



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION

# Circularity and the UNIDO Stockholm Convention Programme





Policies for POPs management

Clean Recycling

PCB Decontamination

Toxic-free manufacturing

Emission-free processes

The projects referenced are co-financed by the  
Global Environment Facility (GEF).



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# Circular Economy and the Stockholm Convention

By and large, today's manufacturing takes raw materials from the environment and turns them into new products, which are then disposed of after use. It's a linear process with a beginning and an end. In this system, limited raw materials eventually run out. Waste accumulates, either incurring expenses related to disposal or polluting.

In addition, manufacturing processes are often inefficient, leading to further waste of natural resources. In a circular economy, however, products are designed for durability, reuse and recyclability, and materials for new products come from old products. As much as possible, everything is reused, remanufactured, recycled back into a raw material, used as a source of energy, or as a last resort, disposed of.

The circular economy is a new way of creating value and, ultimately, prosperity. It works by extending product lifespan through improved design and servicing, and relocating waste from the end of the supply chain to the beginning. Rather than using resources just once, efficiency is maximized by using them over and over again.

Governments are encouraging — and, in some cases, demanding — the adoption of circular economy principles and practices in the name of enhanced resource efficiency and reduced waste. At the global level, the Sustainable Development Goals (SDGs), adopted by United Nations Member States in 2015, encompass many related ambitions.

There are many examples of how the United Nations Industrial Development Organization (UNIDO) adopts a circular economy approach in its Stockholm Convention programme. From extending product lifetimes, to ensuring the safe recycling of goods through the substitution of Persistent Organic Pollutants (POPs), this approach is explored further in the following pages.

# POLICIES FOR POPs MANAGEMENT ARE...

## ensuring sustainability through legal advice and regulatory assistance

UNIDO intervenes on policies for POPs management on two levels: providing technical assistance to developing countries and countries in transition to formulate or update their National Implementation Plan (NIP); and integrating a policy and regulatory technical assistance component in thematic POPs projects, in order to embed sectoral change in policies at country level.

In assisting countries in formulating or updating their NIP, UNIDO can help to link sectoral priorities to wider policies, such as circular economy. At national level, POPs and broader toxic substance consideration is integrated with circularity and recycling policies. At project level, improving the regulatory framework addresses the need to create an effective waste management system, including a strong recycling industry.





## ***POLICIES FOR POPs MANAGEMENT IN ACTION***

Building strong legal and institutional frameworks is central to UNIDO’s project on the “Sound Management of Unintentional POPs and PBDEs” executed by the Republic of Côte d’Ivoire’s Ministry of Environment. The project aims to reduce Unintentional POP and polybrominated diphenyl ethers (PBDE) emissions from the national industrial waste sector by providing a regulatory framework conducive to the safe and sound management of POPs-contaminated waste electrical and electronic equipment (WEEE) and end of life vehicle (ELV) components. A bill on industrial waste management and several decrees will also be drafted. This will serve to strengthen the links between relevant legislative frameworks and the circular economy, hazardous chemicals and POPs management, and will be further promoted by targeted awareness campaigns.

### **UNIDO POPs Programme Results:**



**231** environmental policies and regulations approved




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“This project aims, through a coordinated intervention, to strengthen the legal and institutional framework, create business opportunities and invest in the sector for the creation of green jobs.”

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*Professor Joseph SEKA SEKA, Ministry of Environment and Sustainable Development, Cote d’Ivoire*

# CLEAN RECYCLING IS...

## enhancing resource use in an environmentally sound way

Persistent Organic Pollutants (POPs) are present in a wide range of products from cars to mattresses. This poses a serious threat to public health and the environment. UNIDO addresses these threats by supporting recycling industries through the introduction of environmentally sound management (ESM) systems. These systems ensure that operations meet the best applicable recycling standards, national regulations and international treaties so that recyclable materials conform to high quality specifications.



Improving the collection, treatment and recycling of POPs-containing waste supports the circular economy approach by promoting the preventive 4-R paradigm (replace, reduce, reuse, recycle).





## CLEAN RECYCLING IN ACTION

As the fastest-growing waste stream in the world, electronic waste, known as e-waste, continues to represent a threat to both the environment and global human health. UNIDO is working with partners on a project co-funded by the Global Environment Facility (GEF) to support 13 countries across Latin America in addressing this issue.

The UNIDO-GEF project on “Strengthening of National Initiatives and Enhancement of Regional Cooperation for the Environmentally Sound Management of POPs in WEEE” assists the countries both technically and financially, advising on policies, business models, legislation, technology, and awareness-raising. A circular economy approach will support national industries providing recycling services and high quality recyclable materials, generating significant numbers of direct decent jobs and work opportunities. At the same time, the project will help to protect the environment from hazardous wastes, chemicals and emissions, recovering raw materials and providing affordable refurbished products.

### UNIDO POPs Programme Results:



Number of new  
businesses **117**



Materials recycled/reused  
**1,339** in metric tons




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“This project is fundamental because we want to be part of the bioeconomy, where the circular economy is integrated into the productive matrix of the country.”

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*Tarsicio Granizo, former Minister of Environment, Ecuador*

# PCB DECONTAMINATION IS...

## neutralizing dangerous substances

From paint to electrical equipment, polychlorinated biphenyls (PCBs) have been employed in a multitude of applications, many of which are still in use today. The presence of PCBs in the environment poses a serious threat to human health and wildlife. In order to address these threats, UNIDO promotes the establishment of environmentally sound PCB management systems by enhancing national legal, institutional and technical capacities for PCB management. The adoption of best working practices, international standards and protocols and technology transfer will prevent further cross-contamination of equipment with PCBs and the introduction of PCBs into the environment.



The installation of a treatment facility for PCB-containing transformers promotes the circular economy by removing toxic substances from transformers and extending their in-service lifetime, or alternatively recovering the transformer oil and recycling the cleaned metals.







## PCB DECONTAMINATION IN ACTION

Owing to a lack of in-country treatment options and rising overseas disposal costs, some PCB waste was being discharged and introduced into the environment in the Republic of North Macedonia.

UNIDO works with a number of industry partners, including the national power distribution company “EVN” on the “Phasing out of PCBs and PCB-containing equipment”. From policy framework improvement to detailed PCB inventories, the project established bases for sound PCB management throughout the entire life-cycle (inventory, usage, handling, storage, transportation and disposal). Environmental officers were trained on sound PCB management, a secure temporary PCB storage facility was established, and PCB-containing transformers were treated using newly-installed technology, extending the lifetime of equipment and oils.

### UNIDO POPs Programme Results:



POPs eliminated/  
discontinued  
**11,568** metric tons  
PCB, pesticides, DDT



POPs safeguarded  
**77,670** metric tons  
PCB, pesticides, DDT




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“We are the first country in the region to establish a PCB treatment facility, enabling the decontamination and reuse of PCBs-laced transformer oils.”

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*Stevo Temelkovski, Deputy Minister of Environment and Physical Planning, Republic of North Macedonia*

# TOXIC-FREE MANUFACTURING IS...

## safer production for people and the planet

In manufacturing, POPs are sometimes used as inputs, or are present as contaminants, becoming ingredients in products. UNIDO supports the manufacture and introduction of alternative chemicals and non-chemical solutions for industries worldwide. This is with the aim of eliminating risks to human health and the environment.



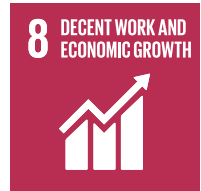
Many of the Best Available Techniques and Best Environmental Practices (BAT/BEP) advocated by UNIDO support the circular economy by promoting the recycling of industrial outputs, for example, whilst helping industries to minimize releases of Unintentional POPs.



## TOXIC-FREE MANUFACTURING IN ACTION

Pesticides, dyestuffs/pigments, effluent water and sludge are all potential sources of Unintentional POPs (dioxin/furan) releases in the textile industry. UNIDO's Pilot Demonstration Project on "the Implementation of Best Available Techniques and Best Environmental Practices (BAT/BEP) in the Textile Industry" in Ethiopia was successful in demonstrating how the textile industry could adopt greener technologies in a more inclusive and sustainable manner, thus increasing efficiency and reducing releases of POPs. At Kombolcha Textile Share Company (KTSC), one of the country's largest integrated textile factories, extensive analysis determined a range of ways in which KTSC could lead the way in a unified industry-wide approach to achieving reduced POPs releases in the dyeing and finishing activities of textile processes.

The "Development and Promotion of non-POPs alternative to DDT" project is funded by GEF and implemented by UNIDO with the support of a range of Indian ministries and other agencies. It aims to prevent malaria through alternative environmentally friendly methods, such as neem-based botanical pesticides, bt-based bio pesticides and Long Lasting Insecticidal Nets (LLINs) including the proper disposal of its "end-of-life" to prevent environmental contamination. These methods are far less toxic and also bring benefits to farming communities by creating jobs, whilst new neem plantations increase green cover, contributing to mitigating climate change.



### UNIDO POPs Programme Results:



Number of companies adopting BEP **4,718**



Number of women trained **100,235**




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“There was a large amount of chemical wastage and inefficiency before the new machines arrived. Now the chemist has to make only 2 trials and no longer 16 trials for a week or more.”

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*Mr. Birhanu G/Medhine, Processing Department Head, KTSC*

# EMISSION-FREE PROCESSES ARE...

## kinder to the environment and company budgets

Power plant operations, waste incineration and smelting are just some of the industrial processes that generate emissions of Unintentional POPs and other toxic pollutants. Listed under the Stockholm Convention, these processes are also highly energy-intensive. This presents an opportunity for UNIDO to explore the synergistic reduction of POPs and greenhouse gases.

Many energy-intensive processes use secondary raw materials or alternative fuels, supporting the circular economy by minimizing resource use. The application of Best Available Techniques and Best Environmental Practices (BAT/BEP) in the value chain of secondary or alternative materials prevents unwanted emissions of environmentally harmful and health-hazardous substances, as well as enhancing energy efficiency.





## EMISSION-FREE PROCESSES IN ACTION

Whilst the recycling of metals is an important and well-established economic industrial activity, the production of secondary metals from scrap through high temperature metallurgical processes can lead to the enhanced formation and release of Unintentional POPs and other pollutants such as mercury.

UNIDO works with the Department of Primary Industries and Mines under the Ministry of Industry of Thailand (DPIM-MoI) on the GEF-funded project “Greening the scrap metal value chain through promotion of BAT/BEP to reduce Unintentional POPs releases from Recycling Facilities.” This project aims to remove many of the existing technical and institutional barriers to adopting environmentally sustainable approaches to the recycling of scrap metal along the entire value chain. It also aims to link, wherever possible, energy efficiency improvements (related to improved profitability) with an effective and economic reduction of Unintentional POPs releases.

### UNIDO POPs Programme Results:



Unintentional POPs  
avoided **161,930** mg



Unintentional POPs  
safeguarded **228,786** mg



“This project will boost environmentally friendly production and sustainably benefit the local community, whilst helping Thailand to enter the industry 4.0 scheme.”

*Wisanu Tubtiang, Director General of the  
Department of Primary Industries and Mines (DPIM)*



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