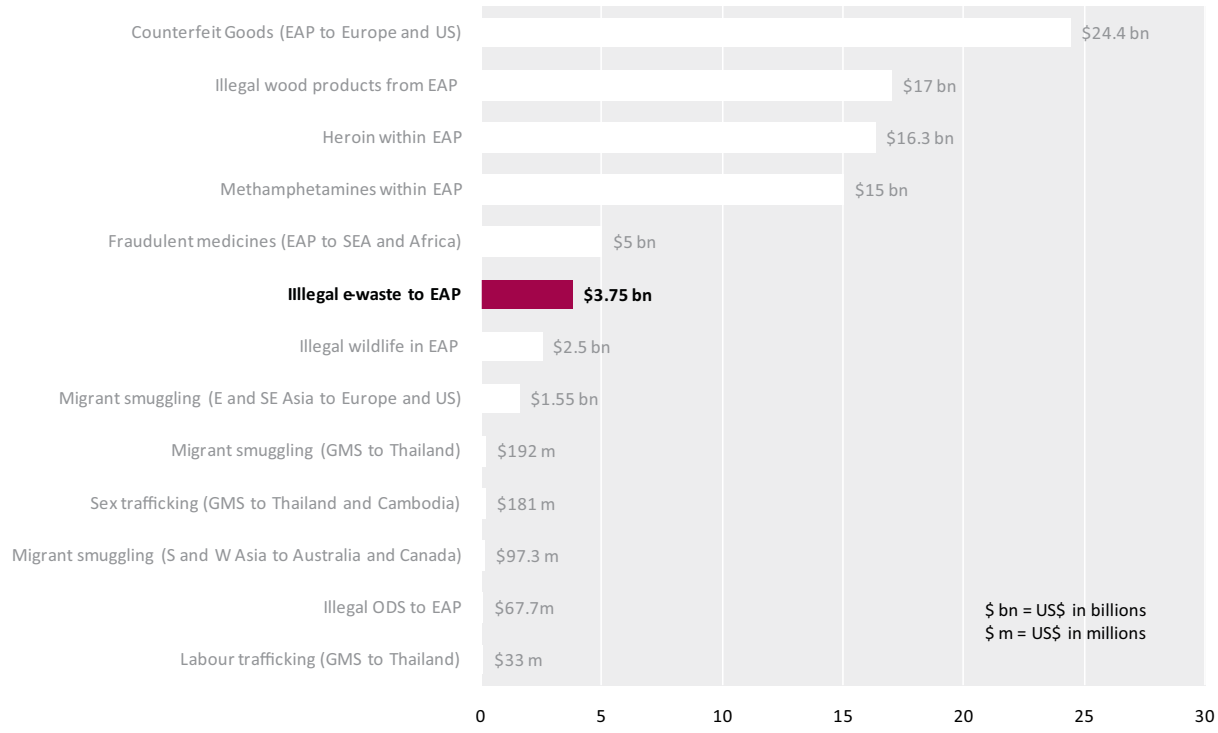
Chapter 9

Illicit trade in electrical and electronic waste (e-waste) from the world to the region



UNEP

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NATURE OF THE THREAT

1. **Environmental disruption:** pollution of soil and water systems, emission of greenhouse gases, thinning of ozone layer, negative impact on marine and forest ecosystem by ultraviolet radiations.	2. **Negative impact on human health:** toxic metals and ultraviolet radiations affecting immune, respiratory and digestive systems, including high risk of skin cancer and eyes diseases.
3. **Socio-economic impoverishment:** increase costs for public health, reduced agriculture productivity, food insecurity and poverty.	

1. What is the nature of this market?

Electrical and electronic waste (e-waste) is the fastest growing waste stream in the world. Globally, the United Nations Environment Programme (UNEP) estimates that up to 50 million tons of e-waste is generated every year, with only 10% of it being recycled.[1]

Broadly, the term e-waste covers a host of electronic items, such as personal computers, televisions, mobile phones, and printers, as well as electrical goods like refrigerators and air-conditioning units. The growth in e-waste is a consequence of the digital economy and rapid innovation in consumer electronics, as continuous product developments lead to a rapid turnover of electronic devices. Consumption in emerging markets is rising rapidly. For example, sales of personal computers in China reached 40 million units in 2008. This was second only to the United States. In the same year, 190 million new mobile phones were sold in China.[2] China generated an estimated 1.7 million tons of e-waste in 2006. This volume is predicted to rise to 5.4 million tons by 2015. In 2012, it is estimated that 190 million personal computers and 74 million televisions will become obsolete in China.[3] All this will require management of e-waste, whether through direct re-use, reclamation, resource recovery, recycling or disposal operations. An emerging factor that creates incentives for recycling of e-waste is the scarcity of precious and rare earth metals contained in electronics. Therefore the recycling and recovery market becomes an important element impacting both the legal and illegal transboundary movement of e-waste worldwide.

Despite such growth in China, the main generators of e-waste are still the developed countries in the European Union (EU) and the US. Since 2008, the EU has produced on average 6.5 million tons of e-waste each year. This figure is set to almost double to 12 million tons by 2015. In terms of per capita e-waste generation, the UK rate is 15 kg per year, and Germany 13.3 kg, while Japan generates 6.7 kg and China 1.7 kg.[4]

[1] UNEP 2010. This figure tallies with business research findings of 53 million tons of e-waste produced in 2009, of which only 13% was recycled. See also: ABI Research 2010.
[2] Foreign Policy 2009, "E-waste: There's an app for that", *Foreign Policy*, 23 September 2009
[3] Chi and others 2011
[4] Ongondo and others 2011

The e-waste trail often begins in Europe, the United States and Japan, where discarded electronic and electrical equipment is collected by recycling operations. There are two main ways in which old equipment can be discarded. First, private consumers dispose of used equipment at municipal waste collection sites. The second is where businesses contract a specialized waste company to collect and treat defunct equipment. In principle, discarded equipment is then tested in order to separate working items from non-working items. The latter (e-waste) should be dispatched to specialized recycling facilities. In reality, the e-waste is often diverted onto the black market due to a lack of sufficient auditing and oversight, The motivations are numerous: first, avoid the cost of legitimate recycling, and, second, receive payments for the scrap equipment. Further, the trade of used electronic and electrical equipment can be driven by the re-use value of products and waste exported to developing countries. In such situations the equipment (whether in working or – less likely – non-working condition) can fetch prices far above their intrinsic material value.[5]

Globally, trade in hazardous and other wastes, including e-waste is regulated under the Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal (1992). The Convention was developed in response to a series of scandals in the 1980s involving the dumping of toxic waste in developing countries. Currently, 178 countries are parties to this Convention, including almost every country in East Asia and the Pacific.[6]

A raft variety of international, regional and national agreements, as well as legislation and other measures further regulate or restrict the trade in hazardous and other waste in general or e-waste in specific. Within the EU, the Waste Electrical and Electronic Equipment (WEEE) Directive seeks to promote recycling to reduce the amount of e-waste being dumped in landfill sites. Under the EU's Waste Shipments Regulation, transfer of e-waste to countries which are not members of the Organisation for Economic Cooperation and Development (OECD) is prohibited. China banned the import of used electrical and electronic equipment in 2000. In many other Asia Pacific countries, specific national

[5] Secretariat of the Basel Convention, December 2011.
[6] Only one country has not yet acceded to the Basel Convention. http://archive.basel.int/ratif/convention.htm#10.

Overview of Pollution Crime

There are many forms of transnational organized environmental crime, and as the world becomes increasingly connected through trade and regulation of this trade, new forms will continue to emerge. One of the two main subsets of environmental crime is crime related to the illicit harvesting of natural resources, notably wildlife and timber resources, which were addressed in the two previous chapters.

The other main subset is pollution crime, notably the smuggling and dumping of hazardous wastes, including electrical and electronic "e-waste", and the trade in ozone-depleting substances (ODS). The international trade in these products is regulated by global treaties, and substantial legal markets do exist.

East Asia plays a prominent role in the illegal trade of both e-waste and ODS. The region is a major recipient of illicit e-waste. It is also the largest producer of ODS. It is estimated that up to 10 million tons of e-waste are traded illegally into and around the region every year, with a potential value of at least US$3.75 billion. Approximately 3,660 tons of ODS are illegally traded from and within the region every year, with an estimated value of up to US$68 million per year.

These crimes are of international concern. The world is one vast ecosystem, and the release of ODS anywhere in the world impacts our common ozone layer. Dumping e-waste negatively impacts shared soils and water systems, not to mention the harm caused to human health by the illegal disposal of these materials.

These materials are generally illegally disposed of in less developed countries, where criminals take advantage of lax or non-existent environmental controls or less effective enforcement – or both – in order to profit at the expense of both human and environmental health from unsound recycling and disposal practices.

Illegal trafficking of hazardous and other wastes, including e-waste, is specifically defined under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. In fact, Parties to the Convention are required to introduce national/domestic legislation to prevent and punish the trafficking.

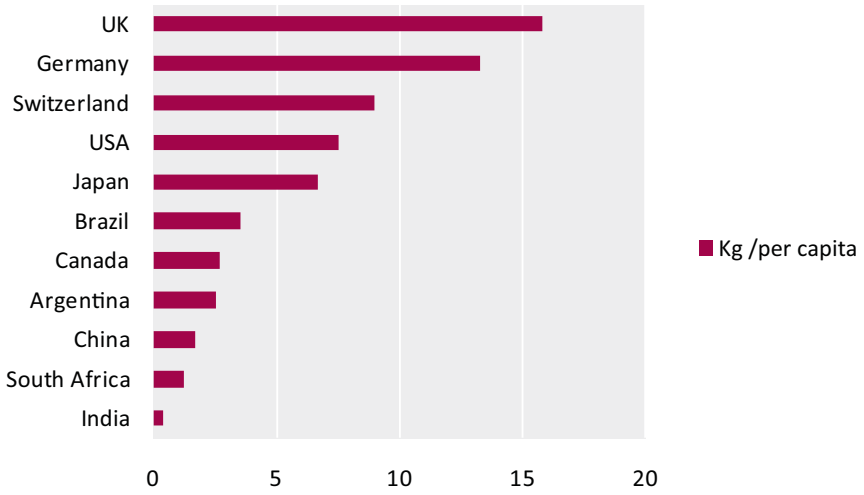
e-waste regulations are not in place and thus, e-waste is handled under hazardous waste regulations due to the presence of toxic materials. The US, while not a party to the Basel Convention, regulates exports of equipment containing cathode ray tubes (CRTs) - mainly from computer monitors and television sets - under the Resource Conservation and Recovery Act. All of these regulations seek to prevent hazardous waste from being dumped into developing countries that lack the infrastructure and facilities to safely recycle or dispose of it.

E-waste is classified as hazardous waste due to the presence of toxic materials which can be considered either hazardous or non-hazardous waste in accordance with the Basel Convention and can have adverse impacts on both the environment and human health. For example, CRT monitors contain up to 2 kg of lead,[7] which is toxic to humans. Yet, in addition to being hazardous, e-waste also contains commercially valuable elements, such as copper and gold. One ton of computer scrap contains more gold than 17 tons of ore. Ideally these valuable materials should be retrieved through safe recycling practices in modern facilities. Nonetheless, environmentally-sound recycling has significant cost implications. Unscrupulous recyclers and waste brokers in Australia, the European Union, Japan and the United States effectively avoid costs and obtain income from the illicit trade. For example, Australia reportedly only recycles around 5% of e-waste collected, but exports around 60% of used computers that are collected through recycling schemes.[8]

[7] See "Why do CRT monitors contain lead?" in How Stuff Works. Available: http://computer.howstuffworks.com/question678.htm.
[8] Agence France Presse 2011, "Australia starting to groan under the weight of a growing mountain of electronic waste", *Agence France Presse*, 27 May 2011.

It costs up to US$18 to safely remove lead from one CRT monitor in the United States.[9] It is estimated that illegal disposal of e-waste such as CRTs provides an economic saving of between 200% and 400% of the cost of legitimate recycling.[10] This has led to modern recycling facilities failing to obtain the predicted volume of e-waste. In the UK, the recycling industry anticipated an annual volume of 1.5 million tons of e-waste for processing, yet the actual quantity received was only a third of this.[11] Similarly, a recycling plant set up in Hangzhou, China, has an e-waste processing capacity of 700 tons a year, but only dismantles 90 tons.[12]

Figure 1: E-waste generation, per capita (selected countries, most recent year available)



Source: Ongondo and others 2011

Another factor in the profitability of e-waste smuggling is the relatively low cost of shipping containers from the United States and European Union to China. After delivering goods from China, containers – which would otherwise return empty – can be used to transport e-waste on the return leg, leading to lower costs for cargo such as e-waste. In summary, what drives the illicit trade is a combination of two factors: the market value for commercial metals and other elements in e-waste plus the effort to avoid paying the price for safe recycling.

However, the informal recycling of illicit e-waste carries a high cost in terms of health and the environment. Outdated practices release a host of damaging pollutants. Plastic casings on cables are burned to get to the copper inside. Printed circuit boards are heated over coal-fired grills, emitting lead. Open acid baths are then used to separate out copper and gold. CRT monitors are dismantled by hand and components with no resale value are dumped near rivers. The impact on the health of the workers and the surrounding environment can be severe. In Guiyu, Guangdong province, the hub of the informal recycling system in China, the state media estimates almost nine out of 10 residents suffer from problems with their skin, nervous, respiratory or digestive systems.[13] One study found that children in Guiyu had levels of lead in their blood 50% higher than those in neighbouring villages.[14] Water, air and soil in the area is polluted by toxic heavy metals and persistent organic pollutants that enter the food chain.

2. How is the trafficking conducted?

In East Asia and the Pacific, the illicit trade appears to be driven by recycling for metals to be used in manufacturing. Within the region, China is the main destination for e-waste, despite the fact that the country banned the import of used electronic and electrical equipment in 2000. Globally, it is estimated that 80% of e-waste is shipped to Asia (including India) – with 90% of that amount destined for China.[15] The main sources of e-waste reaching China are the European Union, Japan and the United States. Such shipments are in breach of the law in the countries of export as well as in China. Secondary centres for e-waste trade in the region include Indonesia, Thailand and Viet Nam.[16]

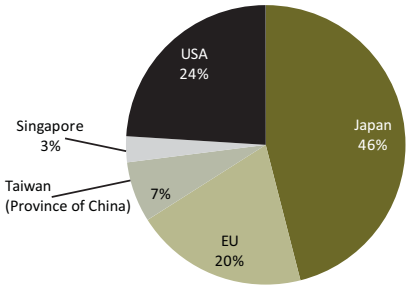
[9] Interpol 2009
[10] Thompson and Chainey 2011
[11] The Guardian 2009, "Dirty Deals", *The Guardian*, 9 July 2009.
[12] Chi and others 2011
[13] Reuters 2007, "China's e-waste capital chokes on old computers", *Reuters*, June 11, 2007.
[14] USGAO 2008
[15] Ongondo and others 2011
[16] Report of the Regional Workshop on the Environmentally Sound Management of E-wastes, Siem Reap, Cambodia, March 2007.

In China, the bulk of illicit consignments of e-waste are shipped via Hong Kong (China), with increasing imports via Viet Nam. Most of the waste ends up in the southern Chinese province of Guangdong, where it enters the "informal" recycling sector. The main demand in this sector is for CRT monitors and printed circuit boards.

In Guangdong province, the main centre for the informal recycling of e-waste is Guiyu, with secondary centres in Dongguan, Foshan, Shunde, and Zhongshan.[17] Guiyu alone processes over one million tons of e-waste annually.[18] Informal recycling is characterised by low-cost, labour-intensive practices with no regard for health and environmental impact. Compared with the more capital intensive formal recycling sector, the informal centres continue to prosper. This is because informal centres can avoid the costs associated with health and environmental protection. There is a plentiful supply of waste from illegal imports as well as collections within China itself (where 60% of e-waste generated is estimated to go into the informal sector). The informal centres generate high rates of recovery. And there is a high level of downstream demand. While the price offered by the informal centres for one ton of printed circuit boards is around US$420 in Guiyu, a modern authorised recycler in eastern China can offer only US$250, due to their increased costs of safe treatment.[19] Coupled with the afore-mentioned lack of national or regional regulations on e-waste and value of extracting raw materials, it is also the relatively higher financial gain from this extraction in the informal recycling sector that exacerbates the high economic interest in improper recycling and recovery of materials from e-waste.

Ultimately the products recovered from informal recycling are sold to the manufacturing sector, often via networks of brokers – both legal and informal. From Guiyu, components are sold to major electronics manufacturing centres such as Shenzhen, with copper and other metals ending up in refineries.[20] The Chinese government has been promoting more modern recycling parks and attempting to improve practices in the informal sector – such as replacing coal-fired grills with

Figure 2: Sources of seized CRT in Hong Kong (China), March – October 2007



Source: RILO-AP 2007.

electric heaters, but the resilience of the informal recycling sector continues to be a key factor driving demand for illicit e-waste.

The flow map of e-waste in the East Asia and Pacific region reflects the pivotal role of China as the main recipient from developed countries around the world. But China is also a growing generator of its own e-waste. It is also the region's largest manufacturer with high demand for components and metals.

One of the most comprehensive insights into the illicit e-waste trade comes from the results of Project Sky-Hole Patching, initiated in Asia and the Pacific by the World Customs Organization (WCO) and UNEP. This operation was carried out in 21 countries under the aegis of the WCO's Regional Intelligence Liaison Office for Asia-Pacific and instigated by China Customs. The first phase began in September 2006 and focused on ozone-depleting substances, with hazardous waste movements added from March 2007. The aim of the project was to foster regional cooperation between customs agencies through intelligence sharing and interception of illegal shipments.

Over eight months (March-October 2007) Hong Kong Customs intercepted 98 illegal shipments of hazardous waste from 25 countries, predominantly the European Union, Japan and the United States.[21]

[17] Shinkuma and Huong 2009.
[18] Ongondo and others 2011.
[19] Shinkuma and Huong 2009.
[20] Chi and others 2011.

[21] The main type of e-waste seized was cathode ray tube computer monitors and televisions. In total, 1,100 tons of CRTs and televisions were seized, equivalent to 36% of all hazardous waste intercepted by weight. In terms of source countries, 200 tons of CRTs came from the United States, 380 tons of CRTs and 94 tons of televisions came from Japan, 250 tons of CRTs came from the EU (170 tons from Belgium, 47 tons from Italy and 34 tons from Germany), 56 tons of CRTs from Taiwan (Province of China) and 28 tons of CRTs from Singapore. Source: RILO-AP 2007.

As well as confirming the major role played by OECD countries as the source of most e-waste shipped to the East Asia Pacific region, analysis of the Hong Kong (China) seizures also confirms the port's role as a transit hub for e-waste shipments bound for other destinations, mainly inland China and Viet Nam.[22]

In addition to trade via Hong Kong (China), a significant second route has grown over the last few years to supply the informal recycling sector of southern China, via northern Viet Nam. This "backdoor route" has developed in response to improved enforcement in Hong Kong (China) and capitalizes on unclear regulation in Viet Nam over the imports for limited periods of time of e-waste for re-export. It is estimated that up to 90% of e-waste arriving at Vietnamese ports is destined for re-export.[23] The northern port of Haiphong dominates this trade. Containers of e-waste, predominantly CRTs, arrive at the port from the United States, the European Union, Japan and Hong Kong (China), and are transferred by road to storage facilities in the area around Mong Cai town, approximately 150 kilometres away in the province of Quang Ninh. Mong Cai is located across from the Chinese province of Guanxi, with a river forming the international border. CRTs are loaded on small boats which ferry them across the river to the Chinese town of Dongxin. The boats usually travel at night and the CRTs are covered with canvas. A single boat can carry around 800 CRTs. A field survey carried out in 2010 estimated that up to 100,000 tons of e-waste and scrap lead acid batteries are smuggled between Mong Cai and Dongxin each year.[24]

There is also an indication of transboundary movement of e-waste between Africa and Asia. In fact, precious metals contained in printed wiring boards (PWBs) collected in West Africa are sold below world market prices to traders that organize exports to recycling facilities in Asia.[25]

The main smuggling methods used for shipping containers of e-waste are concealment and mis-declaration. Enforcement against illegal trade is complicated by the legitimate trade in used electronic goods such as computers, which helps bridge the "digital divide" between developed and developing countries. The high variability between national legislations including their difference in definition of e- and hazardous waste further drives the transboundary movement of waste. For example, if a used computer is in working condition, it is not classified as hazardous waste and thus not covered by the Basel Convention. Although some countries such as China prohibit imports of all used electronic and electrical equipment (even those in working condition), the legal trade in such items provides a convenient cover for smuggling of e-waste. One concealment method regularly used by smugglers is to mix both working and non-working end-of-life computers within the same container. The broken e-waste computers are stacked haphazardly at the back of the container, with a layer of working equipment properly stacked on pallets and shrink-wrapped placed at the front of the container in case of visual inspection.

Other common ways to smuggle e-waste is by mis-declaring the shipping content as second- hand goods, used electronic goods, personal effects, plastic scrap or mixed metal scrap. Smugglers also use free trade zones exempt from government regulations, such as Batam island in Indonesia, to avoid confiscation of e-waste shipments.

3. Who are the traffickers?

A variety of actors are involved in e-waste trafficking. They range from legitimate recycling firms to so-called "waste tourists", with an array of middlemen and brokers in between. From the location, where end-of-life waste electronic and electrical equipment is discarded to the site of informal dismantling, the e-waste often passes through the hands of several players.

In terms of organizational networks, e-waste traffickers tend to be more loosely connected than

[22] The role of Hong Kong port as a central hub for e-waste trafficking is confirmed by information gathered by the Basel Action Network tracking shipping containers of used CRTs leaving the United States in contravention of the country's regulations. From 2008 to 2010 the organisations tracked 179 containers of which 110 were bound for Hong Kong (China), 15 for mainland China and 12 for Viet Nam. A follow-up survey by the Basel Action Network traced consignments of CRTs which had evaded customs control in Hong Kong port to temporary storage facilities in the New Territories area of Hong Kong (China), from where the e-waste was taken across the border by trucks to mainland China. Source: Basel Action Network, Illegal Global Trafficking in Hazardous Waste, 4th MEA-REN Workshop, Beijing, China, 21-22 September 2010.

[23] Huynh 2010

[24] Yoshida 2010

[25] Secretariat of the Basel Convention , December 2011.

the traditional hierarchical criminal group structure. Small groups of traders and brokers will come together for a relatively short period of time, do the deal, and then disperse.[26]

In countries such as the UK, the sub-contracting of recycling operations is commonplace. While large companies hold the contracts from local authorities to deal with all waste, certain streams – such as e-waste – are subcontracted to smaller firms. These firms may lack the necessary recycling facilities. Such firms will collect the dumped equipment from collection sites. However, instead of delivering it to legitimate recyclers, they will export it. Such traders tend to be small firms, with a key individual appearing as a director or owner of several inter-linked entities in order to avoid detection.

In the United States, the analysis of prosecutions for the illegal export of CRTs has revealed that the culprits are seemingly legitimate recycling firms. In one case a recycling firm based in Colorado assured clients that it would dispose of broken CRTs in accordance with US law and charged them a recycling fee. Instead, the company sold the e-waste to brokers representing foreign buyers and shipped the monitors to China instead.[27]

Widespread distribution of CRTs to the black market by recycling companies in the US was confirmed by an independent enquiry carried out by a branch of the US government. Investigators established a front company based in Hong Kong (China) and received offers from 43 recycling firms to ship CRTs to Hong Kong (China) in contravention of both US and Hong Kong law.[28] In addition to remote transactions via websites, buyers from developing countries, particularly African countries, are also known to travel to OECD countries as "waste tourists" to secure supplies of e-waste and arrange shipment.[29]

The e-waste buyers in the East Asia and Pacific region are usually brokers and waste traders. Recycling in the region is characterised as a fragmented trading business consisting of a host of informal enterprises.[30] According to Hong Kong customs, potential high-risk importers of e-waste tend to be small firms trading in used electronic goods or in recycling.[31] As soon as consignments of e-waste are successfully imported, the brokers sell the scrap to the informal recycling sector in centres such as Guiyi. After the dismantling has been carried out, the valuable metals and components are then sold via to manufacturing companies or metal refineries via waste brokers utilizing strong trade networks.[32]

Verifiable information on links between e-waste trafficking and other forms of transnational organised crimes is scarce. For instance, a range of contraband is known to flow from Viet Nam to China via the Mong Cai corridor described earlier. This includes e-waste and also illicit wildlife products such as ivory. However, it is not certain whether the same individuals are involved in smuggling different products. More research is required.

At the same time, it is clear that the increasing globalisation and regulation of the waste trade, including e-waste, presents significant opportunities for organised crime. A 2006 INTERPOL study of 36 court cases in Europe relating to waste pollution crime revealed the active involvement of organised crime groups.[33] The attraction of e-waste to white collar criminals and organised crime gangs is the lucrative combination of high profits and low risk of detection. The sheer number of brokers involved and the porous system for handling e-waste, coupled with the resilience of informal recycling in East Asia driving demand, pose serious challenges to effective enforcement.[34]

4. How is the money handled?

Scant information exists on financial transactions relating to illicit trade in e-waste. Recycling companies in the United States and Europe Union divert discarded equipment to the black market and receive legitimate payments from clients for collecting e-waste and the undertaking to organise its safe recycling. These can be local authorities and commercial enterprises. Such payments are made

[26] Interpol 2009
[27] In the indictment, the recycling firm was alleged to have shipped 160 containers totalling over 100,000 CRTs to China between 2005 and 2008 firm. Source: United States Attorney's Office District of Colorado Press Release, 16 September 2011. The case is understood to have not yet gone to trial. Source: Waste Recycling News, "Charges follow 60 Minutes e-waste case", 6 October 2011.
[28] USGAO 2008
[29] Interpol 2009
[30] Responsible Research 2011
[31] RILO-AP 2007
[32] Chi and others 2011
[33] Interpol 2009
[34] Thompson and Chainey 2011

through transparent channels such as business invoices. They are usually declared as taxable income.

Payments from buyers of e-waste are less transparent. Searches of electronic commerce sites reveal that payment terms stipulated by sellers of computer scrap and other e-waste are usually telex transfer or popular money transfer systems – such as Western Union – rather than the usual letter of credit system used for international commerce. It is likely that payments between waste brokers and informal recyclers in places like Guangdong are made in cash.

5. How big is the flow?

Although the motivation for e-waste smuggling and the major smuggling routes are clear, there is a dearth of reliable information on the scale of illicit trade in e-waste. For instance, 75% of e-waste generated annually in the European Union – equivalent to around 8 million tons – seems to remain unaccounted for.[35]

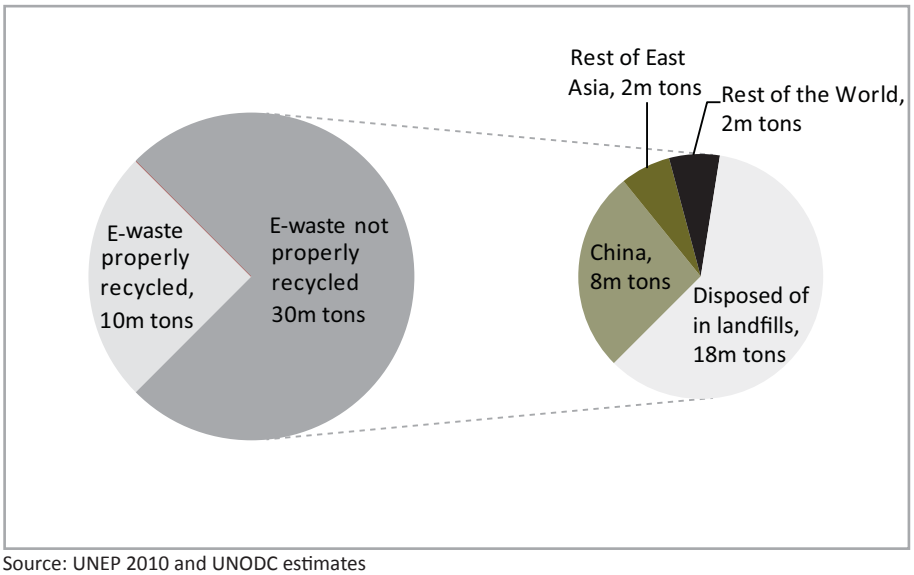
Most information on flows of e-waste is based on seizure data and reports by media and non-governmental organisations. Official sources of information from government agencies are either incomplete or confidential. Despite the frequent request of the Secretariat of the Basel Convention to parties to provide details of cases of trafficking in hazardous waste, including e-waste, the practice of reporting is just sporadic and by no means comprehensive.

While it is possible to map the main trade flows of e-waste in East Asia and the Pacific, it is much more problematic to accurately gauge the scale of the illicit trade, both in terms of volume and value. This information is due to a range of factors, such as the use of legal trade in used equipment to provide a cover for illicit trade in e-waste, the lack of specific customs codes, the clandestine nature of the trade, incomplete recording systems by national agencies and the fragmentation of seizure data.[36] Yet, some insights into the potential scale and profitability of the trade can be achieved through analysis and extrapolation of data on the volume of e-waste generated, amounts of e-waste entering legitimate recycling channels, seizure incidents, and prices paid.

Globally, the illegal trade in hazardous waste is estimated to generate revenue of US$12 billion a year for criminal enterprises. Depending on the requirements in each country, illegal disposal is estimated to be up to four times cheaper than legal treatment.[37] Although e-waste only accounts for a fraction of total trade in hazardous waste it is the fastest growing category of waste. According to the UNEP, between 30 and 50 million tons of e-waste is generated every year.[38]

Based on this UNEP estimate, an average of 40 million tons per year can be assumed for this assessment. Of this 40 million tons, various estimates range between 10%-39% of this being properly

Figure 3: Global recycling of e-waste and estimated illegal exports



Source: UNEP 2010 and UNODC estimates

[35] The Times 2009, "Britain's dirty little secret as a dumper of toxic waste", *The Times*, 18 July 2009.

[36] Thompson and Chainey 2011
[37] Thompson and Chainey 2011
[38] UNEP 2010

recycled through legitimate channels.[39] For this assessment it is assumed that 75% of e-waste is not properly recycled thus entering the 'hidden flow' – globally, that is 30 million tons per year.

Not all of the estimated 30 million tons is traded illegally, since an unknown proportion of the total is disposed of in landfills. There is no credible estimate for the split between illegal exports and landfill for major source areas such as the European Union. Further, not all electrical appliances are suitable for e-waste (e.g., washing machines) as only those appliances with the highest amounts of recoverable metals and other substances are considered valuable (e.g., consumer electronics, communications and information technology). In the EU, the latter category accounts for 40% of e-waste.[40] If 40% of e-waste is assumed to be suitable for illegal export, then this would amount to an estimated 12 million tons of illegal exports (40% of 30 million tons).

Asia (including India) is the biggest recipient of illicit e-waste, with China being the largest single destination.[41] Globally, it is estimated that around 70% of the world's scrap electronics are bound for China.[42] If this is the case, this would translate into an estimated 8 million tons of e-waste being smuggled into China every year. For the entire region, this value could be rounded to an approximate 10 million tons of e-waste each year (taking into account a 2 million tons in internal flows via third countries such as Viet Nam).

According to existing sources, a container of CRT monitors can be sold for US$5,000 in Hong Kong (China), which would correspond to US$250 per metric ton.[43] INTERPOL reports that one ton of e-waste is valued at US$500. Splitting the difference yields an average figure of US$375 per ton. If the estimated volume of 10 million tons of e-waste traded in the EAP region per year, the potential value would be $3.75 billion.

Considering that the global market for e-waste, including legal exports, has been predicted by UNEP to be valued at around US$11 billion by 2009[44] the scale of the estimate of US$3.75 billion of illegal e-waste in East Asia is reasonable.

[39] ABI Research 2009. Most estimates provide an average of only 10% of e-waste being properly recycled. Figures from the EU indicate that 25% is recycled (based on 75% being unaccounted for). US estimates of the amount of e-waste (specifically CRTs) sent to recyclers and subsequently exported range from 61% (Interpol) to 80% (Basel Action Network), meaning that the recycling rate is 10%-39%. The average of 25% is taken for this assessment.

[40] Huisman and others 2009

[41] According to the Basel Action Network it has been estimated that between 50 to 100 containers of e-waste (each container carrying an average 15 tons of e-waste) arrive from the United States to Hong Kong (China) every day (presentation to the 4th Multilateral Environmental Agreement - Regional Enforcement Network Meeting, Beijing, 21-22 September 2010).

[42] LaDou and others 2007

[43] Businessweek 2008, "E-Waste: The Dirty Business of Recycling Electronics", *Businessweek*, 15 October 2008.

[44] UNEP 2007a, E-Waste Inventory Assessment Manual, Volume 1.

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: UNODC elaboration based on information from EIA