using Chlor-N-OIL and possibly gas chromatography in a laboratory.

If a PCB content of over 50 mg/kg is confirmed, the equipment should be properly labelled and stored.

E. EMERGENCY PLAN



It is important to prepare an emergency plan to assess and address the potential risks that may arise in the case of storage of PCB liquids and equipment, including spills, leaks, fires, and explosions. An emergency plan should include information on trained personnel, an efficient communication system with the authorities, a response action plan, and required tools, equipment, and materials for both the emergency and first aid.

The PCB Management Guidance can be found on our website.

C. TRANSPORTATION



National: The transportation of PCB liquids and equipment within a national territory requires a transport manifest. This manifest includes information on the carrier, the owner of the equipment, the company receiving the load, and on the cargo.

International: To export PCB liquids or equipment to another country, a notification of transboundary movement under the Basel Convention must be prepared. This requires submitting the necessary documentation to the competent authority of the Basel Convention in the country to which the PCB liquids or equipment will be exported.

“Unsound management can lead to cross-contamination, soil and water pollution, and high economic costs”

PCB Management Guidance

6 CLEAN WATER AND SANITATION



REDUCING EXPOSURE TO PCB IN DAILY LIFE

PCB IN OPEN APPLICATIONS

PCB in open applications are an important source of direct toxic chemical exposure to humans.

PCB were produced in large quantities between the 1930s and 1980s. They were used in closed applications such as transformers and capacitors, and in open applications such as in paint, buildings, installations, and machinery.

PCB in open applications are listed under the Stockholm Convention:



PCB WERE USED IN OPEN APPLICATIONS SUCH AS IN PAINT

“Identify other articles containing more than 0.005% of PCB and manage these in an Environmentally Sound Manner”.

However, to date, countries have focussed their efforts on elimination of PCB in closed applications and no concrete deadlines have been set regarding PCB in open applications.

PCB IN OPEN APPLICATIONS IN THE EVERYDAY ENVIRONMENT

It is estimated that the majority of these open applications are still in use today. They can be found all around us in the everyday environment.

In Germany, pregnant teachers were banned from a school building due to high exposure risk to PCB in open applications.

PCB IN OPEN APPLICATIONS



Paint



Buildings



Installations



Machinery

DIRECT EXPOSURE

PCB in open applications are responsible for one fifth of the global sources of PCB and make up at least 50% of the PCB emissions that humans are exposed to. In comparison to PCB in closed applications, they are more easily released into the environment and therefore pose a significant risk to direct human exposure in daily life.

THE WAY FORWARD

A Global Environment Facility (GEF) project proposal on open applications is being developed by the United Nations Institute for Training and Research (UNITAR) and UN Environment. The

overall objective is to assess the global situation of Persistent Organic Pollutants (POPs) in open applications, including PCB, and to draft and pilot test guidance and methodologies to identify their sources and generate reliable data. This will enable sound planning and development of policies at the national level to manage POPs in open applications as well as the development of a global strategy.

Sound management of PCB in open applications is part of the solution for a safe and sustainable everyday environment.



A GLOBAL PARTNERSHIP

THE PCB ELIMINATION NETWORK (PEN)

A global multi-stakeholder mechanism that promotes and encourages the environmentally sound management of PCB with a view to attaining the 2025 and 2028 goals of the Stockholm Convention.



SEVENTH MEETING OF THE ADVISORY COMMITTEE OF THE PEN, 2 TO 3 DECEMBER 2016. ASUNCIÓN, PARAGUAY.

THE PCB ELIMINATION NETWORK (PEN)

The PEN was established by the Conference of the Parties (COP) to the Stockholm Convention at its fourth meeting in 2009 (decision SC-4/5). The PEN leads the way toward elimination of PCB in accordance with the Basel Convention Technical Guidelines by:

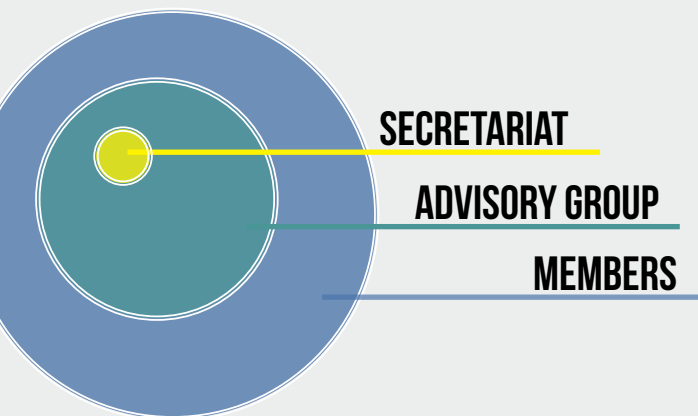
- Defining strategies and facilitating activities
- Providing targeted assistance and developing guidance materials
- Raising awareness
- Encouraging global and regional coordination and exchange of information between different stakeholders

The PEN provides updates on progress of work to every meeting of the COP to the Stockholm Convention and the United Nations Environment Assembly (UNEA). At these meetings, important decisions are made regarding the activities of the PEN.

Strengthen the means of implementation and revitalize the global partnership for sustainable development.

17 PARTNERSHIPS FOR THE GOALS





A MULTI-STAKEHOLDER MECHANISM

The PEN is coordinated by a Secretariat, hosted by UN Environment's Chemicals and Health Branch. The Secretariat works in close collaboration with the Basel, Rotterdam and Stockholm Conventions Secretariat.

The PEN is composed of an Advisory Committee and PEN members. The Advisory Committee oversees the work of the PEN and meets annually to review the activities undertaken and establish the direction for future work. Membership to the PEN is open to governments, inter-governmental organizations, donors, PCB holders, non-governmental organizations, industry, experts/academia, Stockholm and Basel Conventions Regional Centres, and business sectors.

ACTIVITIES

The PEN undertakes a number of activities within the context of *PCB - A Forgotten Legacy?* and four thematic groups:

INVENTORIES

MAINTENANCE, HANDLING AND INTERIM STORAGE OF EQUIPMENT CONTAINING PCB

DISPOSAL OF PCB AND REMEDIATION OF CONTAMINATED SITES

OPEN APPLICATIONS OF PCB

Some activity highlights include:

NEW DOCUMENTS

- The Consolidated Assessment of Efforts Made toward the Elimination of PCB (2016)
- PCB Inventory Guidance (2016)
- PCB Management Guidance (2016)

AWARENESS RAISING

- The PEN has been developing and implementing a new awareness raising strategy within the context *PCB - A Forgotten Legacy?*

Other concrete activities include: supporting efforts addressing PCB in open applications; assisting with preparations for the COP and the UNEA; and coordinating the meetings of the Advisory Committee.

CONTACT US!

Do you have questions about the PEN or its activities? Would you like to become part of the PEN?

E-mail: science.chemicals@unep.org

or visit the **PEN page on our website**
web.unep.org/chemicalsandwaste

SAFE MANAGEMENT OF CHEMICALS FOR HEALTHY OCEANS

PCB IN OCEANS

Oceans, seas, and coastal areas form an integrated and essential component of the Earth's ecosystems and are critical to sustainable development.

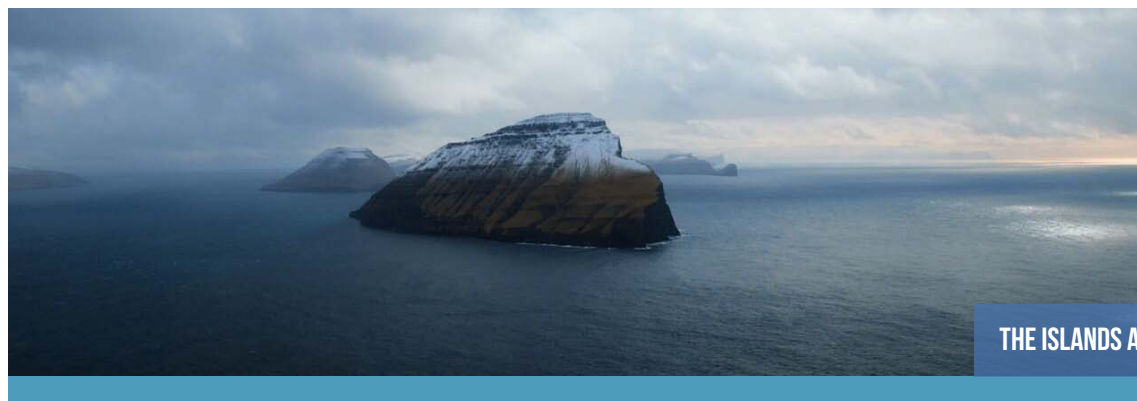
A SUSTAINABLE FUTURE

17 goals to transform our world by 2030

The beginning of 2016 marked the start of the 2030 Agenda for Sustainable Development and the related Sustainable Development Goals (SDGs). The SDGs provide a broad framework and global opportunity for addressing the linkages between chemicals, ecosystems, and human health.

- As much as 40 per cent of the world oceans are heavily affected by human activities, including pollution, depleted fisheries, and loss of coastal habitats.
- One of the targets is to prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution by 2025.

Conserve and sustainably use the oceans, seas and marine resources



THE ISLANDS AND THE WHALES

DOCUMENTARY: THE ISLANDS AND THE WHALES

The power of filmmaking

'The Islands and the Whales', a key documentary by Mike Day, illustrates that hazardous chemicals have worldwide effects on the environment and human health.

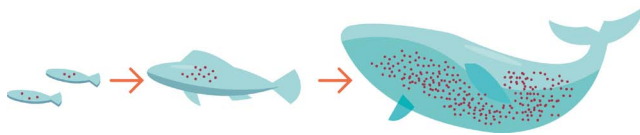
"In their remote home in the North Atlantic, the Faroese Islanders have always eaten what nature could provide, proud to put local food on the table. The land yields little, so they have always relied on harvesting their seas.

Hunting whales and seabirds kept them alive for generations, and gave them the way of life they love; a life they would pass on to their children.

But today they face a grave threat to this tradition, and it is not the controversy surrounding whaling that threatens the Faroese way of life; the danger is coming from the whales themselves.

The Faroese are among the first to feel the effects of our ever more polluted oceans. They have discovered that their beloved whales are toxic, contaminated by the outside world. What once secured their survival now endangers their children and the Faroese Islanders must make a choice between health and tradition."

More information:
www.theislandsandthewhales.com



EXTRAORDINARY LEVELS OF TOXIC CHEMICALS IN THE DEEPEST OCEAN FAUNA NATURE (2017)

Evidence of environmental pollution by humans on the most remote and inaccessible habitats

Scientists have found extraordinary levels of the toxic polychlorinated biphenyls (PCB) and polybrominated diphenyls (PBDE) in ocean fauna in two of the world's deepest ocean trenches (>10,000 metres). PCB and PBDE are both human-made chemicals that have dangerous effects on the environment and our health. The scientists stress that “the oceans comprise the largest biome on the planet, with the deep ocean operating as a potential sink for the pollutants and litter that are discarded into the seas”.

The finding reveals bioaccumulation of these toxic chemicals through the food chain across the world's oceans and to full ocean depth. To illustrate the levels found in the Mariana trench in the North Pacific, the scientists state that “the highest levels of PCB were fifty times more contaminated than crabs from paddy fields fed by the Liaohe River, one of the most polluted rivers in China”.

PCB POLLUTION CONTINUES TO IMPACT POPULATIONS OF ORCAS AND OTHER DOLPHINS IN EUROPEAN WATERS NATURE (2017)

In a large pan-European meta-analysis of stranded or biopsied cetaceans, three out of four species – striped dolphins, bottlenose dolphins, and killer whales – had mean PCB levels that markedly exceeded all known marine mammal PCB toxicity thresholds. Some locations (e.g. western Mediterranean Sea, south-west Iberian Peninsula) are global PCB “hotspots” for marine mammals.

Despite regulations and mitigation measures to reduce PCB pollution, their biomagnification in marine food webs continues to cause severe impacts among cetacean top predators in European seas.



Source: Clean Seas campaign, UN Environment

PCB IN MARINE LITTER

Each year, at least 8 million tonnes of plastic leak into the ocean

Some marine litter such as (micro)plastics absorb PCB and most other persistent organic pollutants (POPs). When fish and shellfish ingest plastics, the PCB desorbs in the gut and intestines and causes additional exposure.

On 23 February 2017, UN Environment launched the #CleanSeas campaign to tackle the pressing problem of marine plastic pollution.

More information: cleanseas.org

A TOXIC LEGACY IN ABANDONED MINES

THE CASE OF CHILE AND PERU

Helping rid the world of toxic chemicals is a key step to helping maintain the earth's ecosystems.



The global mining industry has been an extensive user of electrical equipment containing toxic chemicals, such as PCB. Mismanagement of mining equipment can lead to releases of PCB into the environment. Some of the direct consequences can be contamination of groundwater and negative health effects for mineworkers and communities living nearby.

In Chile and Peru, a project funded by the Global Environment Facility (GEF) entitled “Best Practices for PCB Management in the Mining Sector of South America” was launched to improve the situation in mines. The

project aimed to improve mining companies’ performance, while preserving the environment and health of the workers and the communities, by investing in the sound management of PCB equipment in mines, training mine workers, and engaging with the communities. The Basel Convention Regional Centre for South America executed the project with the support of UN Environment.

Some of the main challenges faced concerned the difficult accessibility and remote locations of the mines. Some of the mines were located at high altitudes, up to more than 4,000 meters above sea level.

PROJECT INFORMATION

Title: Best Practices for PCB Management in the Mining Sector of South America

Location: Chile and Peru

Project phase: 2010 – 2014

Executing agency: Basel Convention Regional Centre for South America

Implementing partner: UN Environment

Project cost: 2.4 million USD

Website: www.thegef.org or www.inti.gob.ar/pcb/



The project successfully mobilised efforts on PCB in the two countries. Training, development of guidance materials and action plans, technical assistance, and new agreements led to new partnerships between the implementing agency, executing agency, companies, experts, national laboratories, and other stakeholders. Moreover, the project encouraged the transfer of technology for local development of PCB disposal and resulted in the treatment of 50 tonnes of PCB. It is expected that more companies will use the existing guidance materials and take advantage of the tools and methodologies established as part of the project.

The project in Chile and Peru has demonstrated how action can be effectively taken to tackle the issue of contaminated PCB equipment in mines. The toxic legacy of such equipment in abandoned mines around the world should not be forgotten as PCB are highly persistent and continue to pose direct and long-term risks to the environment and human health.

Mismanagement of mining equipment can lead to releases of PCB into the environment. Some of the direct consequences can be contamination of groundwater.

6 CLEAN WATER AND SANITATION



The PCB Elimination Network (PEN) is a global multi-stakeholder mechanism that promotes and encourages the environmentally sound management of PCB with a view to attaining the 2025 and 2028 goals of the Stockholm Convention.

The PEN leads the way toward elimination of PCB by:

- Defining strategies and facilitating activities
- Providing targeted assistance and developing guidance materials
- Raising awareness
- Encouraging global and regional coordination and exchange of information between different stakeholders

Do you have questions about the PEN or its activities?

Would you like to become part of the PEN?

E-mail: science.chemicals@unep.org

or visit the PEN page on our website web.unep.org/chemicalsandwaste

UN Environment

Secretariat of the PCB Elimination Network (PEN)

Chemicals and Health Branch | Economy Division

International Environment House 1 | 11-13 Chemin des Anémones

CH-1219 Chatelaine | Geneva Switzerland

E-mail : science.chemicals@unep.org

