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## Conference Paper

# Weaknesses in European e-Waste Management

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# **Weaknesses in European e-Waste Management**



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Illegal exports of waste electrical and electronic equipment – WEEE – from industrial to developing countries is a growing criminal phenomena posing serious threats to the human health and the environment. Several loopholes in the current jurisdictional systems along the supply chain in the European Union; deficiencies in law enforcement capacity, knowledge and training; and other supply chain related weaknesses prevent an effective response to such criminal activity. This paper identifies the vulnerabilities along the supply chain, the shortcomings in the legislative framework around WEEE, and its limited implementation and enforcement that facilitate leakages from the legal WEEE streams. An understanding of the weaknesses will enable the governmental bodies to develop appropriate counter-measures to improve the prevention, detection, investigation and prosecution of WEEE violations. This paper presents a comprehensive gap analysis across the EU member states, Norway and Switzerland. It focuses on the key issues surrounding the international and national legislative frameworks and the implementation thereof, law enforcement capacity, knowledge and training, information management, and penalties and prosecution. The study helps to identify the underlying problems and the key concerns faced by national authorities - and, this information will lead to a set of recommendations for the European Commission and the EU member states to address the problem of illegal e-waste exports.

**Keywords:** WEEE Supply Chain, Illicit Trade, Supply Chain Security, FP7-CWIT

## 1 Introduction

The exponential growth of the global electrical and electronics equipment (EEE) market and shorter lifespan of consumer electronics have resulted in one of the fastest growing waste streams worldwide, including in and out-from Europe (Eurostat, n.d.). Some 9 million tonnes of e-waste were generated in 2005 in the EU, which is expected to grow to 12 million tonnes by 2020 (EC, 2015). The rising volume of waste electrical and electronic equipment (WEEE) in Europe contributes to the increasing number of illegal exports to less developed nations, particularly in Asia and Africa. Evading high disposal and recycling costs is the main incentive for businesses to dump WEEE overseas. The increase in domestic demand for used electronics, used parts and materials in the developing world facilitates the illegal trade activities. A robust regulatory and enforcement regime along with a tightly controlled supply chain are necessary to thwart such unlawful acts. However, a number of structural, administrative and procedural weaknesses mark the existing legislative framework and supply chain system. This paper carries out a gap analysis to identify commonalities and discrepancies across Europe with specific focus on jurisdictional loopholes, penalties and prosecution; law enforcement capacity, knowledge and training; and supply chain weaknesses.

Following a brief literature review and a methodology chapter, the three sub-topics - jurisdictional loopholes, law enforcement capacity and supply chain weaknesses - are presented, providing information on various EU countries. The current situation in legislation and enforcement are examined in details and then wrapped up with a brief discussion on the main

challenges faced by European countries with some high-level improvement suggestions.

## **2 Literature Review on WEEE Legislative, Law Enforcement and Challenges in Supply Chain**

Just like in the rest of the world, there are two main basic streams of e-waste in the European Union: Business to Business (B2B) and Business to Consumer (B2C) chains. B2B waste arises, for instance, when companies discard old IT equipment, typically handing it over to recyclers. Unscrupulous recycling companies, as observed for example in the UK, sell it off to smugglers, instead of performing recycling activities themselves. The other source of e-waste are the consumers, who take the obsolete equipment to designated collection facilities. Local recycling sites are often found to be the source of illegal e-waste. Investigations have shown that the material passes through many brokers and middlemen between collection and destination. Some companies are directly exporting and some are selling off to exporters. The European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) has estimated that approximately 1.5 million waste-loaded containers are shipped illegally every year (IMPEL, 2012, p. 6).

A lack of oversight by compliance schemes frequently allows leakages of e-waste from the civic amenity sites. Some compliance schemes sub-contract the collection and recycling of select categories of e-waste. The large number of Producer Compliance Schemes further complicate the control

mechanism for example in the UK. According to industry experts, this competitive system drives down the price paid for recycling to such levels that responsible recyclers are displaced from the market (EIA, 2011, pp. 2-11). In the Netherlands, retail collection points are identified as vulnerable points for illegal exports. Fridges, televisions and smaller equipment are dispatched to developing countries from these facilities (Wang, 2009, p. 70). Prosecution related to violations is a problem in many countries: prosecutions are infrequent or too late, and the fines imposed too low. Many environmental inspectorates are not empowered to impose administrative fines, or are given have the powers of the criminal police - necessitating good collaboration with the police, which is often missing, as exemplified by Italy. The judicial police usually have insufficient human capacity to deal with these issues (EC, 2011, p.54). As an illustrative example, in the Netherlands, around 30% of Waste Shipment Regulation (WSR) cases are not prosecuted (Geeraerts, Illes and Schweizer, 2015, p. 26).

Recent research has identified several weaknesses in the Netherlands. In terms of human capacity, severe limitations were noted. Apparently, only 4 inspectors were employed in Rotterdam harbour, where 6 million containers were shipped each year, 15 percent being waste. Only 14 inspectors were in charge of inspection activities all over the Netherlands. Only a limited number of customs and police officers were involved in daily activities, without having received adequate training on the enforcement of the WSR (Wang, 2009, pp.68-69). Lack of coordination between competent authorities and the destination countries is another missing element in that is important in tackling e-waste crimes.

There is also limited assessment on the impact of enforcement activities and the effectiveness of the WSR enforcement due to weaknesses in the registration systems in the environmental inspectorate and customs, and due to the lack of systematic reporting by the police and customs (Geeraerts, Illes and Schweizer, 2015, pp.25-26). Moreover, gaps exist in electronic data interchange within the enforcement network, in general information management, and in the customs ICT systems where customs data does not accurately reflect the compliance rate and customs control strategy (Algemene Rekenkamer, 2012, pp.7, 10, 35 and 38).

Two recent studies report a number of deficiencies existing in many of the EU member states. Limited personnel and financial capacity appear to be a general problem preventing better export controls. There are huge discrepancies in the number and the nature of inspections; enforcement organisations involved; available resources; and penalty and prosecution systems across the EU countries. The notable gaps identified include the following:

- lack of inspection planning and risk assessments;
- insufficient provisions on the burden-of-proof;
- lack of "up-stream" inspections (of waste producers, collection points, interim storage, recovery and disposal operators);
- lack of targeted training for waste authorities;
- incompleteness of existing guidelines;
- shortage of technical equipment;
- incompleteness of existing guidelines;
- practical difficulties arising from the broad definition of waste in the WSR, and the existence of two different code systems (the

WSR/Basel codes and the international tariff codes used by customs authorities);

- inadequate system of receipt and processing notifications; and
- insufficient coordination and cooperation across competent authorities-- (Geeraerts, Illes and Schweizer, 2015, pp.26-27 and Recast Directive, pp.15-19).

### 3 Study Methodology

Building on the literature review findings, three sets of questionnaires focusing on different target groups were produced by partners within the CWIT (Countering WEEE Illegal Trade, FP7-project) – consortium and sent to experts in the 28 EU countries, Norway and Switzerland – covering law enforcement and environmental authorities as well as industries. The following subset of questions is related to the information analyzed and presented in this conference paper:

1. Has your country transposed the WEEE Directive re-cast into the national legislation?
2. Does your country have any actual or future program to exchange information on inspections carried out?
3. Under your national legislation, what are the measures implemented/planned to monitor shipments of used EEE?
4. Is there a template available in your country for the declaration made by the holder who arranges the transport of the EEE that none of the material or equipment within the consignment is waste?



5. In your country, is there a protocol or guidelines available for a used EEE functionality test?
6. Under your national legislation, are exporters of used EEE obliged to provide a certificate of functionality of the appliances transported?
7. Is there a guide or set of criteria available in your country to define appropriate protection of the goods against damage during transportation?
8. Under your national legislation, are there reporting requirements for e-waste? If yes, what?
9. 9. What criteria are used to distinguish used electrical and electronic equipment (second-hand equipment) from WEEE?
10. Is there any specialised training for the detection, investigation and prosecution of illegal trade in waste and related offences in your country?
11. Under your national legislation, what are the specific WEEE related penalties for collection and trading offenses?
12. Who should be prosecuted with regard to the illegal trade of e-waste?
13. Is liability with regard to the illegal trade of e-waste considered to be criminal, civil or administrative?
14. In your view, is your national legislation adequate to prosecute offenses related to trade of e-waste?
15. In your view, what kind of additional provisions should be included into your national legislation for enhanced prosecution of such cases?

16. In your view, what kind of additional provisions should be included into the international legislation for enhanced prosecution of such cases?
17. Please provide any additional information you may deem important in relation to the illegal trade of WEEE.

We received written responses from 17 countries out of the 30. The main outcomes are shared in the next three chapters of this paper.

## **4 Jurisdictional Loopholes Along the Supply Chain**

Despite some improvements made by European regulations, violators of WEEE regulations take advantage of the legislative loopholes for their personal gain. The recast WEEE Directive (Directive 2010/19/EU of the European Parliament and the Council of 4 July 2012) builds upon the original WEEE Directive by providing a better regulatory environment and further limiting the negative externalities of improper WEEE disposal.

### **4.1 Legal Challenges and Loopholes**

A couple of European countries have not yet completed the transposition of the recast WEEE Directive in their national legislation within the agreed deadline. As of the time of writing of this paper, the recast WEEE Directive was not yet transposed in Germany, Poland, and Slovenia - as well as in the non-EU country of Norway (see Figure 1).



Figure 1 Overview of recast WEEE Directive across Europe

Discrepancies in the definition and classification of WEEE have a considerable impact on the illegal trade. In particular, Belgium showed concerns about the national differences in the classification of WEEE. For instance, the same material is considered green listed in one member state and amber in another. Consequently, offenders may try to export waste from those countries with the most flexible classification. Offenders also capitalize on the differences in classification to avoid prosecution in the case of detection.

Ireland refers to the ambiguity in international legislations, specifically the differences in the wording between the WEEE Directive and the Basel Technical Guidelines regarding the inclusion of components, such as a motherboard or a printed circuit board.

Another frequently mentioned issue is the lack of strategy and guidance for the law enforcement agencies (LEAs) and transporters on how to distinguish between WEEE and UEEE (used electrical and electronic equipment). In fact, one of the most common modus operandi to illegally trade WEEE is to declare the goods as UEEE instead of WEEE.

Some countries including Austria, Denmark, Norway, Switzerland and the UK have prepared guidelines for LEAs and transporters. However, such guidelines, including an inspection strategy, were missing in a number of countries like Germany, Greece, Italy, Romania and Spain.

The implementation of a ban on cash transactions in the scrap metal trade in France resulted in an increase in the quantities collected at the national level indirectly pointing to a reduction in thefts or other illicit activities for valuable components of e-waste (ADEME and OCAD3E, 2013, p.28). But, it was observed that in due course it led to a higher incidence of theft from collection points in border areas. The analysis also revealed a shift in illegal activities to neighboring countries where such a ban does not exist, underlining the necessity for further harmonization of regulations at the European level.

## 4.2 Penalties and Prosecution

There are considerable differences in the penalty systems for illicit WEEE activities across the EU. Collection and trading offences can be prosecuted through the administrative or the criminal procedure, and liability may be considered as administrative, civil or criminal, depending on the country. While this offers wider options for addressing violations, resorting to civil

or administrative fines may give the impression that the offence is not serious. For instance, in the UK, the penalties for waste offences (up to 2 years imprisonment) are significantly lower than for other illegal trade offences, like illicit narcotics (up to 10 years imprisonment.)

While some fines apply in all EU member states, imprisonment is not applicable everywhere. Other sanctions, such as confiscation of assets; temporary or permanent, total or partial closing of facilities; suspension/revocation of license; temporary disqualification from the executive offices of legal entities and enterprises and from public offices; publication of the criminal judgment of conviction; and fees on return shipments, may also apply. As opposed to other countries such as Romania, Estonia and Portugal, where maximum legal fines are lower than 50.000 Euros, financial penalties are quite high in Spain, where an illegal shipment of hazardous waste can result in a fine of up to 1.75 million Euros. Such discrepancies have the potential to shift illegal activity from one country to another, where the consequences are less severe.

Specialized prosecution offices are found only in couple of countries including Belgium, Greece, the Netherlands, Spain and Sweden.

Some countries reported shortcomings in their legislation, where an illegal waste shipment is completed only when it has crossed the border. For example Norway has been working to address this issue, by making an attempt to export an offence (Kristensen, 2012). The lack of corporate liability in criminal law in Germany has been viewed as a weakness in the legislative framework around WEEE. In Romania, the national framework does not provide clear provision regarding who is held liable for prosecution in case of an illegal export. There are no clear provisions on penalties for the

illegal collection and exports of WEEE, for regular checks of the enforcement bodies (environmental guard, customs), and for compliance.

Countries including Denmark, Finland, Norway, Scotland, Sweden and the UK have expressed concerns about proving guilt in WEEE cases. More specifically, they experience difficulty in proving the hazardous nature of the shipment, such as finding appropriate documentation of the WEEE contamination levels as defined in relevant national and international legislations. Adding to the difficulty is the fact that often the waste is not returned to the country of origin, preventing the authorities from determining if the composition is above or below established limits to be considered hazardous. In Denmark the burden of proof is prohibitively high for authorities when it comes to prosecuting other actors in the value chain of UEEE and WEEE before the shipment takes place. Belgium faces a challenge to collect evidence on who is responsible for the violation.

The recast WEEE directive has introduced a provision facilitating the prosecutors' activities by placing the responsibility of proving the functionality of the equipment to the exporter. However, without proper guidelines for the testing, recording of test results and packaging of EEE, exporters can circumvent actual functionality testing and falsely declare equipment as UEEE while it is actually non-functional –and prosecutors lack evidence against WEEE exporters. The Netherlands has referred to a lack of experience of the enforcement in implementing the new legislation. Romania also considered that the awareness of the provisions of the recast WEEE Directive should be improved.

As a consequence of the lack of means and human resources, prosecutions happen only in the most serious cases. For example, while the Scottish legislation requires prosecution of the transshipments of hazardous waste after only one administrative warning, in practice this applies only for “significant cases” - e.g. for more than 50 items in a container, falsified documents, or an attempt to conceal, and if there is evidence that the suspects have generated a large profit, or are known to be systematic offenders.

### 4.3 Summary on Jurisdictional Loopholes

Several shortcomings in the national and international regulatory framework can be noted from the above discussion. Despite the transposition deadline of February 2014, some European countries have not transposed all aspects of the Directive recast. Even among the countries that have transposed the recast WEEE Directive, there are remaining concerns on the clarity of the concepts. These ambiguities include the number of waste classification systems in use, particularly European Waste codes versus Basel codes, differences among countries in classifying certain types of waste (green vs amber), and in the accepted thresholds of contamination.

In addition, the lack of harmonization of the penalty systems and of the classification of WEEE appear to be two major bottlenecks coming in the way of enforcement activities. At the international level, particular need was expressed to harmonize the minimum standard on offences and provisions, such as the cash ban in metal scrap trade. This would simplify enforcement in transboundary cases, and reduce the number of criminals from shifting their activities to lower-risk countries within the EU. Further,

a number of authorities reported difficulties in collecting evidence, such as proving the liability of offenders or the hazardous nature of a waste.

A common challenge faced by some member states is the level of penalty applied that is related to the classification of the crime. When a shipment is intercepted before it has left national borders, authorities are only able to classify the act as an "attempt to ship". In some countries, this means that the penalty is much lower than for the actual act of illegally exporting WEEE, and in others, it may not be considered an offense at all.

The above legislative challenges indicate the necessity of reviewing and reinforcing both national and international legislations, to provide a solid foundation for an effective enforcement system.

## **5 Gaps in Law Enforcement Capacity, Knowledge and Training**

Effective enforcement relies on a number of factors, including financial and human resources of the authorities involved in WEEE related activities; the level of expertise of the personnel; and coordination between the key administrations.

### **5.1 Knowledge and Training**

A common practice to illegally ship WEEE is to load containers with WEEE and other goods – for example second-hand cars, electronics, clothing, and bikes- which makes detection of illicit WEEE more difficult. It is well known that LEAs do not have the capacity to physically inspect all the containers



dispatched from Europe; just a minor sub-set. As an indication, one respondent from a major European port estimated that about twenty containers of WEEE are packed each week (approximately 1000 containers per year) in this port, and the authority inspect just about ten containers a year. In fact, one of the main modus operandi used by offenders to circumvent controls consists in the false declaration of WEEE containers as UEEE or metal scrap.

Some countries in the EU specifically highlight the current gaps in their capacity building activities. In Belgium the prosecutors require additional training on environmental law issues, whereas inspectors and police would benefit from specific training on WEEE issues. A different issue reported in Austria is the reliance of police and customs on external experts to determine if the loads are in fact waste. Because this consultation process is time-consuming, it is often bypassed. In Greece, priority seems not to be given to the WSR and the agencies involved are not equipped with the necessary legal powers. Further, environmental inspectors lack equipment to assess the hazardous nature of a WEEE shipment. In addition, the customs facilities lack adequate storage capacity for seized waste shipments (EU-ROSAI, 2013, pp.36-37). In Lithuania, the need is recognized to increase number of inspectors involved in waste shipments control and to introduce systematic trainings and workshops for inspectors. In Slovakia there is a need for continuous awareness rising and training due to personnel changes at relevant institutions - including the need for human, financial and technical resources, as well as IT-systems for monitoring illegal traffic. A number of countries including Finland, Lithuania, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the UK, provide

training programs on inspections, detections, investigations, and prosecutions to various authorities - such trainings typically covering all types of waste.

Guidance to LEAs and businesses is also provided in a number of countries - including Austria, France, Germany, Ireland, the Netherlands, Poland, Slovakia, Sweden, Switzerland and the UK - covering especially the issues of distinction between UEEE and WEEE; detection of illegal trade in waste and related offences; and waste classification or outlining the requirements of the WEEE Regulation.

## 5.2 Interagency Collaboration

Once detected, a tendency for criminals is to move their activity from one country or one specific sea port to another where control might be weaker - a practice known as "port-hopping." This demonstrates a lack of national and international coordination and harmonization among authorities.

In Denmark a need for collaborative ties with the environmental authority is recognized, due to the complexity of the legislation. In general terms, no single agency has sufficient capacity or authority to control waste shipments single-handedly.

The Dutch authorities have pointed out a lack of cooperation with other organizations - mostly at international level - and the lack of harmonization, specifically related to national differences in the classification of certain waste streams. Further, controls are not carried out by customs, but only by the environmental inspectorate that has limited capacity and legal powers. An IMPEL report underlines a wide range of practicability and enforce-

ability issues arising in the application of the WSR in the Netherlands, including differences in the frequency of the controls among the EU member states; ambiguity in the legislation; a lack of cooperation in enforcement activities; and difficulties on how to set-up cross-border agreements. These enforcement difficulties are largely linked to the extensive scope and complexity of the WSR; the strong challenges for authorities addressing waste shipments; and the rapid development of new waste streams and mechanisms of shipments (IMPEL, 2011).

France has recognized the necessity to improve collaboration between customs and police forces of various European countries, in coordination with international organizations involved in the fight against organized crime, e.g. via the exchange of information, cross-checking of databases and executing joint operations.

According to a 2013 report, Greece shows deficiencies in the information and communication systems, and issues with the existence of two different code systems (EWSR/Basel codes and customs codes) (EUROSAI, 2013, pp. 55-56).

The German police has noted difficulties in coordination among the competent authorities, specifically because they do not have access to the customs databases. This is a strong barrier when it comes to targeted inspections. The police may put customs on alert for a particular container, but often do not receive any updates on the inspection outcome.

In Northern Europe the level of cooperation is not uniform across all agencies involved and there is room for improvement in coordinating actions between some authorities. In fact, information exchange between police,

customs and the environmental agency is limited due to the existing legislation and the differences in the mandates of the organizations. Moreover, cooperation with the authorities in the e-waste recipient countries in Africa and Asia poses even bigger challenges.

Because WEEE has not yet been a focus for authorities in the Czech Republic, they had little experience and demonstrate no cooperation in the area. But some collaboration existed with the competent authorities in a neighboring country.

Poland has noted the need to “improve direct, working contacts with competent authorities from non-Annex VII countries in case of illegal transboundary shipment of waste”.

Lithuania has acknowledged a need to improve the cooperation between national and international competent authorities and a more effective system of exchanging information on experiences and best practices between parties.

In terms of coordination with destination countries, varying responses are provided by the UK. A lack of communication among law enforcement authorities across jurisdictions was considered a major obstacle and a most necessary area of improvement. One additional problem is that in the event of detection in the destination port, the shipments are generally not repatriated to the point of origin for further action.

Lastly, an improvement suggestion is made by the Dutch environmental inspectorate: introduce a real-time system allowing involved authorities to engage in the timely exchange of intelligence, or one system accessible for all.

### 5.3 Summary on Law Enforcement Gaps

In terms of governmental capacity, limitations in human and monetary resources are repeatedly reported by authorities in the entire enforcement chain. These include the number of staff involved, in particular their skills and knowledge on such a specialized issue, which is a major obstacle to detect infringements. The lack of training on distinguishing between WEEE and UEEE appears to be a common problem. Even though training programs and guidance documents on illegal shipments of waste or WEEE for LEAs exist in many countries, the shortage of human capacity is a stumbling block in proper inspection activities.

The gap analysis shows the involvement of a large range of authorities in the countering of illegal WEEE trade but collaboration and exchange of information across these agencies appear to be missing, creating barriers for effective controls, including targeted inspections.

Furthermore, due to the low penalties associated with WEEE violations, authorities may only be granted limited investigative powers. LEAs' action can also be hindered by the burden of proof requested by the law. Proving the hazardous nature of a shipment may require external assistance, a process that is often long and costly. Without such proof, no action can be taken against the individual(s) responsible for the shipment. Countries also face difficulty in proving who exactly can be held responsible for the reported violation.

With respect to prosecution, again limited resources and knowledge seem to be major gaps. Only five countries reported having specialized environmental prosecutors involved. Due to insufficient resources, only the most

serious WEEE cases - involving high profits, multiple shipments and/or repeat offenders - are pursued for prosecution. And, when a WEEE case is brought to the court, sentences applied are too lenient, the prison terms issued are too few, and the fines imposed are usually too low to create a disincentive for offenders.

As can be seen from the discussion, many of the problems encountered by law enforcement bodies are associated with insufficient financial means and human resources. The resulting loopholes create enough leeway for criminal operators to circumvent control, and in case of detection, to get away with minimum penalties.

## **6 Supply Chain Weaknesses**

Examining the weaknesses of the WEEE supply chain is necessary to better understand the exit points from reported WEEE streams. WEEE has the potential to enter illegal streams at any point, starting from the initial discard by the consumer, to collection, consolidation, treatment and its final destination. Different type of actors and violations have been reported.

WEEE can exit legal treatment streams even before being collected from households in countries where a street pick-up service is provided. Unauthorized street collection by informal actors facilitates illegal exports, in numerous places across Europe. The offenders are aware of the scheduled visits, picking the select e-waste before the council trucks can retrieve it.

Industry representatives mainly refer to the theft of WEEE and its components, and informal buyers operating at collection points. The Spain respondents specifically highlight the "cannibalization/ cherry picking" of

WEEE components, such as compressors, refrigerant tube circuits, and deflection coils from CRT televisions and monitors. Such thefts imply a lack of security and oversight and a lack of police control over the waste collection sites.

WEEE may also exit reported streams through dealers, brokers, distributors or transport companies collecting waste and second-hand material, for export purposes to Eastern Europe, Asia and/or Africa. Enhanced regulation of the activities of scrap dealers and greater transparency of all material flows by all actors - not only the collection systems - have been suggested as improvement measures.

The UK has spotted a weakness in the reporting method. When the compliance schemes give the WEEE to recyclers for treatment, the recycler must provide an "evidence note" stating the amount that has been treated; receiving remuneration based on this amount. Obviously, these documents can falsely claim that a certain amount has been treated when it is in fact being exported illegally. However, a different system has been recently introduced, which adds greater visibility and has eliminated the involvement of brokers in selling evidence notes.

Besides purely illegal actors, a number of legitimate businesses, such as WEEE management organizations, WEEE treatment facilities, and street pick-up services, directly circumvent WEEE regulations by exporting it to non-OECD countries.

A good practice to improve WEEE supply chain security has been indicated in a French study showing that tracking the WEEE flows restricts leakages and increases the formal collection of WEEE. Among the retailers examined in this study, only one initiated an IT system for tracking the flow of WEEE

collected in stores and during deliveries. The volume of WEEE collected in the region trebled during the months that followed the setting up of the tracking system (ADEME and OCAD3E, 2013, p. 28).

The above discussion indicates that WEEE has the potential to enter illegal streams at multiple points in the supply chain. It could begin at the initial discard by the consumer, at collection facilities, or through any of the legitimate or illegitimate actors involved in WEEE flows. In addition, some loopholes in WEEE management, as identified in the UK, facilitates its diversion from licit to illicit streams. Thus enhanced monitoring at exit points, coupled with the exchange of good practices, such as the French example, would be appropriate preventive measures to secure the WEEE supply chain.

## 7 Discussions and Conclusions

As with many other environmental offenses, the WEEE sector remains attractive to criminals due to the current low risk of enforcement action, the low level of applied sentences and the relatively high profits to be made. This gap analysis has aimed at giving an overview of the common specific weaknesses in the WEEE legal framework, enforcement, and supply chain among European countries.

Three main shortcomings have been observed in the national and international legislative frameworks. The full transposition of the EU Directive has not taken place in all member states. There are considerable differences in waste classification systems and there is a lack of harmonization of provisions and penalties across the EU.



Effective enforcement relies on a number of successive steps to thwart unlawful activities. These include detection of the crime, arresting or taking enforcement action against the offender, or prosecution to convict the offender.

At the initial level of detection, countries face a number of challenges. A shortage of human capacity is a strong barrier to carrying out inspection activities. There is no unified information system among national and international agencies that would enable targeted inspections. Adding to this is the difficulty in distinguishing between UEEE and WEEE, when shipments are being inspected.

When detection does take place, authorities face other challenges to take action against the violator. Collecting evidence against the perpetrator is not easy. Authorities are sometimes not granted sufficient investigative powers as the crime is not considered severe in many EU member states. Finally, the fines imposed are too low to act as a deterrent to non-compliance.

Regarding prosecution, only the most severe cases are taken to this stage due to limited means. For those handful of cases brought to court, the high burden of proof is restrictively high to prove guilt.

As is evident, there are considerable obstacles encountered by authorities in every step of the enforcement chain.

The strength and the consistency of the legislative framework have a huge importance over the WEEE sector compliance as they are determining factors of the LEAs' activity and capacity. The gaps identified on this level give

rise to ambiguities and create loopholes for criminals to circumvent controls or escape punishment. Strengthening national and international framework is, thus, the first and foremost step to facilitating enforcement. It was observed that a lack of human and financial capacity creates many barriers in key activities of the enforcement chain like detection and prosecution. A general lack of awareness among governmental authorities of this crime type appears to be an inhibiting factor in the allocation of resources. Penalty levels are generally low, except in some countries. Stronger penalties and punishments in some member states do not prove to be very effective as illegal operators shift their activities to regions with less severe consequences for violation.

It appears that a large number of national agencies are involved in countering in WEEE related infringements, due to the nature of this crime. This situation results in a diffusion of relevant information with each administration holding partial information. Such a division of intelligence creates barriers for effective controls, including targeted inspections.

Finally, the general lack of oversight in WEEE collection points leads to many thefts of WEEE and its components strongly affecting the collection rates and facilitating its diversion to illegal streams.

Criminals are aware of the existing vulnerabilities in each step of the WEEE chain as well as the weakness in the enforcement system and continue being active. To deter such acts, better allocation of resources, stronger penalties, greater harmonization of national systems, enhanced security measures, and stronger cooperation among administrations are most necessary improvement measures.

In terms of future research, the authors make the following recommendations: (i) gather further information on the key issues identified in the gap analysis through questionnaires and interviews; (ii) identify best practices in the most problematic areas identified; and (iii) do further research on the key area of inspection planning and strategy, and derive from it further examples of best practices to disrupt the illegal WEEE supply chains.

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