



United Nations
Office on Drugs and Crime

3a

Waste Crime and Trafficking

GLOBAL ANALYSIS ON
**CRIMES THAT
AFFECT THE
ENVIRONMENT**

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The Global Analysis on Crimes that Affect the Environment:

Part 3a – Waste Crime and Trafficking

February 2026

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**EXECUTIVE
SUMMARY**

**GLOBAL ANALYSIS ON
CRIMES THAT
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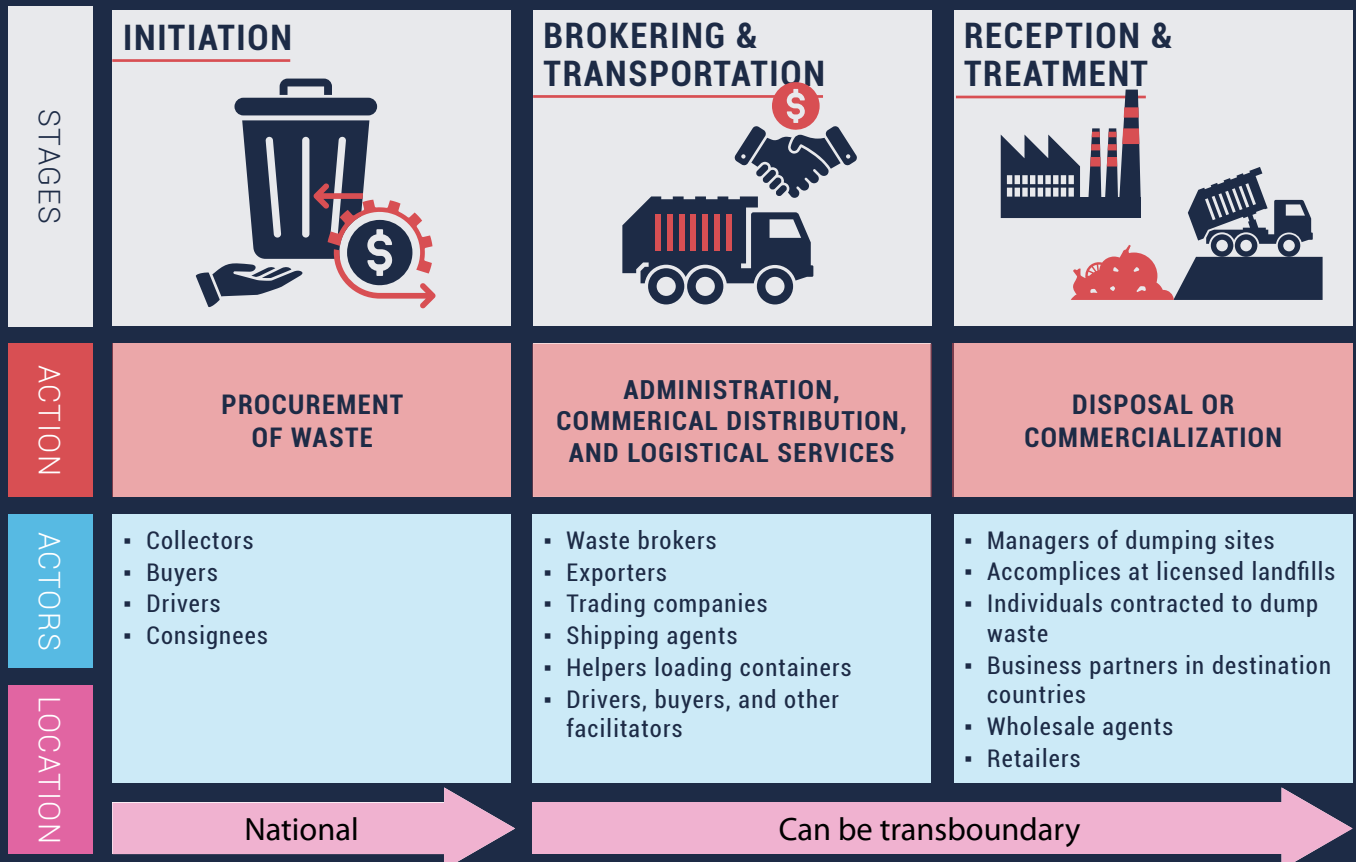
Waste Crime and Trafficking

An Introduction to Waste Trafficking

Waste is created during the entire life cycle of soft or hard commodities, from the sourcing of raw materials to production and manufacturing, distribution, delivery, sale, consumption, and end-of-life disposal. Profits in the waste industry accrue both from charging for the disposal of waste and from the resale of substances recovered from waste, where possible. Different types of waste, such as e-waste and plastic, and materials to be recycled or incinerated, as well as waste intended for different destination regions, follow distinct supply chains. For example, plastics and lead-acid batteries are transported along different routes, by different actors, to different destinations through different methods.

Waste crime is unlike illegal flows of natural resources or contraband such as metals or wood, or commodities such as firearms and drugs, because most waste initially has a negative value, as the owner is responsible for covering its treatment expenses.¹ What is waste in one place may not be waste in another due to differences in legislation as well as waste disposal and management capabilities. So, for example, what is e-waste in Europe may be second-hand goods elsewhere. Complying with waste management regulations is costly for industry, households and the public sector, with varying costs depending on the type of waste; these costs include collection, transport, treatment and disposal.²

STAGES OF ORGANIZED WASTE CRIME



PRIVATE ACTORS IN THE WASTE INDUSTRY



TRANSBOUNDARY MOVEMENT OF WASTE

Possible private actors

- Waste exporter
- Shipping agent
- Declarant
- Accreditation companies/surveyors
- Transport companies
- Waste brokers & dealers
- Shipping lines

Movement of waste
under the scope of
the Basel Convention
requiring Prior
Informed Consent

Movement of waste out-
side of the scope of the
Basel Convention, which
is either not regulated or
regulated under national
legislation



WASTE TREATMENT

Possible private actors

- Consignee/receiver of the waste
- Transport companies
- Waste brokers & dealers

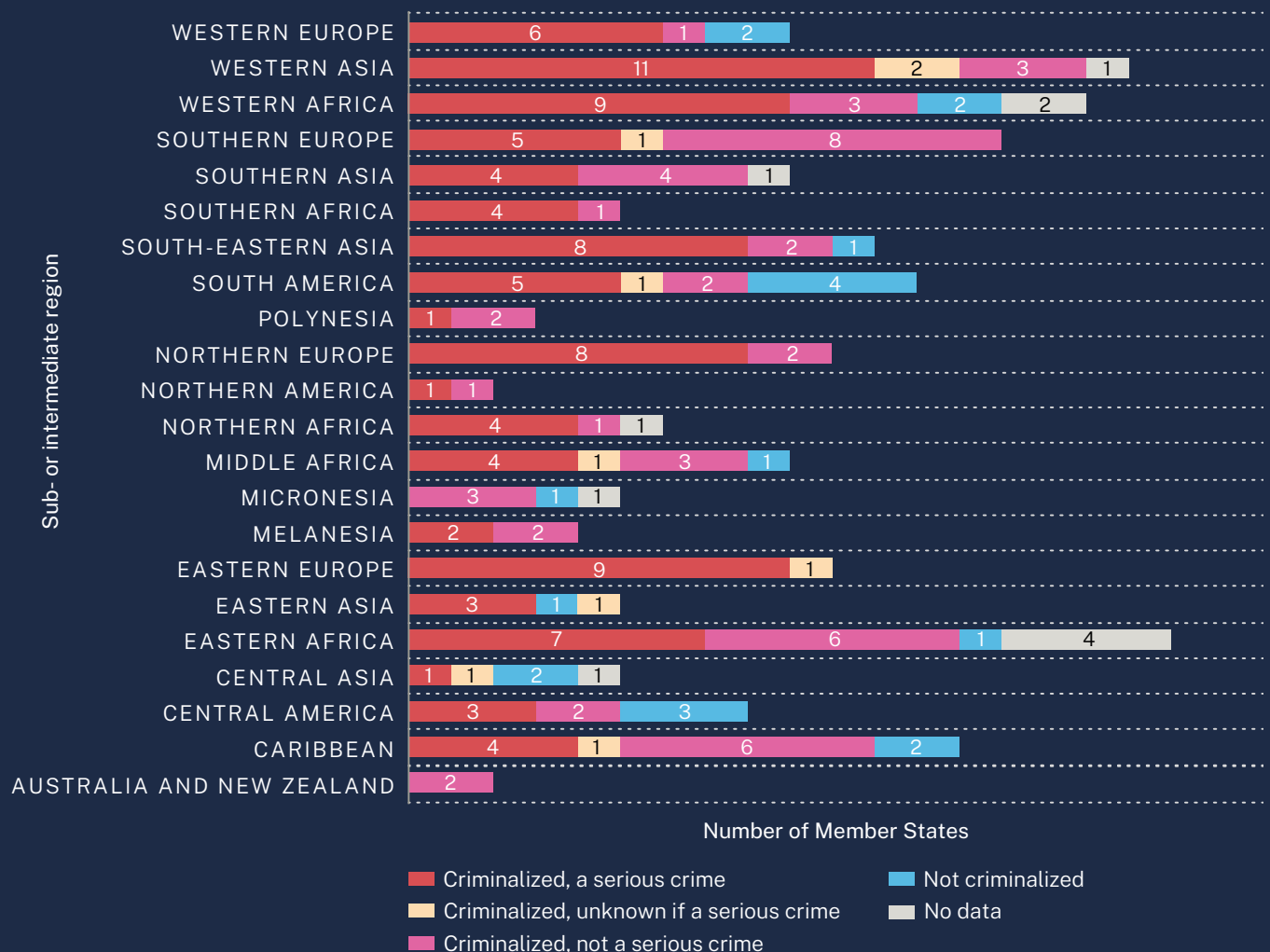
Illegal waste disposal or trade can be lucrative when waste management and disposal services are offered at prices below the costs of following the processes and procedures required by law. This reduces the costs for those who need to dispose of waste, as well as for the disposal by service providers who do not follow the law.

Some categories of waste retain value as certain components, like metals, can be recovered, reused, or sold to recycling plants.³ This is particularly the case with e-waste. This aligns with the concept of a circular economy, in which products and materials are

kept in circulation rather than becoming waste. Waste trafficking undermines this model when waste is disposed of illegally.⁴

Waste-related offences become waste crime when any person engages in the trade, treatment, or disposal of waste in ways that breach international or domestic legislation. Most data for this report concern cross-border waste trafficking or the illegal trafficking of waste; much less information is available about the domestic/national treatment of illegal waste or domestic/national waste crime.

STATE OF CRIMINALIZATION OF WASTE-RELATED OFFENCES



Source: UNODC. 2025. Part 1 – the Landscape of Criminalization. *Global Analysis on Crimes that Affect the Environment*. Vienna, Austria.

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal is the most comprehensive global instrument governing the movement of hazardous waste and other waste movement between countries. Almost all countries in the world (191 as of 19 October 2025) are party to the Basel Convention, which includes the obligation to consider that illegal traffic in hazardous wastes or other wastes is criminal.⁵

Domestic waste crime includes actions that are not compliant with legal waste processing occurring at the national level, and includes, but is not limited to, illegal disposal, illegal incineration, and illegal recycling. The legislation of a majority of UN Member States criminalizes at least one violation of waste-related offences and over half of this legislation (99 Member States) provides for a penalty of at least four years or more in prison, which makes the offence a ‘serious crime’ under the United Nations Convention against Transnational Organized Crime in those States.^{6, 7, 8}

The five main waste categories by number of internationally recorded cases of waste trafficking under the Basel Convention between 2016 and 2023 are electrical and electronic waste (e-waste), mixed waste, end-of-life vehicles and engines, plastic, and metal and metal-bearing wastes. Most studies on waste trafficking focus on plastic and e-waste, despite the fact that plastic waste is not one of the most prominent legal waste streams by export or import.⁹ E-waste is considered one of the fastest growing waste streams.¹⁰ “Newer” wastes such as photovoltaic panels have also been identified as susceptible to exploitation by organized crime groups, as well as plastic waste and e-waste.^{11, 12}

Extent and Proceeds

The global official legal waste management market was valued at USD 1.2 trillion in 2024, an increase from USD 410 billion in 2011.¹³ Industrial waste is likely to be the largest waste category globally, followed by agricultural waste, construction and demolition waste, and municipal solid waste (see Figure on page 12).¹⁴

Hazardous waste, medical waste, and e-waste contribute much less, but are more costly to manage. Overall, 97 per cent of global hazardous waste remains within countries, though this differs between low-income and high-income countries, with the latter exporting more and a few small high-income countries exporting most of their hazardous waste.¹⁵

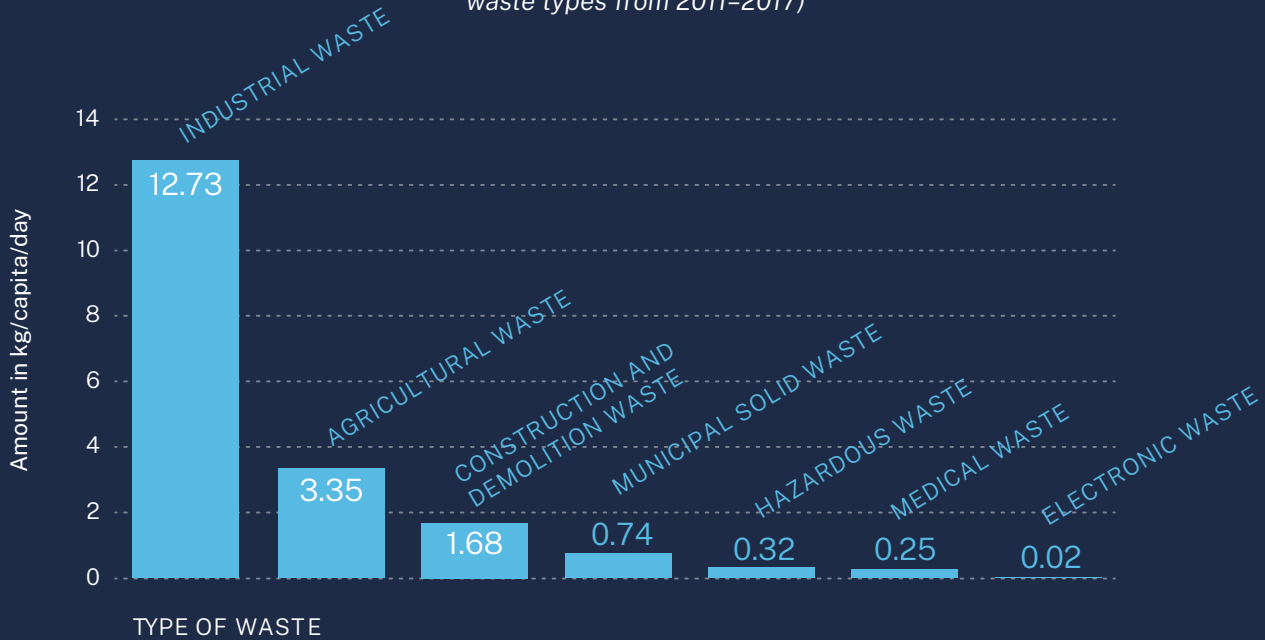
One study estimates that in 2022 only 22.3 per cent of e-waste was managed in an environmentally sound way and that this percentage contained raw materials (iron, gold, copper, etc.) that represented a value of USD 28 billion out of the possible 91 billion from all e-waste that could have been reclaimed.¹⁶ Global municipal solid waste generation is predicted to outpace population growth, reaching 3.4 billion Mt (metric tons) by 2050.¹⁷ It is estimated that one-third of global municipal solid waste is not managed in an environmentally-sound manner.¹⁸

Calculating how much profit is made through illegal activity in the waste industry is complicated, as the exact size of the global illegal waste trade is unknown.¹⁹ An additional challenge in estimating the value of waste trafficking is that proceeds of illegal waste businesses are comingled with the legal waste trade. Global estimates for 2010 suggest that profits from informally, unregistered and illegally handled and unregistered e-waste amounted to between USD 12.5 billion and USD 18.8 billion annually.²⁰ How much of this is specifically illegally handled and therefore constitutes waste crime is not known.²¹

Based on the three main datasets analysed for this study (INTERPOL and World Customs Organization reports, and reports by parties to the Basel Convention), all regions of the world were detected as being involved in the illegal export, import or transit of waste and/or a combination of these. The undetected portion of waste trafficking is likely to be significantly higher than what is detected. Insufficient data is available to understand the extent of domestic waste crime (as opposed to transboundary waste trafficking).

ESTIMATES OF GLOBAL LEGAL WASTE GENERATION

(estimated global average for municipal solid waste from 2016, estimated yearly global average for the other waste types from 2011–2017)



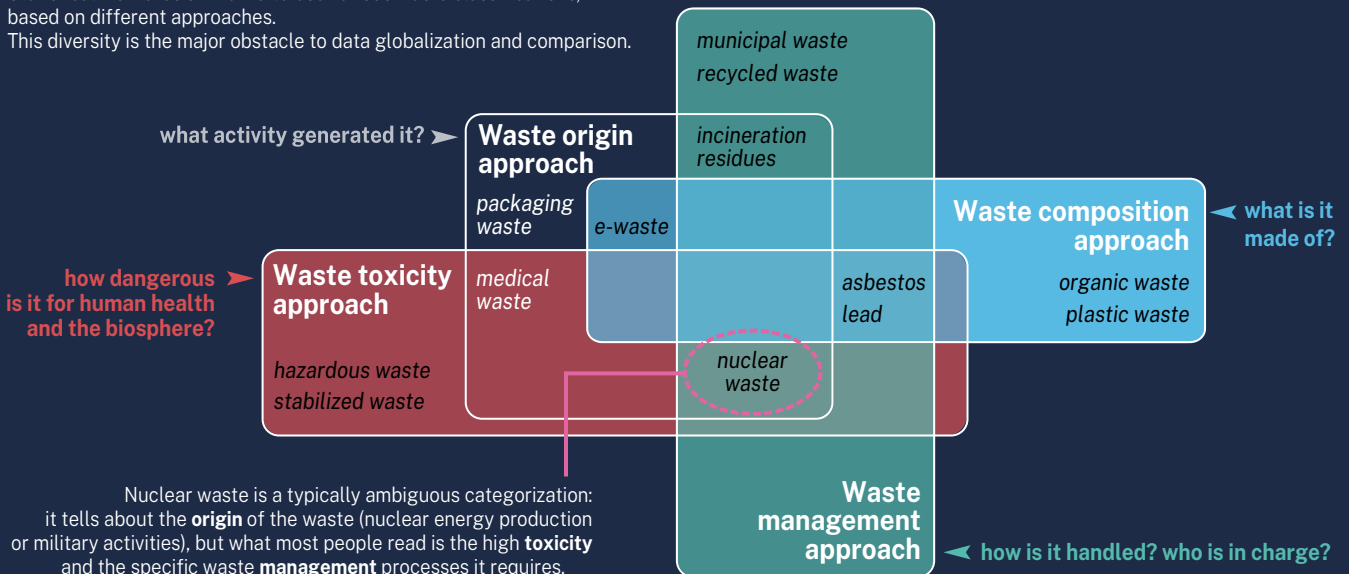
Source: Kaza et al (2018) *What a Waste 2.0. A Global Snapshot on Solid Waste Management to 2050*. The World Bank; see also UNEP (2010) and (2018) *Waste without Frontiers* and *Waste without Frontiers II*.

DIFFICULTIES OF CLASSIFYING WASTE

(and counting it)

Different approaches and overlapping definitions

Statistical institutes of the world use various waste classifications, based on different approaches. This diversity is the major obstacle to data globalization and comparison.



Source: Vital Waste Graphics 2.

Flows of Illegal Waste

UN COMTRADE data indicates that, in the legal market, during the period 2017–2023, Northern America²² exported the most waste by value globally in absolute volume (USD 206 billion), followed by Western Europe (USD 205 billion) and Northern Europe (USD 97 billion). Eastern Asia (USD 228 billion), Western Europe (USD 226 billion) and Southern Europe (USD 92 billion) imported the most waste by value.

The general assumption about waste trafficking is that it predominantly goes from high-income countries to low-income countries, but also to poorer regions within the North with less regulation and enforcement. European countries have the highest levels of reporting of waste trafficking and intra-European waste trafficking is found across all three datasets. Of all Basel Convention illegal reported closed cases (9,203), 4,220 cases between 2016 and 2023 took place within Europe, of which 525 were in 2023.

In 2023, cases related to fuels, paper products, soils and healthcare wastes mostly involved Western Europe. By contrast, Eastern Europe was mostly involved in end-of-life vehicles, rubber waste, catalysts, and textile wastes. Northern Europe had a noticeable portion of the battery waste cases while Southern Europe imported the most mixed illegal waste.

Plastic waste trafficking involving Europe is prevalent in all datasets used for this report. Plastics are cheaper to export from Europe, particularly to Asia, rather than to treat, because of high labour costs; plastic exported from Europe should be pre-sorted (though this is not necessarily the case), to make it easier for Asian companies to treat. Asia has little infrastructure to collect pre-sorted waste, making it difficult to treat waste produced in Asia within Asia even though there is the capability to treat pre-sorted waste from elsewhere. Other identified cases of plastic waste trafficking were from Europe to Africa and in recent years also from Europe to Latin America and the Caribbean.

Overall, there are little data on waste trafficking not involving Europe likely due to lack of data collection as well as lack of data sharing in other parts of the world. Some cases identified by INTERPOL involved

hazardous waste trafficked from Mexico to the United States of America and from the Arabian Gulf to Southeast Asia.²³ Other cases involved used car tyres exported from North America²⁴ and East Asia to West Africa, and a mix of hazardous plastic scraps, metal scraps and e-waste going from North America to East and South Asia.²⁵ Plastic waste is also illegally trafficked between North America and Asia,²⁶ but the lack of data from North(ern) America regarding waste trafficking impedes full understanding of this region's role. Intra-regional plastic waste trafficking in Asia is also significant, as well as, to a lesser extent, intra-regional occurrences in North and South America and the Middle East and North Africa.^{27, 28}

Actors in Waste Trafficking

Each type of waste crime and trafficking is likely to involve distinct actors at different stages of the supply chain. Waste generators may often lack awareness of whether the waste will be managed in compliance with regulations after it has been collected, even though they often have responsibility to do so. Various actors, such as factories and retailers, may engage in illegal activity, such as illegal dumping – which can overlap with pollution crime.

When waste or second-hand products have been generated, the brokers and/or collectors are involved in the next stage – often when most of any illegal transboundary waste activities start and where enforcement and regulatory officials are most engaged. Collection actors may include informal pickers, communal collectors/consolidators, recycling centres, waste takeback systems, refurbishers, charities, internet platforms, and waste brokers and dealers.

Once collected, the waste is transported, and this is where waste trafficking may occur. The interim stage between collection and transport may involve storage and handling, expeditors, shipping agents, terminal operators, and shipping companies. Recycling centres and refurbishers, for instance, may first dismantle and recycle waste before it is illegally exported. Fifty per cent of the waste trafficking cases reported under the Basel Convention during 2016–2023 involved the exporter, and over 60 per cent involved the exporter or generator.

Eventually, the illegal export reaches its destination, where disposal, including operations such as recycling, may occur, and ultimately, the waste may be subject to burning and dumping.

An INTERPOL analysis of 27 organized pollution crime cases, 22 of which were waste crime, from 19 countries, suggests three different roles carried out by suspects:²⁹

1. Initiation of the business and procurement of waste, typically involving companies or individuals based in the country where the crime or criminal group originates. They plan and arrange the illegal business, such as collecting waste, and they include collectors, buyers, drivers and consignees.
2. Brokering and transportation by intermediaries, who provide administrative, commercial distribution, and logistical services to facilitate the offences. They may be part of the same criminal group or external actors contracted for their services, and they handle documentation, sourcing commercial partners and destination sites, and transportation. Examples include waste brokers, exporters, trading companies, shipping agents, helpers loading containers, drivers, buyers and other facilitators.
3. Reception and treatment and/or retail of waste—the final stage of the offence, where the waste recipients organize disposal or commercialization. These actors include managers of dumping sites, accomplices at licenced landfills, individuals contracted to dump waste, business partners in destination countries, wholesale agents and retailers of reusable or recycled products.

Further disaggregated data or information on offenders—such as natural or legal person, sex, nationality, gender, number of offenders, level of organization—in recorded waste trafficking cases are not available. However, a majority of the illegal closed cases reported under the Basel Convention appear to involve corporate actors (i.e., brokers, exporters, generators, distributors).

In domestic waste crime, the offenders may be small companies or individuals dealing with waste storage, for instance where there is a lack of permit for storing such wastes, which are often hazardous. However, in

Italy and Eastern Europe, for example, research has highlighted that corporations and organized crime groups (OCGs) may also be engaged in coordinated illegal waste dumping.^{30, 31, 32}

Most actors seem highly knowledgeable about legislation and regulations, with waste trafficking requiring a high level of expertise. The complexity of waste trafficking requires a sophisticated logistical arrangement to coordinate the different steps, including waste collection, export, import, and delivery and disposal, which are often carried out by distinct operators situated in various global locations. Some general characteristics of OCGs in the EU involved in waste crimes, according to several different studies, include being geographically mobile and seeking regions with favourable regulatory conditions for their criminal activities;³³ demonstrating a strong understanding of vulnerabilities within waste control systems;³⁴ and displaying high flexibility and rapid adaptability to market and regulatory shifts.³⁵

OCGs have been found involved in waste crime cases around the world, ranging from local illegal activities to large-scale intercontinental trafficking. According to INTERPOL, among OCGs engaged in pollution crime, and waste trafficking specifically, many operations involve legitimate companies with decentralized networks and chains of individual actors.³⁶ OCGs involved in waste trafficking in Europe, for example, frequently use legal business structures to facilitate criminal activities. Offenders may be frequently associated with other types of crimes, such as: financial crimes, theft, tax evasion, document fraud, corruption, extortion, illegal drug production, public embezzlement, immigration offences, abuse of office, intimidation and threats, illegal employment, drug trafficking, illegal trade of explosives, violations of consumer rights, vehicle theft, money-laundering, and labour exploitation.^{37, 38, 39, 40, 41, 42}

Corporate involvement in waste crime and trafficking varies. Some companies do not comply with regulations, others knowingly acquire illegal services and still others commit waste trafficking offences themselves, having parallel illegal operations.^{43, 44, 45} In the EU, for example, criminal activity has been identified in collection and treatment companies, recycling fa-

cilities, trading and stock companies, transport firms, and logistics businesses.⁴⁶ In the e-waste sector in Europe in particular, legal businesses such as waste management companies, recyclers/end processors, sorting/consolidation sites, freight forwarder/logistics operators, informal collectors, e-waste brokers and internet traders have also been involved in the illegal trade to an unspecified degree.⁴⁷ In some cases, waste traffickers control the entire processing cycle, from the country of export to the country of import and possess substantial human and financial resources.⁴⁸

One trend in the EU in waste crime is that multiple companies are owned by the same individuals, and the companies frequently change management and terminate after a short period of time so that a new entity, owned and organized by the same group, can take over the business.⁴⁹ Different stages of the waste cycles may be purposely located in separate jurisdictions to avoid detection.^{50, 51} However, the extent of registered companies' involvement in illegal waste trade relative to that of OCGs and their use of legal businesses as front companies remains unclear.⁵²

THE TWO MAIN CRIMINAL STRUCTURES INVOLVED IN WASTE TRAFFICKING



ORGANIZED CRIMINAL GROUP

In waste trafficking cases, OCGs usually have a hierarchical structure with a centralized command.

OCGs are able to manage the entire crime cycle through a centralized decision-making process and strict chain of command.

LEGITIMATE COMPANY



A legitimate company operating in the environmental compliance sector may engage in illegal business practices to increase their profits or cut their costs.

This may involve a more flexible structure consisting of decentralized chains of individuals or clusters of companies or criminal groups. Such a structure better serves the purpose of trafficking waste across borders.

Source: UNODC. 2024. *Cash in the Trash*. Bangkok, Thailand.

Modus Operandi for Waste Trafficking

The specific modus operandi depends on factors such as the type of waste being trafficked and its destination, whether it remains within a region or is exported elsewhere within or outside the region. Types of waste crime in the area of waste treatment include actions that bypass legal waste processing, occurring at the domestic level, and include illegal disposal, illegal incineration and illegal recycling.⁵³ Methods in illegal waste disposal and treatment include mixing waste

with other materials, storing it illegally in warehouses, burning it, using it as fuel, burying it underground or dumping it in nature.⁵⁴ Waste may also be disposed of and concealed in the foundations of new construction sites. For instance, a construction firm in South Africa pleaded guilty to violating the National Environmental Management Waste Act when it was discovered they had used building waste to fill in wetlands where they were building new homes.⁵⁵

Criminal groups may establish illegal processing facilities for activities like e-waste disposal, leading to severe environmental damage.^{56, 57} Legal waste processing companies may be used as a front company to conceal illegal activities such as pouring liquid waste into streams or lakes, disposing of liquid or semi-liquid waste onto cultivated land, incorporating waste into production cycles (e.g., burning waste to generate energy), and fraudulently labelling hazardous waste as non-hazardous.⁵⁸

Waste brokers obtain and produce fraudulent authorizations and documents, which can misreport prices and contents, making the illegal appear legal so that it can be transported for treatment or disposal.⁵⁹ Websites and online platforms advertise illegal products and services and are used by waste management companies and brokers in the EU to coordinate illegal activities with non-EU actors.⁶⁰ The utilization of violence is not prevalent in waste-related crimes, although it exists. When violence is associated with this type of crime, INTERPOL suggests it is a significant indicator of the involvement of OCGs.⁶¹

Waste trafficking, which involves the transboundary movement of waste which does not follow export and/or import regulations at the international level, encompasses illegal shipment of waste, violating restrictions of the origin and destination country, and/or violating waste treatment requirements.⁶² Available evidence suggests that operational methods used in waste trafficking may include:^{63, 64, 65, 66, 67, 68, 69, 70, 71, 72}

- Declassifying hazardous waste as non-hazardous waste.
- Mislabelling and making false declarations regarding the content of shipments, including not disclosing that the waste is hazardous.
- Using fraudulent authorizations to give the appearance of legality to the waste.
- Concealing waste among legal shipments.
- Mixing hazardous waste with non-hazardous waste.
- Establishing front companies to traffic waste under the guise of legitimacy.

- Falsifying certified documents or other documentation, often involving corrupt practices. Documents commonly targeted for fraud include, but are not limited to: licences, waste processing invoices, export/import documents, notification and movement documents, and packaging waste recovery notes.
- Using transit countries to obscure the route and make the trafficking harder to detect.
- Unlawfully labelling waste as second-hand products.
- Taking advantage of changes in regulations to exploit potential enforcement gaps while being implemented.
- Taking advantage of price fluctuations in the waste market, e.g. by managing illegal disposal sites to attract illegal business when the legal market prices for disposal increase.
- Changing operational methods as soon as their illegal activities are detected by authorities.
- Alternating between legal and illegal activities and moving swiftly between companies, through developing considerable contacts within the waste industry.
- Participating in other types of trafficking simultaneously – shared routes, criminal affiliations and logistical assets lowers operational expenses and maximizes the profits.

Payments in the context of waste trafficking often happen online or over the phone; the use of online platforms makes it difficult to trace these transactions and the connections between suspects unless special investigation methods are used.⁷³

Drivers and Enablers

Financial motives are the primary driving factors for committing waste offences.^{74, 75, 76, 77, 78} For instance, in the EU there is a growing demand for illegal waste disposal services due to stricter waste regulations and increased legal disposal costs.^{79, 80} Companies may look to reduce production costs and maximize profits, and illegal waste disposal can cut costs. Individuals who commit crimes take advantage of businesses un-

der financial pressure and businesses cut corners. In the waste industry, it is particularly easy to undercut legal competitors, by providing more cost-efficient options for waste disposal through dumping.⁸¹ When illegal activities divert profits from legal competitors, it affects the entire waste market, including recycling.⁸² The absence of strict standards, or the failure to respect existing rules, allows actors on the waste market to avoid certain costs and thus increase their final profit. Such behaviour is criminal when adopted as a deliberate ploy in a regulated context. However, destination countries of illegal waste shipments may have few environmental regulations and implementing the existing framework is often hampered by corruption and lack of enforcement capacity, knowledge and technology.⁸³

When the market values of raw materials are high – like for metal – extracting them illegally from waste becomes a lucrative business. In many instances in the case of Europe, the fines imposed have been lower than the profits that can be earned from a single illegal e-waste shipment.⁸⁴ At the same time, many jobs and activities in destination countries benefit from such illegal e-waste shipments. However, the most numerous jobs are probably informal waste pickers working on landfills in many cities in the developing world, who can suffer various negative health impacts.⁸⁵

Similar issues can be observed in the international recycling market for ocean-going vessels, where illegal shipbreaking is prevalent. Iron or steel make up 80-90 per cent of a ship and represent a valuable source of scrap steel for construction, for example. The amount of energy required by recycling processes is generally much lower than for refining metal from ore and for several countries, especially where natural resources are scarce, this market represents a vital source for national supply.⁸⁶ Metal scrap is not generally hazardous, but when contaminated with hazardous substances export restrictions of the Basel Convention apply. If international regulations are not properly enforced or circumvented, hazardous substances will continue to accumulate, causing fatalities, injuries and environmental damage. Simply imposing bans on the export of end-of-life ships often leads shipowners to exploit loopholes like flags of convenience to avoid compliance.⁸⁷

Restrictions and import bans on plastics have led to an increase in illegal recycling facilities and illegal landfills in emerging Asian import nations with limited enforcement capabilities.⁸⁸ The increasing intra-European plastic waste market is also assumed to be vulnerable to manipulation by OCGs; there is a surplus in plastic waste, and difficulties in treating, monitoring and finding disposal places creates openings for opportunistic crime.⁸⁹

Fundamental to pollution criminality, including the waste sector, is the ability to infiltrate the public sector and local politics.⁹⁰ Both OCGs and corporations employ corruption to hide illegal waste within legal waste streams with varying degrees of capture or infiltration of the regulatory or enforcement communities. Public sector employees may actively engage in the commission of crimes to share the profits and advantages and often play a crucial role in facilitating two types of offences in particular: those related to the misuse of municipal areas (such as illegal waste disposal in landfills) and those involving manipulation of the public administration.⁹¹

Criminals may use legal businesses to bribe corrupt officials, engage corrupted public officials such as customs officials or other public supervisors to obtain authorizations or bypass security checks,⁹² or use captured public officials to facilitate criminal activity by providing confidential information or by disrupting enforcement.⁹³

There is a lack of or weak oversight of the production of waste during extraction of raw materials, production and manufacturing, which are not covered by the Basel Convention. The traceability of waste, both domestically and transboundary, plays a vital role in identifying the source, consignee, broker, and other investigative leads.⁹⁴

Legislative gaps, limited enforcement capacities, lack of traceability and low penalties are facilitators of waste crime.^{95, 96, 97, 98} Furthermore, at least in relation to the EU, one study found that when general law enforcement personnel, prosecutors, and judges are tasked with handling crimes that affect the environment alongside various other offences, they may be unable to acquire the necessary expertise to effectively address the complexities of these crimes, which are highly technical in nature.⁹⁹

There are advantages and disadvantages of specialized environmental authorities or environmental protection agencies to managing different types of crimes that affect the environment including waste crimes, but these regulators often lack investigative powers, and they cannot operate independently from law enforcement.^{100,101,102} Conversely, law enforcement authorities possess investigative powers but typically lack specialized knowledge in waste offences. If relevant authorities do not collaborate, this leads to difficulties for those tasked with investigation in identifying crimes that affect the environment and gathering essential evidence for successful prosecution.¹⁰³

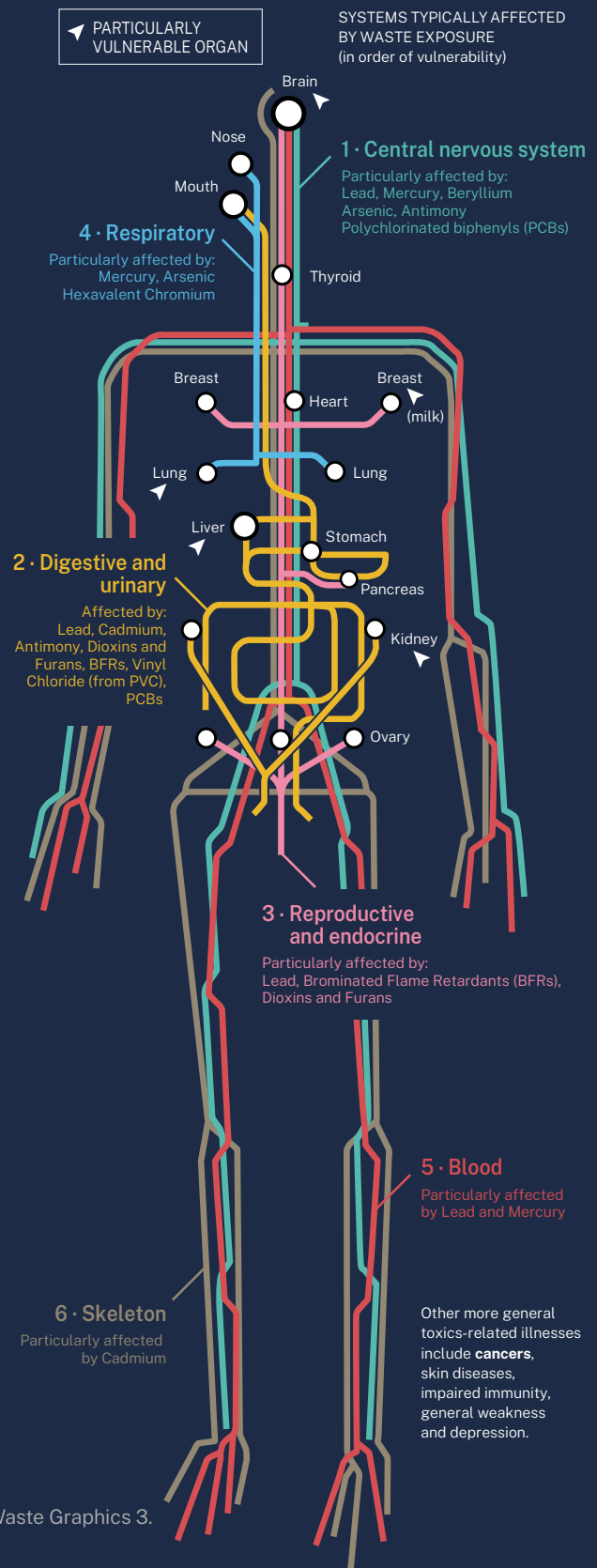
Impacts

Waste trafficking generates large profits for some, but it creates costs for others. The legal waste recycling industry suffers significant losses from illegal actions. The cleaning and restoration costs that are a consequence of improper waste management for the society can be substantial. For example, the clean-up cost per unauthorized landfill that followed illegal waste dumping in the cases analysed by INTERPOL in 2018 amounted to USD 15.6 million on average.¹⁰⁴ Exporting countries have also experienced an increase in illegal landfills, together with both accidental and intentional waste fires; these waste fires likely affect import countries too, such as those in South-East Asia as well as in Europe.¹⁰⁵

In addition, waste at all stages of the supply chain – from extraction and industrial activities to collection and disposal – can have significant consequences on the people working with the waste (as well as people living near it). Low-income countries in particular can struggle with environmentally-sound waste management, resulting in hazardous waste being mixed with municipal waste and/or workers not being properly equipped with safety gear.¹⁰⁶ In areas where waste is dumped or in accessible landfills, an informal sector (not necessarily illegal or scavenging) has arisen where people collect valuable components from the waste. There are health implications for these unprotected waste workers from the components of various kinds of waste.

WASTE BODY BURDEN

Health concerns affecting waste workers and people living close to landfills or incinerators



Response to Waste Trafficking

Perhaps the most significant international collaboration to combat waste trafficking is ENFORCE – The Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic, officially established by decision BC – 11/8 of the Basel Convention in 2013.¹⁰⁷ The membership of ENFORCE consists of UN Member States representing the different regions, Basel Convention regional and coordinating centres, the World Customs Organization, INTERPOL, UNEP and UNODC, among others.¹⁰⁸ Civil society organizations working on waste trafficking are also eligible for consideration, as are other organizations that might contribute.

The activities of ENFORCE centre on training tools and information sessions, information exchange on good practices and techniques, monitoring and reporting on progress in training, ensuring sustainability of all efforts, improving understanding of the challenges and needs of stakeholders, developing common approaches and strategies promoting dialogue, cooperation and coordination between members, and increasing the visibility of efforts aimed at preventing and combating illegal waste trafficking.¹⁰⁹

Further research is needed in terms of what sanctions are given as well as to better understand the impact of those sanctions on the range of offenders.^{110, 111} In the case of e-waste in the EU, research has suggested that administrative fines are often too low to deter offenders.¹¹²

In addition, there are limited resources for the enforcement of laws and regulations for waste in most countries.¹¹³ In the EU, the combination of a scarcity of resources and lack of dedicated enforcement bodies results in hurdles, including ineffective cooperation, limited inspections, and underutilization of relevant data by law enforcement agencies.¹¹⁴ According to the European Commission and INTERPOL, only two per cent of all the world's maritime containers are physically inspected by customs authorities and of that two per cent, only a small number of containers are inspected for waste, such as e-waste.^{115, 116}

In the EU, law enforcement operations have revealed there is scarcity of dedicated units addressing waste

crimes.^{117, 118} According to INTERPOL, issues extend beyond ineffective cooperation within countries to include problems in international cooperation when roles among domestic authorities are unclear.¹¹⁹ Further exacerbating the problem is the lack of a unified information system among national agencies and a lack of international information sharing.¹²⁰

Detecting illegal activity by corporations can be particularly challenging for law enforcement as the criminal justice system is not necessarily involved in overseeing corporate behaviour. In the e-waste sector for instance, as with many corporations, businesses self-regulate.¹²¹ Some governments rely on businesses themselves to monitor their compliance with the law.^{122, 123}

Key findings

1. Waste trafficking and waste crime affects us all but data are scarce and geographically skewed.

Based on the three main datasets analysed for this study, all regions of the world are involved in waste trafficking, including export, import, transit and/or a combination of these. However, the available data on waste trafficking, particularly the illegal closed cases reported under the Basel Convention, are geographically skewed with little data available on waste trafficking not involving Europe. This means that it is neither possible to estimate the extent and value of global waste trafficking, nor to map global illegal waste.

Very limited information is available about national level waste crime, including its transboundary impacts.

2. The growing waste management market and stricter rules for disposal could offer increased opportunities for criminal actors to make profit.

Illegal waste disposal or trade is profitable for both the supply and demand side when waste management and disposal services that do not follow expensive legally required processes and procedures are offered at a lower price. Some components in waste, like metals, maintain their

value and can be recovered, reused, or sold to recycling plants and further profits can be made by circumventing the expensive processing and procedures required by law. Since global waste generation is expected to grow and, at the same time, the requirements for environmentally sound waste management will make waste disposal more costly, there could be increased opportunities for criminal actors to make profits.

3. Waste crime involves organized crime groups, which frequently use legal business structures to facilitate criminal activities, as well as legitimate companies involved in illegal business practices.

OCGs have been found involved in waste crime cases around the world, ranging from local illegal activities to large-scale intercontinental trafficking. INTERPOL's analysis of OCGs engaged in pollution crime, and waste trafficking specifically, has found that OCGs utilize decentralized networks and chains of individual actors. OCGs involved in waste trafficking in Europe, for example, frequently use legal business structures to facilitate criminal activities. Corporate involvement in waste crime and trafficking varies. Some companies do not comply with regulations, others knowingly acquire illegal services and still others have parallel illegal operations.

4. The complexity of the waste supply chain and waste management processes increases vulnerability to illegality and creates challenges for the criminal justice system.

Tracking waste is challenging due to the lack of harmonization of waste codes used to categorize waste across trade platforms (e.g., the Basel Convention, UN COMTRADE and regional tracking like the European Union), fraud and forgery of logistics documentation, the use of front and shell compa-

nies, and the involvement of multiple actors and geographic locations. In addition, evidencing the harms created by waste crime and trafficking requires knowledge of chemicals and the impacts of pollution, and creates challenges for the criminal justice system.

Specialized environmental authorities or environmental protection agencies possess the necessary knowledge to manage different types of crimes that affect the environment, including waste crimes, but often lack investigative powers and cannot operate independently from law enforcement. This makes it difficult to hold those responsible accountable.

5. Legal and illegal waste flows often burden low-income regions and countries with environmental and public health threats.

Of all the waste generated worldwide only a small percentage is exported. Regarding hazardous waste globally, 97 per cent remains within countries, though this differs between low-income and high-income countries, with the latter exporting more and a few small high-income countries exporting most of their hazardous waste.

Wastes that are difficult and expensive to dispose of often burden low-income regions with pollution and environmental and public health threats. Informal waste recycling is also a common livelihood for the poor in low- and middle-income countries and is not necessarily illegal. However, it offers opportunities for waste exporters to circumvent the law or dispose of waste illegally.

Policy Implications

The necessary responses to waste crime and trafficking, as with other crimes that affect the environment, revolve around improving knowledge, data and awareness; improving the harmonization of legislation and ensuring the penalties are effective, proportionate and dissuasive; increasing the human and financial resources dedicated to combating waste crime and trafficking; and improving enforcement and corporate governance, particularly the accountability of legal persons.

1. Efforts to **track** waste from generation to disposal will help tackle illegality. For tracing to work, intra-national and international cooperation along with continued improvement of implementation of the harmonized formal definitions of waste, guidelines, and waste codes provided by the Basel Convention, and improvement on reporting obligations are essential. Harmonizing minimum standards on offences and provisions can also simplify enforcement in cross-border cases.
2. **Corporate accountability** is key to combating waste crime and trafficking. Improvements to corporate reporting on waste production and handling are needed. Whereas there are efforts such as the Global Reporting Initiative to have waste companies report their waste generation, its impact on the environment and how waste is managed, more information is needed to ensure the uptake of such voluntary schemes and their effectiveness. Addressing corporate liability and appropriate penalties for legal persons for crimes that affect the environment, particularly in the waste sector, is key. Establishing a system for criminal enforcement and punishment for legal persons is essential. For large-scale and/or recidivist corporate offenders and those linked to or acting as organized criminal groups, utilization of the United Nations Convention against Transnational Organized Crime can provide additional tools for law enforcement to respond.
3. Waste exporting countries should **ensure illegal waste shipments are not leaving their ports**. The added value of investigations into potential corruption among border and frontline officers, especially regarding the illegal movement of environmentally sensitive goods such as waste, should be reviewed. This could be a strategy to enhance detection accuracy, preventing more illegal shipments before export rather than the burden being placed solely on the detection of illegal imports during inspections on arrival.
4. To prevent illegal waste management and disposal in low- and middle-income countries, the international community should consider **supporting countries** that lack the capacity **to deal safely with hazardous waste and/or recycling material**, in particular if there is an existing informal economy and market for reuse. Domestic waste crime should receive at least as much attention as waste trafficking.
5. Effective **communication of updates to import regulations** to relevant organizations and other states is crucial to share information, raise awareness of regulatory frameworks and requirements, and adapt to evolving market and regulatory changes.
6. Platforms exist to improve data harmonization, collection and analysis, but there is a need for targeted capacity-building and outreach by international organizations to **increase reporting**. Changing and new modus operandi of waste crime and trafficking need to be more widely shared via improved international information-sharing mechanisms.

Definitions¹²⁴

Wastes, under the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention), “are substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law”.¹²⁵

The Basel Convention is the most comprehensive global environmental instrument governing the movement of **hazardous wastes** and other wastes between countries (see Box 2). Hazardous wastes for the purpose of the Basel Convention are listed in Annex I and other annexes^{126 127} to the Convention and/or those considered to be hazardous under national legislation. The Convention also sets out hazardous wastes that are excluded from its scope, notably wastes which, as a result of being radioactive, are subject to other international control systems. These would include, for example, radioactive substances and waste from normal operations of ships covered by other conventions (the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, and the International Convention for the Prevention of Pollution from Ships (MARPOL)). Other categories of waste requiring special consideration are listed in Annex II. It is important to highlight that though the Basel Convention promotes the environmentally sound management of waste, it does not address domestic waste crime occurring within a single country.

Waste management encompasses the collection, transport and disposal of hazardous wastes or other waste, including after-care of disposal sites.¹²⁸ Disposal also includes recycling and other forms of resource recovery, direct re-use or alternative uses.¹²⁹

There are numerous natural and legal persons involved in the transboundary movement and management of waste, including but not limited to exporters, importers, and carriers. There are also **generators**, defined as “any person whose activity produces hazardous wastes or

other wastes or, if that person is not known, the person who is in possession and/or control of those wastes”, and **disposers**, who are “any person to whom hazardous wastes or other wastes are shipped and who carries out the disposal of such wastes”.¹³⁰

As set out in Part 1 of the UNODC *Global Analysis on Crimes that Affect the Environment*,¹³¹ waste-related offences become **waste crime** when any person engages in the trade, treatment, or disposal of waste in ways that breach international or domestic legislation.^{132 133} This part categorizes illegal activities that constitute waste crime into two main groups: 1. **domestic/national treatment of illegal waste or domestic/national waste crime** and 2. **cross-border waste trafficking or illegal traffic of waste**.¹³⁴ The former includes actions that are not compliant with legal waste processing, occurring at the domestic/national level, and includes, but is not limited to, illegal disposal, illegal incineration, and illegal recycling. The latter corresponds to the Basel Convention, which is focused on international trade and trafficking. The Basel Convention is the only international convention related to the environment that requires criminalization of illegal traffic.¹³⁵ The exact activities to be criminalized are listed in Article 9, paragraph 1 on **Illegal Traffic**, namely any transboundary movement of hazardous wastes or other wastes:

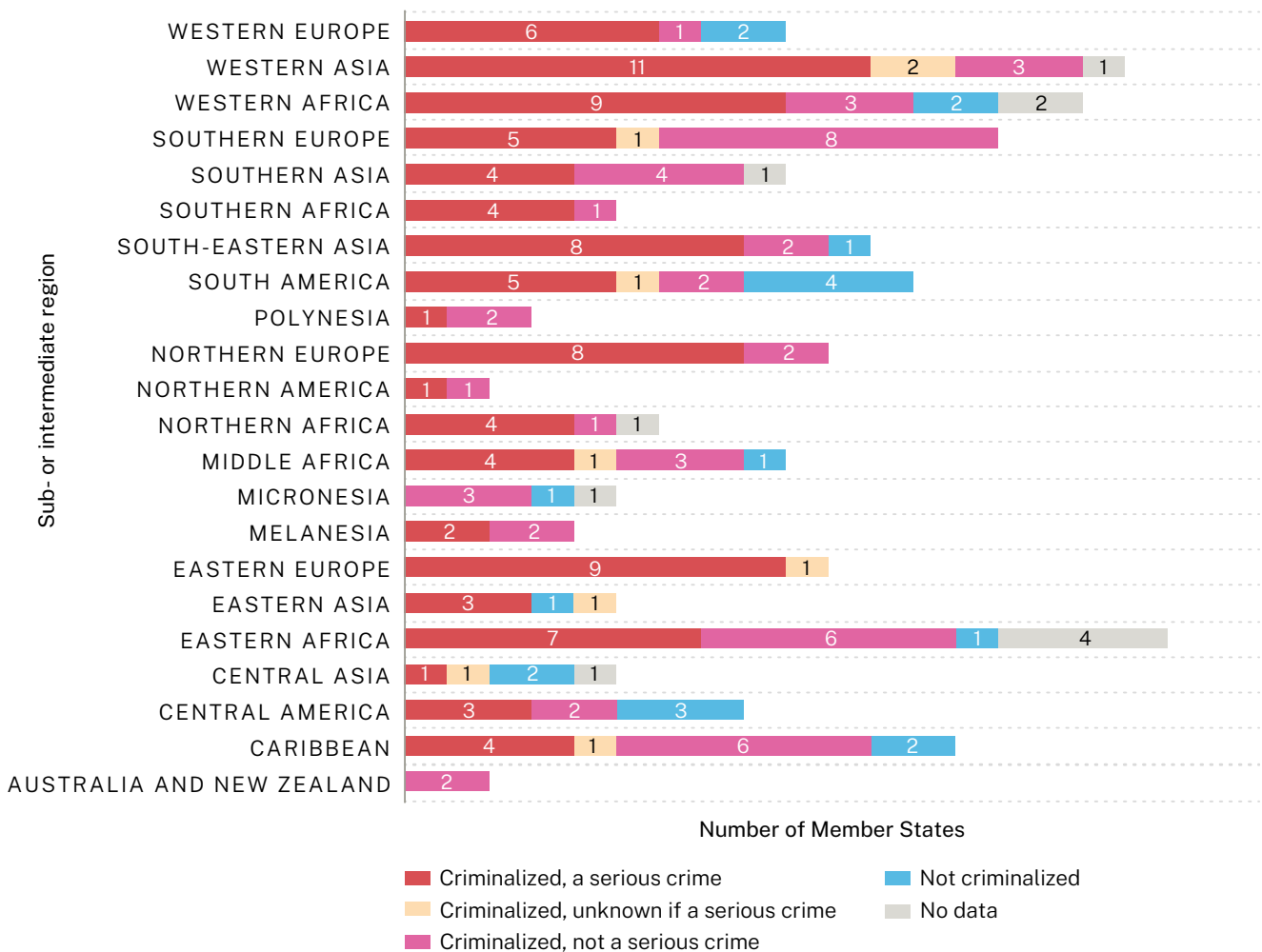
“(a) without notification pursuant to the provisions of the Convention to all States concerned; or (b) without the consent pursuant to the provisions of this Convention of a State concerned; or (c) with consent obtained from States concerned through falsification, misrepresentation or fraud; or (d) that does not conform in a material way with the documents; or (e) that results in deliberate disposal (e.g. dumping) of hazardous wastes or other wastes in contravention of this Convention and of general principles of international law, shall be deemed to be *illegal traffic*” [emphasis added].¹³⁶

Introduction

The illegal dumping, burning, movement, shipping, and disposal of all kinds of waste occurs throughout the world and contributes to the pollution of air, soil and water. This part of the *Global Analysis on Crimes that Affect the Environment* provides a global overview of what is known about the nature and extent of trans-boundary waste trafficking, as well as highlighting the lack of data on domestic (national) waste crime that occurs within countries and other illegal trade-related data gaps, such as for certain geographies (non-Euro-

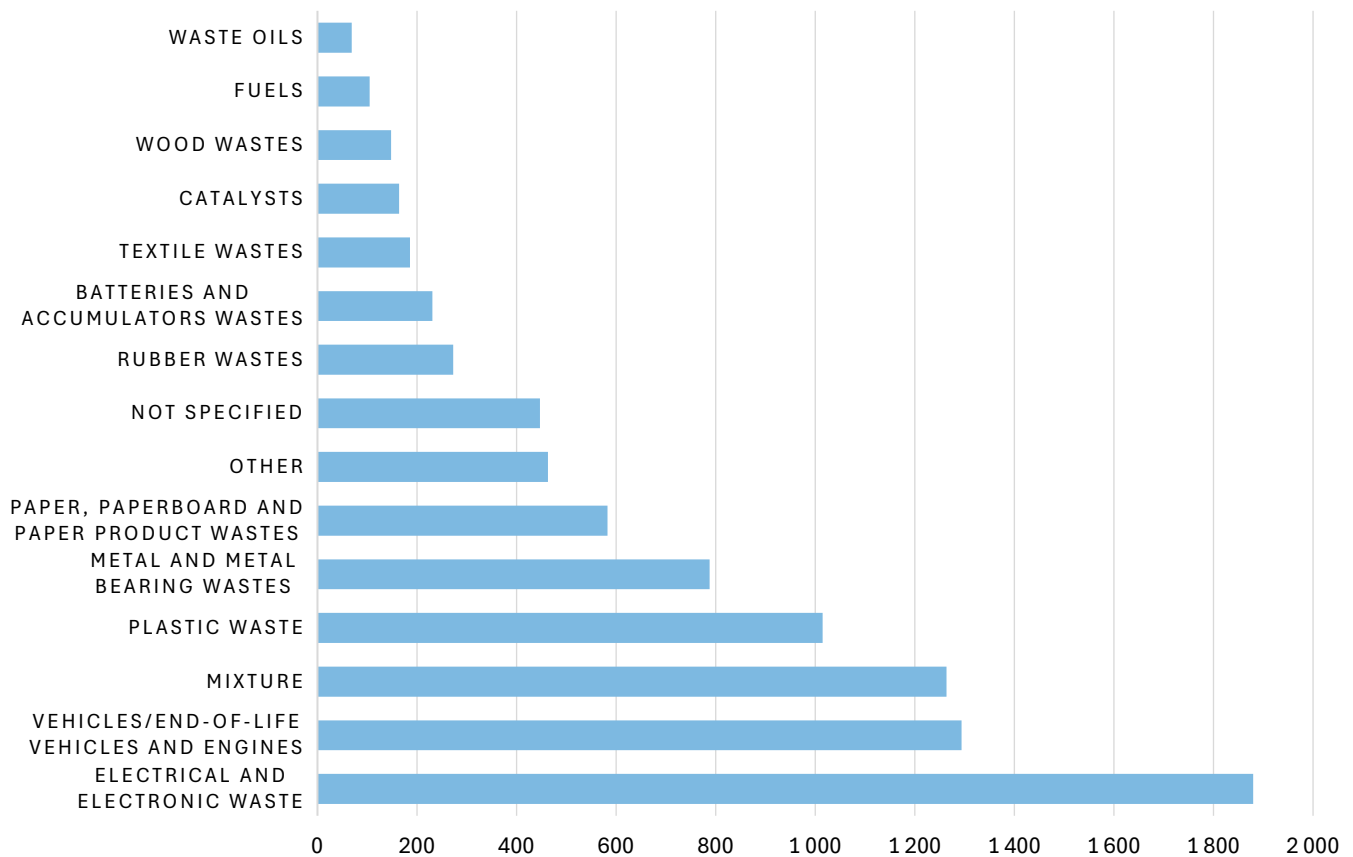
pean countries) and types of waste. This analysis is set within the context of the legal waste industry as it is critical to understand how legitimate and criminal activities interact in this sector and to identify vulnerabilities in the supply chain. The criminal actors involved in waste crime and trafficking are detailed as well as the methods they use to commit these crimes. The law enforcement responses and policy implications are also analysed.

Figure 1 – State of criminalization of waste-related offences



Source: UNODC. 2025. Part 1 – the Landscape of Criminalization. *Global Analysis on Crimes that Affect the Environment*. Vienna, Austria.

Figure 2 – Number of reported illegal closed cases to the Basel Convention by waste category 2016–2023 accumulative



The legislation of a majority of UN Member States criminalizes at least one violation of waste-related offences and over half of this legislation (of 99 Member States) provides for a penalty of at least four years or more in prison, which makes the offence a ‘serious crime’ under the United Nations Convention against Transnational Organized Crime in those States.^{137, 138, 139}

This study focuses on the five main global waste trafficking categories by number of cases identified in the Basel Convention closed cases of illegal traffic reported by Parties between 2016 and 2023 – electrical and electronic waste (e-waste), mixture of waste, end-of-life vehicles and engines, plastic, and metal and metal bearing wastes.

Summarized Methodology

Waste crime can be divided into two separate aspects – the domestic aspect of illegal waste treatment and disposal, and the transboundary aspect as defined by the Basel Convention (waste trafficking) (see page 22). The data for waste crime are scarce. For this study, three types of data were used:

1. Legal waste trade data, mainly from UN COM-TRADE
2. National level waste crime, mostly from the UN-CTS and INTERPOL

Data on national-level waste crime can be found in the United Nations Survey of Crime Trends and Operations of Criminal Justice Systems (UN-CTS). Section 10 of the International Classification of Crime for Statistical Purposes (ICCS) contains four categories related to Acts against the natural environment. Category 1002 – Acts involving the movement or dumping of waste –

has two further subcategories: 10021 *Acts involving the movement or dumping of waste within national borders* and 10022 *Acts involving the movement or dumping of waste across national borders* (the alignment with Article 9 of the Basel Convention will depend on the Parties' implementation of the Convention provisions into their national legislation).¹⁴⁰ The incidents reported to the CTS are not broken down into these two subcategories and only 59 Member States have shared data between 2014 and 2023, meaning the data reveal little and have not been included. Other sources of data for domestic waste crime are the reports documenting INTERPOL operations, which have limited participation and limited disaggregation. Thus, there are very few data related to national/domestic waste crime.

3. Data on transboundary waste trafficking from national reports submitted by the Parties of the Basel Convention, World Customs Organization (WCO) illicit trade reports and INTERPOL reports.

Most of the data for this *Global Analysis* related to waste trafficking come from the national reports submitted by the Parties of the Basel Convention since 2016.¹⁴¹ Comparing the data from these three sources has limitations as seizures are different from incidents, which are in turn different from closed cases. Furthermore, the data are inconsistent across all sources in terms of classification/codes, quantities, weights, values etc, which also creates limitations and challenges.

The data on country of export and import were used to identify the illegal waste flows between different subregions as well as the main export and import regions. The information about the reporting party for each case was used to identify the subregions reporting illegal cases. The data on the responsible party for the illegality were analysed to gain further insight into which actors are involved in waste trafficking.

The process of categorization and all the categories created from the statistics are outlined in Appendix III.

BOX 1: THE 1989 BASEL CONVENTION ON THE CONTROL OF TRANSBOUNDARY MOVEMENTS OF HAZARDOUS WASTES AND THEIR DISPOSAL AND ILLEGAL WASTE TRADE

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, which entered into force in 1992, is an international legally binding agreement that controls the transboundary movements and disposal of hazardous and other wastes. At the time of writing, the Convention has 191 parties. The Convention aims to protect human health and the environment from the adverse effects which may result from the generation and management of hazardous wastes and other wastes. It centres around: the reduction of hazardous waste generation and the promotion of environmentally sound management of hazardous wastes, wherever the place of disposal; the restriction of transboundary movements of hazardous wastes except where it is perceived to be in accordance with the principles of environmentally sound management; and a control procedure where transboundary movements are permissible.

The procedure for transboundary movement of such wastes between Parties is set out in Article 6, which requires the State of export to notify States concerned (States of import or transit States, whether or not Parties) of any proposed transboundary movements of waste and not allow the movement to commence until it has received the consent of the State of import and confirmation of the existence of a contract between the exporter and the disposer specifying environmentally sound management of the wastes in question. For transboundary movements that may proceed, notification and movement documents need to accompany the waste shipment from start to final destination and the entire process known as the Prior Informed Consent (PIC) procedure.¹⁴²

The Basel Convention is the only multilateral environmental agreement that explicitly requires its Parties to consider that illegal traffic in hazardous wastes or other wastes is criminal (see Article 4 and Article 9).¹⁴³ Parties are required to have domestic legislation to prevent and punish illegal traffic. The punishment required is not specified, though guidance on the implementation of provisions related to illegal traffic and prosecution is provided by the Secretariat,¹⁴⁵ as well as a general manual for implementation, including a checklist for legislators.¹⁴⁶ The "Ban Amendment" of the Basel Convention, which entered into force in 2019, prohibits hazardous wastes covered by the Convention

Table 1 – Number of Basel Convention Parties submitting national reports and number which have reported closed cases of illegal traffic of wastes

Number of Parties (191 in total)	2016	2017	2018	2019	2020	2021	2022	2023
Submitting national reports	113	111	112	113	116	92	118	117
Reporting illegal cases	21	28	31	26	28	25	30	27

and defined as hazardous in the national legislation of Parties which are intended for final disposal from being exported from members of Organization for Economic Cooperation and Development (OECD), the European Commission and Liechtenstein to other States. It also prohibits such movements of hazardous waste under Article 1(1)(a) of the Convention which are intended for reuse, recycling, and recovery.¹⁴⁷ The Ban Amendment aims to address the challenges faced by countries receiving imports of hazardous wastes and other wastes that they do not wish to receive or are unable to manage in an environmentally sound manner.¹⁴⁸

Before the end of each calendar year, Parties to the Convention are required to submit a report on the previous calendar year (i.e., by 31 December 2025, the report for the year 2024 was due). The report should contain information set out in Article 13 of the Convention including, among other things, information regarding transboundary movements in which the Party has been involved such as the category of waste, characteristics, destination, any transit country, and disposal method. The format of the questionnaire for national reports was adopted by the Conference of the Parties to the Convention. Since 2016, Parties have had the opportunity to include information on cases of illegal traffic that have been closed in the reporting year.¹⁴⁹

Data limitations

The reporting of closed cases of illegal traffic provides insight into illegal trade, while having some limitations. In particular, the reports originate mostly from Europe meaning that much less is known about illegal waste traffic involving other parts of the world, particularly those who are not party to the Basel Convention. Furthermore, the cases reported are those closed within the year of reporting, which means the crime may have occurred much earlier. In addition, in some cases where fines are imposed for tax evasion or smuggling to containers involving waste, and the containers remain with Customs, these cases are not recorded as illegal waste traffic.¹⁵⁰ Combined, this means a trend analysis over time and a complete picture is not possible from these data. Furthermore, when data are provided, weight (e.g., tons, kilograms), volume (e.g., cubic metres), or units

(e.g., number of end-of-life vehicles, number of containers full of plastic) may all be used within a single waste category depending on the reporting party. This makes it impractical to aggregate the data into a total amount of illegal waste flow.

Table 2 – Percentage of reported illegal waste

Subregion country of export	% of global total, 2016-2023
Western Europe	45.22%
Northern Europe	33.80%
Southern Europe	7.02%
Eastern Europe	4.25%
North America	3.93%
Eastern Asia	1.14%
South-eastern Asia	0.80%
unknown	0.89%
Western Asia	0.70%
Western Africa	0.41%
Central America	0.40%
South America	0.34%
Northern Africa	0.32%
Southern Asia	0.23%
Australia and New Zealand	0.14%
Caribbean	0.11%
Southern Africa	0.10%
Eastern Africa	0.09%
Central Asia	0.07%
Middle Africa	0.03%
Eastern Europe / Southern Europe	0.01%

Source: the Basel Convention Secretariat.

Overview of the Legal Waste Sector

Size and value of the waste market

Waste is created during the entire life cycle of soft or hard commodities, from the sourcing of raw materials to production and manufacturing, distribution, delivery, sale, consumption, and end-of-life disposal. Profits in the waste industry accrue both from charging for the disposal of waste and from the resale of substances recovered from waste, where possible. Estimating the size and value of the global waste trade is hampered by different approaches towards classifying and counting waste (see Figure 3).

According to one market research firm, the legal global waste management market for all waste was valued at USD 1.2 trillion in 2024¹⁵¹ compared to USD 410 billion

in 2011.¹⁵² In 2015, the average operating cost of household waste was USD 35 per (metric) ton in low-income countries and over USD 100 per ton in high-income countries.¹⁵³ These costs include collection, transport, treatment, and disposal. For legal and environmentally sound management of other wastes—i.e., hazardous and nuclear—these costs are much higher. Industrial waste is likely to be the largest waste category globally, followed by agricultural waste, construction and demolition waste and municipal solid waste (see Figure 3).¹⁵⁴ Global municipal solid waste generation will outpace population growth, reaching 3.4 billion tons by 2050.¹⁵⁵ It is estimated that one-third of global municipal solid waste is not managed in an environmentally-sound manner.¹⁵⁶

Figure 3 – About the classifying of waste (and counting it)

Different approaches and overlapping definitions

Statistical institutes of the world use various waste classifications, based on different approaches. This diversity is the major obstacle to data globalization and comparison.

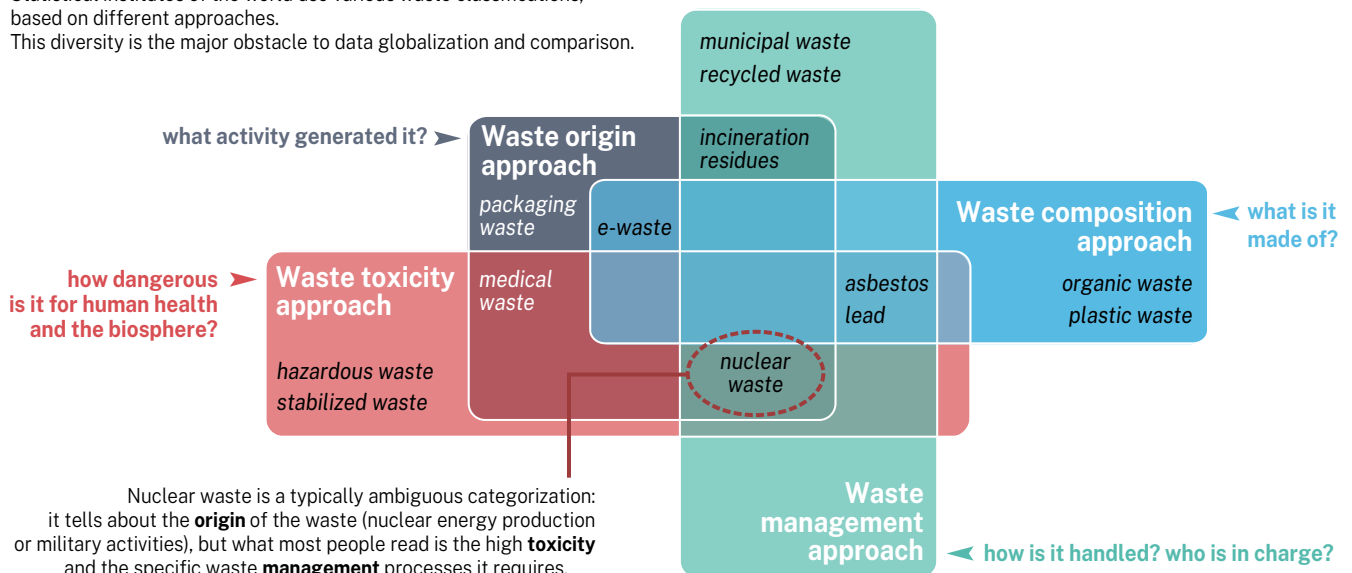
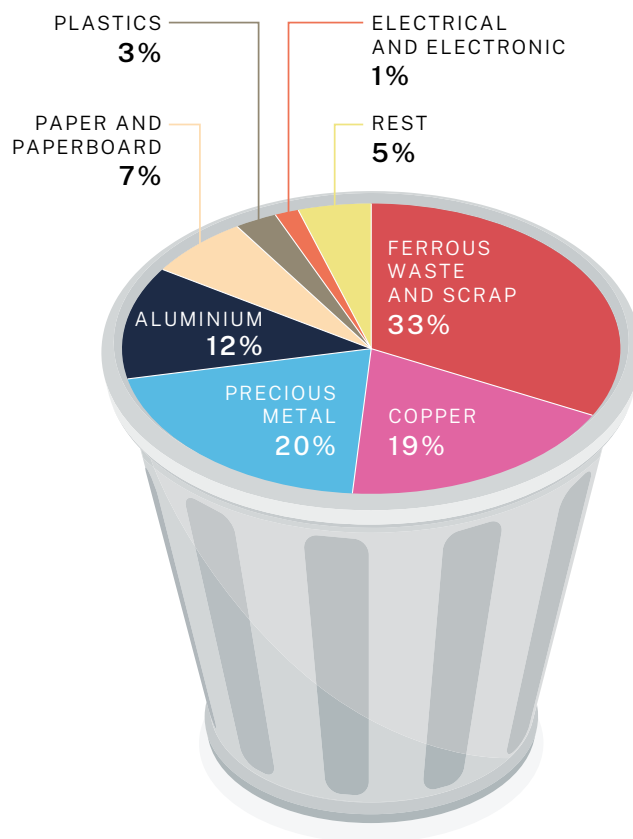


Figure 4 – 2017–2023 UN COMTRADE waste export data by value on average (percentage)



One study found hazardous waste (not defined in the study), medical waste, and e-waste contribute much less, but are more costly to manage. Regarding hazardous waste globally, 97 per cent remains within countries, though this differs between low-income and high-income countries, with the latter exporting more and a few small high-income countries exporting most of their hazardous waste.¹⁵⁷ Another study estimates that in 2022 only 22.3 per cent by volume of e-waste was managed in an environmentally sound way.¹⁵⁸

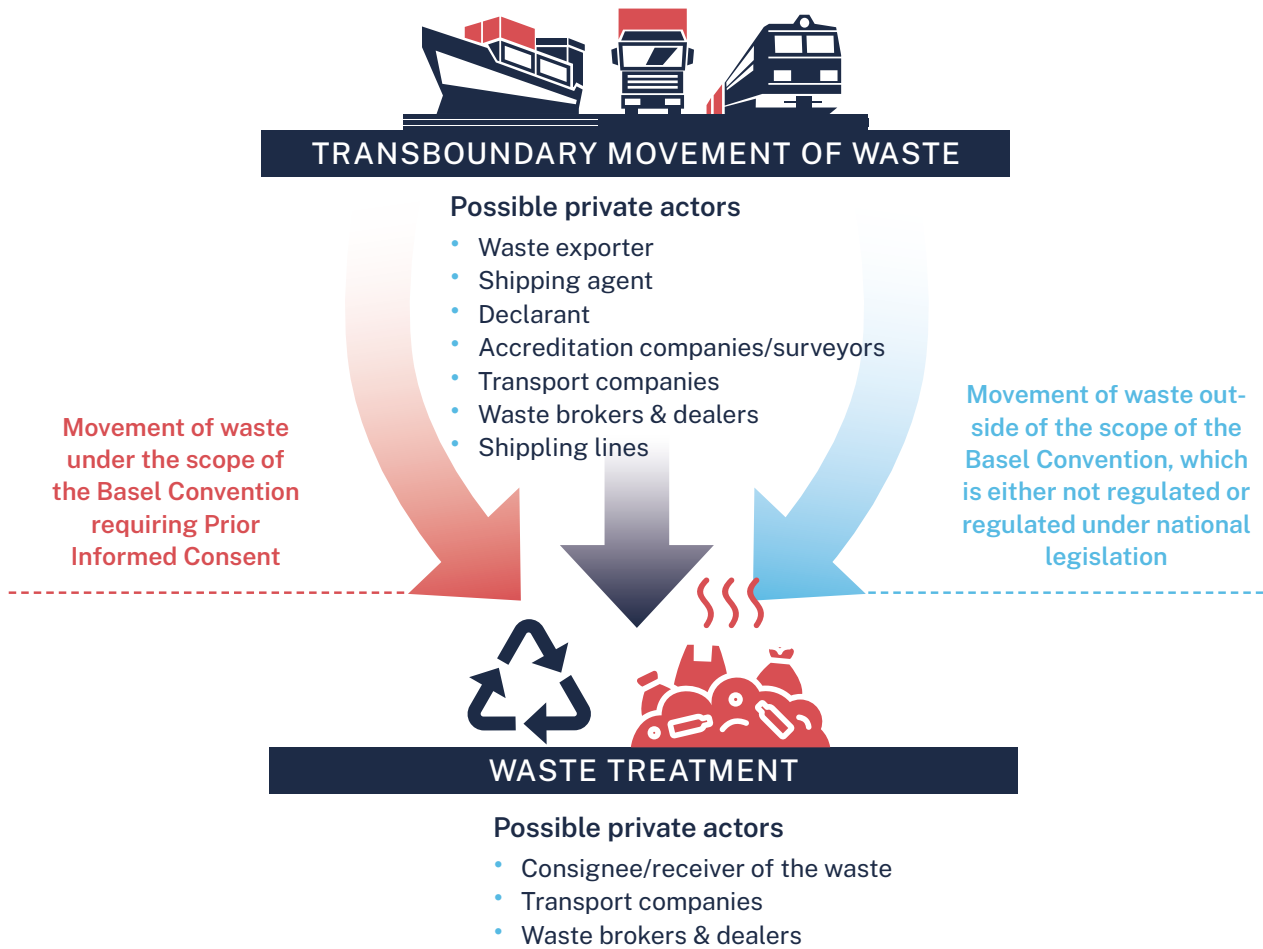
Actors in the waste supply chain

Waste is generated by various actors. When products become waste or second-hand products, the collection stage follows. Previous studies of waste exported from the EU have found actors involved in collection may include individual people informally picking waste, consolidating companies or collectives, recycling centres, companies operating waste takeback systems, refurbishers, charities, online marketplaces, and waste

dealers.^{159, 160} Once collected, waste is transported. The interim stage between collection and transport may involve companies engaged in storage and handling, expeditors, shipping agents, terminal operators, and shipping companies. Recycling centres and refurbishers, for instance, may first engage in dismantling and recycling before export takes place.

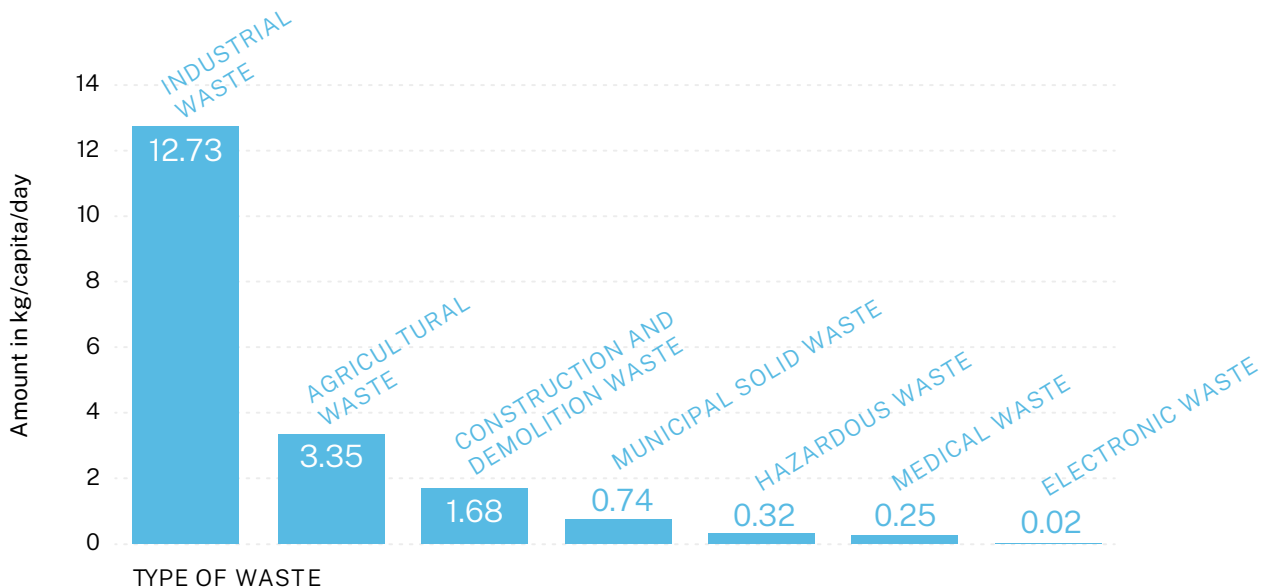
Eventually, the waste export reaches its destination, where disposal can include actors engaged in recycling, burning and/or dumping.^{161, 162} Different types of waste, such as e-waste and plastic waste, and discarded electronic equipment intended for different purposes, such as recycling and incineration, as well as different destination regions, follow distinct supply chains.

Figure 5 – Private Actors in the Waste Industry



Source: Isarin, N., Baez-Camargo, C. and Cabrejo le Roux, A. 2023. *Environmental Corruption Deep Dive Series – Nexus Between Corruption and Waste Trafficking*. Basel, Switzerland. Basel Institute of Governance.

Figure 6 – Estimates of global waste generation (estimated global average for municipal solid waste from 2016, estimated yearly global average for the other waste types from 2011–2017)



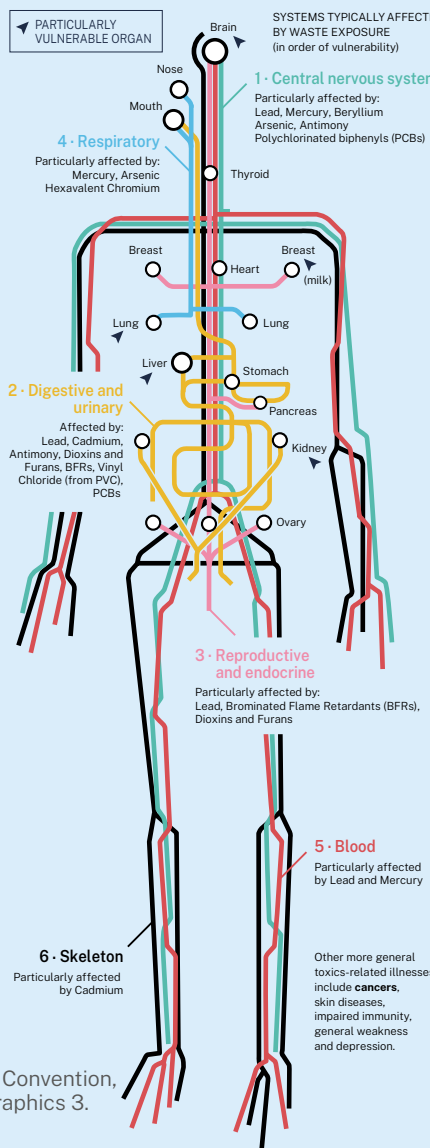
Source: Kaza et al (2018) *What a Waste 2.0. A Global Snapshot on Solid Waste Management to 2050*. The World Bank; see also UNEP (2010) and (2018) *Waste without Frontiers and Waste without Frontiers II*.

BOX 2: WORKING IN THE WASTE SECTOR

Waste at all stages of the supply chain – from extraction and industrial activities to collection and disposal – can have significant consequences on the people working with the waste (as well as people living near it). According to a study by the Basel Convention Secretariat in 2012, low-income countries in particular can struggle with environmentally-sound waste management resulting in hazardous waste being mixed with municipal waste and/or workers not being properly equipped with safety gear.¹⁶³ They also note that in areas where waste is dumped or in accessible landfills, an informal sector (not necessarily illegal or scavenging) has arisen where people collect valuable components from the waste. All of these unprotected waste workers face health implications as seen below from the components of various kinds of waste.

Figure 7 – Waste Body Burden¹⁶⁴

Health concerns affecting waste workers and people living close to landfills or incinerators



Source: Basel Convention, Vital Waste Graphics 3.

Legal waste trade patterns

In the legal market, Northern America exports the most waste by value globally (USD 206 billion) followed by Western Europe (USD 205 billion) and Northern Europe (USD 97 billion). Per capita this amounts to USD 530 in Northern America and USD 1,020 in Western Europe meaning Western Europe exports nearly twice as much waste per capita by value. Eastern Asia (USD 228 billion), Western Europe (USD 226 billion) and Southern Europe (USD 92 billion) import the most waste by value (Figure 8). Western Europe being both a large importer and exporter highlights the importance of intra-European trade.

The main trends in legal flows of 18 types of waste gleaned from an analysis of UN COMTRADE between 2017 and 2023 are that (a) most waste stays within regions and (b) ferrous waste and scrap is on average annually the most traded waste by weight and value. Africa and Oceania have the least amount of intra-regional trade whereas most waste exports from Asia and Europe remain within the respective region.

Waste that is traded between regions seems to have a pattern. Metal scraps are exported to Asia and Europe, apart from nickel, which is exported to the Americas. Asia imports noticeable quantities of paper and paperboard, e-waste, and rubber and Europe imports noticeable quantities of precious metals and glass. About 29 per cent by value of waste exported from the United States of America stays in the Americas region with other significant amounts of waste by value, mostly copper waste and scrap being exported to Asia.

Figure 8 – Combined 2017–2023 UN COMTRADE trade data for all 18 waste categories exported and imported by top 10 regions by value

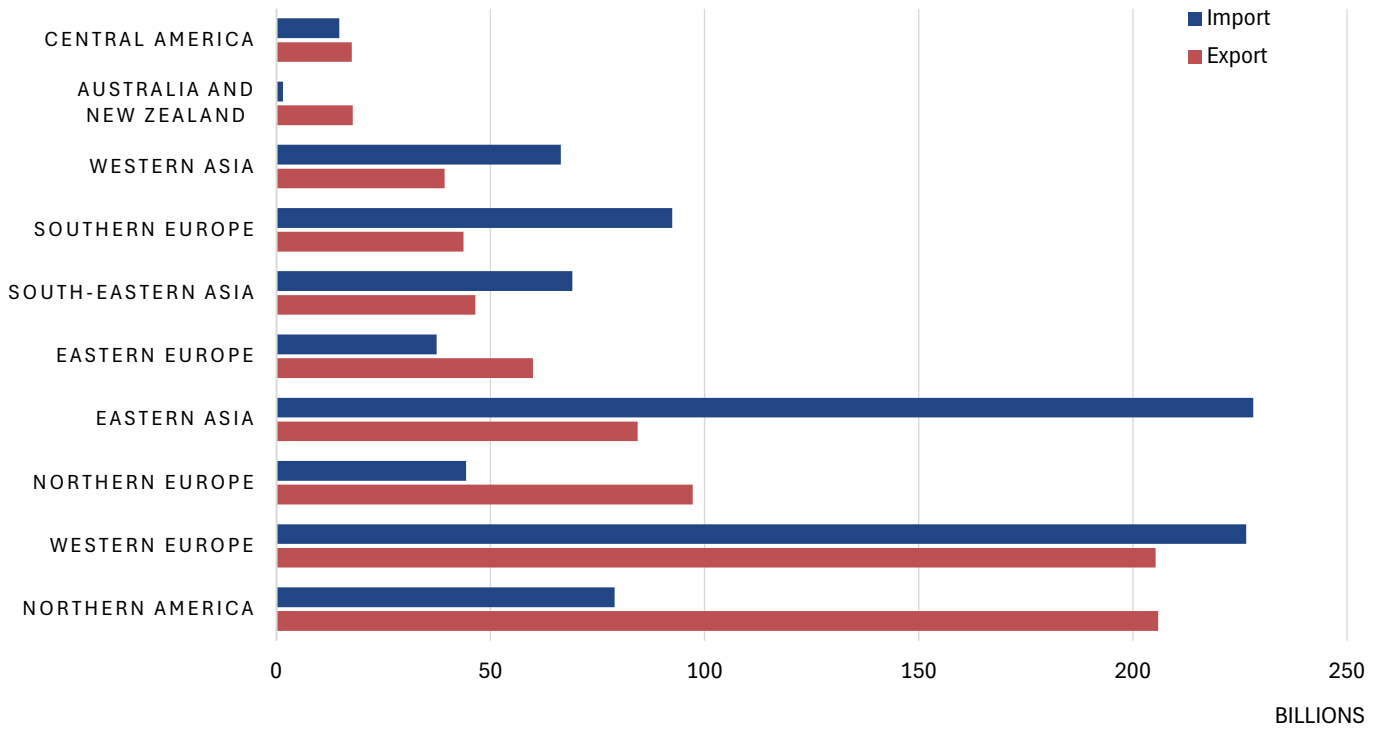
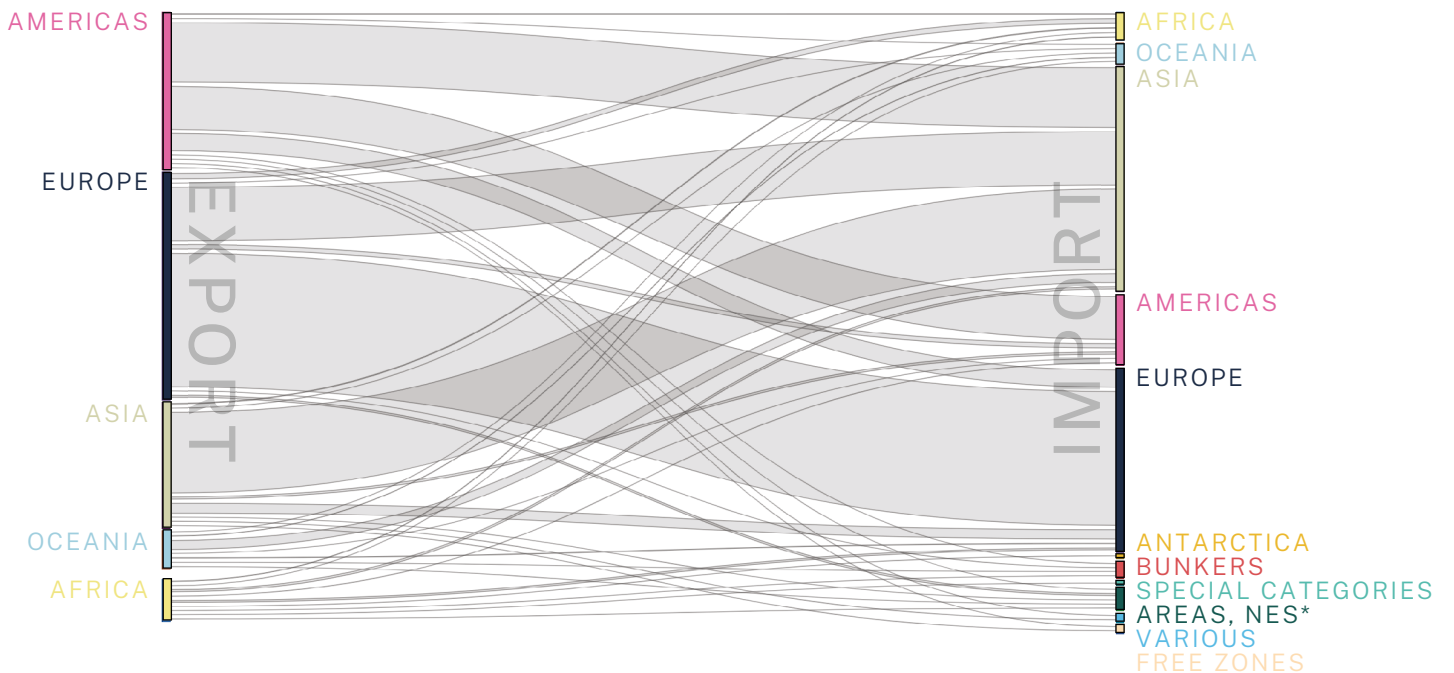


Figure 9 – Destination of waste export by exporting region for 2023 from UN COMTRADE for all 18 waste categories by value in USD



* Not Elsewhere Specified (NES)

Waste Crime and Trafficking

Profits in the waste industry start as soon as waste is created and accrue both from charging for disposal of waste and from the resale of substances recovered from waste, where possible. Waste crime is unlike illegal flows of natural resources or contraband, such as metals or wood or commodities like firearms and drugs, because most waste initially has a negative value as the owner is responsible for covering the expenses for its treatment.¹⁶⁵ What is waste in one place may not be waste in another due to differences in legislation as well as waste disposal and management capabilities.

Illegal waste disposal or trade can be lucrative when waste management and disposal services are offered at prices below the costs of following the processes and procedures required by law. This reduces the costs for those who need to dispose of waste, as well as for disposal service providers who do not follow the law.

Some categories of waste can also have a positive value as some wastes or their components, like metals or e-waste, maintain their value and can be recovered, reused, repaired, refurbished, or sold to recycling plants.¹⁶⁶ This is particularly the case with e-waste. This aligns with the concept of a circular economy, in which products and materials are kept in circulation rather than becoming waste. Waste trafficking undermines this model when waste is disposed of illegally.¹⁶⁷

Waste-related offences become waste crime when any person engages in the trade, treatment, or disposal of waste in ways that breach international or domestic legislation. Most data for this report concern cross-border waste trafficking or the illegal traffic of waste; much less information is available about the domestic/national treatment of illegal waste or domestic/national waste crime.

Extent and proceeds

Evaluating how much profit is made by illegal activity in the waste industry is complicated as the exact size of the global illegal waste trade is unknown.¹⁶⁸ An additional challenge in estimating the value of waste trafficking is that proceeds of illegal waste businesses

are comingled with the legal waste trade.¹⁶⁹ One size estimate for a part of the global illegal trade comes from the European Commission in 2021. Coordinated law enforcement operations to tackle waste trafficking reveal that an estimated 15 to 30 per cent of waste shipments involving the EU might be illegal.¹⁷⁰ In 2020, the annual revenues for hazardous waste trafficking in just the EU have been estimated to be EUR 1.5-1.8 billion, and revenues from non-hazardous waste trafficking between EUR 1.3 and 10.3 billion.¹⁷¹ In 2017, INTERPOL estimated the potential value of the illegal waste detected during Operation 30 Days of Action at USD 33 million.¹⁷² Global estimates for 2010 calculated from estimates of e-waste generated and estimates of the amount of e-waste properly disposed of state that the profits from informally and illegally handled and unregistered e-waste might range from USD 12.5 – 18.8 billion annually.¹⁷³ How much of this is specifically illegally handled and therefore constitutes waste crime is not known.

The undetected portion of waste trafficking is likely to be significantly higher than what is detected. Regarding domestic waste crime, insufficient data are available to understand its extent. In addition, different definitions of what constitutes waste and its illegal disposal make it challenging to calculate the value and volume of domestic waste crime. Even though it is hard to make a reliable or exact evaluation of the profits from the illegal waste market, most sources predict that it will rise, in particular for e-waste, as the amount of e-waste produced globally is growing.

Waste trafficking generates large profits for some, but it creates costs for others. The legal waste recycling industry suffers a great loss from illegal actions and on top of that, the cleaning and restoration costs that are a consequence of improper waste management for the society can be substantial.^{174, 175} The clean-up cost per unauthorized landfill that followed illegal waste dumping in the cases analysed by INTERPOL in 2018 amounted to USD 15.6 million on average.¹⁷⁶

Flows of illegal waste

The general assumption about waste trafficking is that it predominantly goes from high-income countries to low-income countries, but also to poorer regions within the North with less regulation and enforcement. European countries have the highest levels of reporting of waste trafficking, and intra-European waste trafficking is found across all three datasets used in this study. Of all Basel Convention illegal reported closed cases (9,203), 4,220 cases between 2016 and 2023 took place within Europe, of which 525 were in 2023.

Overall, there are few data on waste trafficking not involving Europe. Some cases identified by INTERPOL involved hazardous waste trafficked from Mexico to the United States of America and from the Arabian Gulf to Southeast Asia.¹⁷⁷ Other cases involved used car tyres exported from North America and East Asia to West Africa, and a mix of hazardous plastic scraps, metal scraps and e-waste going from North America to East and Southern Asia.¹⁷⁸ Plastic waste is also illegally trafficked between North America and Asia,¹⁷⁹ but the lack of data from North America regarding

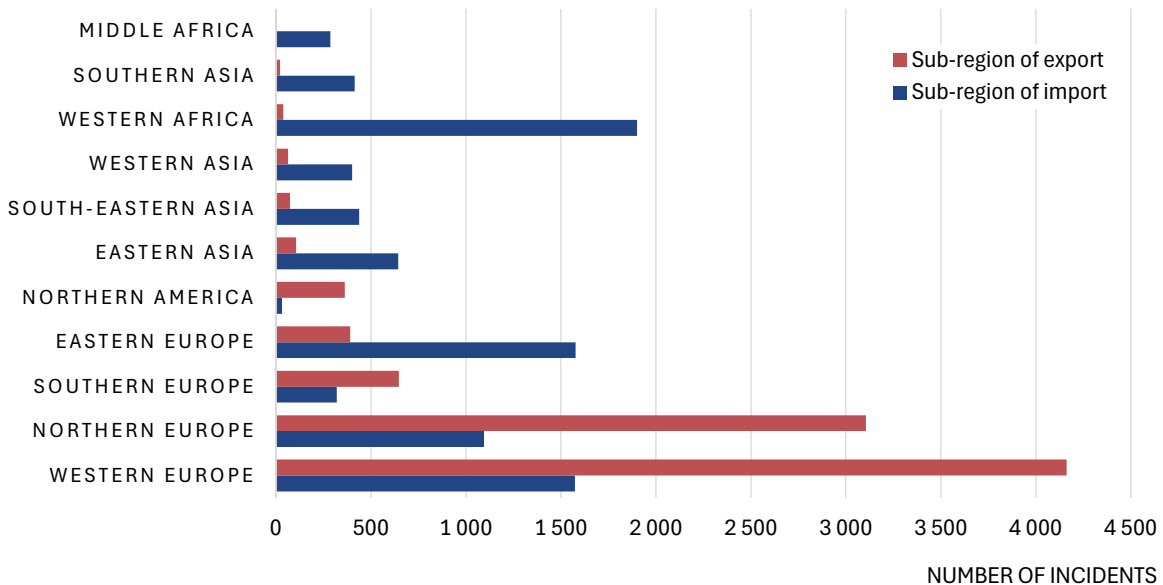
waste trafficking impedes full understanding of this region’s role. Intra-regional plastic waste trafficking in Asia is also significant, as well as, to a lesser extent, intra-regional occurrences in North and Latin America and the Middle East and North Africa.¹⁸⁰

Waste trafficking involving Europe

As mentioned above, it has been estimated that 15 to 30 per cent of the EU’s waste trade may be illegal.¹⁸¹ Part of the illegality is intra-European waste trafficking, which is evident from the Basel Convention data, INTERPOL reports, and WCO operations. INTERPOL estimated 65 per cent of all illegal plastic trading routes may originate in Europe and 41 per cent may be destined for Europe.

Across the data sources, a flow of illegal waste from Europe to Asia is identified. The data from the 40 countries which reported to INTERPOL for its plastic waste trade assessment up until 2018 indicated that 40 per cent of the plastic shipment routes between Europe

Figure 10 – Basel Convention reported closed cases of illegal waste traffic imports from 2016 through 2023 by sub-region of import and export



and Asia contained illegal shipments of plastic.¹⁸² Plastics are cheaper to export from Europe rather than to treat there because of high labour costs. The plastic that is exported from Europe should be pre-sorted (though this is not necessarily the case), so when it arrives at its destination, mostly in Asia, it is easy for companies to treat. Asia has little infrastructure to collect pre-sorted waste, making it difficult to treat waste produced in Asia within Asia even though there is the capability to treat pre-sorted waste from elsewhere.¹⁸³

In 30 Days of Action, the participant countries reported to INTERPOL that e-waste accounted for 60 per cent of the detected illegal waste shipments between Europe and Africa, exceeding more than any other illegal flow.¹⁸⁴ Other waste identified in 30 Days of Action included metal and waste from the car industry. Routes of illegal metal waste included Sweden to Pakistan,¹⁸⁵ the Netherlands (Kingdom of the) to Kuwait, and the United Kingdom to Türkiye and Jordan.¹⁸⁶ Illegal metal waste also was imported to Europe; one case concerned metal waste (copper, bimetals, and mercury) shipped from the United States of America to Belgium.¹⁸⁷ More recently, the findings of the WCO’s Operation DEMETER X in 2024 show that Africa overtook Asia for the first time as the primary destination for illegal waste shipments from Europe.¹⁸⁸

The most recent data from the Basel Convention illegal closed cases confirm some of the above flows. In particular, illegal e-waste exported from Europe to Africa was reported, but also rubber waste. Textile waste, plastic, metals and metal bearing scraps, and paper were exported from Europe to Asia. Batteries and healthcare waste in 2023 were exported from Europe to the Americas. Europe was the importer in 127 illegal closed cases in 2023 of the Basel Convention dataset. The waste streams identified were e-waste, waste oils, and metal and metal scraps from Central Asia and plastic and rubber waste from Australia and New Zealand among others.

Intra-European waste trafficking is found across all three datasets. Cases reported to the Basel Convention in 2023 show that fuels, paper products, soils and healthcare wastes were mostly trafficked to Western Europe. By contrast, Eastern Europe was mostly involved in end-of-life vehicles, rubber waste, catalysts, and textile wastes. Northern Europe had a noticeable portion of the battery waste cases while Southern Europe imported the most mixed illegal waste. The 30 Days of Action found that mixed materials, biological and chemical waste, and construction and demolition waste were the most frequently trafficked types of waste.¹⁸⁹

Figure 11 – Basel Convention reported closed cases of illegal waste traffic in 2023 exported from Europe to other regions

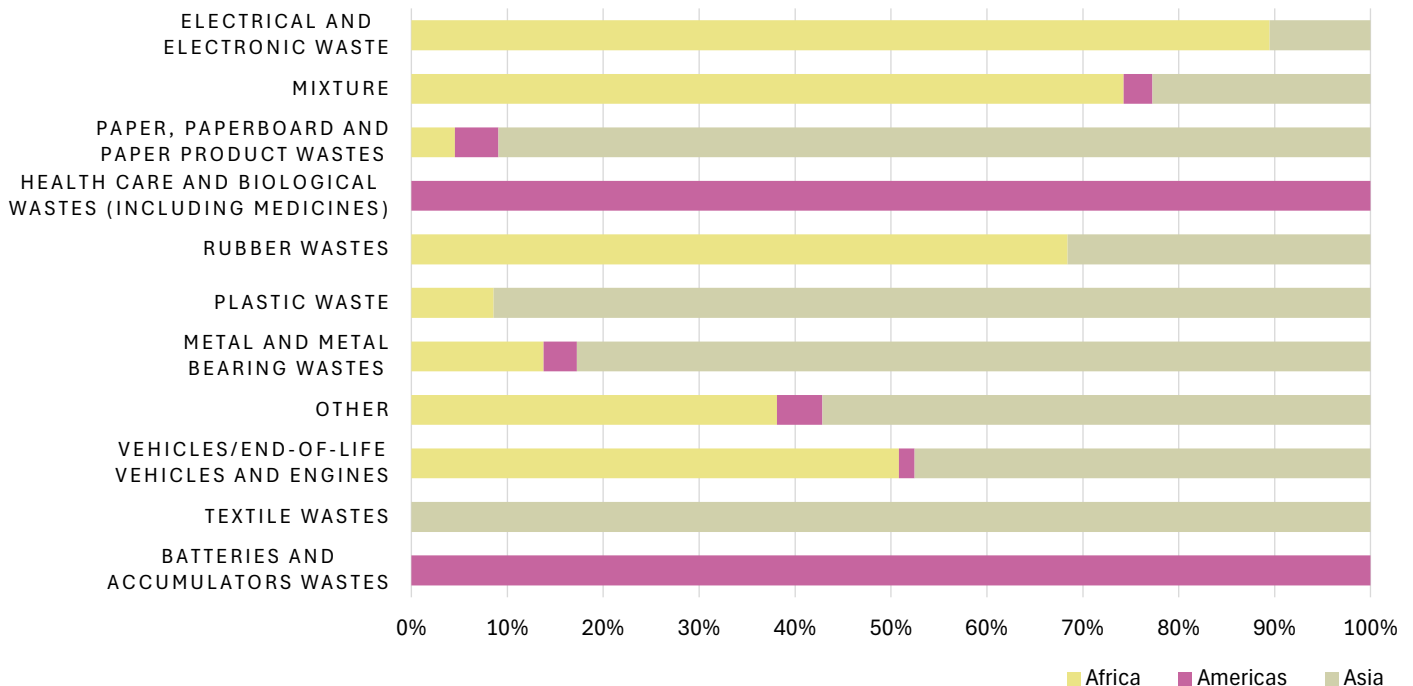


Figure 12 – Basel Convention reported closed cases of illegal waste traffic in 2023 imported by Europe from other regions

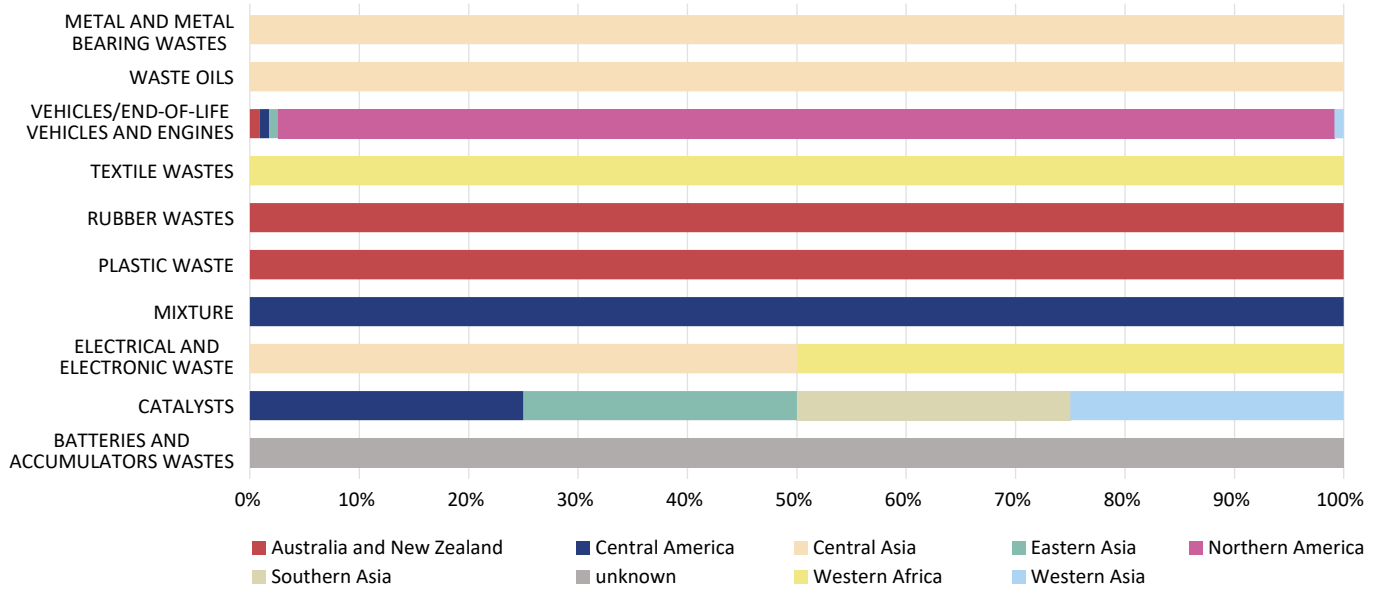
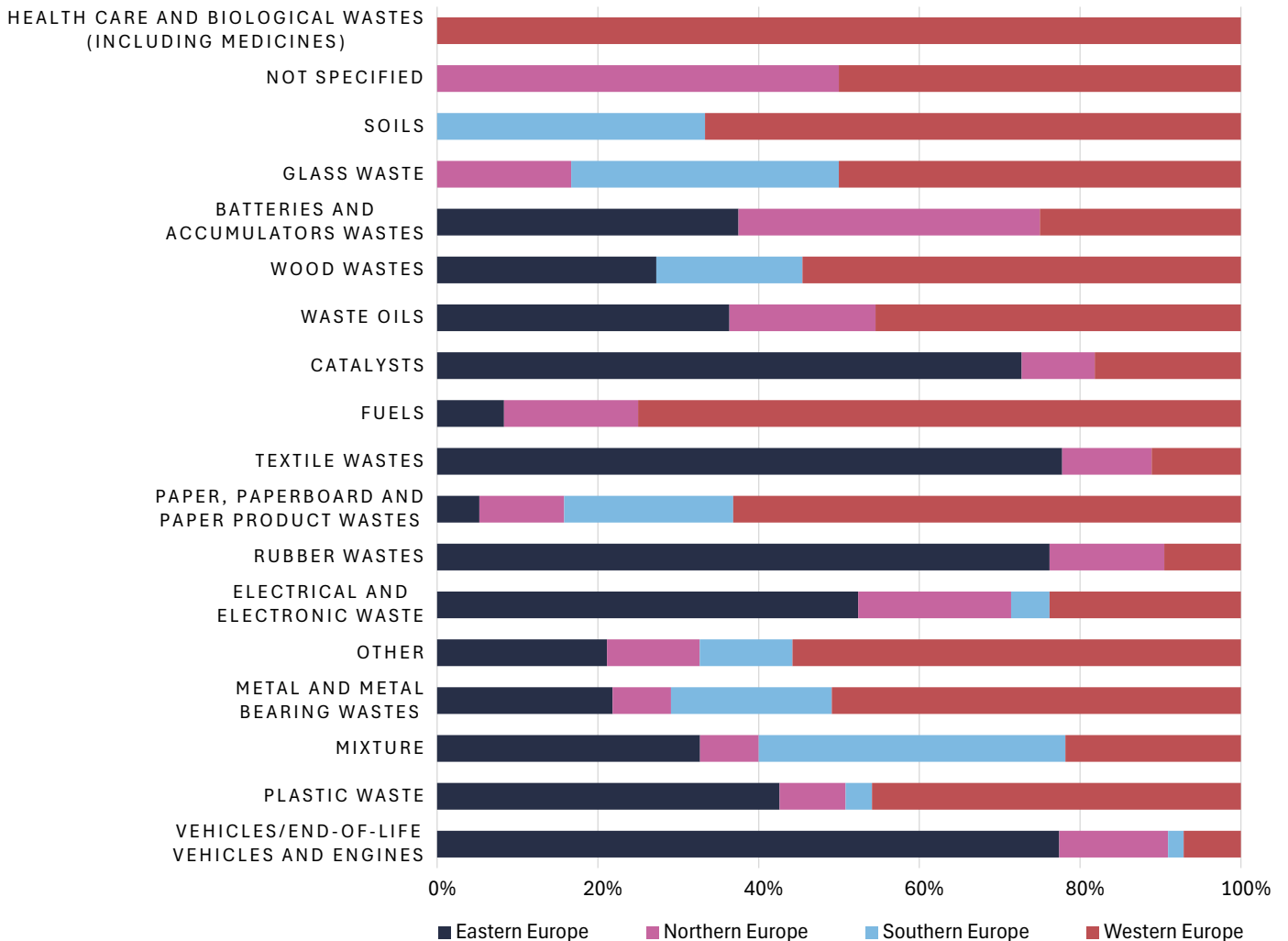


Figure 13 – Basel Convention reported closed cases of illegal waste traffic in 2023 exported from Europe to European regions



Waste trafficking not involving Europe

Based on the three main datasets on illegal activity analysed for this study, all regions of the world were found to be involved in the export, import, transit, and/or all combinations of these. However, waste trafficking not involving Europe is where there is the least amount of data. In the Basel Convention data there are 48 illegal closed cases not involving Europe for 2023. No clear pattern emerges from these cases apart from mixed waste being the most prevalent illegal waste.

Some cases identified by INTERPOL involved hazardous waste trafficking from Mexico to the United States of America and from the Arabian Gulf to South East Asia.¹⁹⁰ Other cases consisted mainly of used car tyres exported from North America and East Asia to West Africa and a mix of hazardous plastic scraps, metal scraps and e-waste going from North America to East and Southern Asia.¹⁹¹ Plastic waste is illegally trafficked

between North America and Asia,¹⁹² but the lack of data from North America regarding waste trafficking impedes full understanding of this region's role. Intra-regional trade in Asia appears significant as well as to a lesser extent intra-regional occurrences in North and South America and the Middle East and North Africa.¹⁹³ In relation to waste from ozone depleting substances – the Montreal Protocol controlled substances – the WCO suggests that because of the stricter global controls, free trade zones and transit countries are being utilized more.¹⁹⁴ The Basel Convention data and the findings of the WCO's Operation Demeter X in 2024, as mentioned above, highlight Africa as a growing destination of illegal waste, a shift probably driven by uneven enforcement capacity and regulatory gaps in African countries.¹⁹⁵

Drivers and Enablers

Financial motives are the primary driving factors for committing waste offences.^{196, 197, 198, 199, 200} For instance, in the EU there is a growing demand for illegal waste disposal services due to stricter waste regulations and increased legal disposal costs.^{201, 202} Companies may look to reduce production costs and maximize profits, and illegal waste disposal can cut costs. Individuals who commit crimes take advantage of businesses under financial pressure and businesses cut corners. In the waste industry, it has been found to be easy to undercut legal competitors by providing more cost-efficient options for waste disposal through dumping.²⁰³ When illegal activities divert profits from legal competitors, it can affect the entire waste market, including legitimate recycling facilities.²⁰⁴ Some estimates state that illegal disposal of waste can result in 200 to 300 per cent cost savings for the waste generator when compared to proper ways of waste disposal.²⁰⁵

As mentioned, one study estimates that in 2022 only 22.3 per cent of the e-waste was managed in an environmentally sound way; this percentage contained raw materials (iron, gold, copper, etc.) that represent a value of USD 28 billion out of a possible USD 91 billion from all e-waste that could have been reclaimed.²⁰⁶ When the market values of these raw materials are high, extracting them illegally from waste becomes a lucrative business. In many instances in Europe the fines imposed have been lower than the profits that can be earned from a single illegal e-waste shipment.²⁰⁷ At the same time, many jobs and activities in destination countries benefit from such illegal e-waste shipments. The most numerous are probably informal waste pickers working on landfills in many cities in the developing world who can suffer various negative health impacts.²⁰⁸

Similar issues can be observed in the international recycling market for ocean-going vessels, where illegal shipbreaking is prevalent. Iron or steel make up 80-90 per cent of a ship and represent a valuable source of scrap steel for construction, for example. The amount of energy required by recycling processes is general-

ly much lower than for refining metal from ore and for several countries, especially where natural resources are scarce, this represents a vital source for national supply.²⁰⁹ If international regulations are not properly enforced or circumvented, hazardous substances will continue to accumulate, causing fatalities, injuries and environmental damage. Simply imposing bans on the export of end-of-life ships often leads shipowners to exploit loopholes like flags of convenience to avoid compliance.²¹⁰

Restrictions and import bans on plastics have led to an increase in illegal recycling facilities and illegal landfills in emerging Asian import nations with limited enforcement capabilities.²¹¹ The increasing intra-European plastic waste market is also expected to be vulnerable to manipulation by organized crime groups (OCGs); there is a surplus in plastic waste, and difficulties in treating, monitoring and finding disposal places create openings for opportunistic crime.²¹²

Corruption²¹³ and financial crimes

Waste crimes are strongly linked with other offences. According to numerous analyses, these other types of crimes involve tax evasion, document fraud, corruption, extortion, theft, public embezzlement, immigration offences, abuse of office, intimidation and threat, illegal employment, drug trafficking, illegal trade of explosives, violations of consumer rights, vehicle theft and money laundering.^{214, 215, 216, 217, 218, 219} INTERPOL found cases in which the money stemming from associated financial crimes is channelled by criminal groups into legal waste management businesses and properties.^{220, 221}

INTERPOL also notes a fundamental trait of pollution criminality, including in the waste sector, is the ability to infiltrate the public sector and local politics.²²² Public sector employees may actively engage in the commission of the crimes to share the profits and advantages, and often play a crucial role in facilitating two

types of offences: those related to the misuse of municipal areas (such as illegal waste disposal in landfills) and those involving manipulation of the public administration. In the EU, EUROPOL has noted criminals may use legal businesses to bribe corrupt officials,²²³ engage corrupt public officials such as customs officials or other public supervisors to obtain authorizations or bypass security checks²²⁴ or, as INTERPOL has found, use ‘captured’ public officials to facilitate criminal activity by providing confidential information or by disrupting enforcement.²²⁵ The EUROPOL and INTERPOL reports cited here indicate cases where both OCGs and corporations employ corruption to hide illegal waste within legal waste streams with varying degrees of capture or infiltration of the regulatory or enforcement communities.

UNODC’s²²⁶ *Unwaste* study provides this summary:

“Corruption can occur at different stages of the waste management chain, even before any transactions take place, for example during the licensing or allocation of waste trading or processing quotas, or during the procurement phase for waste management contracts. The rules and procedures for transporting waste across borders vary depending on how the waste is classified (hazardous or non-hazardous) and on its intended treatment in the importing country. To circumvent the rules, which are often time-consuming and costly to comply with, corruption has been used, such as bribing officials to obtain permits or licences or overlooking violations of waste management regulations”.

Actors in Waste Crime and Trafficking

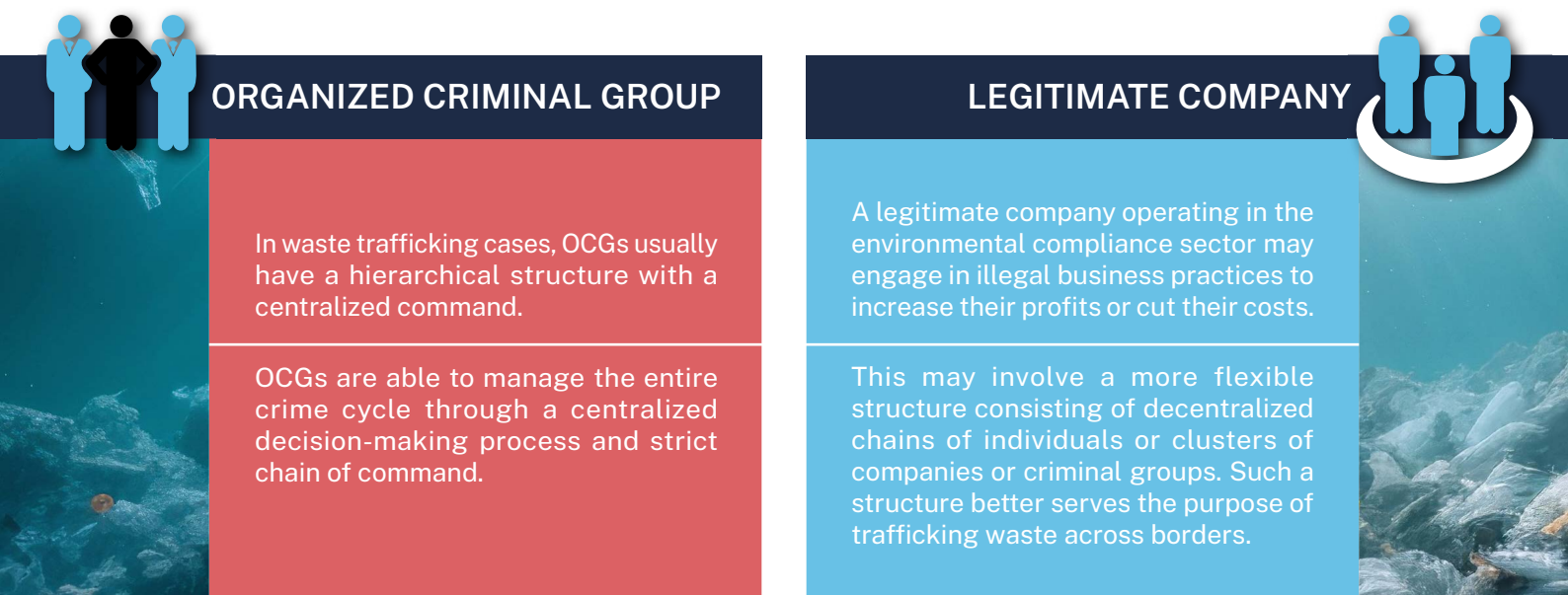
Waste crime may begin with the creation of waste, where various actors such as factories and retailers may engage in illegal activity, such as illegal dumping. When products become waste or second-hand products, the collection stage follows, an important entry point for illegal activity. Which specific actors are present in illegal processes will ultimately depend on the type of waste and whether the waste is intended for domestic illegal waste treatment, burning or dumping, waste trafficking or both. The waste generator might often lack awareness of whether the waste will be managed in compliance with regulations after it has been collected, even though they have responsibility to do so in many jurisdictions.²²⁷

One study by a law enforcement consortium in the EU found when waste stays within country borders, thus within national jurisdictions and so not subject to the

Basel Convention, the offenders may be small companies or individuals who, for example, deal with storing wastes, which are often hazardous, without the required permits.²²⁸ Another study in the EU (focusing on Italy) highlighted there may also be OCGs engaged in coordinated illegal waste dumping.²²⁹

One INTERPOL study in 19 countries on pollution crime (which overlaps with waste crime)²³⁰ outlines two distinct structural patterns. The first is centralized criminal groups and mafia clans, characterized by a singular, cohesive group of perpetrators overseeing the entire chain of activities related to the offence. Control is maintained through centralized decision-making and a strict hierarchy. Centralized groups often demonstrate a clear division of roles among participating individuals or companies.²³¹ The second structure involves legitimate companies with decentralized networks and

Figure 14 – The two main criminal structures involved in waste trafficking



chains of individual actors. The complexity of waste trafficking requires a sophisticated logistical arrangement to coordinate the different steps including waste collection, export, import, delivery and disposal, which are often carried out by distinct operators situated in different global locations.²³²

The majority of closed illegal cases reported to the Basel Convention appear to involve corporate actors (i.e., exporters, generators and distributors make up over 60 per cent of the reported responsible parties). In addition, a report on pollution crime mentions that many of the cases involved senior businesspeople (not legal entities).²³³

As for the level of knowledge and awareness, from EUROPOL and INTERPOL operations, most actors seem to be highly knowledgeable about legislation and regulations, with waste trafficking requiring a high level of expertise.^{234, 235, 236, 237} A European e-waste study suggested that the use of fraudulent documents indicates that offenders are knowledgeable about the necessary authorizations and intentionally bypass them.²³⁸

Organized crime groups

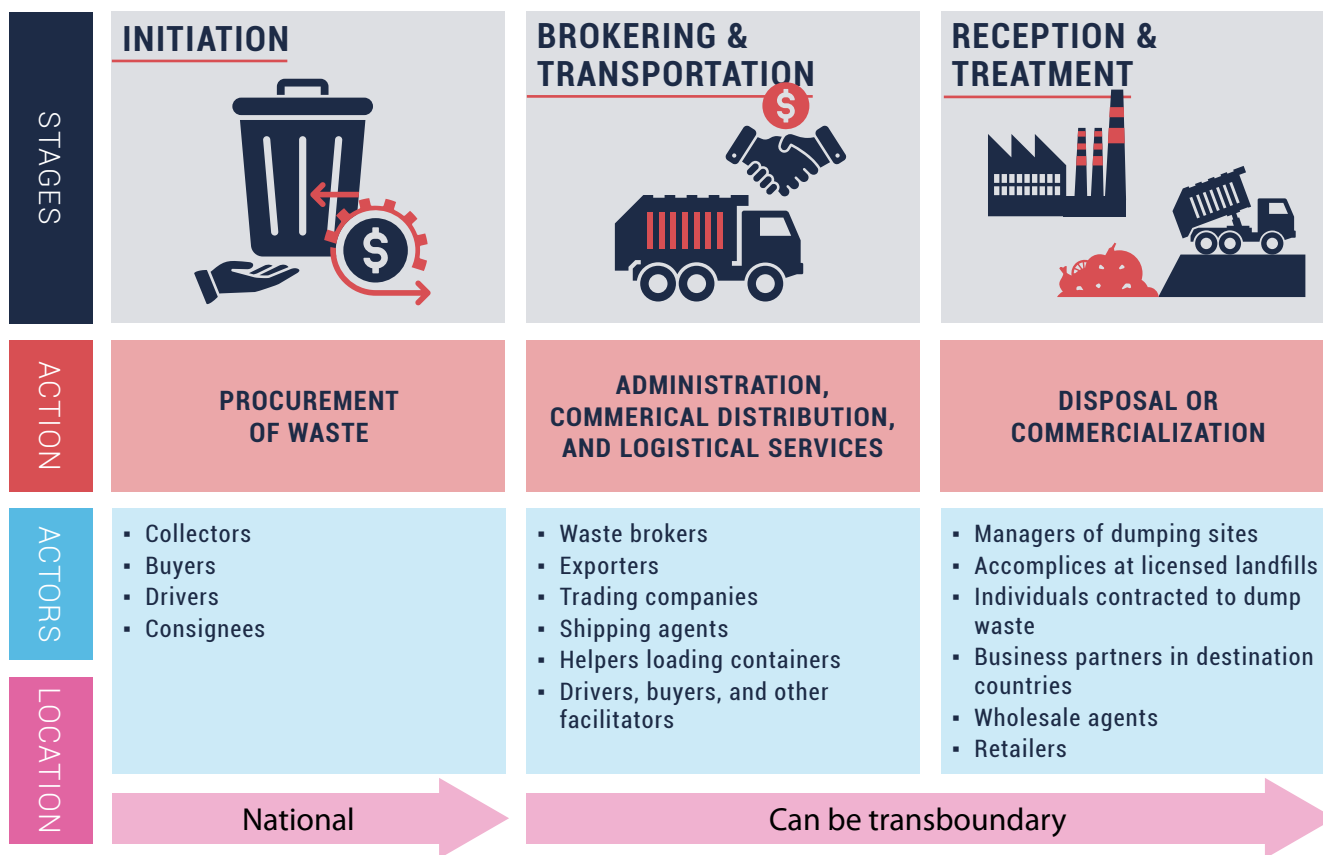
Evidence of the involvement of OCGs in waste crimes remains fragmented at the global level, although analyses suggest that it has emerged in different parts of the world and represents a threat.²³⁹ OCGs have been found to be involved in waste crime cases around the world, ranging from local illegal activities to large-scale intercontinental trafficking.²⁴⁰ In the EU, waste crime offenders have frequently been found to be linked to OCGs.^{241, 242} For example, OCGs in Italy and Eastern Europe are known to have been involved in illegal waste trade for some time.^{243, 244, 245} The Camorra in Italy are known to use front companies to win public tenders for waste management contracts by intimidating legal competitors.²⁴⁶ One EUROPOL threat assessment²⁴⁷ claims other OCGs involved in waste crimes in Europe are poly-criminal networks and that OCGs trafficking waste across the EU frequently operate through land routes between neighbouring countries, sometimes collaborating with local criminal networks.²⁴⁸ Major harbours at the borders of Western Europe are used for illegal exports of waste outside the EU in freight and maritime cargos.²⁴⁹ EU-based OCGs use major harbours to traffic large amounts of hazardous wastes in containers.²⁵⁰

The INTERPOL analysis of 27 organized pollution crime cases, 22 of which were waste crime, from 19 countries found three different roles of suspects: 1) initiation of the business and procurement of the commodities (waste); 2) brokering and transportation; and 3) reception and treatment and/or retail of the commodities (non-recyclable or –reusable waste and recyclable or reusable waste).²⁵¹ Role 1 typically involves companies or individuals based in the country where the crime or criminal group originates. They plan and arrange the illegal business, such as collecting waste. This role includes collectors, buyers, drivers, and consignees. Those in role 2, the intermediaries, provide administrative, commercial distribution, and logistical services to facilitate the offences. They may be part of the same criminal group or external actors contracted for their services. They handle documentation, sourcing commercial partners and destination sites, and transportation. Examples include waste brokers, exporters, trading companies, shipping agents, helpers loading containers, drivers, buyers, and other facilitators. Role 3 actors work at the final stage of the offence, where the waste recipients take care of disposal or commercialization. These include managers of dumping sites, accomplices at licenced landfills, individuals contracted to dump waste, business partners in destination countries, wholesale agents, and retailers. The analysis mentions that it was not known to what extent all the offenders involved in the 27 cases knew that they were part of a criminal activity.²⁵²

According to EUROPOL, the operational methods of criminal groups can differ based on their access to resources, expertise, and contacts.²⁵³ Some general characteristics of waste crime in the EU according to several different studies include:

- Being geographically mobile and seeking regions with favourable regulatory conditions for their criminal activities²⁵⁴
- Demonstrating a strong understanding of vulnerabilities within waste control systems²⁵⁵
- Displaying high flexibility and rapid adaptability to market and regulatory shifts²⁵⁶

EnviCrimeNet (a network of European Law Enforcement Agencies and recognized European Centre of Excellence)²⁵⁷ stated in 2015 that OCGs are often involved in all steps of the supply chain of hazardous and e-waste from collection to storage, transport, recycling

Figure 15 – Stages of Organized Waste Crime

Source: UNODC elaboration.

and dumping. “Newer” wastes such as photovoltaic panels have also been identified as susceptible to exploitation by OCGs.^{258, 259} OCGs involved in waste trafficking were found to use legal business structures to facilitate their criminal activities.^{260, 261, 262}

Corporations

Due to limited data and reporting on waste crime and trafficking there is little evidence of corporate involvement at the global level. However, evidence from the EU points to vulnerabilities in the waste supply chain indicating that a similar pattern could exist as with other crimes that affect the environment. This ranges from unintentional involvement – the unknowing actor and/or the company that fails to complete their due diligence – to intentional misconduct, where the company is engaged in opportunistic illegal activity in addition to legal activity and/or the company is established in order to commit criminal activities alongside legal activities.^{263, 264, 265}

For example, in the EU criminal activity has been identified in private companies at different stages of the waste supply chain including in collection and treatment companies, recycling facilities, trading and stock companies, transport firms, and logistics businesses.²⁶⁶ Within the European e-waste sector, legal businesses such as recyclers/end processors, sorting/consolidation sites, and freight forwarder/logistics operators, informal collectors, e-waste brokers and internet traders have also been involved in the illegal trade to an undetermined degree.²⁶⁷ Illegal waste trade cases in the EU have involved persons working in or operating waste management companies.²⁶⁸ In some cases, waste traffickers control the entire processing cycle, from the country of export to the country of import, and possess substantial human and financial resources.²⁶⁹

One trend in the EU waste sector that has been seen is that corporations engaged in waste crime run multiple companies owned by the same individuals, and the companies frequently change management and

terminate after a short period of time so that a new entity, owned and organized by the same group, can take over the business.²⁷⁰ As stated by EUROPOL, different stages of the waste supply chain may be purposely located in separate jurisdictions to avoid detection.^{271, 272} The extent of registered companies' involvement in illegal waste trade and the proportion relative to that of OCGs and their use of legal businesses as front companies remains unclear.²⁷³

Modus Operandi

The specific modus operandi depends on factors such as the type of waste being trafficked and the destination of the waste, whether it remains within a region or is exported within or outside the region. Types of waste crime in the area of waste treatment include actions that bypass legal waste processing, occurring at the domestic level, and include illegal disposal, illegal incineration and illegal recycling.²⁷⁴ Methods in illegal waste disposal and treatment include mixing waste with other materials, storing it illegally in warehouses, burning it, using it as fuel, burying it underground or dumping it in nature.²⁷⁵ Waste may also be disposed of and concealed in the foundations of new construction sites. For instance, a construction firm in South Africa pleaded guilty to violating the National Environmental Management Waste Act when it was discovered they had used building waste to fill in wetlands where they were building new homes.²⁷⁶ Similarly, the New South Wales Environmental Protection Authority in Australia has an ongoing criminal investigation into landscaping mulch created from recycled materials contaminated with asbestos found in dozens of places around the city of Sydney.²⁷⁷

Criminal groups may establish illegal processing facilities for activities like e-waste disposal, leading to severe environmental damage.^{278, 279} Legal waste processing companies may be used as a front company to conceal illegal activities such as pouring liquid waste into streams or lakes, disposing of liquid or semi-liquid waste onto cultivated land, incorporating waste into production cycles (e.g., burning waste to generate energy), and fraudulently labelling hazardous waste as non-hazardous.²⁸⁰

Waste brokers obtain and produce fraudulent authorizations and documents, which can misreport prices and contents, making the illegal appear legal so that it can be transported for treatment or disposal.²⁸¹ Websites and online platforms advertise illegal products and services, and are used by waste management com-

panies and brokers in the EU to coordinate illegal activities with non-EU actors.²⁸² The utilization of violence is not prevalent in waste-related crimes, although it exists. When violence is associated with this type of crime, INTERPOL suggests it is a significant indicator of the involvement of OCGs.²⁸³

Waste trafficking, which involves the transboundary movement of waste that does not follow export and/or import regulations at the international level, encompasses illegal shipment of waste, violating restrictions of the origin and destination country, and/or violating waste treatment requirements.²⁸⁴ Available evidence suggests that operational methods used in waste trafficking may include:^{285, 286, 287, 288, 289, 290, 291, 292, 293, 294}

- Declassifying hazardous waste as non-hazardous waste.
- Mislabelling and making false declarations regarding the content of shipments, including not disclosing that the waste is hazardous.
- Using fraudulent authorizations to give the appearance of legality to waste.
- Concealing waste among legal shipments.
- Mixing hazardous waste with non-hazardous waste.
- Establishing front companies to traffic waste under the guise of legitimacy.
- Falsifying certified documents or other documentation, often involving corrupt practices. Documents commonly targeted for fraud include but are not limited to the following: licences, waste processing invoices, export/import documents, notification and movement documents, packaging waste recovery notes.
- Using transit countries to obscure the route and make the trafficking harder to detect.
- Unlawfully labelling waste as second-hand products.

- Taking advantage of changes in regulations to exploit potential enforcement gaps while being implemented.
- Taking advantage of price fluctuations in the waste market, e.g. by managing illegal disposal sites to attract illegal business when the legal market prices for disposal increase.
- Changing operational methods as soon as their illegal activities are detected by authorities.
- Alternating between legal and illegal activities and moving swiftly between companies, through developing considerable contacts within the waste industry.
- Participating in other types of trafficking simultaneously – shared routes, criminal affiliations and logistical assets lowers operational expenses and maximizes profits.
- Dumping and abandoning of waste at destination or in the port.

Breaking it down – the five main waste types illegally trafficked

Electrical and electronic waste

According to the World Bank²⁹⁵ and supported by the UN COMTRADE analysis, e-waste is a small portion of the total global waste industry by weight. Yet according to UNITAR's Global Transboundary E-waste Flows Monitor 2022, it is one of the fastest-growing waste streams, which is related to the comparatively high value of this waste category.²⁹⁶ With the rise of electronic vehicles, the increase in value and quantity of e-waste is likely to continue.

Electrical and electronic waste can be hazardous or non-hazardous. It can include: CFC-containing refrigerators, laptops, refrigerator compressors, compressors contaminated with oil, LCD panels, mobile phones and printed circuit boards, TV scrap, electrical assemblies consisting only of metals or alloys, flat panel displays, waste electrical and electronic assemblies containing hazardous components, white goods, mixture of turbochargers, electronic scrap (e.g. printed circuit boards, electronic components, wire, etc.) and reclaimed electronic components suitable for base and precious metal recovery, solar panels, cathode-ray tubes, etc.

E-waste is typically destined for facilities that should be reusing the items, repairing them, or recovering any useful materials – predominantly metals.²⁹⁷ E-waste is of concern because of the health and environmental impacts when not managed properly.^{298, 299} E-waste may be hazardous and contains hazardous substances such as cadmium and mercury as well as some persistent organic pollutants, e.g., polychlorinated biphenyls, controlled under the Stockholm Convention.³⁰⁰ Both manual dismantling and open burning are of health concern

as crushing and burning of the appliances results in potentially toxic dusts and fumes in the air.³⁰¹ The remaining e-waste is largely not reusable so it is at risk of being illegally dumped.³⁰²

E-waste accounted for 20 per cent of the Basel Convention reported cases from 2016–2023 involving Africa, Europe and Asia. In Operation 30 Days of Action, 47 per cent of the cases involved e-waste³⁰³ and the WCO reported that e-waste was the main seized waste in 2019 and 2020.³⁰⁴ E-waste seizures and quantities reported to the WCO decreased in 2022 and 2023, which meant that it was no longer the main waste stream by incidents.³⁰⁵

Mixture of wastes

A particular concern arising from the analysis of available data relates to the presence of mixture of wastes or mixed waste. The mixed waste category encompasses a single shipment containing various types of waste together, including sometimes both hazardous and non-hazardous wastes. This poses particular challenges in distinguishing legal from illegal waste types as well as in disposal as different types of waste require distinct treatment. Mixed wastes are destined for facilities for the treatment of the various components, but if any of the components are mis-declared and/or contaminated (e.g., with mercury or other metals, clinical waste, chemicals), the waste may not be able to be properly treated and may then be dumped or burned. According to a 2021 study by the Secretariat of the Basel, Rotterdam, and Stockholm Conventions and the Minamata Convention on Mercury,³⁰⁶ the proportion of chemically intensive products being discarded is in-

creasing, making more waste hazardous. Thus, both contaminated and mixed wastes are problematic.

In the WCO's *Illicit Trade Report* in 2023, mixed waste is in the top ten types of illegal wastes seized in 2022 and 2023 though the number of seizures are small.³⁰⁷ In INTERPOL's 30 Days of Action in 2017, mixed waste made up 25 per cent of the types of waste detected in illegal exports from Europe to Africa and a significant though not quantified proportion of waste in intra-European illegal trade.³⁰⁸ The quantity of mixed waste identified from the Basel Convention reports represents a significant proportion, ranking as the second-highest number of closed cases after e-waste. Waste traffickers in Europe have repeatedly been detected mixing hazardous waste with non-hazardous waste;^{309, 310} in some cases vehicle tyres were used for concealment of hazardous wastes.³¹¹ These datasets indicate that actual mixed waste shipments and shipments labelled as mixed waste are at particular risk of having illegal waste; mixed waste can serve as a chosen method of concealing illegal waste.

End-of-life-vehicles (ELV) and engines

End-of-life-vehicles and engine wastes may include car parts, cars, used cars, damaged cars, end-of-life maritime vessels, tractors, harvesters, waste trucks, vehicle equipment, car body panels, boat motors, old motors, etc. and may be hazardous or non-hazardous. Like e-waste, ELVs are destined for reuse, repair, or recovery, but dumping and burning ELVs and/or the non-recoverable components often occurs.³¹² With the rise in electronic vehicles, the issue of recycling and proper disposal of the batteries and other components will become increasingly important.

A total of 1,294 illegal closed cases involving ELV were reported from 2016 to 2023 to the Basel Convention. INTERPOL found that the rapid generation of waste from both lead-acid and lithium batteries has exceeded the existing management capacities, leading to opportunities for illegal waste treatment³¹³ and potentially environmental pollution from illegal dumping. The WCO's 2023 report reported a considerable increase in the quantity of ELVs seized.³¹⁴

Plastic waste

Plastic wastes may be hazardous or non-hazardous and can include household plastic waste, LDPE film, polystyrene flakes, waste PE foil, ethylene polymer, solid plastic waste, plastic film, textile polyester waste B3010, toner cassette, PVC off grade, plastic foil, polyurethane foams, waste PVC, plastic wastes –PET, EPS-blocks, B3011 –LDPE film, ABS, toner ink cartridges, soiled plastics, laminated film, farm plastics and fibre glass.

Plastic wastes may be hazardous for various reasons, for example due to specific harmful chemical ingredients in the plastic or it may be contaminated with hazardous substances.³¹⁵ A total of 1,015 illegal closed cases involving plastic waste were reported to the Basel Convention from 2016 to 2023, amounting to 11 per cent of total cases. A small percentage of plastic is recycled, meaning that most of it is dumped or burned.³¹⁶

The WCO reported an increase of illegal waste seizures involving plastic between 2022 and 2023.³¹⁷ In 2023 from the 26 countries that shared data, Western Europe, Eastern and Central Europe, and Central Africa emerged as the primary locations for plastic waste seizures.³¹⁸

There is some evidence that plastic waste regulations and measures may have had an impact on illegal waste treatment and dumping practices. UNODC's *Unwaste* project found restrictions and import bans have led to an increase in illegal recycling facilities and illegal landfills in emerging Asian import nations with limited enforcement capabilities.³¹⁹ INTERPOL notes exporting countries have also experienced an increase in illegal landfills, together with both accidental and intentional waste fires; these waste fires likely affect import countries as well, such as in South East Asian as well as European importers.³²⁰

Metal and metal bearing wastes

The fifth most prominent waste category in the Basel Convention dataset is metal and metal bearing wastes. Like e-waste, metal waste is presumably valuable as the metal can be recovered from the waste to be sold. In the latest data from the WCO, metal waste seizures and quantities seized rose between 2022 and 2023.³²¹

Recycling metals is very advantageous both in terms of material and energy consumption. Depending on the process, steel can contain between 25 per cent and 100 per cent of recovered steel. Scrap is easily collected and sorted, and can be reused, most of the time with limited material property loss. The amount of energy required by recycling processes is generally much lower than for refining metal from ore – up to 95 per cent less energy for aluminium, and 75 per cent for iron and steel, according to some studies. For several countries, especially where natural resources are scarce, this market represents a vital source for national supply.

Cheaper than ore, recycled metal from the ship recycling industry accounts for a considerable percentage of national steel production in some Asian countries. Iron or steel make up 80–90 per cent of a ship and represent a valuable source of scrap steel for construction, for example. The amount of energy required by recycling processes is generally much lower than for refining metal from ore and for several countries, especially where natural resources are scarce, this represents a vital source for national supply.³²² Metal scrap is not generally hazardous, but when contaminated with hazardous substances the export restrictions of the Basel Convention apply. Ships sent for scrap contain a list of substances which make ship-breaking sites highly polluted and dangerous, contaminated with used oil, asbestos cladding, flame retardants, toxic paints, heavy metals, among others. If international regulations are not properly enforced and as long as prevailing practices at ship-breaking sites remain unchanged, hazardous substances will continue to accumulate, causing fatalities and injuries.

BOX 3 – TEXTILE WASTE

This rise of fast fashion has environmental consequences. Textiles can fall under the Basel Convention when they contain hazardous substances, which they often do, such as heavy metals, persistent organic pollutants, and plastics to name only a few of the toxic compounds in fabrics.³²³ Circumventing the regulations on waste via fraudulent declarations undermines environmental protection efforts and also creates unfair competition for legitimate second-hand markets. Proper classification and management of these materials are crucial for effective recycling and reducing the environmental impact of textile waste.

According to UNODC's *Unwaste* project, "every year 92 million tons of textiles are discarded worldwide;³²⁴ in the EU, on average people discard 12 kg per person per year and in the US, 47 kg per person each year. Between 2017 and 2023, rags, cotton waste, waste of human-made fibres and used textiles represented almost 75 per cent of the value of textile imports declared globally, and 85 per cent of the volume in the UN COMTRADE records.³²⁵

Textile waste trade is illegal if it is mis-declared. This could mean claiming that it is second-hand goods when it is waste or that it is non-hazardous when it is hazardous. Ongoing work under the Basel Convention is exploring policy, legal and technical options to improve the environmentally sound management and control of transboundary movements of used textiles and textile wastes and there is a proposal to include used textiles and textile wastes under the convention.³²⁶

In 2023, 10 WCO Members reported textile seizures, with six of them collectively accounting for 93% of all incidents and 99% of the total seized quantity. Notably, China reported a single seizure of 9,000 tonnes representing a staggering 97% of the total intercepted quantity. Despite Eastern and Central Africa recording the most textile seizures (73%), these accounted for less than half a per cent of the total quantity seized. Maritime transport was the predominant mode of conveyance for seized textiles, while risk profiling was the primary detection method."

Overview of Responses and Possible Policy Implications

While studies on responses and policy exist, many of them are dated, indicating the need for more research. That said, much of the findings still hold. Traceability of waste, both domestically and transboundary, plays a vital role in identifying the source, consignee, brokers and other investigative leads.³²⁷ To achieve this, intra-national and international cooperation along with continued improvement of implementation of the harmonized formal definitions of waste, guidelines, and waste codes provided by the Basel Convention, and improvement on reporting obligations are essential. Furthermore, a European e-waste study found that harmonizing minimum standards on offences and provisions, for instance a regional ban on cash transactions in the metal scrap trade (other waste sectors may need other approaches), can simplify enforcement in transboundary cases.³²⁸

Furthermore, in relation to corporations and legal persons, improvements to corporate reporting on waste production and handling are still needed. Detecting illegal activity by corporations can be particularly challenging for law enforcement as the criminal justice system is not necessarily involved in overseeing corporate behaviour. In the e-waste sector for instance, as with many corporations, businesses self-regulate.³²⁹ At least in many high-income country approaches to regulating corporations, governments often rely on the businesses themselves to monitor their compliance with the law.^{330 331}

Whereas there are efforts to encourage waste companies report their waste generation, its impact on the environment, and how waste is managed,³³² more information is needed as to the uptake of such voluntary schemes and their effectiveness. In addition, addressing corporate liability and appropriate penalties for legal persons for crimes that affect the environment,

particularly in the waste sector, are key. Even though corporate liability seems to be possible within most UN Member States' legislation (148 of 193 Member States seem to have provisions in their environmental legislation),³³³ there is little evidence of the application of such provisions. Without corporate liability, successful prosecutions may not be possible because of difficulties with identifying specific individuals responsible for the crimes and with proving criminal intent.

Furthermore, the often low fines used by courts, at least in the EU as one study found, can be seen as 'operational expenses' and not deter (re)offending for legal persons.³³⁴ For this reason, as this same study on EU Member States proposed, establishing a system for the criminal enforcement and punishment for legal persons is essential.³³⁵ One possible approach is to consider corporate criminal activity under organized crime legislative provisions.

Legislative gaps, limited enforcement capacities, lack of traceability and low penalties are facilitators of waste crime identified by studies and law enforcement organizations.^{336, 337, 338, 339} Furthermore, at least in relation to the EU, one study found that when general law enforcement personnel, prosecutors, and judges are tasked with handling crimes that affect the environment alongside various other offences, they may be unable to acquire the necessary expertise to effectively address the complexities of these crimes, which are highly technical in nature.³⁴⁰ UNODC's *Unwaste* study also found that building up expertise and capacity would help tackle waste crime.³⁴¹ There are advantages and disadvantages of specialized environmental authorities or environmental protection agencies managing different types of crimes that affect the environment including waste crimes, but several studies and INTERPOL note these regulators often lack investiga-

tive powers and they cannot operate independently from law enforcement.^{342 343 344} Conversely, law enforcement authorities possess investigative powers but typically lack specialized knowledge in waste offences; it might, for instance, be difficult to distinguish between used electronic equipment and e-waste. A European e-waste study found if relevant authorities do not collaborate, this leads to difficulties for those tasked with investigation in identifying crimes that affect the environment and gathering essential evidence for successful prosecution.³⁴⁵

In the EU, law enforcement operations have revealed there is scarcity of dedicated units addressing waste crimes.^{346, 347} According to INTERPOL, these problems extend beyond ineffective cooperation between authorities within countries to encompass problems in international cooperation when roles among domestic authorities are unclear.³⁴⁸ UNODC's *Unwaste* study also found gaps in international and national cooperation.³⁴⁹ The Implementation and Compliance Committee for the Basel Convention has been tasked with addressing this by developing a template for coordinating mechanisms between competent authorities and enforcement entities, to prevent and punish illegal traffic, and to establish effective communication channels.³⁵⁰ Projects like UNODC's Passenger and Container Control Programme 'Countering Illegal Hazardous Waste Trafficking through the Container Control Programme' seek to improve multiple aspects of the challenges. Since the initiation of the project in 2021, over 130,000 tons of plastic and hazardous waste have been seized/detected after frontline officers in South-eastern Asia received trainings.³⁵¹ There were also multi-ton seizures of other types of hazardous waste including household waste and used lead acid batteries during the project's mentorship phase. The project also emphasizes inter-agency cooperation by bringing together UNODC-supported units, waste management and environmental departments, international partners and other relevant actors, such as the private sector, including shipping lines, importers, and exporters, to promote a holistic approach to the challenges posed by the trafficking of hazardous waste.³⁵²

One European e-waste study found there is also a lack of a unified information system among national agencies and a lack of international information sharing,³⁵³ further exacerbating the problem. This may be addressed through the establishment of a digital infor-

mation exchange platform and an enforcement group through the 2024 EU Waste Shipment Regulations.³⁵⁴ INTERPOL suggests the value added of investigations by border and frontline officers, especially regarding the illegal movement of environmentally sensitive goods, such as waste, should be reviewed.³⁵⁵ This could be a strategy to enhance detection accuracy, preventing more illegal shipments by inspecting exports rather than the burden only being placed on the detection of illegal imports. Effective communication of updates to import regulations to relevant organizations and other States is crucial to share information, raise awareness of regulatory frameworks and requirements, and adapt to evolving market and regulatory changes as noted by INTERPOL.³⁵⁶

As found in *Part 1 – the Landscape of Criminalization* of this Global Analysis, in 99 UN Member States it appears that waste crime is not categorized as 'serious crime' under national legislation, meaning that the penalty does not include the possibility of four years in prison as set out in the UNTOC.³⁵⁷ Analysis by law enforcement organizations has indicated further research is needed in terms of what sanctions are actually given as well as to better understand the impact on the range of offenders of those sanctions.^{358, 359} In the case of e-waste in the EU, research has suggested that administrative fines are often too low to deter offenders.³⁶⁰ In addition, INTERPOL analysis has indicated there are limited resources for waste enforcement in most countries.³⁶¹ In the EU, the combination of a scarcity of resources and lack of dedicated enforcement bodies results in hurdles, including ineffective cooperation, limited inspections, and underutilization of relevant data by law enforcement agencies.³⁶² According to the European Commission and INTERPOL, only two per cent of all the world's maritime containers are physically inspected by customs authorities and of that two per cent only a small number of containers are inspected for waste, such as e-waste.^{363, 364}

Thus, the responses to waste crime and trafficking, as with other crimes that affect the environment, revolve around: improving knowledge, data, and awareness; improving the harmonization of legislation and ensuring the penalties are effective, proportionate, and dissuasive (which includes environmental remediation and restoration as well as corruption); increasing the human and financial resources dedicated to combating waste crime and trafficking, including preventive measures

(including corruption and implementation of the UN Convention Against Corruption); improving enforcement; and, centrally, improving corporate governance, particularly the accountability of legal persons.

A majority of Member States criminalize at least one violation of waste-related offences³⁶⁵ and a majority of countries in the world are party to the Basel Convention. Yet more work is needed to enforce waste regulations, hold criminal organizations accountable, and address domestic waste crimes. This will help address part of the triple planetary crisis and improve the environment for people around the world.

BOX 4: INTERNATIONAL PREVENTION STRATEGIES

Perhaps the most significant international collaboration to combat waste trafficking is ENFORCE – The Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic – that was officially established by decision BC-11/8 of the Basel Convention Conference of the Parties in 2013.³⁶⁶ The membership of ENFORCE consists of “One representative from each of the five United Nations regions that are parties to the Convention; five representatives from the Basel Convention regional and coordinating centres, based on equitable geographical representation” who are elected.³⁶⁷ Other members include the WCO, INTERPOL, the UN Environment Programme (UNEP), and UNODC among others. Civil society organizations working on waste trafficking are also eligible for consideration as are other organizations that might contribute.

The activities of ENFORCE centre on:

- “Sharing and developing training tools and materials (including review of and improvement of existing training tools materials);
- Hosting and organizing workshops or electronic training and information sessions, in particular for developing countries;
- Facilitating information exchange on success stories, techniques and expertise, and dissemination of good practices;
- Periodic monitoring of and reporting on the progress and effectiveness of the training activities and modules, for example by developing performance indicators, identifying gaps and problematic areas and proposing modifications;
- Developing means to ensure sustainability in the efforts under ENFORCE;

- Improving understanding of the challenges and needs of parties and the various stakeholders in preventing and combating illegal traffic in line with the requirements of the Basel Convention;
- Developing common approaches and strategies for preventing and combating illegal traffic in line with the requirements of the Basel Convention;
- Promoting dialogue between members and developing a shared vision for preventing and combating illegal traffic that is in line with the objectives and requirements of the Basel Convention;
- Promoting cooperation between members and a coordinated approach to capacity-building and operational activities, for instance through joint activities, to broaden the geographical distribution of such activities and to reduce competition over resources;
- Increasing the visibility of and support for efforts aimed at preventing and combating illegal traffic.”³⁶⁸

ENFORCE monitors and shares activities undertaken within these areas on the Basel Convention website as well as their Roadmap of planned activities.³⁶⁹ There are 243 activities of various kinds over 10+ years. Of note is that ENFORCE as a form of technical assistance to the Basel Convention is limited to addressing illegal waste traffic as defined by the Basel Convention and membership is confined to Convention Parties (apart from the international and civil society organizations listed earlier).



Appendix I - Regional groupings

Africa

Eastern Africa – Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Rwanda, Seychelles, Somalia, South Sudan, Uganda, United Republic of Tanzania, Zambia, Zimbabwe

Middle Africa – Angola, Cameroon, Central African Republic, Chad, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Republic of the Congo, Sao Tome and Principe

Northern Africa – Algeria, Egypt, Libya, Morocco, Sudan, Tunisia
Southern Africa – Botswana, Eswatini, Lesotho, Namibia, South Africa

Western Africa – Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, Gambia (Republic of The), Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo

Americas

Caribbean – Antigua and Barbuda, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent the Grenadines, Trinidad and Tobago

Central America – Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama

Northern America – Canada, United States of America

South America – Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela (Bolivarian Republic of)

Asia

Central Asia – Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan

Eastern Asia – China, Democratic People's Republic of Korea, Japan, Mongolia, Republic of Korea

South-eastern Asia – Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, Viet Nam

Southern Asia – Afghanistan, Bangladesh, Bhutan, India, Iran (Islamic Republic of), Maldives, Nepal, Pakistan, Sri Lanka

Western Asia – Armenia, Azerbaijan, Bahrain, Cyprus, Georgia, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Türkiye, United Arab Emirates, Yemen

Europe

Eastern Europe – Belarus, Bulgaria, Czechia, Hungary, Poland, Republic of Moldova, Romania, Russian Federation, Slovakia, Ukraine

Northern Europe – Denmark, Estonia, Finland, Iceland, Ireland, Latvia, Lithuania, Norway, Sweden, the United Kingdom of Great Britain and Northern Ireland

Southern Europe – Albania, Andorra, Bosnia and Herzegovina, Croatia, Greece, Italy, Malta, Montenegro, North Macedonia, Portugal, San Marino, Serbia, Slovenia, Spain

Western Europe – Austria, Belgium, France, Germany, Liechtenstein, Luxembourg, Monaco, Netherlands (Kingdom of the), Switzerland

Oceania

Australia and New Zealand – Australia, New Zealand

Melanesia – Fiji, Papua New Guinea, Solomon Islands, Vanuatu

Micronesia – Kiribati, Micronesia (Federated States of), Marshall Islands, Nauru, Palau

Polynesia – Samoa, Tonga, Tuvalu

Appendix II – Legal trade and analysis of UN COMTRADE waste trade statistics

Waste generation

The World Bank estimates that by 2050, nearly 70 per cent of the human population will live in urban areas where generation of waste is more concentrated.³⁷⁰ They predict, from data from 215 countries and territories, that growth in global municipal solid waste generation will outpace population growth, reaching 3.4 billion tons by 2050.³⁷¹ In low-income countries, such waste generation is predicted to more than triple by 2050 and of concern is that in some places more than half of waste is openly dumped although high-income countries generate higher quantities of waste per person.³⁷² Municipal solid waste consists of residential, commercial, and institutional waste, encompassing various substances generated from these sources: food and green waste, glass, metal, paper and cardboard, plastic, rubber and leather, wood, and other materials, although this definition varies widely between countries. The differences in what is included in municipal solid waste highlight the complexities of comparing waste data. Generally, where national-level waste data exist, it often refers to municipal solid waste. In 2018, the World Bank conservatively estimated that one-third of global municipal solid waste was not managed in an environmentally-sound manner.³⁷³ Data related to illegal management of municipal solid waste are lacking as are data concerning most other types of waste.

Municipal solid waste is only a small part of the waste industry. Not all of the 215 countries and territories with data available on solid waste generation provide data on other waste streams; the World Bank estimates are based on formulations drawing on what data were

available. Between 2011 and 2017, they estimated industrial waste generation to be the largest waste category globally, with estimated rates of 12.7 kilograms per capita per day. Next is agricultural waste, with an estimated rate of 3.4 kilograms per capita per day, generated primarily in countries with substantial farming industries. Construction and demolition waste estimates are 1.7 kilograms per capita per day, and municipal solid waste at 0.7 kilograms per capita per day. Hazardous waste, medical waste, and e-waste contribute much less, with rates of 0.32, 0.25, and 0.02 kilograms per capita per day, respectively.

As seen in Figure 4, between 2011 and 2017, the World Bank estimated that the global yearly average kilogram per capita per day of hazardous waste generation was 0.32 or 817 million tons per year. Other estimates by the UNEP place the average annual hazardous waste production in 2015 at just below 400 million tons per year.³⁷⁴ The difference in estimates is due to definitions of waste, the methodology for collecting data and the availability of data. The 400 million tons UNEP estimate was taken from reports by Parties to the Basel Convention. For a deeper understanding of the types of waste making up these waste streams, as well as their flows, UN COMTRADE data were used as detailed in the next section.

Analysis of UN COMTRADE waste trade statistics

Legal waste trade statistics used in this analysis was obtained from the UN COMTRADE database and consisted of 19 HS classification commodity codes (see

table below). Annual data on total exports and total imports of each of these 19 commodities was downloaded for all countries from 2017 to 2023 to form the 18 waste categories listed in the table below. In addition, for 2023, data on import and export partners was also

included for analysis of the regional flows of waste. All countries were categorized first into regions then into subregions and intermediate regions following United Nations Statistical Division definitions.³⁷⁵

Table 3 – HS codes for waste excluding textile and medical wastes among others

HS	code	Full description	Short categorization of waste
HS	2619	Slag, dross; (other than granulated slag), scalings and other waste from the manufacture of iron or steel	Slag, dross
HS	2621	Slag and ash n.e.c. in chapter 26; including seaweed ash (kelp) and ash and residues from the incineration of municipal waste	Slag and ash
HS	271091	Waste Oils; of petroleum or obtained from bituminous minerals, not crude; and preparations n.e.c., weight 70% or preparations of the same, containing polychlorinated biphenyls (PCBs), polychlorinated terphenyls (PCTs) or polybrominated biphenyls (PBBs)	Waste oils
HS	271099	Waste Oils; of petroleum or obtained from bituminous minerals, not crude and preparations n.e.c., weight 70% or preparations of the same, not containing polychlorinated biphenyls (PCBs), polychlorinated terphenyls (PCTs) or polybrominated biphenyls (PBBs)	
HS	3825	Residual products of the chemical or allied industries, not elsewhere specified or included; municipal waste; sewage sludge; other residual products.	Residual products
HS	3915	Waste, parings and scrap, of plastics	Plastics
HS	4004	Waste, parings and scrap of rubber (other than hard rubber) and powders and granules obtained therefrom	Rubber
HS	4707	Waste and scrap of paper and paperboard	Paper and paperboard
HS	7001	Glass; cullet and other waste and scrap of glass, excluding glass from cathode ray tubes or other activated glass of heading 85.49, glass in the mass	Glass
HS	7112	Waste and scrap of precious metal or of metal clad with precious metal; other waste and scrap containing precious metal compounds, of a kind uses principally for the recovery of precious metal other than goods of heading 85.49	Precious metal
HS	7204	Ferrous waste and scrap; remelting scrap ingots of iron or steel	Ferrous waste and scrap
HS	7404	Copper; waste and scrap	Copper
HS	7503	Nickel; waste and scrap	Nickel
HS	7602	Aluminium; waste and scrap	Aluminium
HS	7802	Lead; waste and scrap	Lead
HS	7902	Zinc; waste and scrap	Zinc
HS	8002	Tin; waste and scrap	Tin
HS	8549	Electrical and electronic waste and scrap	Electrical and electronic
HS	854810	Waste and scrap of primary cells, primary batteries and electric accumulators; spent primary cells, spent primary batteries and spent electric accumulators	Primary cells and batteries

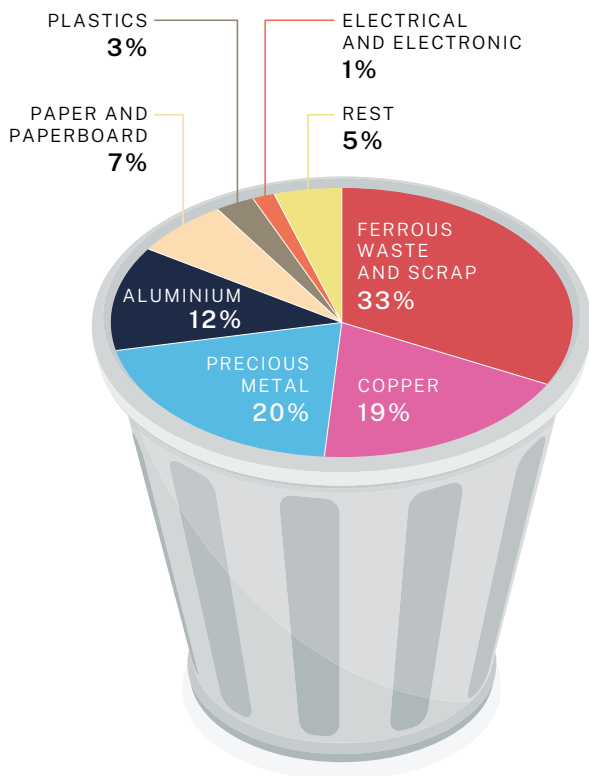
Transboundary waste movement

This section details the different elements of the cross-border movement of waste. This entails the waste streams (the types of all waste), where these different types of waste are being produced and where they are being transported to, and the flows of hazardous waste in particular as this is the specific focus of the Basel Convention. This overview sets the scene for understanding the illegal trade.

Legal Trade Waste Streams

An analysis of UN COMTRADE data for 2017 through 2023 for 18 different waste streams provides a global overview for legal trade volumes and geographic flows of these particular commodities (this does not include clinical and textile wastes which are summarized by UNODC's *Unwaste* project and cited where relevant). Figure 16 shows these 19 waste streams, indicating that ferrous waste and scrap is the most exported commodity by net weight every year analysed. Paper and paperboard are the second most prominent waste stream by weight. Electrical and electronic waste (e-waste) is a separate category to the other metal waste streams only since 2022 (see e-waste discussion below).

Figure 16 – 2017–2023 UN COMTRADE waste export data by value on average (percentage)



If the comparison is made by value, ferrous waste and scrap is globally the highest value commodity exported followed by other metal waste streams like copper and precious metals (see Figure 16).

Waste stream imports (not pictured) have the same pattern by quantity with ferrous waste and scrap being imported the most by weight followed by paper and paperboard. The same is observed for imports by value with ferrous waste and scrap and metals having the highest import value.

Legal Trade Waste Flows

The direction of these flows of waste shows a significant amount of intra-regional trade (see Figure 17). In fact, in 2023, for Asia and Europe most of their waste by value stayed within the region. In Africa, the largest proportion of waste was exported from the region to Europe and from Oceania almost entirely to Asia. The Americas exported most of its waste to Asia, followed by intra-regional and Europe. 'Other' as a destination refers to bunkers, special categories, free zones, and areas not elsewhere specified (NES).

Regions do not trade equal amounts of waste (see Figure 18). In 2023, Europe exported the most waste overall by value most of which was intra-regional followed

Figure 17 – Percentage of waste streams by value staying within regions and being exported for 2023 from UNCOMTRADE

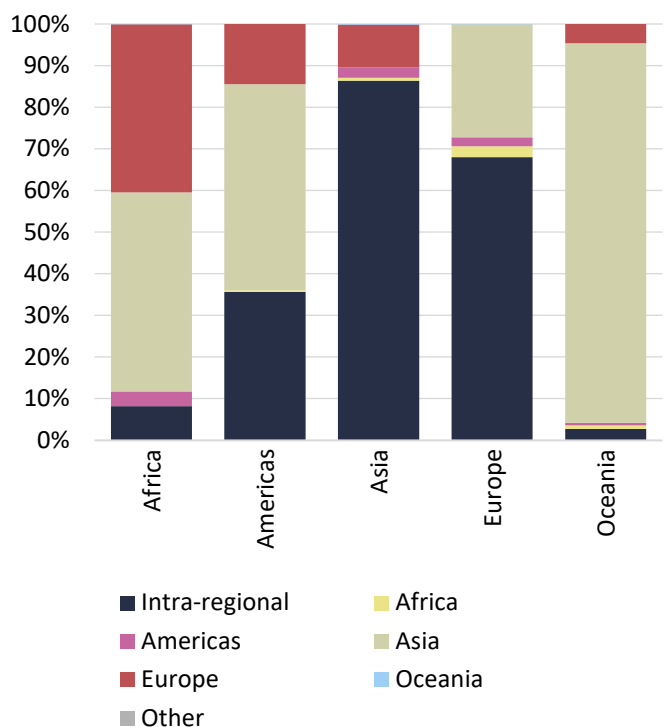
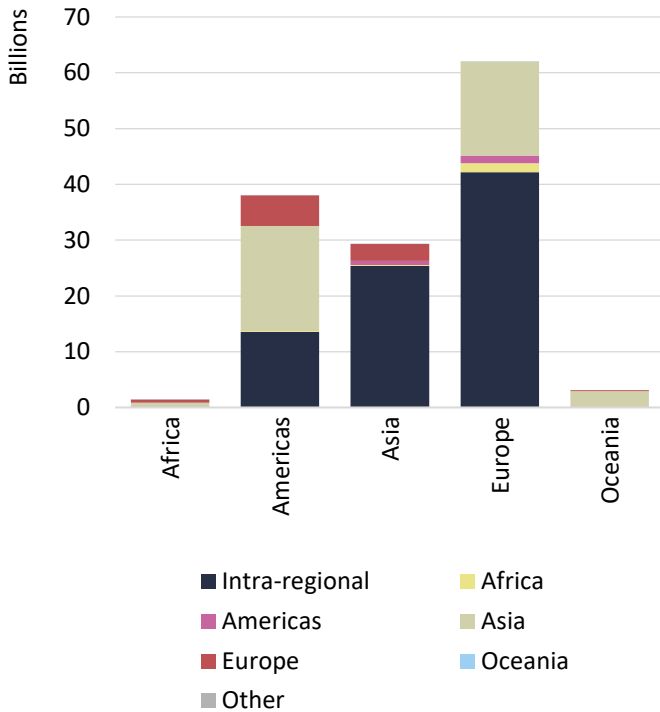


Figure 18 – Regional flows of all 18 waste categories by value for 2023 UN COMTRADE data



by exports to Asia. Africa and Oceania export a fraction of waste by value compared to the other three regions.

A combined analysis of regions and the 18 waste streams for 2023 shows the different geographic flows for different waste streams. The following five figures evidence the value of the 18 waste streams being exported in 2023 from one focal region to the other regions (see Figures 19, 20, 21, 22, 23). From Africa, waste oils and glass wastes are traded intra-regionally (see Figure 19). Many metal wastes (apart from nickel, tin, and precious metals), plastic, and paper and paperboard are exported to Asia.

In the case of Asia in 2023, when waste was exported out of the region it mostly went to Europe (precious metal and residual products), but for the most part, the waste is traded within Asia (see Figure 21). The majority of waste oils and a portion of nickel waste were exported to the Americas.

Figure 20 shows that for the Americas most metal wastes (apart from nickel and precious metals) are exported mainly to Asia whereas residual products and waste oils are exported intra-regionally.

Figure 19 – Destination of waste exports from Africa by value in 2023 UNCOMTRADE data

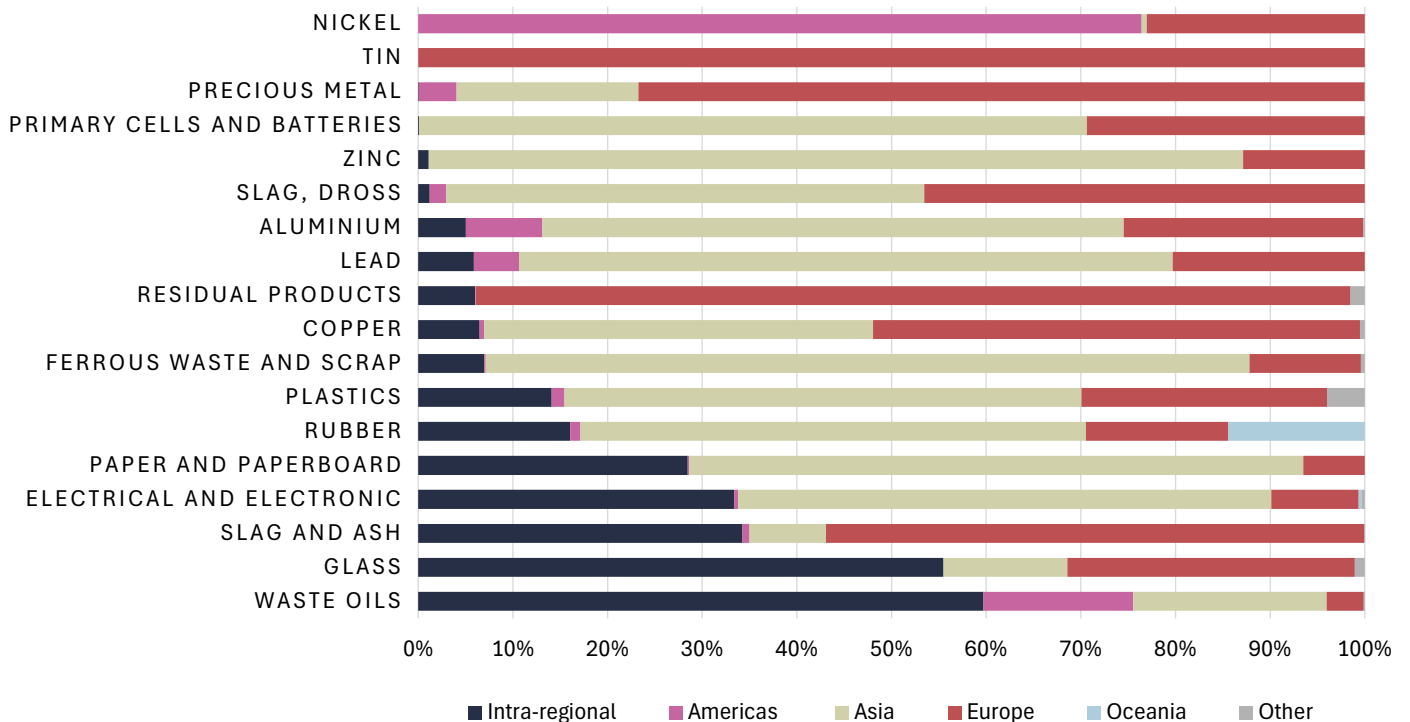


Figure 20 – Destination of waste exports from the Americas by value in 2023 UNCOMTRADE data

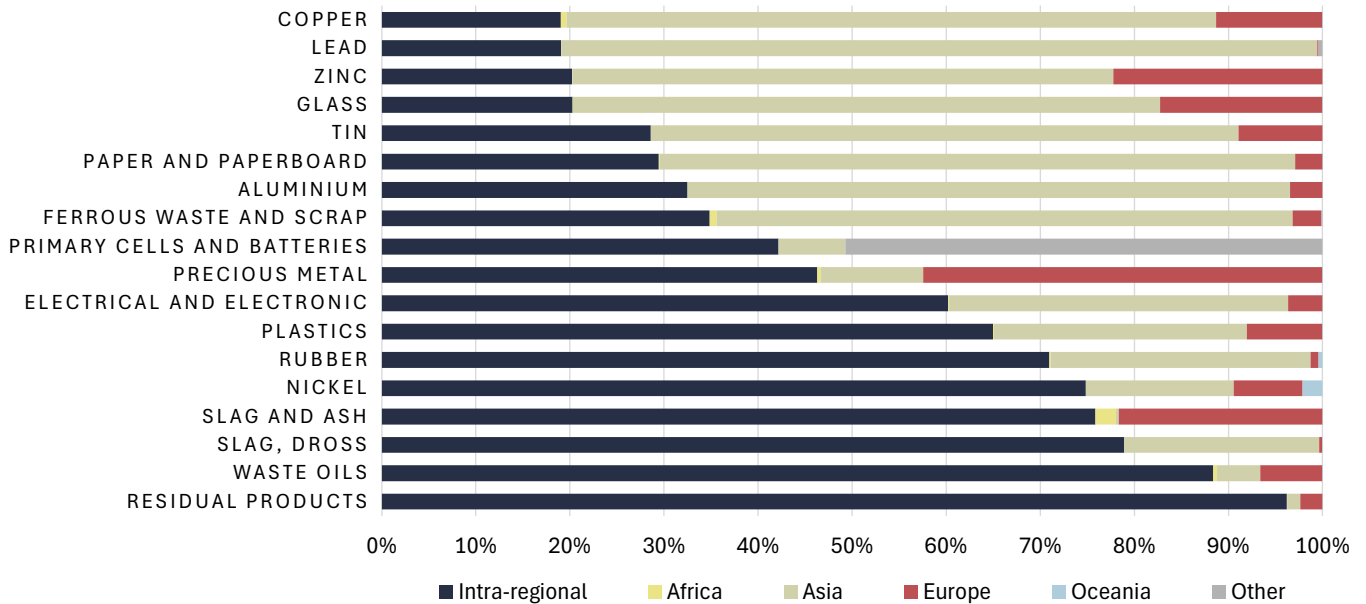
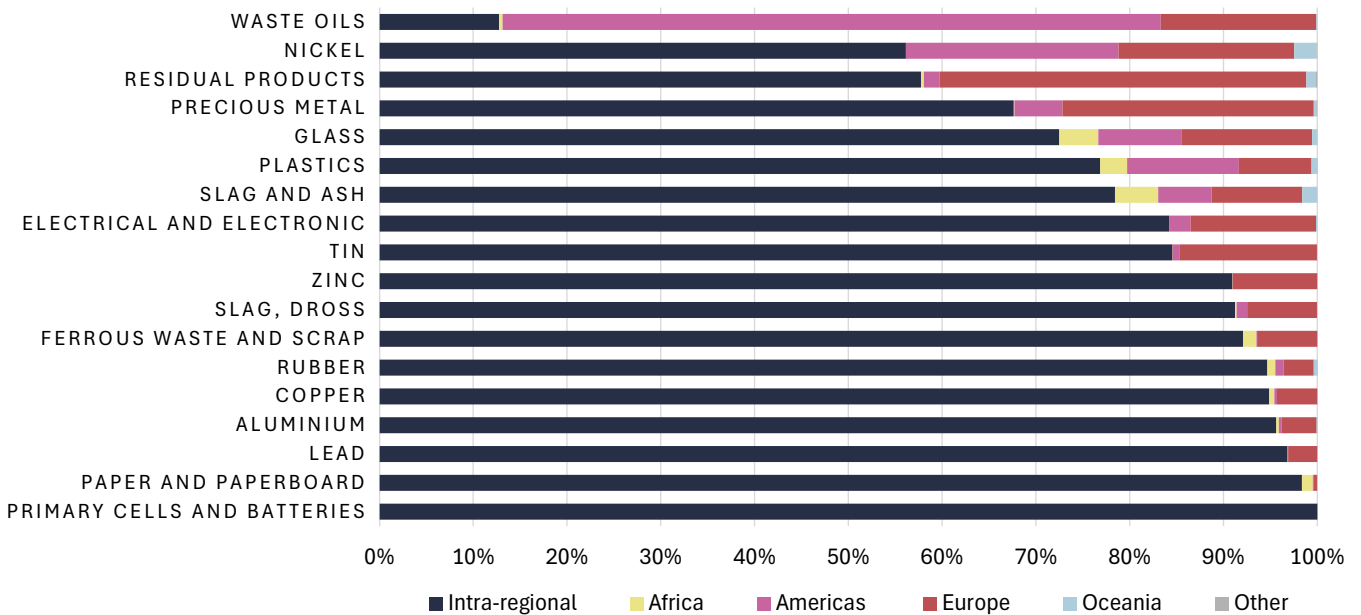


Figure 21 – Destination of waste exports from Asia by value in 2023 UNCOMTRADE data



In 2023, for Europe most waste was also traded with-in Europe. When it was exported, particularly rubber, paper and paperboard, and ferrous waste and scrap, it was exported to Asia. In the case of glass, it was exported to 'Other' (see Figure 22).

Finally, for Oceania in 2023, most of their waste apart from waste oils, residual products, glass and slag and ash was exported to Asia (Figure 23). Also notably, the majority of precious metals waste was exported to Europe and Asia while a quarter was destined for Africa and the Americas.

Figure 22 – Destination of waste exports from Europe by value in 2023 UNCOMTRADE data

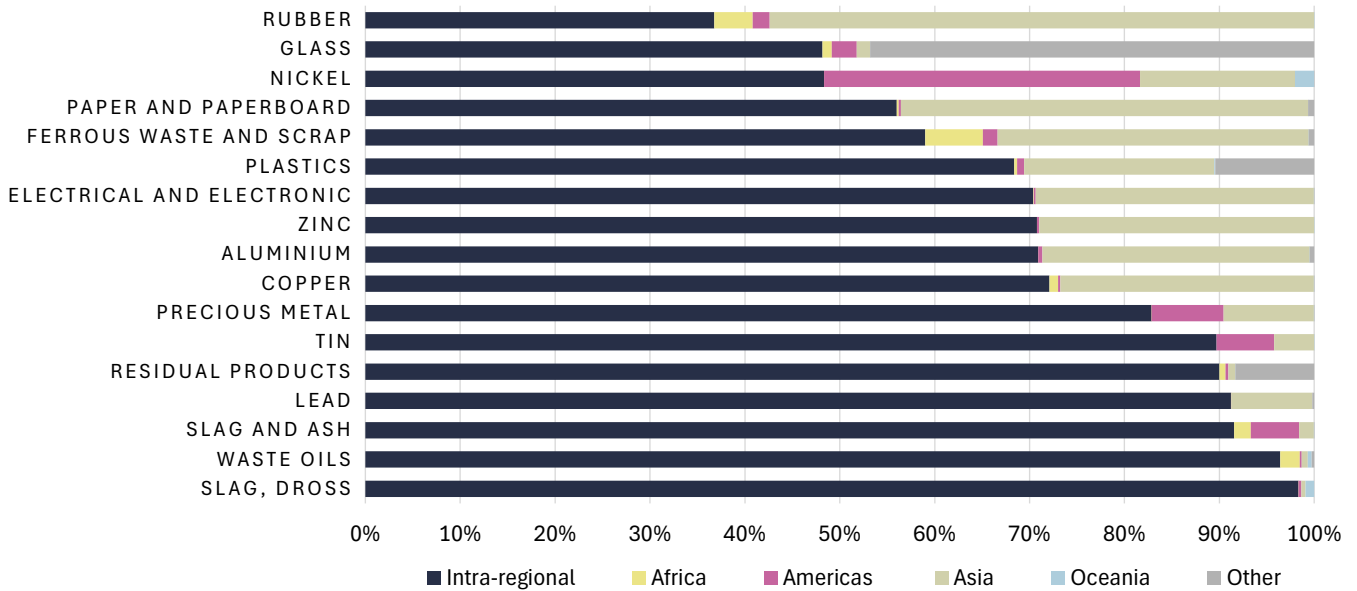
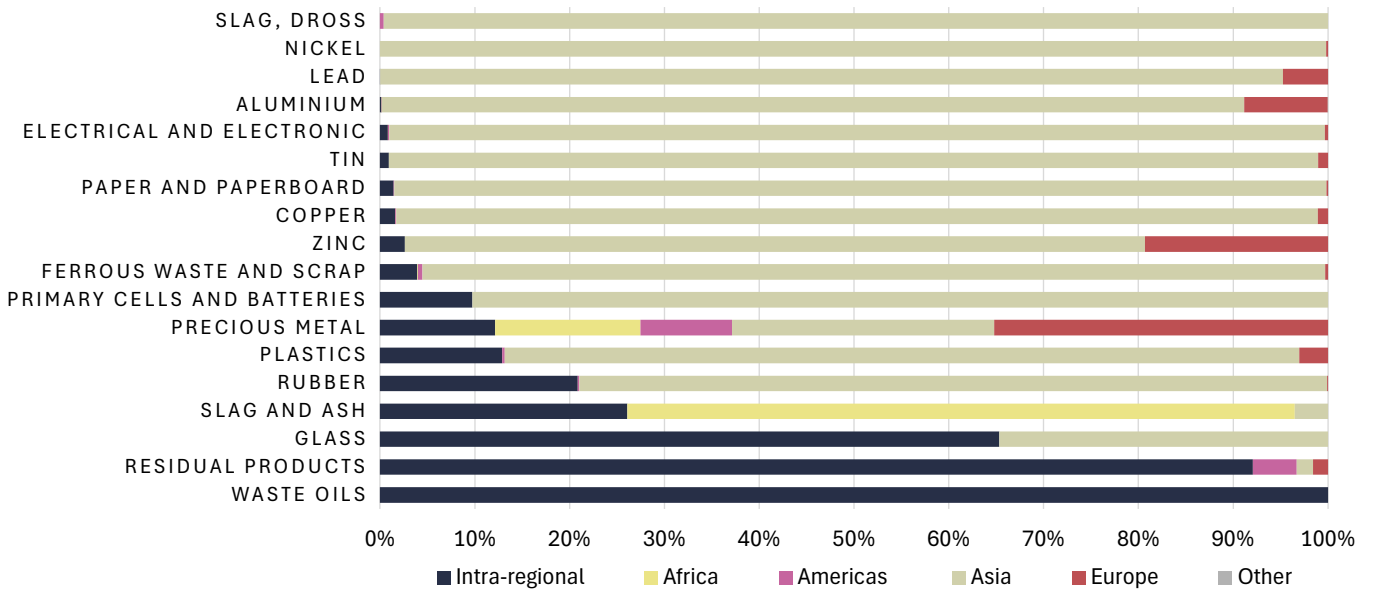


Figure 23 – Destination of waste exports from Oceania by value in 2023. UNCOMTRADE data



An analysis of the legal exports and imports by value of all 18 waste streams for the entire time frame of analysis (2017 through 2023) and broken down into sub- and intermediate regions reveals that Northern America exports the most waste by value globally in absolute volume (USD 206 billion) followed by Western Europe (USD 205 billion) and Northern Europe (USD 97 billion). Per capita this amounts to USD 530 in North-

ern America and USD 1020 in Western Europe meaning Western Europe exports nearly twice as much waste by value. Eastern Asia (USD 228 billion), Western Europe (USD 226 billion) and Southern Europe (USD 92 billion) import the most waste by value.

When this is broken down even further, the United States of America is the main exporter of legal waste overall by value and of precious metals, ferrous waste

and scrap, copper, and aluminium in particular (see Figure 24). In terms of importers, depending on the waste stream, the main importer by value is China for copper waste (and overall), Germany for precious metal, and Türkiye for ferrous waste and scrap (see Figure 25).

Legal Hazardous Waste Transboundary Movement

The previous sections have outlined the production and legal trade of *all* types of waste. However, the statistics available on illegal trade focus primarily on hazardous waste, thus this section breaks down what is known about this subcategory of waste.

According to a 2018 study by UNEP, overall, 97 per cent of global hazardous waste remains within countries though this differs between low-income and high-income countries, with the latter exporting more and a few small high-income countries exporting most of their hazardous waste; this trend has remained stable since 2010.³⁷⁶ But these data may obscure hidden patterns since Basel Convention Parties are no longer obliged to report the generation of hazardous wastes³⁷⁷ and have never reported internal trade.

This study focuses on the five main waste categories by number of cases identified in the Basel Convention closed cases of illegal traffic reported between 2016 and 2023: electrical and electronic waste (e-waste), mixture of waste, end-of-life vehicles and engines, plastic, and metal and metal bearing wastes. The mixture and end-of-life vehicles and engines do not map directly to the UN COMTRADE dataset, and information about the nature and scope of trade seems to be limited. Similarly, there is limited data on metal and metal bearing wastes. Studies (cited below) focus on plastic and e-waste. Plastic waste is not one of the most prominent legal waste streams by export or import. E-waste is complicated to track as there has only been a dedicated HS code since 2022³⁷⁸ and it may have been captured previously in other metal waste streams.

Regarding plastic, one study estimates that “The total amount of resins and fibers manufactured from 1950 through 2015 is 7800 tons. Half of this—3900 tons—was produced in just the past 13 years (2002–2015)”.³⁷⁹ From this study, it was determined that 30 per cent of all plastics ever produced between 1950 and 2015 (about 2,500 tons) were currently in use in 2017. Only nine per cent had been recycled (10 per cent of that nine per

cent were recycled more than once) and 12 per cent of plastic had been incinerated. This means that more than 60 per cent (about 4,900 tons) of all plastics ended up in landfills or the natural environment.³⁸⁰ Even though plastic waste is not one of the main types of waste traded, a UNODC report notes it has severe consequences for the environment.³⁸¹ Currently, Member States are negotiating a legally binding instrument to address plastic waste and pollution.³⁸²

One study indicates that e-waste is one of the fastest growing waste streams.³⁸³ According to UNITAR, in 2019, globally 53.6 tons of e-waste was generated; this is expected to reach 74.7 tons in 2030 and 110 tons in 2050.³⁸⁴ Of this e-waste in 2019, an estimated 5.1 tons moved across borders with 1.8 tons of this being reported as hazardous waste per the Basel Convention and 3.3 tons not being reported and likely at risk for illegal trade.³⁸⁵ Furthermore, for 83 per cent of the 53.6 tons of e-waste in 2019 the end treatment is not known, meaning it could have been dumped, traded, or recycled in a non-compliant or environmentally hazardous manner. UNITAR notes this e-waste likely contained refrigerants—71 kilotons of brominated flame retardants, and 50 tons of mercury; the value of this total e-waste in 2019 is estimated at USD 47.6 billion,³⁸⁶ largely due to the high concentration of metals in e-waste, which are a valuable commodity. UNITAR’s and ITU’s update to their study on e-waste found in 2022 62 billion kg (62 tons) were produced.³⁸⁷ They note 22.3 per cent of this waste was documented as formally collected and recycled in an environmentally sound manner and that the growth of e-waste generation since 2010 is outpacing the formal collection and recycling capacity by a factor of almost five.

Figure 24 – Combined 2017–2023 UN COMTRADE waste exports of top ten exporters by value broken down by 18 waste categories

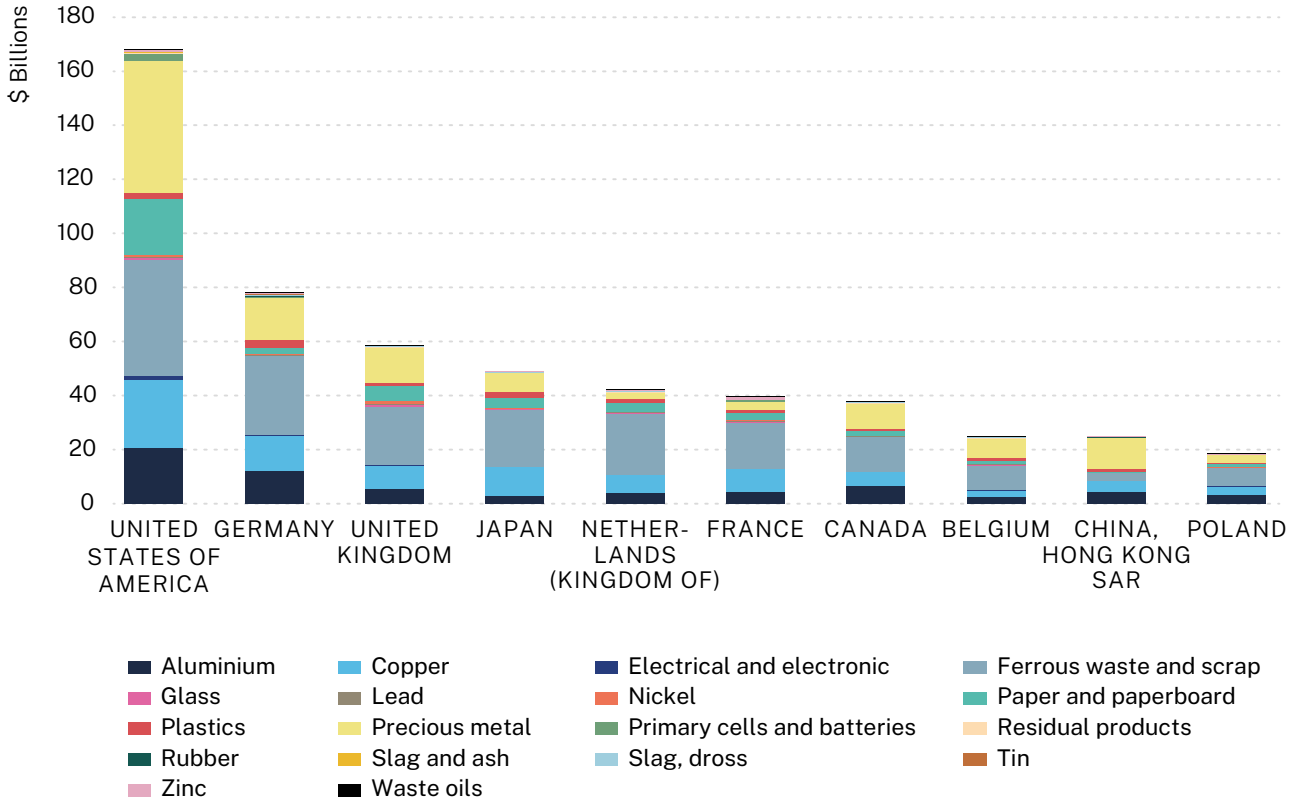
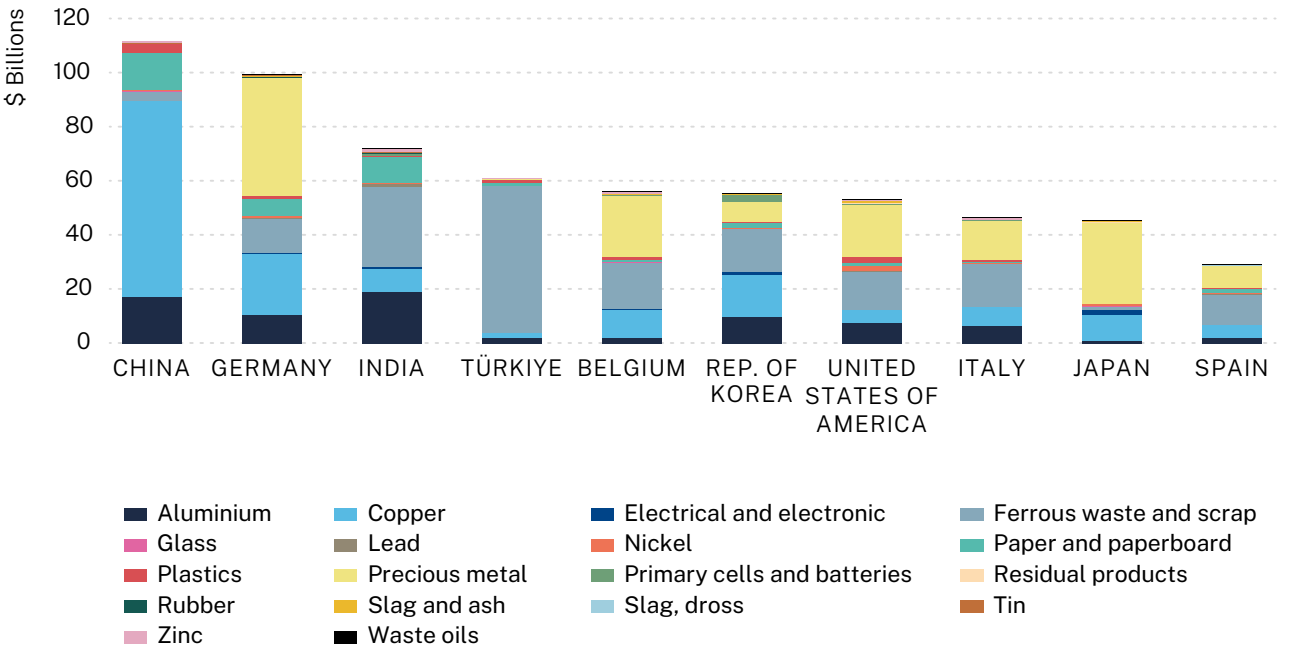


Figure 25 – Combined 2017–2023 UN COMTRADE waste imports of top ten importers by value broken down by waste category



Appendix III - Basel Convention legal and illegal trade statistics

The legal trade statistics

What is reported to the Basel Convention Secretariat in terms of the overall amount of hazardous waste traded is as follows:

The main data reporting mechanism of the Basel Convention focuses on recorded legal trade, which Basel Convention Parties provide in Tables 4 and 5 of their national reports' submission. These tables list all the transboundary movement of hazardous wastes and other wastes that were subject to control in accordance with the Basel Convention or with national legislation and that took place during the period of the concerned reporting year.

The following information can be obtained in Tables 4 and 5:

- Country of destination (Table 4) or country of origin (Table 5)
- Annex VIII, II or IX code
- Annex I code (Y code)
- National waste code
- Type of waste
- Amount of waste (in metric tons)
- Hazardous characteristics – Annex III code (H code)
- Final disposal operation – Annex IV A code (D code)
- Recovery operation – Annex IV B code (R code)

Examination of the raw data for Tables 4 and 5 showed that the type of waste is not always indicated and moreover, the different waste codes listed are not always

consistent making it difficult to carry out standardized waste categorization. Furthermore, reconciliation of trade from the import and export sides, with the aim of avoiding duplication of events, was not possible. Given these challenges, the data from these tables were not used for this study. As detailed above, the UN COMTRADE trade dataset was used instead to analyse legal hazardous and non-hazardous waste trade in order to compare to the illegal waste trade.

Illegal Traffic

Starting in 2016, Basel Convention Parties must include information on cases of illegal traffic that have been closed in the year covered by the report. Cases of illegal traffic are provided in Table 9 of the reports; however, Parties are also given the option to state that there were no cases of illegal traffic closed during the reporting year. The following information should be provided for each case:

- Countries of export and import
- Waste code (asked to be provided from Annex VIII, II or IX of the Basel Convention)
- Type of waste (not required to fill in if the waste code has been provided)
- Amount of waste (in metric tons)
- Identification of the reason for illegality
- The responsible party for the illegality
- Measures taken including any punishment imposed
- Parties may also provide comments if deemed necessary

For this analysis, the data on State of export and import were used to identify the illegal waste flows between different subregions as well as the main export and import regions. The information about the reporting Party for each case was used to identify the subregions reporting illegal cases. The data on responsible Party for the illegality were analysed to gain further insight into which actors are involved in waste trafficking. The closed waste trafficking cases for each Party and year were individually downloaded as Excel spreadsheets and subsequently consolidated into a single Excel spreadsheet. The data regarding the type of waste in the Basel Convention data are at times inconsistent, missing, or conflicting; thus, a standardization process was undertaken and waste categories created specifically for this study. This process of categorization and all the categories created are outlined below.

Thus, the data reported here on waste trafficking consist of new waste categories derived from the existing information as well as combining categories for the entity responsible for the illegality. In one instance, based on the pattern of legal trade from UN COMTRADE, the Basel Convention data were supplemented with data from the United States Environmental Protection Agency website. The website has public records of criminal (as well as administrative) convictions of waste-related offences. Those criminal cases that were transboundary are cited where relevant. For non-transboundary waste crime, data were drawn from previous studies. Data are limited in this regard as detailed in Box 3.

Subregions for reporting countries and import and export countries

For each closed case, the reporting Party as well as the involved State of export and import were categorized first into regions then into subregions and intermediate regions following United Nations Statistical Division definitions.³⁸⁸ Any case in which either the exporting or importing country was missing was labelled “unknown”. For countries which had mentioned several importing countries, the last one mentioned was used as the destination. Similarly, any case in which there were several countries mentioned as exporting countries, the first one was considered the country of export. Each case with several countries mentioned as exporters or importers were considered as cases involving transit countries.

Waste types

The waste categories were established by merging information from the spreadsheet cells labelled “waste codes” and “waste type”. Because parties employed waste categories using the Basel Convention, the European List of Wastes, OECD and/or HS codes, each of which employs distinct waste categorization methods for distinct purposes, it was not feasible to consolidate all information under one of these category systems. Consequently, the constituent parts of the waste were utilized to create categories of types of waste (i.e., plastic, metal, paper), provided it could be identified from the available information. E-waste and vehicle waste were exceptions, for which it was not possible to specify a specific constituent. Both categories may consist of a mixture of waste constituents, including metals and plastics. Because a substantial part of waste trafficking contains these two waste categories according to both the data extracted from the Basel Convention as well as stated by other sources, they were made into their own categories and not added into the mixture category. In some cases, the waste code and the verbal description of the same case had different levels of detail. The less general and more descriptive option was used to categorize the waste. For example, if the written description was “brake fluid” which stands for “oil based brake fluid”, and the code A3020 was provided, the waste was classified as waste oils.

Miscellaneous wastes

In instances where the waste could not be identified, the waste was categorized as “miscellaneous”. If there were only an insignificant number of cases of a specific waste type, such as one case involving bitumen, the waste was categorized as “miscellaneous”. In addition, descriptions which did not specify the constituent of the waste, such as “broken trash cans”, were put into the “miscellaneous” category.

Mixed waste/Mixture of waste

Any case that listed several different codes (e.g. “MIX –B1010 + B1030 + B1115 + GC010 + GC020 + not listed”) or if the written description indicated a mixture of different kind of wastes (“WEEE/Vehicles” or “WEEE and plastic”), the waste was classified as mixed waste. Waste categories such as household waste and construction waste were also classified as mixed wastes. If the description, however, was as an example “contaminated plastic” it was categorized as plastic waste.

Mixed plastic waste (y48) was categorized as plastic waste. It is important to acknowledge that what was categorized as mixed waste, may have been, in some instances, different types of waste placed in separate containers. From the reports, it is not possible to conclude that all shipments listing multiple types of waste contained mixed waste.

Not compatible, not specified, code not found

The “not compatible” category stands for cases in which the code and the description did not match. In cases where there were no descriptions of the waste or if the description was unclear or only half the code was provided, the waste was classified as “not specified”. In a few cases, the provided code was not found and consequently these were categorized as “code not found”.

Responsible for illegality

Parties used several different terms to describe the responsible actor for the illegal closed cases. Below is a list of categories established from the national reports.

- Importer: the term consignee is sometimes used instead of importer.
- “Importer or disposer”
- Exporter: the term notifier is sometimes used instead of exporter, as is owner and/or sender.
- “Exporter or generator”
- The company of export and the company for import.
- Multiple responsible parties: several parties listed such as “Exporters, brokers and shipping parties” or “Notifier/transporter”.
- Not specified: the responsible party could not be established from the text such as “Exporter or generator, importer or disposer” or the cell was left empty or otherwise indicated that it was unclear.
- Transporter: Carrier
- Other: The name of the person who arranged or organized the shipment, or the company name was given.

Endnotes

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Annex VIII: List A-Wastes contained in this Annex are characterized as hazardous under Article 1, paragraph 1 (a), of this Convention, and their designation on this Annex does not preclude the use of Annex III to demonstrate that a waste is not hazardous.

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