# 10 Illegal trade in hazardous waste

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## INTRODUCTION

Waste is a by-product of contemporary society, present in ever higher quantities given the growing rates of consumption and production. The use of chemicals in manufacturing products has also increased the toxicity of waste (Pellow 2007). Nowadays, a massive industry deals with recycling and disposal of all that is discarded, including hazardous waste. As a result, waste is not a useless residue any more but a valuable commodity driven by global supply and demand. From collection to recycling, the value of the global waste market is estimated to be about US$410 billion yearly (excluding the informal waste market) (Rucevska et al. 2015).

Waste is a health hazard, especially when dismantling and disposal policies and practices are cumbersome. The substandard treatment and disposal of hazardous waste has been referred to as problematic, with industrialized countries externalizing the environmental harm to developing regions of the world. Given its potential harm, hazardous waste is subject to a number of international environmental conventions. Although the trade in hazardous waste is one of the most regulated, several crime-control challenges remain, not least due to the criminogenic characteristics of the waste sector and product. Opportunities arise for illegal activities in different stages of the waste process and most of these are very lucrative. Waste crime refers to the trade, treatment or disposal of waste in ways that breach environmental legislation and that cause harm or risk to the environment and human health. Many cases of non-compliance with waste regulation are, however, dealt with administratively and might not even come to the attention of police or justice officials.

This chapter begins by introducing the issue of hazardous waste. Attention is paid, first, to (hazardous) waste generation and, second, to the trade in hazardous waste. Next, the chapter discusses the most important international conventions and regulations on waste. It then explains the reasons behind the illegal trade in hazardous waste. This explores the criminogenic characteristics of the sector and product, the more organized criminal activity involved in the black market waste trade (Ruggiero 1996) and the *modus operandi* used in the illegal waste trade. The chapter then moves to a discussion of two particular cases of hazardous waste: e-waste

and shipbreaking. These cases provide insights into what general dynamics drive this illegal trade and illustrate the specific dynamics and regulatory implications of each type of waste. All of this informs an analysis of the international policy and enforcement strategies, the main challenges in controlling the illegal trade in hazardous waste, and opportunities for better control and prevention.

## (HAZARDOUS) WASTE GENERATION

Waste is one of the most prominent environmental issues in contemporary society and, at the same time, one of the most normalized. Since the 1980s the quantity of municipal as well as industrial waste has increased rapidly. Both industrialized and developing countries therefore face the challenge of dealing with the waste they generate (Hoornweg and Bhada-Tata 2012).[1] Countries are also facing the costs of cleaning up contaminated land and old landfills, while remediation and disposal costs are at an all-time high (Weber et al. 2011; Williams 2005).

Whenever there is no further purpose for a product, be it in production or consumption, and it is discarded, waste is generated and needs treatment and/or disposal. Waste treatment is the process that changes the characteristics of the waste to facilitate its handling, to make recovery possible or to reduce the quantity and hazardous nature (Williams 2005). Waste disposal is the final phase, which can refer to landfill, incineration and dumping. Waste can refer to a variety of materials such as glass, metal, paper, textile, plastic or organic material. It can also be classified based on what sectors of everyday life it was generated in, such as households, agriculture, mining, energy production, manufacturing and construction. Indeed, '[w]aste is both a by-product of production and the refuse left over from consumption' (White 2011, p. 73), but it is not just useless residue. What is waste for one person is a valuable secondary raw material for another. Moreover, what we consider waste now, might be considered valuable in a few decades.

Hazardous waste generation is an important part of overall waste production. Hazardous waste refers to waste with radioactive, explosive, corrosive or toxic characteristics resulting, for instance, from chemical manufacturing processes. These types of waste are most likely to cause health or environmental harm. An estimated 300 million tonnes of hazardous waste is produced each year by the Organisation for Economic Co-operation and Development (OECD) countries. Both plastic and e-waste – that is, waste from electronic and electrical equipment – are particularly worrisome types. Plastic has almost unlimited applicability

due to its versatility and is omnipresent in contemporary society. At the same time, plastics are resistant to degradation, especially so-called microplastics that are invisible to the eye but ubiquitous in the oceans, where five plastic waste 'islands' (in the North Pacific, South Pacific, North Atlantic, South Atlantic and Indian Ocean Gyre) cause harm to marine life (Eriksen et al. 2013). E-waste has plastic as a main constituent. It also contains hazardous materials such as the carcinogens lead and arsenic, as well as precious metals such as copper or gold. The production of such equipment is hard on the environment due, for instance, to the mining of component minerals. An estimated 20–50 million tonnes of e-waste is generated per year and that will increase to 72 million by 2017. Only part of that amount is recycled (Rucevska et al. 2015; see also Wright Corporate Strategy Pty Ltd 2010; United States Environmental Protection Agency 2012; European Environment Agency 2013). Waste has long been framed as a commodity that is traded from the developed to the developing countries. The increasing industrialization and urbanization of many developing countries and economies in transition means that domestic hazardous waste generation is also cumbersome. Developing countries often still largely lack the infrastructure to deal with residues, even the non-hazardous fractions. The consequences for illegal trade and associated criminal activity of this growth in waste generation and lack of infrastructure are discussed below.

## TRADE IN (HAZARDOUS) WASTE

Data about the trade in waste are harder to find than those about waste generation, although there is some indication about the importance of waste as a commodity. For instance, about 15 per cent of all trade within the European Union (EU) is trade in waste (IMPEL–TFS 2006). Most waste is traded within the same region (for example, the EU) or takes place between countries that are members of the OECD. It is not only multinational companies that trade in waste. Individual merchants also move waste-generating commodities across borders in luggage or containers to be sold by (informal) street vendors, at a later point becoming waste (Mathews et al. 2012). The existence of major transportation hubs in the ports of Rotterdam in the Netherlands and Antwerp in Belgium have resulted in those countries becoming waste hubs as well, although this is a reflection of trade patterns rather than what these countries actually generate or treat (Bournay et al. 2006, pp. 34–5). These same ports are often hubs for other forms of environmental crime, in part because of their economic importance in global trade networks and in part because controls

for illegal trade actually occur there. In contrast, ports in southern Europe hardly ever control for illegal transports, thereby reducing their likelihood of having high statistics for seizures or illegal trade (Van Erp and Huisman 2010). In much the same way, some Chinese provinces control for illegal smuggling of waste, displacing the smuggling to other provinces (Rucevska et al. 2015).

Data gathered by the Secretariat of the Basel Convention (about which more later) provide some indication of the extent of the trade in hazardous waste (as a subset of waste more generally). However, the data are flawed because they rely on the reporting by parties to the convention, who often use different definitions of hazardous waste (Basel Convention National Reporting no date). Using the definition of hazardous waste from the European Waste Framework, Eurostat (the EU's statistical office) has estimated that about 201 kg of hazardous waste is generated per inhabitant per year in EU member states (Eurostat no date). Much of the trade for treatment of this hazardous waste goes to OECD countries such as Belgium, Germany and the Netherlands because many of the processing technologies and facilities are located there (Zoï Environment Network and GRID-Arendal 2012).

Legitimate reasons for the trade in (hazardous) waste are diverse. First, several countries do not have the necessary facilities to treat their hazardous waste or lack sufficient capacity to treat it all. Also, certain types of waste can only be dealt with in a limited number of facilities (for example, the Swan Hills facility in Alberta, Canada treats dioxins and furan-contaminated materials). Second, sometimes a facility in another country is closer than one in the country of waste origin and transport across a border makes sense. Third, certain types of hazardous waste contain valuable secondary materials to be used in production processes in receiving countries. In times when natural resources are increasingly limited, recycling and reusing secondary materials – the so-called 'urban mine' – is prominent. Fourth, and perhaps most importantly, it is often less expensive to send waste to another country than to manage the disposal within the generating country (Commission for Environmental Cooperation no date).

## LEGAL FRAMEWORK

The more hazardous a waste shipment is, the more domestic and international legal requirements it needs to answer to, such as providing information about the facility it is destined for, or obtaining prior consent of the receiving country before the transport takes place. There was hardly any

regulation on the trade in hazardous waste prior to the 1980s. Chemical disasters such as the Three-Mile Island (1979) and Chernobyl (1986) incidents, both of which involved radioactive waste, increased the concerns of people in industrialized nations about the existence of hazardous waste generation, trade or disposal in their own countries. The dangers of landfilling hazardous waste within the boundaries of industrialized nations were also exposed in the media in the mid-1970s with the Love Canal case in Niagara Falls, New York, where a neighbourhood was built on land formerly used as an industrial chemical dumpsite (see Levine 1982 for details).

From an economic point of view, exporting hazardous waste to countries with lower environmental standards and therefore lower costs for treatment and/or disposal seemed logical. The trade between industrialized and developing countries was big business. Public opinion changed, however, when several disturbing cases of toxic waste exports from industrialized to developing countries were exposed.[2] International pressure developed for the creation of an international convention about the hazardous waste trade to developing countries. In 1989, the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal was adopted, entering into force in 1992. The Basel Convention stipulates that waste should only be traded between countries that have the appropriate facilities to treat it or dispose of it in an environmentally sound way. However, there was a widely held view that while the convention regulated trade, it did not criminalize the shipments of waste to developing countries. Several regional conventions were created to fill this gap, such as the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (entered into force in 1998) and the 1989 Lomé IV Convention in which the EU and several African, Pacific and Caribbean countries agreed to a trade ban on hazardous waste. In 1994, the Ban Amendment to the Basel Convention was adopted and in 1995 the Basel Convention was amended to include an all-encompassing ban on the export of hazardous waste from OECD countries to non-OECD countries. Several industrialized nations (Australia, Canada, Germany, Japan, the US and the United Kingdom) opposed these decisions and, at the time of writing, Australia, Canada and the US continue to lobby for changes because they would like to see a differentiation between waste for final disposal and waste for recycling or recovery purposes.

Other international legal frameworks carry implications for the illegal trade in hazardous waste. One of the most successful multilateral environmental agreements is the Montreal Protocol on Substances that Deplete the Ozone Layer, which entered into force in 1989. The Protocol affected

the trade in hazardous waste by no longer allowing the (legal) trade in second-hand refrigerators, air conditioners and other electronics that use those gases that fall under the restrictions of the Protocol. Although less contested than the Basel Convention, the Montreal Protocol also raises questions about precaution and profit in determining further elimination of ozone depleting substances used as shipping fumigants or in agriculture (Downie 2013).

The International Convention for the Prevention of Pollution from Ships (MARPOL) also had an impact on the trade in hazardous waste. Dating to 1973, the Convention was amended in 1978 and a Protocol was adopted in 1997. The Convention regulates the discharge of wastes that derive from the normal operations of a ship in order to avoid pollution of the marine environment (for example, oil, sewage and garbage).

Other important multilateral environmental agreements that have had an impact on the trade in hazardous waste are the 2001 OECD Decision on Control of Transboundary Movements of Wastes Destined for Recovery Operations, the 2001 Stockholm Convention on Persistent Organic Pollutants, the 1985 Vienna Convention for the Protection of the Ozone Layer, and the 1992 Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade. The EU also has its own legal framework that deals with waste and is generally more stringent than the international requirements. The 2006 Waste Shipment Regulation addressed the problem of uncontrolled transport of waste, implementing the Basel Convention and the OECD Framework Decision, and was revised in 2014 to strengthen the inspection systems of member states and to improve the compliance rate (estimated to be at 75 per cent). The 2002 Directive of Waste Electrical and Electronic Equipment created collection systems to increase the recycling and/or reuse of e-waste, and was revised in 2012 (entered into force in 2014) to include collection targets, further harmonize reporting across the EU and better tackle the illegal trade in e-waste by requesting a test report and proof that the products have a market. Only a small percentage of this freight, however, is actually checked.

All of these international conventions have had positive effects on the trade in (hazardous) waste, some more significant than others. Each has its particular challenges in implementation, which are discussed later. Many of these agreements and conventions deal with the trade from industrialized countries to developing countries or among OECD countries. As a consequence, the trade among developing countries or from countries that have not ratified these conventions risks falling outside control and licensing regulations and therefore is possibly not considered an environmental crime.

## THE ILLEGAL TRADE IN HAZARDOUS WASTE

The illegal trade in waste is the deliberate transportation of hazardous waste to countries that do not have the necessary facilities to treat the waste. It is different from other transnational crimes (for example, drug smuggling or human trafficking), because it is so closely connected to the broader chain of legal operations. Waste crimes are usually about taking advantage of existing policy or enforcement loopholes. The trade flows that are most likely to result in inadequate – and often illegal – recycling or disposal are those from the global North (Australia, the EU, Japan and the US) to the global South (Africa, Southeast Asia and South America) (CREM and Greenpeace Nederland 2008; Puckett and Smith 2002; Puckett et al. 2005).

### Scale

Although exact data do not exist, results of enforcement actions coordinated by the European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) give some indication of the scale of the violations (IMPEL–TFS 2012). Over several phases of IMPEL–Transfrontier Shipment of Waste (TFS) measurements (2006–12), the number of administrative violations – missing or incomplete forms – decreased from 52 to 37 per cent, but the number of illegal shipments – subject to an export ban – increased from 33 to 38 per cent. Overall, one in five containers exported from the EU contain waste and an estimated 20 per cent of those are in violation of export bans or administrative requirements for waste trading (Baird et al. 2014). European inspections statistics indicate that about 10 per cent of illegal waste shipments contain plastic, are considered illegal because they have faulty documentation, contain low-quality products or have a country of destination that is not allowed (Baird et al. 2014). E-waste is another major waste stream among these transport violations. The United Nations Office on Drugs and Crime (UNODC 2009, p. 55) has estimated that the value of toxic waste transported in one year from industrialized countries to West Africa has an estimated value of US$95 million. The 2012 INTERPOL initiative Enigma, which specifically targeted the illegal trade in electronic waste, found that one-third of checked shipments were in breach of regulations (Rucevska et al. 2015). The data available on the illegal trade in waste, however, reflect the impact of control that takes place (through seizures and inspections) and are not necessarily an accurate reflection of the scale of smuggling (Bisschop 2012).

**The Search for Cheaper Treatment and Disposal**

The reasons for the illegal trade in hazardous waste lie mainly in the search for cheaper ways to treat and/or dispose of the waste. Waste has an inverse incentive structure due to its negative value. Although certain fractions of waste (for example, metal) are valuable, generators of hazardous waste generally need to pay large sums to have it treated in environmentally sound ways. Illegal disposal can be 200 to 300 times cheaper than legal disposal (Baird et al. 2014). Cases such as that involving toxic waste dumping by the ship *Probo Koala* on behalf of the Dutch multinational Trafigura point not only to cost variables but also to the global reach of the industry, the health consequences of toxic dumping, and the involvement of governments in the illegal trade (in this case that of Ivory Coast) (see MacManus 2012). Although the MARPOL Convention and the Basel Convention regulate their own specific activities, the *Probo Koala* case raised questions about which convention applied and whether a crime of hazardous waste trade had in fact occurred (Center for International Environmental Law 2012).

**Criminogenic Product and Sector**

A number of other sector and product-specific characteristics can help explain the illegal trade in (hazardous) waste (Vander Beken 2007). Waste is a product of low integrity because it can be easily disguised by being mixed or sold as a second-hand commodity (Gibbs et al. 2010), and the waste sector has been linked to price fixing and racketeering (Van Daele et al. 2007). The rapid growth and international character has allowed a diversity of actors to work in the waste industry, with brokers involved at different stages (Szasz 1986). In collection, transport and treatment, multiple small companies try to compete with the few big ones. As a consequence, the transition from legal to illegal can occur at several stages of the waste process (Huisman 2001): in national and cross-border transport and in collection and disposal. Waste can be more cheaply dealt with by illegal enterprises that disregard environmental regulations or by legal companies in Europe who treat waste that they are not licensed to treat. Sometimes legal and illegal actors also cooperate in the illegal waste trade (Ruggiero and South 2010). More informal groups of waste traders are involved in transnational waste smuggling and dumping, but legal entities have also been found to be involved in fraudulent activities. The criminogenic characteristics of the sector and the product are not the only explanations. Those are so-called push factors for the illegal trade, but there are also pull factors in countries of destination.

**Motivations in Countries of Destination**

Countries in the global South can be especially vulnerable due to weak regulatory systems and governments as well as precarious socioeconomic situations which can result in decisions to accept illegal but financially interesting hazardous waste shipments. Waste traders can shop around for the lowest costs for waste disposal and offer officials in destination countries attractive prices or bribes for accepting the (hazardous) waste into their lands. These same powerful economic actors are also those most likely to influence international treaties and law enforcement in developing countries (Michalowski and Kramer 1987).

***Modus Operandi* for Illegal Waste Smuggling**

The illegal trade in hazardous waste is organized in different ways. Several *modi operandi* help disguise the illegal contents or destinations of the shipments. First, there is the misclassification of waste. The World Customs Organization regulates the trade in waste with its Harmonized System, a product classification that determines trade tariffs. However, not all types of waste are covered by the system's codes. Shippers often attempt to conceal illegal waste trade by misclassifying it so that it does not fall under the Basel Convention requirements.[3] For instance, e-waste is declared as scrap metal or used goods. Second, the hazardous nature of waste is sometimes disguised in transport. An example is the transportation of e-waste in second-hand vehicles that are difficult to inspect in ports because they are soldered shut or have other goods stored on top of them. Another technique is hiding hazardous waste behind a row of other commodities so that when containers are opened, customs only see the other commodities. X-ray scanning of containers can reveal hazardous waste in disguise, but in most ports only a small percentage of containers are subject to scanning, given the sheer volume of trade (for example, less than 1 per cent in Antwerp). Third, shippers sometimes deliberately leave sections of customs declarations forms blank or provide incorrect contact information about destinations in an attempt to hinder controls. The methods of smuggling hazardous waste are also shaped by the broader context of increased containerization and fairly cheap transport across the globe. Some traders also work from so-called free trade zones in order to evade tax, as well as to evade controls on waste fraud (Rucevska et al. 2015). Trade in waste often happens 'on paper', without physically changing hands, thus obscuring the identity of the original owners.

Two types of waste deserve special attention because they are particularly harmful: the trade in waste from electric and electronic equipment,

and the trade in vessels and consequent shipbreaking. They risk falling between the cracks of domestic and international legislation and are thus liable to illegal and criminal practices.

**E-waste**

E-waste is one of the fastest growing waste markets. Both exporting and importing countries shape this trade, which includes waste from electronic and electrical equipment such as computers, televisions, telephones, refrigerators, and so on. E-waste contains hazardous components such as the heavy metals lead, lithium, mercury, cadmium and arsenic, as well as PCBs (polychlorinated biphenyls), CFCs (chlorofluorocarbon) and polyvinyl chloride; it also contains valuable substances such as copper, gold, silver and platinum which explains why its recycling can be very lucrative.

Whilst the search for profit plays a role in the illegal trade of e-waste, the picture is more complex (Gibbs et al. 2010). The examples below illustrate this complexity by following the pathway of electronics from production to consumption and recycling to disposal, focusing in particular on the tensions between legality and illegality (see Bisschop 2012, 2013, 2015).

Producers are the first nodes in the supply chain of electronics. They make decisions about the durability – or planned obsolescence – and toxicity of their products (Brisman and South 2013), and about marketing campaigns to increase consumption of the newest gadgets. Consumers play a role in buying the newest versions of products even though older ones may still function, and in discarding their old or no longer functional electronics. Corporate and government consumers sometimes sell e-waste to (legal or illegal) collectors who offer to treat the e-waste for (too) low prices rather than choosing more trustworthy collectors of waste. The reasons for this can range from a lack of awareness and due diligence, to a conscious choice for cheaper illegal disposal and for the externalization of harm.

The next step in this chain of custody is waste collection and treatment. This is the background against which potential interfaces between legal and illegal actors emerge. Collection of e-waste and discarded but still functional electronics involves scrap metal dealers, urban recycling centres, refurbishers, registered metal collectors and informal actors (for example, waste tourists,[4] Internet users or charities). Many of these e-waste collectors and recyclers live up to their espoused environmental and ethical standards. Others claim to recycle electronics, but are engaged in direct or indirect export – often through brokers – to developing countries. These practices are highly profitable, depending on the type of product traded. E-waste brokers are located on an even more complex

legal–illegal spectrum. On the one hand, they have a role as legal intermediaries in transactions and therefore promote interests similar to those of the other actors in the collection of e-waste. On the other hand, through waste storage and handling, they can function as intermediaries for illegal transportation. Other legal actors in e-waste collection such as scrap metal dealers and refurbishers are also known to (intentionally) feed into illegal transports. The waste sector is very competitive and has high treatment costs, which motivates the search for cheaper – illegal – disposal. E-waste can also hold enough valuable components (for example, precious metals) to make recycling or treatment profitable, thus creating motivation to dismantle the goods as cheaply as possible (Sander and Schilling 2010).

The transport sector also plays a role in the illegal trade in e-waste. Shipping lines, terminal operators, expeditors and shipping agents – and by extension banks and insurance firms – potentially have e-waste smugglers as their clients. They can therefore, at a minimum, be accused of a lack of due diligence. Some of these shipping actors even play a deliberate role and help disguise illegal contents or destinations.

Legitimate business structures (corporate crime) are also intertwined with organized crime groups in money laundering, illegal construction, and corruption related to environmental crimes such as illegal hazardous waste trade. Traditionally, more individual environmental criminals (such as waste tourists) also increasingly organize themselves like criminal groups. Europol (2015) considered e-waste a key illicit commodity for European organized crime in its most recent organized crime threat assessment. It predicted that organized crime will increasingly use project-based, dynamic cooperation and will increasingly target legal business structures, including the waste and transport industries.

In countries of destination, a diversity of actors deal with e-waste and second-hand electronics. Not all actors are knowingly involved in transnational crime. Informal collectors and dismantlers compete in the same market as formal actors and organized crime groups. They cooperate with legal actors by selling them the extracted secondary raw materials. Moreover, informal dismantlers and sellers of second-hand e-goods also cooperate with both illegal (e-waste) and legal (used goods) transporters. Governments in some countries of destination tolerate the import of e-waste – against national or international regulation – often because discarded electronics provide many inhabitants of their countries with a stable source of income through employment in the dismantling, recycling and reclamation industries. Where commodities are sold on, people in developing countries can gain access to the digital world. In these countries, discarded electronics feed into a massive industry, involving recycling, second-hand electrical and electronic equipment, parts, fixing,

refurbishing, and so on. Only a part of such commodities is truly going to waste. Regardless of whether this trade concerns illegal e-waste or legal second-hand goods transport, those commodities are highly likely to end up on the dumpsite at the end of their lifecycle, because there are no adequate recycling facilities in many regions of destination (for example, West Africa).

**Discarded Vessels and Shipbreaking**

Approximately 12 000 vessels reach their end of life each year, either because they are no longer seaworthy or because they no longer meet technical or safety requirements set by the International Maritime Organization (IMO) (NGO Shipbreaking Platform 2013). Shipbreaking activities in developing countries are associated with environmental and occupational health and safety hazards. The shipbreaking industry deals with valuable steel and other metals, but at the same time also has to deal with well known or suspected carcinogens such as asbestos, lead, mercury, residual oil and PCBs. When handled in unsafe ways, these affect the health of the workers and leak into the coastal and marine environment (Neşer et al. 2008).

By disposing of these vessels in developing countries, the shipping industry flouts international regulations on the management of hazardous waste, although those regulations long ignored this particular aspect of the waste trade (Rousmaniere and Raj 2007). Governments of these destination countries often benefit from the shipbreaking in ways similar to those for accepting hazardous waste discussed earlier. The recovery of scrap metal and other equipment on those ships contributes to the local economies of regions that are economically challenged (Puthucherril 2010).

Until the beginning of the 1980s, shipbreaking industries were located largely in the global North, but then the costs for safe demolition of vessels increased, similar to developments for hazardous waste discussed earlier. By the 1990s, the large majority of those activities had shifted to Bangladesh, China, India, Pakistan or Turkey, with a few exceptions in the US and the EU. Bangladesh and India dismantle approximately two-thirds of the end-of-life vessels (Rucevska et al. 2015). Following the campaigns conducted by non-governmental organizations (NGOs) such as Greenpeace and the Basel Action Network to publicize shipbreaking, the International Convention for the Safe and Environmentally Sound Recycling of Ships was adopted under IMO auspices in 2009 in Hong Kong.

The existing regulatory framework for hazardous waste has for a long time failed to deal with end-of-life vessels. In 2002, the Basel

Convention adopted the Technical Guidelines for the Environmentally Sound Management of the Full and Partial Dismantling of Ships. The Basel Convention and Ban Amendment also apply to shipbreaking since quite often vessels are considered hazardous waste and therefore cannot be traded with non-OECD countries.

Although the practice of trading discarded vessels falls under the Basel Convention, there is a workaround. Most of those vessels change owners in the last years and months of travel and use flags of convenience to arrive at their final destinations, thereby disguising the original owner. Quite often ships are sold to owners in India and Pakistan who then send them to a shipbreaking yard. The first transaction hides the fact that the ships are destined for shipbreaking and in the second there is no transboundary movement. Part of the responsibility for the illegal trade in hazardous waste from vessels thus lies with the shipping industry and original owners of the vessels, since they neglect to check the final destination of the vessels they used to own. A few ship-owning companies have started to self-regulate to guarantee the proper recycling of their old vessels.

The health and environmental risks of shipbreaking in developing countries have been obvious since the mid-1990s. Shipbreaking also involves labour and trade issues due to its economic importance for countries of destination. Illegal profits from shipbreaking can amount to over US$2 million per vessel (Rucevska et al. 2015). NGOs have criticized the IMO for 'dragging its feet' in the end-of-life vessel discussion (Rousmaniere and Raj 2007). As noted above, an international convention to regulate shipbreaking was finally adopted in 2009, but it has inherent weaknesses (Bhattacharjee 2009). To speed up the entry into force of the 2009 Hong Kong Convention, the EU adopted the 2013 Ship Recycling Regulation. This also followed from the realization that about 40 per cent of the commercial fleet is owned by European companies. The EU Ship Recycling Regulation sets standards for recycling that apply to ships that fly EU flags or other ships that call at EU ports. At the time of writing, observers anticipate that it might be many years before the Hong Kong Convention will enter into force, for which reason it has been called a 'legal shipwreck' by NGOs (Basel Action Network 2009).

## CHALLENGES IN CONTROLLING ILLEGAL HAZARDOUS WASTE TRADE

The primary goal of regulating the trade in hazardous waste through multilateral environmental agreements was to avoid the harm caused by exports to countries without adequate treatment or disposal facilities.

This harm can take many forms. First, there is the immediate and more distant environmental harm in contaminated water, air and soil, which easily travel across local and national borders (White 2011). These harm eco-systems, animals, crops, drinking water and so on, and the clean-up of these dumps and dismantling sites is a heavy burden (Sepúlveda et al. 2010). Second, there is harm to humans living near the locations where waste is dismantled, burned or dumped, and to those employed in the informal waste business. These victims often do not know they have been harmed or accept the harm because they need the jobs to survive. The harm can also be economic and political. Illegal transporters have economic advantages over legitimate transporters due to lower processing costs and therefore adversely affect trade and competition. Moreover, the informal 'recycling' sector has a lower recovery rate of (precious) metals, which negatively impacts the availability of natural resources. Politically, this illegal trade also undermines the often already weak law enforcement of developing countries through corruption and fraud, and mocks international policymaking (Quadri 2010).

International legal conventions rely on individual Parties for their implementation and enforcement. As a consequence, the legal framework for the transboundary transportation and management of hazardous wastes is not always interpreted or implemented with the same commitment by Parties to the various conventions. One particular difficulty is the interpretation of waste, recyclables and reusable goods. This has important legal ramifications because exports of waste to non-OECD countries are illegal, but exports of second-hand products for reuse are legal under the Basel Convention. This applies to the case of e-waste, where it can be challenging to distinguish between waste and second-hand electronics. In much the same way, it applies to old vessels changing owners for reuse or for shipbreaking. Although the guiding principles in the Basel Convention require that notification and transport documents must include proof of functionality as well as contact details of shippers and destination, and require the use of appropriate packaging, the dynamic nature of e-waste makes controlling for illegal trade difficult. This dynamic nature refers to a temporal dimension in the sense that every day more knowledge about harmful substances emerges. This sits alongside another dynamic in the sense that the discussion about what is a second-hand product and what is waste depends on the cultural and socioeconomic context. It is not easy for policy and legislation to incorporate this dynamism.

Looking at the national and international legislative picture, there is a lot of regulation on (hazardous) waste, albeit with a number of blind spots and loopholes (Bruinsma 1996). At the same time, the legislative framework is very complex and causes confusion in its implementation

(Huisman 2001). Even within the EU, with its more stringent legal framework, some member states regularly fail to inspect waste shipments, which increases the likelihood of 'port hopping'. Port hopping is the practice of switching the port that the vessel calls at, or the port out of which the cargo is exported, depending on how lenient inspections are. This is often motivated by logistic reasons and thus is difficult to detect (Rucevska et al. 2015). Imposing minimum requirements for inspections and controls for illegal trade in hazardous waste could be a solution; however, even within the EU this is already interpreted as impinging too much on nation states' sovereignty. It is even more unlikely that such an agreement can be reached at a global level. In other words, there is often a missing link between policy and implementation when it comes to international agreements and environmental topics (Faure and Heine 2005; Iwama 2004). The transboundary movement of hazardous waste is no exception.

Waste crimes make up a large share of the cases reported to environmental inspectorates. The term can refer to administrative violations (missing or incomplete paperwork), as well as breaches of criminal law (the movement of waste and waste-related commodities contravenes existing trade bans or other forms of regulation). Waste *fraud* – through mislabelling of goods or disguising of contents or destination – has been identified as a major form of environmental crime by the international law enforcement community (EnviCrimeNet 2014; Nellemann et al. 2014). Some studies have alluded to the role of organized crime syndicates in the dumping of hazardous waste (Block 2002; Ruggiero 2009) and police analysis confirms this (Europol 2015). Resources to address these forms of crime remain limited, as does political will. This has consequences for training, resources and effective follow-up across the trade flows (Brack and Hayman 2002). Only limited government resources are invested in controlling the illegal trade in hazardous waste and quite often the responsibility is split between different agencies such as police, customs and environmental inspectorates, or administrations that each have their own priorities, responsibilities and working methods. This results in fragmented approaches to addressing the issue at hand (Bisschop 2013). Given the transnational nature of waste trade, government agencies also need to cooperate across borders, which brings its own practical and judicial difficulties, especially in face of ambiguities about which organization or country is taking the lead. Hazardous waste also requires technical expertise to determine whether paperwork matches actual shipments. This expertise is often lacking or only available to a limited number of controlling agencies, causing them to be overburdened.

Prosecution of breaches of international hazardous waste regulations also remains a matter of national competence, with significant differences

between countries in approach, number of convictions and sanctions imposed (IMPEL–TFS 2013). For example, while the European waste framework requires member states to have sanctions in place for environmental crimes (see, for example, Council of the European Union 2008), there are major differences in the interpretation and implementation of those sanctions (Sander and Schilling 2010). Waste cases are prosecuted but the fines that are imposed for illegal e-waste transports are perceived as too low to be effective and become, in effect, part of the shippers' business plans. One of the reasons for this is that, although it is often possible to prove one shipment is illegal, it may be difficult to prove this has happened systematically. This is similar to findings about the implementation of other environmental policies in the EU, where member states demonstrate substantial margins in their interpretations and determinations of sanctions (Billiet and Meeus 2010). To counter this, judges could be guided about the seriousness of transnational environmental crime (White 2011) or prosecutors could exchange relevant case law, prosecution information such as the level of fines, working methods, prosecution approaches, interpretation and practical experiences (IMPEL–TFS 2013). Many of these weaknesses are similar to those from which other international environmental policy mechanisms suffer (Iwama 2004).

## OPPORTUNITIES FOR CONTROL AND PREVENTION OF ILLEGAL HAZARDOUS WASTE TRADE

The sheer scale of global trade makes it very challenging to rely only on governments to take initiatives in controlling and preventing the illegal trade in waste. Therefore it can be useful to see what other elements that are inherent to the global trade in waste could be modified to prevent further environmental harm. This implies a broader approach to avoiding environmental harm, based not only on government initiatives, but also on embracing a broader view of control and prevention in which corporations and NGOs play a role (Gunningham et al. 1998; Holley et al. 2012). The involvement of these actors has not been used to its full potential (see, for example, Ayling, Chapter 17 in this volume).

Economic and environmental interests will not necessarily coincide when corporations are involved in the management of transboundary waste trade and efforts to avoid illegal trade. Yet better positive and negative incentives can be designed so that corporate actors can get involved in avoiding harm as a consequence of illegal trade in hazardous waste. In e-waste, producers, recyclers and consumers could play a role (Van Erp

and Huisman 2010). Producers can ensure the recycling of e-waste is less harmful by phasing out hazardous components. Through the use of eco-design principles, they could allow for updates instead of discarding of electronics. Governmental initiatives and NGO campaigns play this card. This is closely intertwined with campaigns to make consumers more aware of their unsustainable consumption practices.

The involvement of the waste industry, particularly hazardous waste-generators and treatment facilities, in preventing environmental harm is determined by the potential profits in being environmentally responsible, either financially or in terms of their corporate image (the 'business case'). The scarcity and high energy costs for the extraction of raw materials (for example, precious metals) serves as an incentive to avoid secondary materials going to waste due to substandard recycling practices. For instance, protecting secondary raw materials (copper, gold and so on) and keeping those within Europe is increasingly being developed hand-in-hand with the objective of avoiding further environmental degradation in countries of destination of e-waste transports. The waste sector itself could play an increasingly important role if it would be willing to regulate itself in ways similar to financial market authorities (Gunningham et al. 2003). For shipbreaking, self-regulation for vessel owners could be linked to due diligence requirements in view of the final destination of their discarded vessels.

Transportation companies could also be encouraged to be more diligent and transparent, and in this way avoid their vessels or company names being shamed for illegal hazardous waste trade. Other crucial non-state actors such as NGOs already play a role in raising consumer awareness and in keeping both corporations and governments attentive to the environmental and social harm that results from illegal hazardous waste trade. They have also set up capacity-building projects to engage local actors in better recycling practices. Many people in developing countries rely on their informal waste-dismantling activities (for example, e-waste or shipbreaking) as a sole source of livelihood. Capacity building in this context refers to governance initiatives to improve environmental legislation and implementation. Of equal importance are projects that have an impact on education, health care and the economy of developing countries in order for them to have the economic, cultural as well as knowledge capital to refuse hazardous waste shipments. The problem remains that developing countries will have to deal with the hazardous waste they generate themselves, either in industrial processes or through consumption. Even if industrialized countries no longer export to developing countries, the trade amongst developing countries still needs to be addressed. Even if all trade follows legal requirements – implying that there is no more illegal

trade in hazardous waste – this does not necessarily imply that the way of least environmental harm was chosen. As noted above, developing countries also generate massive amounts of waste (plastics, obsolete electronics, and so on) through production and consumption that might soon exceed those of industrialized countries and that will require disposal.

Opportunities for waste crimes are present in all phases of the waste process and can therefore be present in the activities of legal corporations, organized crime groups and individual smugglers alike. As explored in this chapter, then, the challenges presented to regulators and law enforcement agencies go far beyond the illegal trade in hazardous waste alone.

## NOTES

1. By 2050, the approximately 9 billion people on the planet will generate an estimated 13.1 billion tonnes of waste per year (Baker et al. 2004).
2. Such cases included the dumping of toxic waste in Nigeria by Italian waste disposal companies (see Adeola 2012; Ogbodo 2009; Okaru 2011), and the illegal efforts of the ship *Khian Sea* to dispose of incinerator ash from Philadelphia in several developed countries (see Ridgeway and Drevet 1998).
3. The shipper is the owner of the goods who pays shipping agents and shipping lines to ship the goods to their destination.
4. 'Waste tourists' are foreign nationals (usually from West African countries) who visit industrialized countries (on tourist visas) and collect used electronics and e-waste to then send back to their country of origin, where they or another family member claim them in the port of destination. These are then dismantled in the local informal e-waste industry or sent to the dump.

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