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Building local capacity to address the flow of e-wastes and electrical and electronic products destined for reuse in selected African countries and augment the sustainable management of resources through the recovery of materials in e-wastes

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Component 1: Flows of used and end-of-life e-products from Germany, The Netherlands and Belgium

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1 Introduction

This report is part of the first component of the overall project “Building local capacity to address the flow of e-wastes and electrical and electronic products destined for reuse in selected African countries and augment the sustainable management of resources through the recovery of materials in e-wastes”. As a first component, a fact-finding study on flows in used and end-of-life e-products imported into five West-African countries by sea, in particular from two European countries, Belgium and The Netherlands, and two ports, Antwerp and Amsterdam, is carried out.

The aim of the research is to identify the principle pathways of used electronic and electric equipment (EEE) from Europe to West Africa as well as potential leakage points for end-of-life products that are mandatory required under the WEEE directive to undergo sound waste treatment within Europe. The study focuses on sources, destinations and volumes of used EEE exports as well as on the characteristics of the export business. The role of the two ports and regions in focus will be analyzed.

2 Methodology

In order to achieve the objectives of the study, a combination of assessment methodologies was carried out. Those include the analysis of the official European WEEE collection and management system and its leakage points to the informal sector; the analysis of the structure and role of ports and other key actors in the transport chain of used and end-of-life EEE; and the systematic study of statistical data. The sources of information are stakeholder interviews, Internet and literature reviews and European statistical data. This combination of methodologies was selected because previous experiences with similar studies (Buchert 2007, Sander 2010) showed that pure focus on one assessment methodology falls short on capturing the complexity of the global trade with used and end-of-life EEE and can not provide a comprehensive understanding of trade structures and patterns.

The complexity of the trade with used and end-of-life EEE is largely caused by socio-economic circumstances that foster trade, which is, at least partially, illegal. As a consequence, many actors operate undercover, circumvent disclosure of their activities and interact in informal heterogeneous networks. Knowledge on this informal part of the trade may only be built on indications and qualitative interpretations of data. In contrast, the other part, the legal trade with new and used EEE, may be sufficiently captured in official trade statistics. Nevertheless, even official trade statistics may proof unreliable, as Sander [2010] has shown, because a ‘grey zone’ between legal trade and illegal trade of used equipment, the lack of differentiation between new and used equipment in trade statistics, import restrictions for old used equipments, and economic

dynamics (i.e. informal import charges) that result in mis-matches of official export and import data.

With the applied methodologies the study aims to generate the following findings:

- The analysis of the European WEEE collection and management systems aims to generate a better understanding of the pathways of the traded equipment and the actors involved in the sourcing countries. A particular goal is to identify the mechanism where WEEE and used EEE transfers from the formal to the informal sector. The geographic focus of the analysis lies on Germany, The Netherlands and Belgium as major sourcing countries for seaborne trade out of Antwerp and Amsterdam. The analysis builds on review of the juridical and administrative settings and on stakeholder interviews.
- The analysis of the ports of Antwerp and Amsterdam as well as other key stakeholders in the seaborne trade aims to clarify the mechanisms and roles those stakeholders play in seaborne used EEE trade. Of particular interest is what characteristics may influence the roles of stakeholders in the trade routes and whether trade patterns are static in nature. The analysis builds on review of literature and statistical data as well as on interviews conducted with key stakeholders in the surrounding of the two ports.
- In addition European statistical data on seaborne trade is studied to collect indications for a qualitative assessment of the trade routes. Two sets of documents could provide information on the pathways of used goods: the customs forms and the Ocean Bill of Lading. The later is the transport contract between the goods owner or agent and the ocean carrier or its agent. However, the researchers could not access Ocean Bill of Ladings or any statistics derived from those because of un-willingness by the approached ocean carriers to disclose any meaningful information on them. Thus, the major source of information was the national and international trade statistics whose data are derived from customs declarations.

Building upon these assessments, the data was interpreted in order to generate a comprehensive picture of the structure, characteristics and trends of the trade of used EEE. Qualitative findings and trends for the exports of EEE serve – which some limitations – as proxy information for export volumes and information on key sourcing countries in Europe and destination countries in West Africa.

Expert-Interview results were collected twofold: by conducting telephone interviews and during two visits of the port regions of Amsterdam and Antwerp. The interviews were guided by a set of questions, which were in some cases send ahead of the telephone interviews to the interviewed. However, they only provided a guide and the interviews were conducted in a conversational manner. This was in particular true for the visits of the customs authorities in The Netherlands and Belgium. Thus for this reason and for reasons to prevent in-proper accusations, the references in the text only refer to the or-

ganisations and not to particular persons. The guiding questions used are presented in Appendix 2

On the statistical side, the major challenge with trade statistics is that a statistical tracking of the target goods movements from Europe to Africa is extremely difficult for several reasons:

- Exports of new and used products are not separately reported.
- The export of used items that are waste under the WEEE Directive is illegal and thus not reported as such.
- Products declarations are generally brought and comparison of data difficult.
- The nation of export reporting might not be identical with the nation where the product was manufactured or reached its end of use.
- Neither is the port of departure necessary located in the country of origin.
- Statistical trade data is often provided in terms of value (UN statistics), while figures in terms of weight would matter most in the context of used goods shipments from a resources and hazardous material export perspective. Weight based trade figures can be found in European statistics.

As a result, the study abstains from making any quantitative analysis of used EEE and WEEE exports form Europe to West Africa. The statistical data is used to identify trends and indications of certain characteristics and is thus only used qualitatively.

3 The equipment take back and the leakage to the informal sector

So far the WEEE-Directive sets a collection target of 4 kg WEEE per inhabitant and year in the European Union.

According to the European Commission total officially reported WEEE collection in Europe is estimated at 3 million metric tons annually. The total WEEE arising, including quantities that escape the established collection and recovery organisations is estimated at 9 million tons (WEEE-Forum 2010). Official data on the accumulated WEEE in Europe are not available. According to [UNU 2007] the average amount of WEEE accumulated in the EU 15 is 16 to 18 kg per inhabitant and year.

In Belgium the collection system Recupel has collected a weighted average of 8.2 kg appliances per inhabitant in 2008. The collected total amount is 86,940 tons of household WEEE, which represents an increase of 7% compared to 2007.[1]

Regarding Germany 1.8 million tons of new equipment has been put on the market in 2006. The amount of WEEE collected in the system according to the ElektroG added up to 754,000 t.[2]

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[1] Cp. The homepage of Recupel: http://www.recupel.be/portal/page?_pageid=531,11392327&_dad=portal&_schema=PORTAL.

In the Netherlands [Witteveen 2007] estimates that the total amount of e-waste is 18.5 kilos per citizen per year.

The performance of WEEE collection systems is benchmarked by the WEEE Forum.[3] According to the WEEE-Forum in 2008, 34 participating collection-systems collected approximately 1.4 million tons. This collected tonnage corresponds to approximately 50% of official reported WEEE collection. This represents a weighed average 4.03 kg per inhabitant per year. One organisation managed to collect 16.5 kg per inhabitant (WEEE-Forum 2010).

Not all ‚end-of-life' electric and electronic equipment arising in the Member States is collected by the official collection system. This is due to the fact that pathways of European ‚end-of-life' electric and electronic equipment maybe divided in a formal path, covered and regulated by the WEEE directive, and an informal path where goods leave the formally regulated WEEE area. It should be noted that deviations from the formal path to the informal path are not necessarily indications of illegal shipment of wastes, since they also include used products exported for further uses.

An unknown amount of WEEE leakage appears through regular household waste. Private households are very likely to dispose in particular small sized WEEE in their rubbish bins which is illegal under European Law. Furthermore a reasonable amount of used EEE is assumed to be kept in the households due to various reasons (e.g. used old mobile phones as back-up equipment). As both pathways do not contribute to the export of used EEE (at present) they are not dealt with in this study.

The following figure provides the principal main actors and the principal used EEE flows. Chapters 3.1 and 3.2 will discuss in more detail the role the actors play and the pathways used EEE goes and where it shifts from the formal to the informal sector.

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[2] BMU, Data on WEEE in Germany in the year 2006 - BMU Explanations for the report to the EU-Commission, 5.09.2008.

[3] WEEE-Forum was set up in 2002 by various representatives of collective WEEE take-back systems in Europe and in 2009 consists of 39 collective systems from 23 countries, including RECUPEL and NVMP, see: www.weee-forum.org.

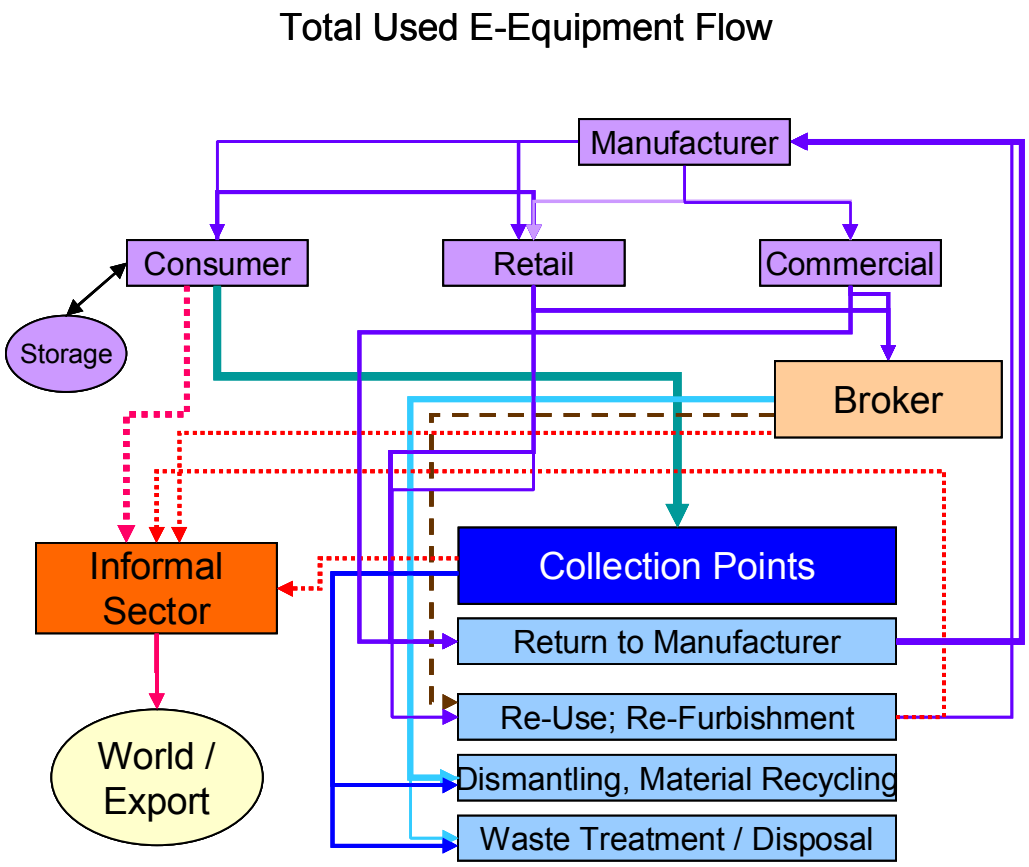

Figure 1: Principle Paths of end-of-life EEE.

3.1 Actors of the informal equipment trade

The following paragraphs define the actors in the used EEE trade based on the interviews conducted.

Brokers and traders are the secondary "owner" of the used EEE equipment that aim to sell the equipment in other countries, for example in West-Africa. Informal equipment brokers are profit orientated. The incentives for snatching used EEE away from the formal system to the informal system are the market value of used and functioning equipment or the value of the raw material resources associated with the waste. Sales prices must exceed the equipment cost, transport costs, customs charges, import fees and taxes as well as possible bribing costs.

The informal sector in Europe is heterogeneous, reaching from small family-based networks to large and organized trading firms. According to customs agents in The Netherlands and Belgium, immigrants or temporary residents from African countries often engage in creating small trading businesses serving the European – African trade routes. Thus, those activities are often concentrated in regions with a high population of persons with African origins [VROM Inspectorate Haarlem 2010, interview]. Other trad-

ers are more professionally organized. However, locations for assembling full container loads are often concentrated and are often known to the customs agents either in the harbour of export itself, like in Amsterdam, or in neighbouring Member States (e.g. in Essen or Bochum, Germany for export via Amsterdam harbour). The determining geographic factors for those concentrations are likely to be the local access to sufficient volumes to fill up a rented container, the availability of appropriate and low-cost land or the ease of customs declaration.

Forwarding companies (logistics firms) organize a freight movement from place A to B. Shipments are often organized by forwarding companies, which are in service contract of small brokers. Brokers sign a transport contract from the place of origin to the place of final arrival. Small charges may be combined to full container loads by the forwarding companies or the brokers, thus making it difficult to trace the place of origin as well as identifying the often heterogeneous content.

Ocean carriers are the operator of marine vessels. They are contracted by the forwarding companies to transport containers or cars from one port to another. The contract between the freight forwarder and the ocean carrier is the Bill of Lading. However, some ocean carrier companies also own or are associated with logistics companies, providing the full range of logistics services. The ocean carriers are not responsible for the content of the containers and are only concerned about health and safety risks that may stem from hazardous goods for the ship and its crew [Peterson 2010, telephone interview]. The Ocean Bill of Lading may provide more correct information than the customs form in order to cover the safety concerns of ocean carriers, although this could not finally be verified because access to and insight into Bill of ladings was denied.

Used vehicle traders are another important actor in the used EEE export, because used EEE and WEEE are often co-loaded with cars and trucks originating for example in Germany, the Netherlands or Belgium and exported for example to West Africa, a major destination for used vehicles [VROM Inspectorate Haarlem 2010, interview]. Indications of co-loading are the weight of vehicle shipments that often by far exceed the true weight of the empty car or truck. In particular trucks and vans are often used as “packaging” and maybe even used multiple times[4] [Buchert 2007], [Sander 2010]. Concrete figures on the amount of used EEE and WEEE exported in cars and trucks are not available. However, this “export-stream” is expected not to be marginal. In Germany on average 3 million cars are deregistered every year of which app. 540,000 are re-

[4] According to a customs declaration available to us a used van appeared several times as export vehicle and its weight exceeded with 6.5 and 9 tonnes by far the vehicle weight.

cycled in Germany itself and 580,000 are exported according to German statistics. This leaves a gap of app. 1.95 millions vehicles per year. The data gap of this unaccounted large amount of used cars is explained by the fact that exports of used cars from Germany to other countries of the European Union are mainly not monitored by the Foreign Trade Statistics. Nevertheless it could be verified that electrical and electronic-goods like TVs, PCs, notebooks, printers, mobile phones etc. are exported from Hamburg to West Africa co-loaded in trucks and cars [FPS, Brussels, personal interview 2010], [Buchert 2007].

3.2 Leakage pathways from the formal to the informal sector

The two distinct formal routes for end-of-life EEE in Europe are the direct route from private end consumer to the dedicated collection sites and the route from retail and commercial users to the dedicated treatment facilities, often using the services of brokers and traders.

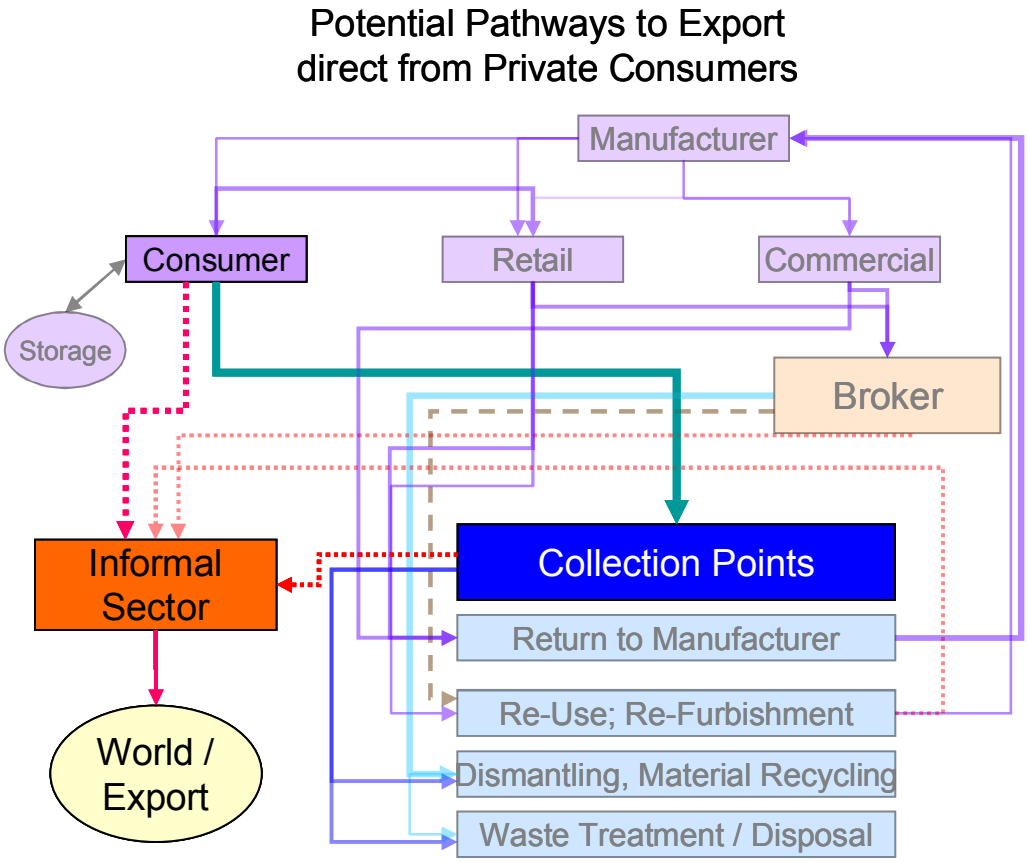

Figure 2: Paths of end-of-life EEE from private consumers to informal sector.

Private consumers, at least in large cities and communities, have multiple options to directly deliver their used goods to the collection points, may call a community pick-up service or schedule a bulky waste pick-up. In the latter case, it is known that informal

collectors are aiming for the bulky waste pick-up dates in order to select and withdraw goods with value for export or parts of electronic equipment containing materials with a high resource price [Werkstatt Frankfurt 2010, telephone interview], [Sander 2010]. Another potential diversion of used goods from the formal sector are informal traders that aim to snatch used goods outside the door of formal collection points. Furthermore, it cannot be excluded that some amounts of used goods leave the collection points and enter the informal sector via traders, e.g. if the collected good is still functioning and therefore sold to a second hand store.

According to BRAL [2010 telephone interview], an official first collection point in Berlin, Germany, they are approached by dealers and traders on a regular basis whether they might sell used electric and electronic equipment. The requests were in particular strong in 2008, when the raw materials prices skyrocketed. It can be assumed that in 2008 with high resource prices, the demand for waste materials was competitive and much of the waste streams were diverted to the Far East for resource recovery. The aim was likely more to recover materials rather than further use equipment.

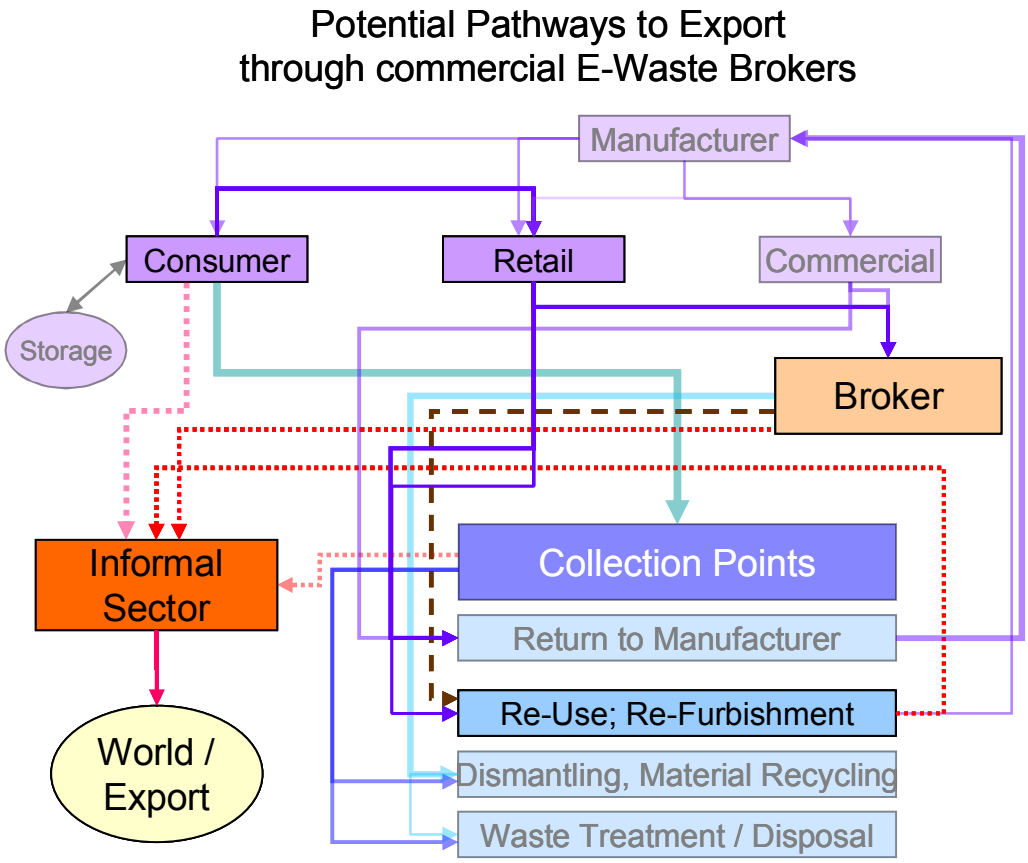

Figure 3: Paths for end-of-life EEE from consumers and retailers to informal sector.

Another significant pathway from the formal area to the informal area is likely the diversion of goods streams from the brokers and stakeholders anticipating re-use and refurbishment. It is known that retailers and commercial stakeholders, who do not have

access to the free public collection points, hand over the used and end-of-life goods to brokers to organize the lawful secondary trade and waste disposal in their name. Despite the fact that under WEEE Directive the responsibility remains with the retailers and commercial users, it can be assumed that they loose track of the goods and may not know the final destination of the discarded goods.

Brokers often present themselves as one-stop service shop, as illustrated by the following examples taken from advertisements:

- “guarantees the collection and treatment solely through registered facilities .. “; “reverse logistics (…) of end-of-life equipment with value potential”;
- “European-wide fast and cost efficient”;
- “logistically flexible collection of e-waste”;
- “conducts the entire waste disposal.”

It can be assumed from the above statements that offering the taking care of the goods post delivery is one competitive advantage to be offered. According to customs agents, broken goods or used goods from retail equipment take-back actions are one type of equipment that appears in questionable exports to West-Africa [VROM Inspectorate Haarlem 2010, interview]. The pathways are usually not known but likely involve brokers and traders between the retailer and the final goods shipper.

In Germany, the management of most end-of-life electric and electronic equipment causes costs, which cannot be covered with the gains from recovered resources [Schrott de 2010, telephone interview]. Thus there are incentives for commercial and retail end-of-life points as well as for brokers to divert equipment into the informal market in order to create “value potential” and avoid costs.

Customs agencies have collected guarantee and repair receipts with exported used and WEEE. Those receipts are evidence that pathways from retailers to the informal sector are virulent [VROM Inspectorate Haarlem 2010, interview].

4 Dutch and Belgian ports as a gateway for used electric and electronic equipment

4.1 Principle structure of the seaborne trade of used goods from Europe to West-Africa

One of the major goals of the study is to identify principle pathways of used and end-of-life goods from Europe to West-Africa, with a focus on the ports of Amsterdam (NL) and Antwerp (BE). The goods of interest, electric and electronic equipment, are predominately shipped in containers. Thus, this part of the study has been also referred to as the “Europe port component” of the project. The following paragraphs summarize some general findings.

There is a distinct group of ocean carriers that provide container liner services to the West-African nations. Partially, the dominance of those lines can be explained by former colonial relationships. The ocean carrier providing service between Europe and West-Africa include: CMA-CGM, Delmas, Grimaldi, Hapag Lloyd, Mediterranean Shipping Company, Mitsui O.S.K. Lines, Safemarine and Zim Container Lines.

However, there is very limited information that can be derived from the liner services today. First of all, service routes may be shifted easily. The container business is flexible, at least within Europe. If for example one port gets congested or fees rise significantly, containers can be shifted to other European ports very easily. Similar behaviour must be assumed if container controls for illegal waste shipments makes one port unattractive. The time and cost of a truck transport to another European port is probably minor, depending on the assumed profit margins of the goods. Furthermore, due to the liberalized trade market within the European Union, there are effectively neither controls nor other obstacles of inter-European trade and goods movement. Secondly, containers are also trans-shipped, stopping over in other ports to be reloaded on different vessels. For example, the ocean carriers Safemarine and Hapag Lloyd regularly service Tangier port in Morocco. Containers destined to West-Africa easily could originate in nearly any European port and be reloaded for example in Tangier on a vessel bound to West-Africa. Similar is true with Hamburg and Rotterdam ports, which are major hubs for North and North-Eastern Europe. Containers to the Baltic region, for example, are usually reloaded in Rotterdam or Hamburg. However, any other port in the liner service between Europe and West-Africa can act as a hub from transhipment. Thirdly, ocean container carriers often operate in alliances. Thus, a vessel operator servicing the European West-African trade lane may transport containers from a large variety of ocean carriers and logistics providers. Thus the contracting partner for the owner of the goods might not primarily be the ocean carrier. Often, agents that do not operate own vessels act as intermediary between goods owner and goods carrier. And moreover, the liner service may pick up containers at a hub port from nearly any other ocean carrier company.

Another general and complicating aspect is the location where goods are declared to custom agencies as goods for export. The country of customs declaration is not necessarily the country of the leaving port. Neither is the nation of customs declaration necessary the nation where the last use of the product occurred. Table 1 lists sample ports of origin, transfer and destination. The ports in The Netherlands and Belgium often handle container from Germany in transit. Goods that originate in Germany could easily shift to ports in Germany, France or Italy without significant higher transport costs [FPS, Brussels 2010, interviews]. Since the inter-European trade is free, it is also possible that used goods from the sourcing country (e.g. Germany) are first transported to another European country by a broker and then there declared for extra-European transport.

The general observations lead to a conclusion that a pure focus on particular ports and transport trade lanes will not result in reliable and predictable export quantities. The study thus expands to research general trade statistics from several key European countries, including some Eastern European countries, for the trade flow analysis. (Chapter 4.3)

Table 1: Sample list of ports within the service between Europe and West-Africa. (Oeko-Institut, liner services from CMA-CGM, Delmas, Grimaldi, Hapag Lloyd, Mediterranean Shipping Company, Mitsui O.S.K. Lines, Safemarine and Zim Container Lines)

Port of origin Europe	**Port of destination West Africa**
Algerairas	Abidjan
Amsterdam	Cotonou
Antwerp	Douala (Cameroon)
Bilbao	Lagos
Bremerhaven	Lome
Felixstowe	Taharadi
Genova	Tema
Le Havre	**Transfer ports on route**
Lisbon	Casablanca (Marocco)
Malaga	Dakar (Senegal)
Naples	Tanger (Marocco)
Rotterdam	
Tarragona	
Tilbury	

4.2 Characteristics of the ports of Amsterdam and Antwerp and their role in the trade of used EEE to West-Africa

The ports in Amsterdam, The Netherlands, and Antwerp, Belgium, are very different in the structure and role they play. Amsterdam is a medium size port, ranking number 12 within Europe, whereas Antwerp is second within the European ports in terms of tonnage traded [ESPO 2005]. Both ports handle large masses of cargo in the liquid and dry bulk market. The more interesting market for used EEE trade are the container market and the roll-on-roll-off (RoRo) market in case of co-loading cars and trucks. The following table will characterize the two ports.

Table 2: Comparison of key figures of the ports of Amsterdam and Antwerp.

Characteristics	Port of Amsterdam	Port of Antwerp
Accumulated throughput 2007 *	87 594 000 tonnes	182 897 000 tonnes
Container throughput 2007	385 603 TEU**	8 176 614 TEU**
TEU growth 2006/2007	26 %	16 %
TEU growth 2005/2008	561 %	34 %
Share of TEU throughput on European total throughput 2007	0.428 %	9,09 %
RoRo traffic in tonnes 2006***	5 497 731	3 148 851

* As the base year 2007 was chosen because of sharp and non-uniform decline in trades in 2008/09.
** TEU = twenty foot equivalent unit; a measurement for a standard container.
*** RoRo traffic also includes ferries, of which Amsterdam has one daily line to England. RoRo traffic data for 2007 Amsterdam was not available.
Sources: ESPO 2009

The Port of Amsterdam is the largest of four Dutch North Sea Canal ports (Ijmuiden, Beverweijk, Zaandam, and Amsterdam). It is the second largest port in The Netherlands. The port of Amsterdam is one port on several liner services from Europe to West Africa, in particular Ghana and Nigeria (e.g. Delmas, Grimaldi).

According to VROM [2010 interview], the Port of Amsterdam is not as important as other ports to receive containers in transit. On the other hand, within the city limits of Amsterdam, several locations are known to the inspectors to load containers with used EEE equipment. The Amsterdam port facilities include also one terminal dedicated for the loading and unloading of cars. However, Amsterdam has been used mostly for exporting new cars (Koopmann Car Terminal), whereas another Netherlands port – the Port of Vlissingen – was named to export predominately used cars.

The Dutch customs authorities together with VROM Inspection conduct inspections at and near the port of Amsterdam. According to them, nearly 80 % of the controlled containers, selected after a pre-screening narrow the target containers, have problematic content or declarations. Used EEE is often shipped as “used goods” or “private goods mixed together with other household goods [VROM 2010, interview]. According to VROM the capacities to control container traffic, throughout The Netherlands, are not sufficient to control the flow. Today, the more inspections are conducted, the more containers with problematic content are being found.

The Port of Antwerp is the dominant Belgian port. Ocean carriers that offer liner service from The Netherlands to West African nations also offer the Port of Antwerp on their schedules. Furthermore, many other container and RoRo lines operate through the Antwerp facilities. Six terminals operate facilities for loading cars in Antwerp. The Belgian customs authorities assume that 90 % of illegal waste shipments are conducted co-loaded in used cars [FPS, Brussels 2010, interviews].

The Port of Antwerp is considered by the governmental agencies more as a transit port, where containers and cargo is being transported to the port by truck, rail, and barge and then loaded onto a seagoing vessel [FPS, Brussels 2010, interviews]. (The same is true for the Port of Rotterdam in comparison with the Port of Amsterdam). Germany, and particularly Münster and Essen in the Ruhr-Region, plays a major role as a sourcing region for the cargo through Antwerp, although cargo may come from nearly any place in Europe, including The Netherlands, France, Switzerland, and Eastern European countries. Furthermore, the Antwerp terminals also handle used cars in containers originating from the USA and destined to Africa [FPS, Brussels 2010, interviews].

The Belgian inspection authorities conduct many of their inspections on the transit routes to the Port of Antwerp. In 2008, approximately 1200 container checks were conducted of which 127 contained E-waste and 47 were send back to the Country of origin. The Belgian customs authorities too emphasize that the personal and financial potency of the inspectors is not sufficient to manage the flow of problematic exports. Additionally, the regionalization of competent authorities in Belgian as well as the unharmonized treatment of shipments (e.g. distinction between E-Waste and used EEE) by, for example, the federal states in Germany (called “Länder”), further hinders a strong enforcement.

The used EEE shipped out of Antwerp use declarations including “second hand goods”, “private goods”, “charities”, “for personal use”, “electro ménagers”, “miscellaneous” and “effects personnelles”. In order to disguise or enable illegal exports not only the before mentioned declarations are used, but the labelling of used EEE themselves is manipulated (e.g. false codes for used fridges or removal of generators of used fridges in order to classify them “not containing CFHC”), custom declarations are given to the competent authorities only on the day the ocean carrier is leaving the port. In Antwerp there are even agents specialised on the export of used EEE [FPS, Brussels 2010, interviews].

4.3 Statistical indications for the flow of goods from Europe to Africa

This section attempts to qualitatively assess the export of goods with a large potential of carrying hazardous materials from Europe to West-Africa. For this purpose European statistics and United Nations statistics were analyzed and potential seaborne freight routes were investigated.

For the purpose of collecting indications on electric and electronic products movement from Europe to West-Africa particular categories were selected:

As exporting countries Austria, Belgium, Czech Republic, France, Germany, Italy, Latvia, The Netherland, Poland, Spain, United Kingdom and Switzerland were selected. Furthermore, total figures for EU 27 were used. The rational for selecting those countries are:

- The Netherlands and Belgium are core countries covered by this study as well as countries with important large seaports.
- Austria, France, Germany, Italy, Spain, United Kingdom and Switzerland are potential major sourcing countries. Furthermore, all except Austria and Switzerland have important seaport locations and maybe used as transit points for goods to Africa.
- Czech Republic, Latvia and Poland were selected to control whether exports from relatively young EU countries play a relevant role today.

As importing countries Nigeria was selected as the major importing country with large seaports. However, in order to capture cross trade between West-African countries Liberia, Cote D'Ivoire, Ghana, Togo and Benin were also selected.

Usually, the trade of used goods is not separately reported, neither from exporters in the cargo declarations nor in national trade statistics. Moreover, it must be assumed that all illegal waste shipments are also declared as products because otherwise exporters would openly violate national and international rules and regulations. This makes the tracking of used and end-of-life electric and electronic goods shipments extremely difficult. Thus the findings from trade statistics are by virtue limited. In order to derive some conclusions the following product groups and statistical sources were selected:

EUROSTAT trade data for HS codes[5]:

84.18 (refrigerators etc.), 84.71 (data processing machines etc.), 85 (electrical machines etc.), 85.27 (radio reception apparatus etc.), 85.28 (television receivers etc.), 85.40 (CRT tubes and other monitors etc.), 87 (Vehicles etc.), 87.03 (vehicles for passenger transport), 87.04 (vehicles for freight transport), 99 (Miscellaneous), and 99.RR (goods not elsewhere reported).

EUROSTAT trade date for SITC Codes[6]:

Rev.3 codes: 75 (Office machines etc.), 76 (telecommunications and sound recording etc.), 77 (electrical machinery etc.), 77521 (refrigerators), 776 (CRT tubes and other monitors), 778 (electrical machinery), and 78 (vehicles).

UN COMTRADE data for SITC Codes:

Rev.3 codes: 7 (machinery and transport equipment), 78 (vehicles) and 7x (machinery and transport equipment without vehicles).

The reasons for this selection are:

[5] HS stands for Harmonized System Code.

[6] SITC stands for Standard International Trade Classification).

- The EUROSTAT HS data was selected to capture the most relevant products from the perspective of resource recovery and environmental risks (refrigerators, computers, monitors etc.).
- The EUROSTAT SITC data was collected in order to identify whether trade from Switzerland plays a significant role.
- The UN data was screened in order to analyze general trends in trade with West-Africa.
- Data for vehicle trade was selected because vehicles often act as “packaging” for used and end-of-life goods.
- Data for the categories HS 99 and 99.RR were selected because of indications that used and end-of-life goods are often shipped without particular assignments to trade codes.

4.3.1 Making sense from statistical data

Studies on the amount of used EEE in general or even concrete figures on the export amounts of used EEE from the EU to non-EU countries are almost not existent. This may be inter alia due to the fact that statistics do not differentiate between used and new goods. Notified waste exports of such equipment are not known.

[Sander 2010] is the first study attempting to quantify the export of used EEE from Germany to non-EU countries. Based on several statistical data (export and import) the flow of used EEE from Germany via the Port of Hamburg to Ghana, Nigeria, South Africa, Vietnam, India and the Philippines was analysed. For 2008 [Sander 2010] extrapolated a total quantity of the exports of used EEE between 93,000 t and 216,000 t. This amount does include an estimated 20 % of used EEE which is exported as extra load of used cars, vans and trucks exported to the named countries.

The figures show that even a rough estimation of the export of used EEE from Germany to non-EU countries is encumbered with statistical tentativeness. Several factors contribute to the uncertainties of the export figures for used and end-of-life electric and electronic goods [Sander 2010] has investigated: Large discrepancies exist between a local port-related data system and the federal statistics system, which only captures goods of a certain value or weight. Furthermore, the data enables only suggestions on the amount of used versus new equipment – suggesting that most exported EEE from Hamburg is indeed used. However, comparing the export figures to the import data from Nigeria and other West-African countries reveal large mis-matches. Thus, concluding numeric estimates for used and end-of-life EEE export to West-Africa from the analysis cannot be supported. It is likely that many goods are declared under different custom codes, such as “miscellaneous items” or “charity“ and that current data makes a differentiation into used and new equipment nearly impossible. Furthermore the export of used EEE from Germany using other pathways than Hamburg harbour (e.g. Rotterdam or Amsterdam harbour) are not included in the figures, despite the fact that

there are no physical or legal hindrances to transit European export goods through third countries.

To start with, an overview of import and export to the select West-African countries is provided in order to grasp the significance of electric and electronic equipment trade between Europe and West-Africa. The import of machinery and transport equipment (by value) dominates with 36.4 % and 37.9 % the imports of Ghana and Nigeria respectively. For Togo those imports account for 24.2 % and 12.2 % for Benin. Benin's dominant import goods are food and beverages. For Ghana, Togo and Benin, the import of oil and mineral products play the prominent role.

Most interesting is the import of machinery and equipment in US $ per capita. Here Ghana stands out by importing worth $ 138 of SITC code 7 [7] products, followed by Nigeria with $ 58.2, Togo with $ 18.4 and Benin with $ 12.5 dollar per capita. While Nigeria has the highest GDP per capita ($ 2 400), Ghana ($ 1 500 per capita) seems to import more higher value goods, which may indicated to some degree the large share of used goods imports to Nigeria. Another general indication of trade flows is that the inter-Sub-Saharan trade has increased significantly and more rapidly than the extra-Sub-Saharan imports (Figure 4 and Figure 5). Thus, the high per capita import of machinery and transport equipment to Ghana may also indicate that goods destined to neighbouring countries may be routed through third countries such as Ghana. Furthermore, the increase in inter-Sub-Saharan vehicle trade by at the same time falling shares of Europe to Sub-Sahara vehicle trade indicates functioning markets between Sub-Saharan African countries and thus that import vehicles may not enter the countries of final destination. (Figure 6, Figure 7 and Figure 8) For vehicles, Nigeria is the major first destination country in West Africa.

[7] SITC section 7 products are machinery and transport equipment, which includes electric and electronic equipment as well as vehicles.

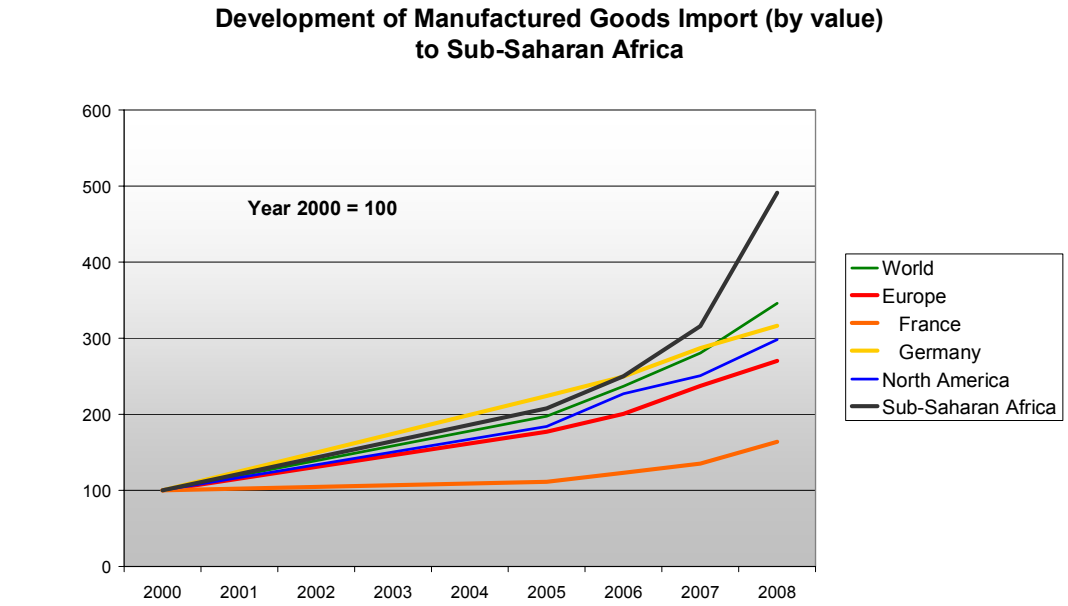

Figure 4: Growth of manufactured goods import to sub-saharan Africa 2000 to 2008. UN COMTRADE data.

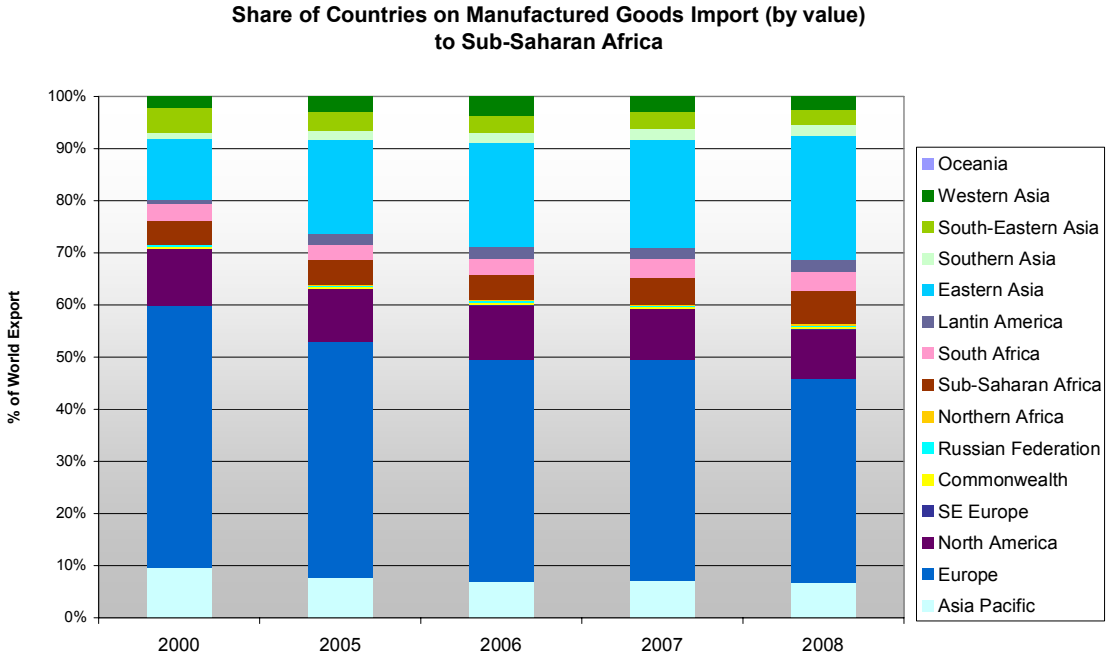

Figure 5: Share of manufactured good export countries to Sub-Sahara Africa 2000 – 2008. UN COMTRADE data

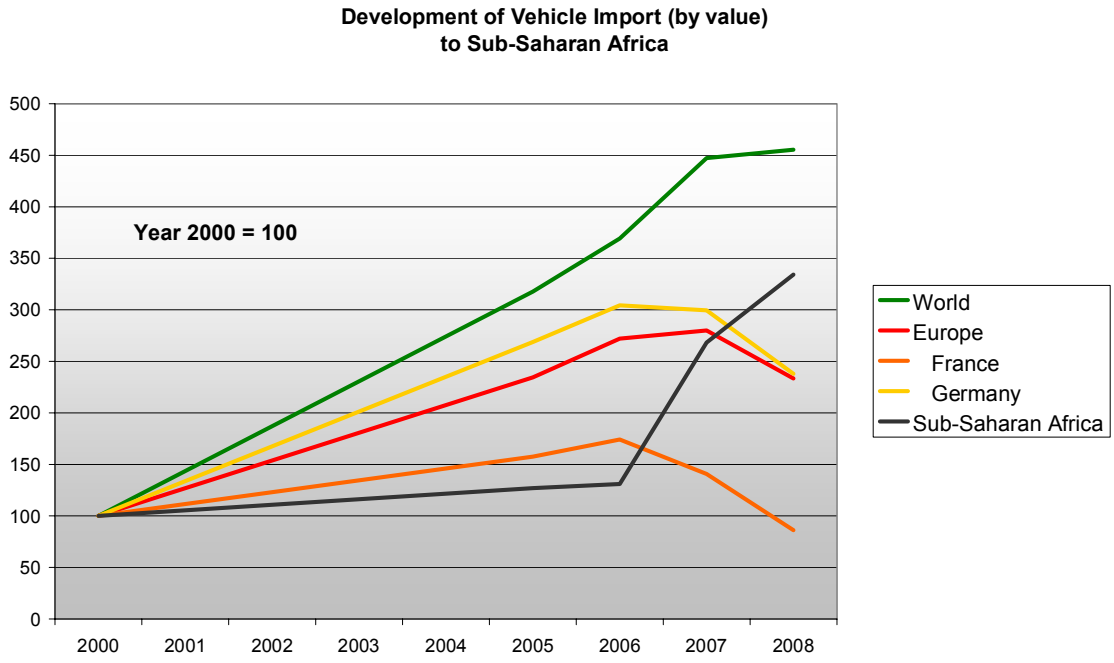

Figure 6: Growth of vehicle import to sub-saharan Africa 2000 - 2008. UN COMTRADE data.

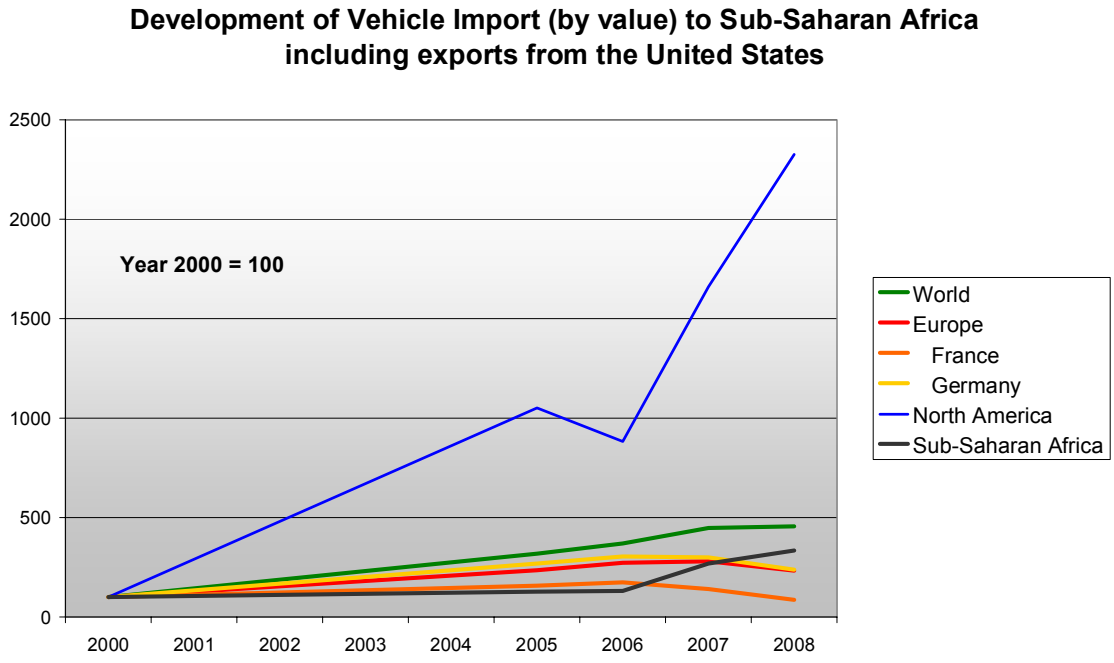

Figure 7: Growth of vehicle imports to sub-saharan Africa including from the United States. UN COMTRADE data.

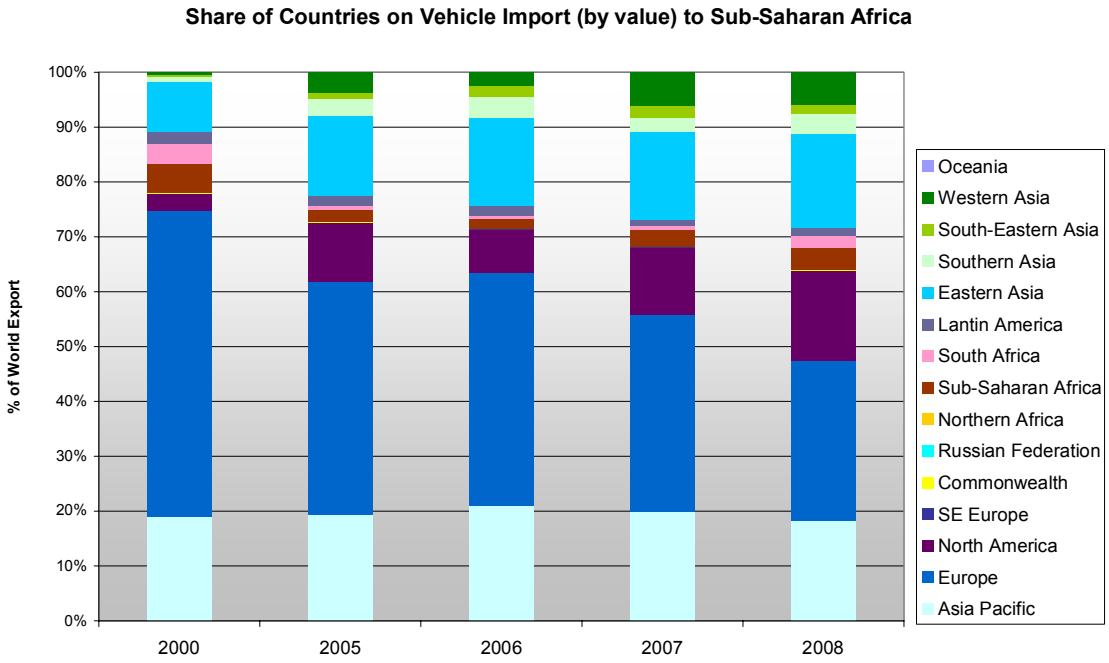

Figure 8: Share of vehicle export countries to Sub-Sahara Africa 2000 – 2008. UN COMTRADE data.

Investigating the export of electric and electronic equipment from the select European countries several general observations can be made. In all studied categories – data processing equipment; electrical machines and equipment; radio, television and video apparatus; and refrigerators – the select European countries generally account for more than 90 % of the EU27 exports (except for refrigerators), usually between 98 % to more than 99 %. Thus, no major exporting country in Europe was missed.

Another worth-while analysis is who in Europe is a major electric and electronic equipment exporter, because the statistical data studied do not differentiate between new and used goods. Thus, if the pattern of Europe to West-Africa trade compares to the general pattern of European country export, it might indicate whether new or used goods are shipped predominately[8]. Of the selected European countries, nearly 50 % of all exports of electric machines (in 2008) are from Germany and The Netherlands, with Germany being the largest exporter. For consumer and communication products both countries cover more than 50 % of European export with The Netherlands dominating those products. The two countries are followed by France, Italy and Great Britain. Great Britain occupies place three in consumer and communications electronics exports. However, its consumer and communication electronics exports have dropped

[8] It is realized that this parallel is weak because an electric or electronic industry of one nation might be dominated by particular products for specific markets. Then exports of particular goods don't need to represent the general pattern.

significantly from 23.8 % in 2005 to 8.9 % in 2008. Poland and Czech Republic's share on the exports range between 3.4 % and 7.3 %. They show significantly larger shares than Latvia, which plays with shares below 1 % no role in electric and electronics exports. (Figure 9 and Figure 10)

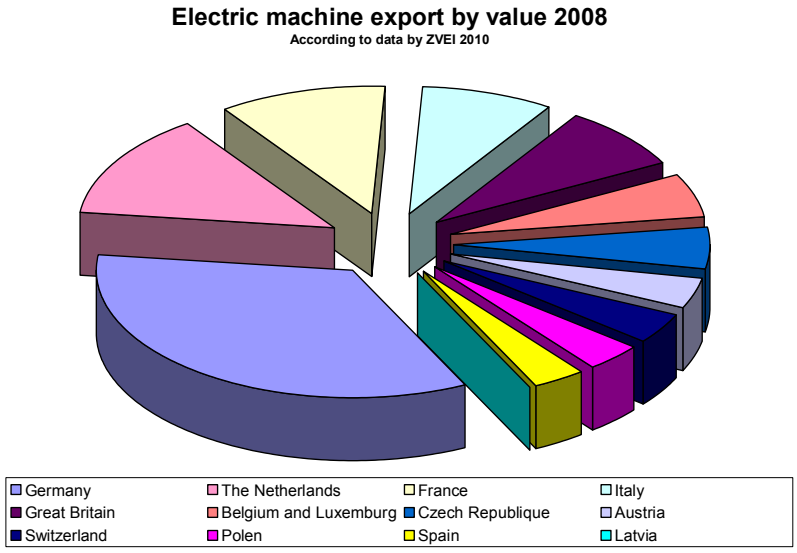

Figure 9: Share of electric machine export from select European countries to the world in 2008

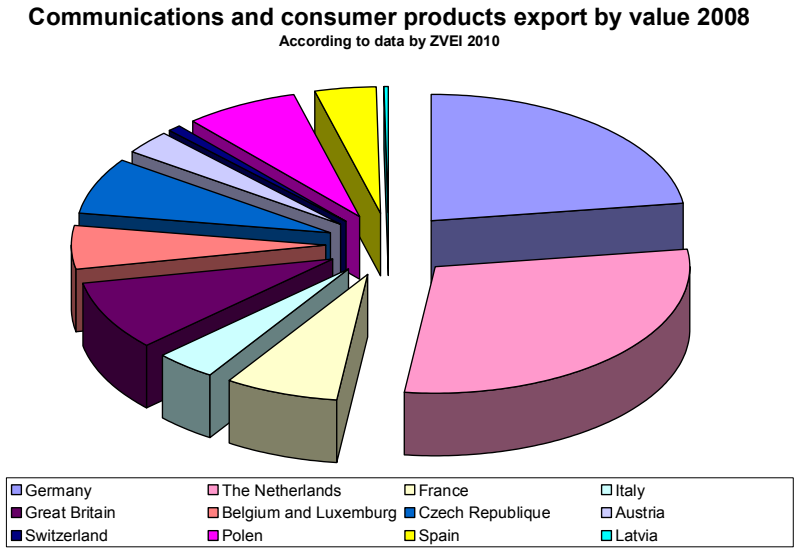

Figure 10: Share of communications and consumer products export of select European countries to the world 2008.

As a conclusion we would expect the most exports to West-Africa for electric machines would come from The Netherlands and Germany, and to some extend France, Italy and Great Britain; those for communications and consumer products from The Netherlands, Germany, Great Britain and to some extend France. The following paragraphs qualitatively assess findings from the European trade statistics.

4.3.2 Export figures for select goods from Europe to West-Africa

The statistical figures for international trade come with a large set of questions and uncertainties. This might be true in particular for trade statistics data to less developed countries and can certainly expected in trades where a significant share of used and WEEE is being shipped. In a concerted inspection effort European countries[9] found 26 % of physically checked containers containing waste, of which more than half were determined illegal (IMPEL 2006). It must be expected that neither the product declarations, nor the value of the products are reported correctly in those circumstances. Furthermore, used electric and electronic equipment is often shipped in small charges, mixed together, sometimes with other export materials (VROM 2009).

Table 3: Share of electric equipment exports of the select European countries. ZEIV 2010

Country	Electric machines etc.		Communications and consumer electronics	
	2005	2008	2005	2008
Germany	32.9%	34.0%	27.0%	22.7%
The Netherlands	15.8%	13.6%	14.7%	29.3%
France	10.8%	10.6%	11.2%	7.0%
Italy	7.9%	8.2%	4.5%	4.1%
Great Britain	11.3%	8.1%	23.8%	8.9%
Belgium and Luxemburg	5.6%	5.7%	6.5%	5.4%
Czech Republique	3.6%	5.2%	2.5%	7.3%
Austria	3.7%	4.0%	2.1%	2.9%
Switzerland	3.2%	3.9%	1.4%	0.9%
Polen	2.2%	3.4%	2.6%	7.2%
Spain	3.0%	3.3%	3.7%	3.9%
Latvia	0.1%	0.1%	0.0%	0.2%

[9] Participating countries were Belgium, France, Germany, Ireland, Latvia, Malta, The Netherlands, Poland, Portugal, Slovenia, Spain, Sweden, and United Kingdom.

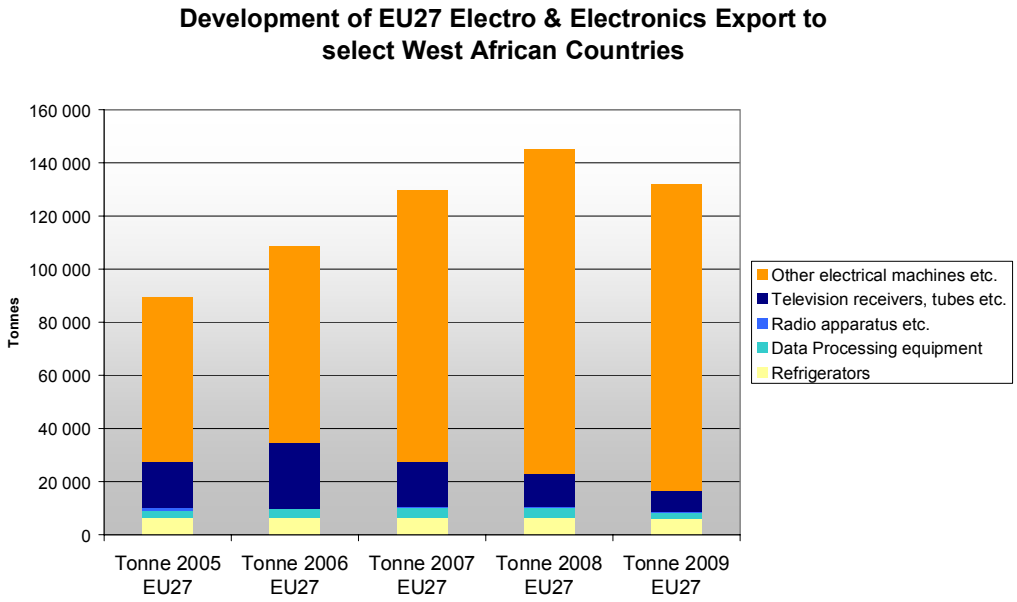

Figure 11: Development of EU27 seaborne exports of electric and electronic equipment to select West-African countries in tonnes from 2005 to 2009. Source: EUROSTAT.

In the following section the study conducts qualitative assessments of statistics data. The assessment is based on the statistical figures, interpreted with the background knowledge from past studies as well as from interviews with experts for trade issues.

Generally, the export of electric and electronic goods from Europe to West-Africa (by weight) has steadily increased up to 2008, while it saw a decline in 2009. The increase however is dominated by the category electrical machines (HS Code 85 ff: Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles). Of particular interest for studying used goods and end-of-life trade are the sub-categories for refrigerators, data processing equipment, radio and television apparatus. Interestingly exports in those categories peaked in 2006 (refrigerators, radio and TVs) and 2007 (data processing equipment) (Figure 11). Thus the growth of trade occurs or is declared in other categories under HS 85. Particular aspects of the trades under study are presented in the following paragraphs.

Refrigerators; HS Code 84.18; SITC Code 77521

The total amount by weight of refrigerator exports from the select European countries to the select West-African countries was around 5 900 – 6 500 t per year. The export of refrigerators has been stable, but was declining in 2009 somewhat. Ghana and Nigeria are the two main importing countries, although declines have been stronger than in Benin and Cote d'Ivoire in particular. Exports to Liberia play virtually no role. The category "refrigerators" is the one with the least coverage by choosing the select export

countries. Only between 78 % and 80 % of the EU27 export is captured with those select export countries.

The second finding is the high shares of the United Kingdom and in particular Italy on refrigerator exports to West-Africa, mostly to Ghana, Nigeria and Italy to Cote d'Ivoire. Furthermore, large shifts in total numbers and shares can be observed (Figure 12). Italy alone accounted for more than 44 % of the exports in 2006, although declining thereafter. The UK exports increased at the same time to peak in 2008 with a share of 26 %. In comparison, Italy and the UK have a share of 26 % and 4 % of the global white goods exports from select European countries in 2008 (ZVEI 2010). Other relevant European exporting countries are France, The Netherlands and Germany. The export shares of France and The Netherlands are hereby in the same range as its share globally, while the share of German exports is well below its share globally. France exports are destined predominately to Benin and Cote d'Ivoire, but also to Nigeria.

The other countries do not play a role in European exports of refrigerators, except Switzerland, which exported some refrigerators to Nigeria.

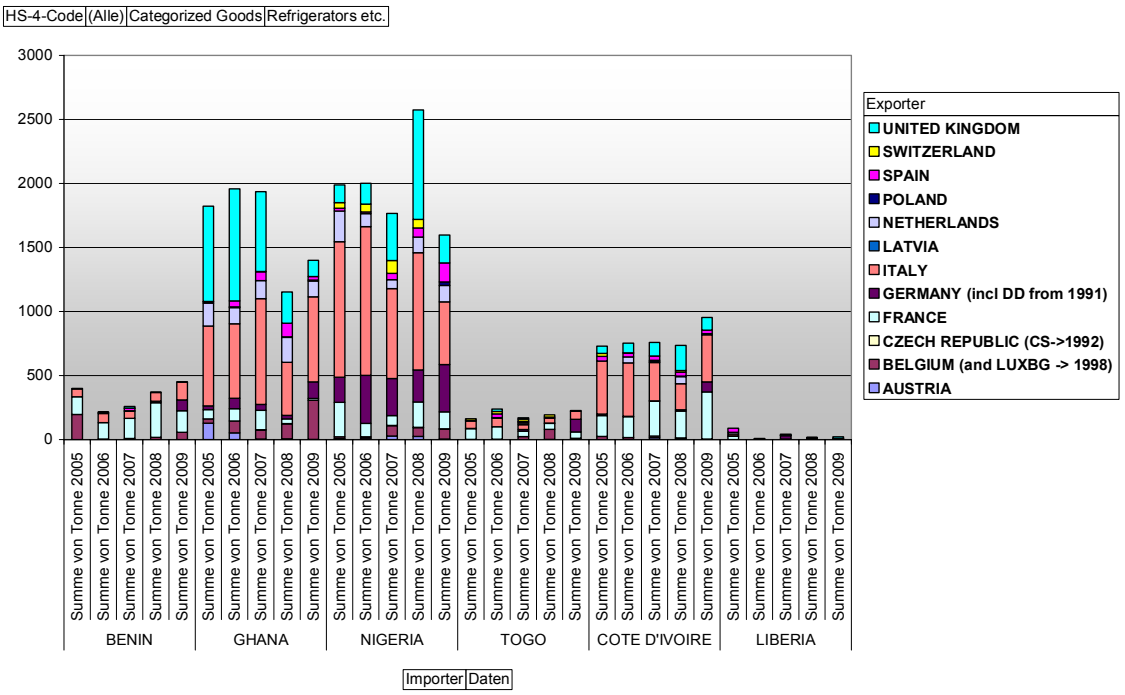

Figure 12: Seaborne import of refrigerators in tonnes 2005 – 2009. EUROSTAT data.

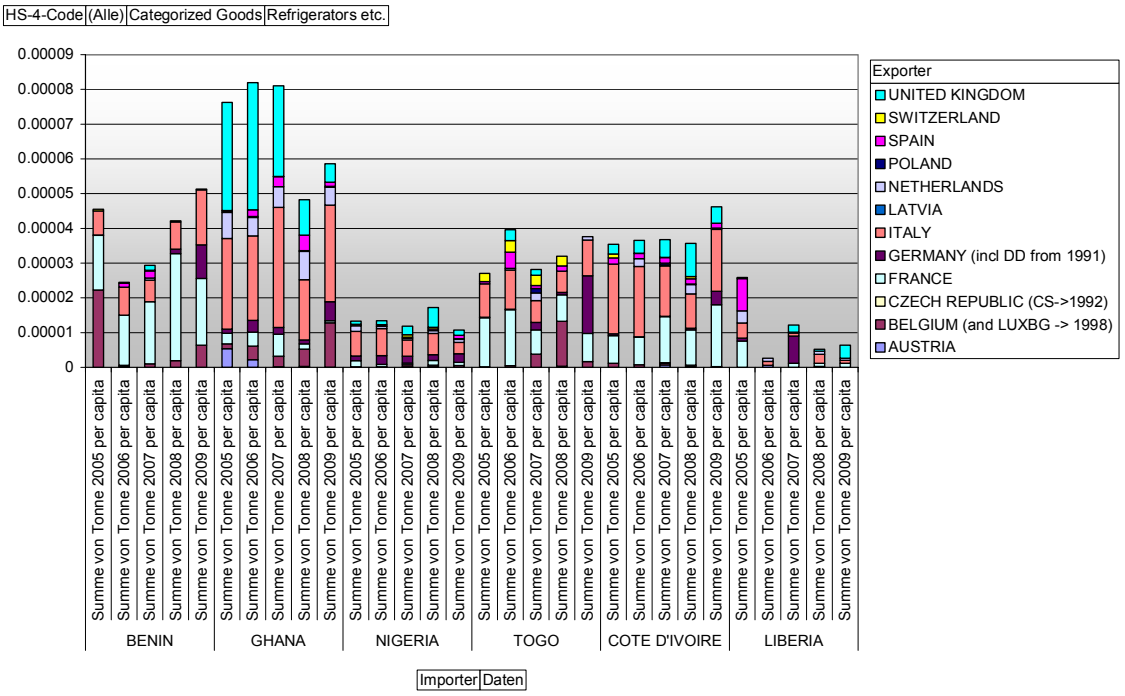

Figure 13: Seaborne import of refrigerators in tonne per capita 2005 – 2009. EUROSTAT & CIA data

Normalized on a per capita basis, the highest figures appear for Ghana, Cote d'Ivoire, Togo and Benin, whereas Nigeria is the least pronounced importing country for refrigerators per capita. With Benin, Togo and Cote d'Ivoire the exporting country France then stands out as a major exporter for refrigerators per capita.

Electrical machines; HS Code 85; SITC Codes 77 and 778:

The total amount by weight of electrical machine exports from the select European countries to the selected West-African countries peaked in 2008 with 122 209 t and fell to 115 486 t in 2009. The major importing countries for electrical machines are Ghana and Nigeria with 27 788 t and 84 283 t respectively in 2008. In 2009 the import into Ghana increased to 31 311 t while that into Nigeria fell to 66 121 t (Figure 14). The share of the exports by the selected countries in relation to the total EU27 exports is between 91 % and 97 %. The total amount of electrical machine exports is rising, although 2009 figures were slightly below those of 2008.

The second major finding is the very high share of UK exports in particular to Ghana and Nigeria (64.3 % in 2009). From the electronics industry export data (ZEIV 2010) one would assume that Germany would be the major exporting country because it has the highest share of electrical machine exports from Europe to the world (34 % in 2008, Data ZEIV 2010). The Netherlands, France and Italy also have a higher share of electric machines export than the UK to the world. However, this is not mirrored in the trade to West-Africa: Germany, The Netherlands, Austria and France appear underrepre-

sented in this comparison. Polish, Spanish, and Italian exports are in the range of their global share on exports.

Switzerland does not play a role in exports of electric machines, neither does Latvia.

On a per capita basis, Ghana stands out above all other West-African countries. The Nigerian imports of electrical machines per capita are comparable of those to Togo and Cote d'Ivoire, with those to Benin and Togo slightly lower (Figure 15).

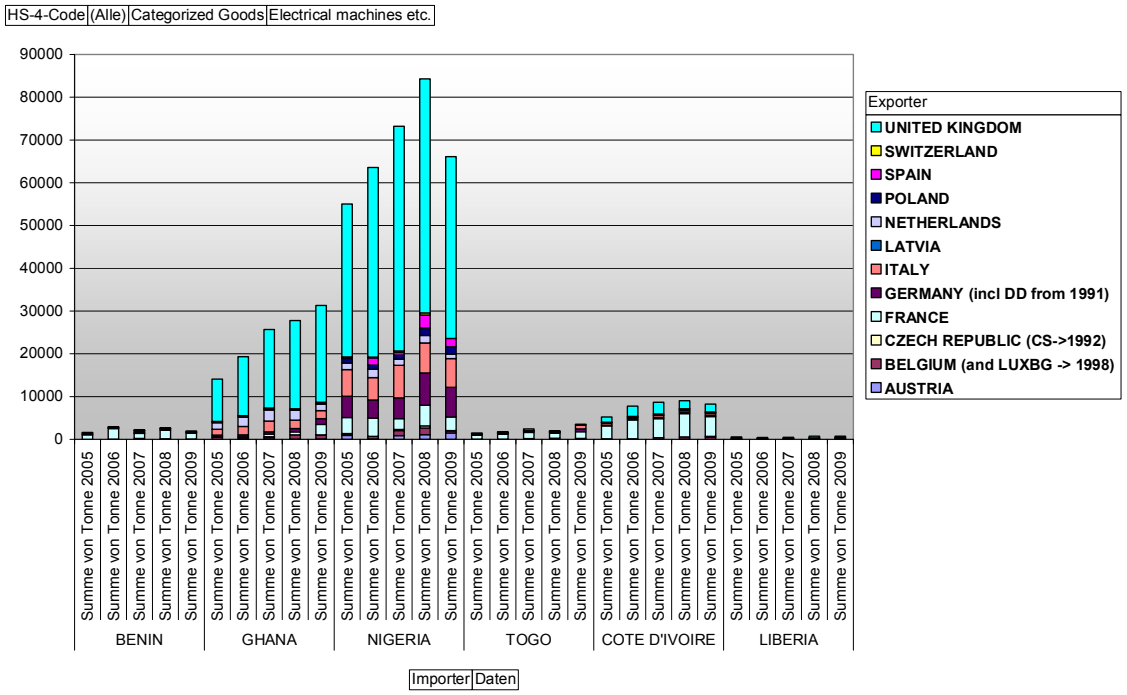

Figure 14: Seaborne import of electrical machines in tonnes 2005 – 2009. EUROSTAT data.

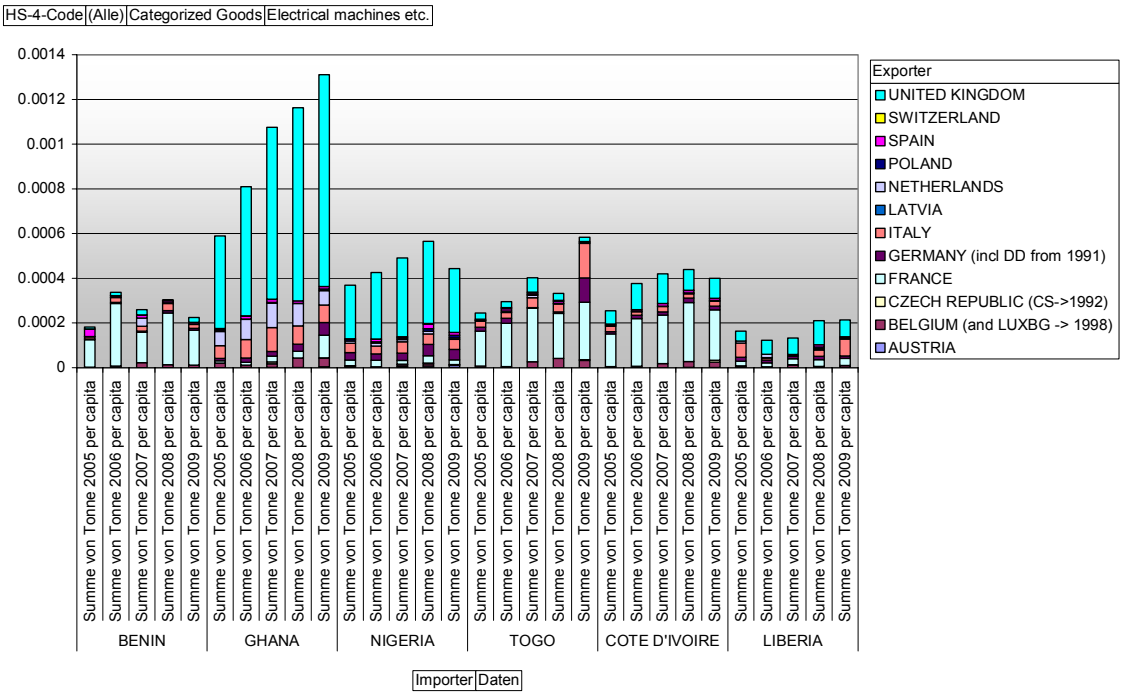

Figure 15: Seaborne import of electrical machines in tonne per capita 2005 – 2009. EUROSTAT & CIA data.

Data processing equipment; HS Code 84.71; SITC Code 75:

The total amount by weight of data processing equipment exports from the select European countries to the select West-African countries is much smaller than that of electric machines. The export peaked in 2007 with 3 982 t and has dropped to 2 478 t in 2009. However, some principal patterns are similar to the other goods categories. The two major importing countries are Ghana and Nigeria, although Cote d'Ivoire is a major receiving country for French exports (Figure 16).

The second major finding is the high share of UK exports, again to Ghana and Nigeria. Great Britain's share was over 45 % and 50 % in 2005, 2007 and 2008. This is by far larger than its share of the global exports of communications and consumer electronic products, which was 23.8 % in 2005 and fell to 8.9 % in 2008 (ZEIV 2010). France is also a major exporting country, in particular to Cote d'Ivoire, and its share has continuously risen from 26 % in 2005 to 46 % in 2009. France's share of exports of data processing equipment to West-Africa is thus above its share of global exports. Another country that in times exported large amounts of data processing equipment to the select countries is The Netherlands; with a share of 25 % in 2006. However, the exports thereafter fell significantly. All other countries' shares under represent the countries in comparison with their role in global exports of communications and consumer equipment.

The third finding is the larger fluctuations of the figures compared to electrical machines. Large fluctuations from one year to another indicate that the type of trade is not demand driven but rather determined by the amounts of goods available to the market. Furthermore, a bell curve trend over the last five years can be observed (Figure 16).

Switzerland is visible as an exporting nation, but plays only a minor role. Austria, Poland, Latvia and Czech Republic do not play a role in data processing equipment exports.

When normalized to the population, the Nigerian and Liberian imports are the least pronounced in the region. The largest amount of data processing machines per capita is imported by Ghana, although in the same range than Cote d'Ivoire, Benin and Togo.

Since data processing machines are high value consumer goods, a third indicator might reveal some insights. Based on the amount of import per GDP, particularly Liberia and Togo stand out (Figure 18)

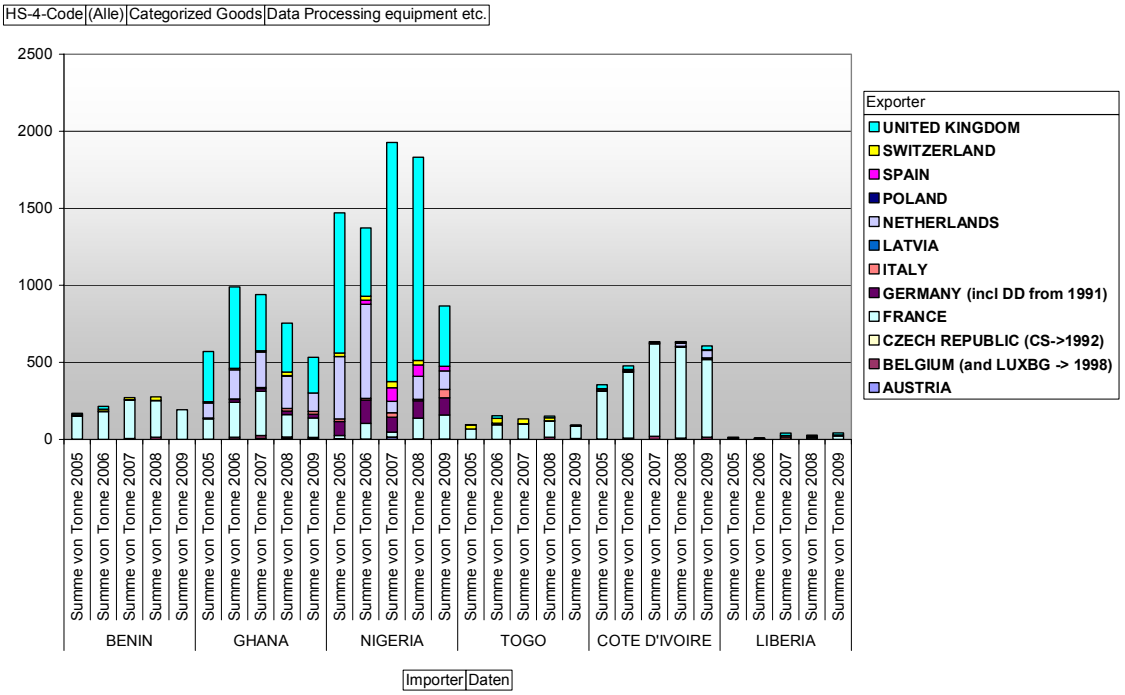

Figure 16: Seaborne import of data processing equipment in tonnes 2005 – 2009. EUROSTAT data.

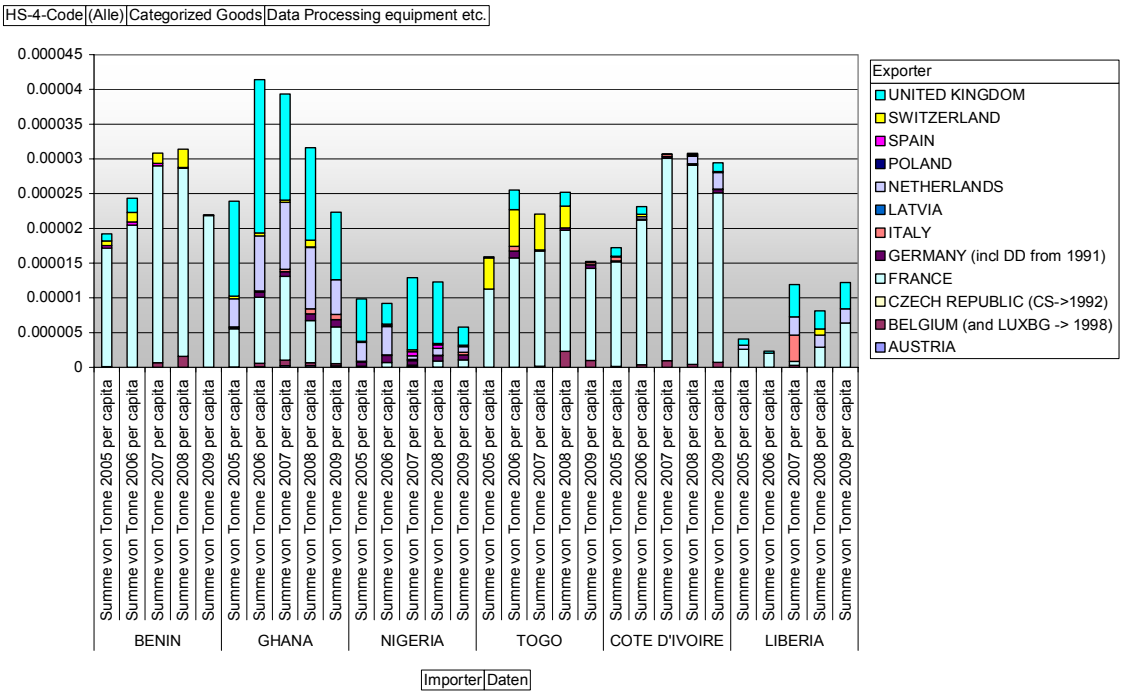

Figure 17: Seaborne import of data processing equipment in tonnes per capita 2005 – 2009. EUROSTAT & CIA data.

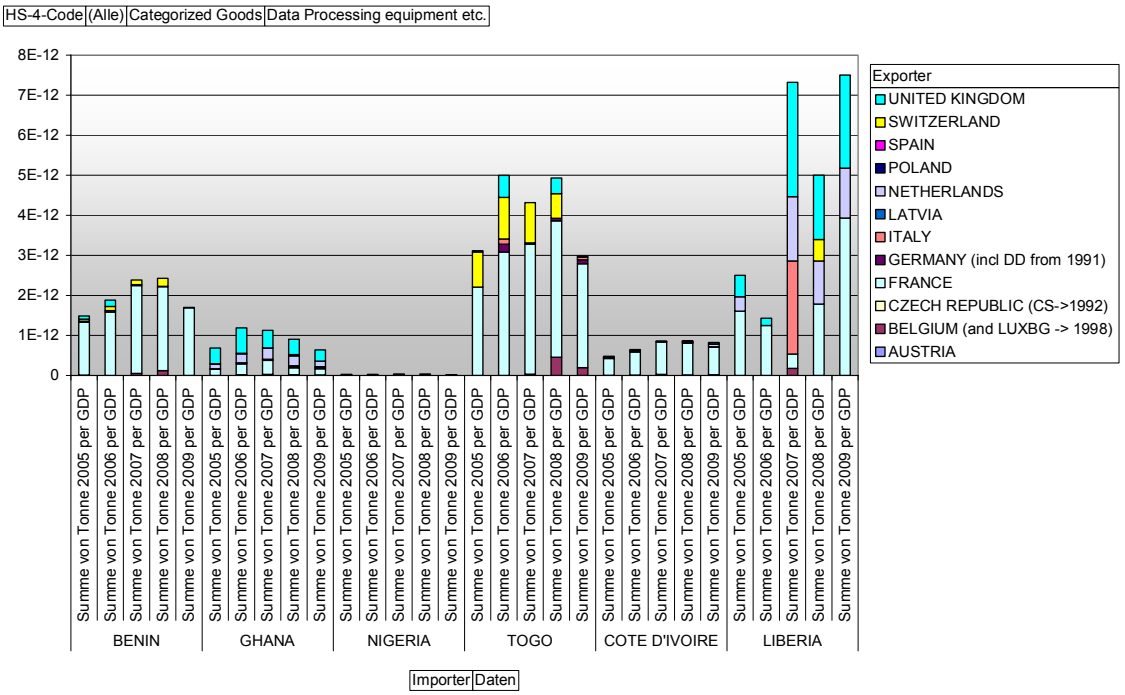

Figure 18: Seaborne import of data processing equipment in tonne per GDP 2005 – 2009. EUROSTAT & CIA data

Reception apparatus for radio-telephony, radio-telegraphy or radio broadcasting; HS Code 85.27; SITC Code 76:

The total amount by weight of radio apparatus' exports from the select European countries to the select West-African countries is small. The export of EU27 countries ranged between 160 t and 750 t per year from 2005 to 2009. However, Switzerland exports large amounts of radio apparatus, in some years exceeding the total exports from EU27. Nigeria and Ghana appear again as the major importing countries. Nigerian imports are steadily declining, while Ghanaian imports show irregular patterns (Figure 19).

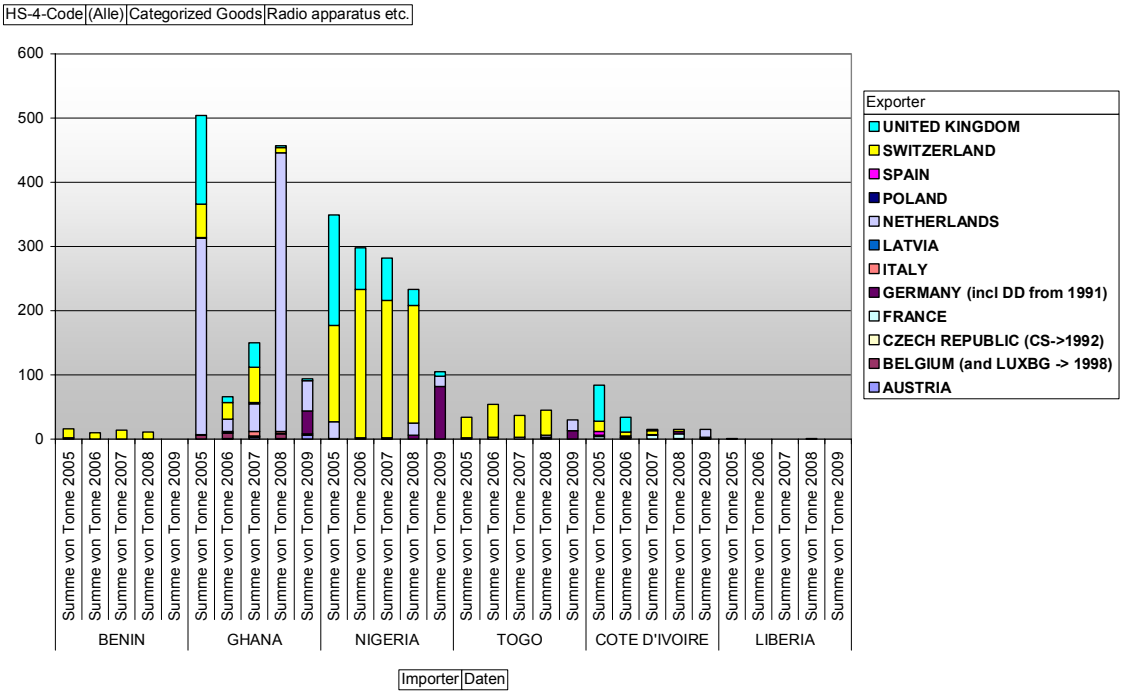

Figure 19: Seaborne import of radio apparatus in tonnes 2005 – 2009. EUROSTAT data.

Because of the general small total amount it is not warranted to investigate other figures for radio apparatuses.

Television receivers, Monitors etc.; HS Code 85.28, 85.40; SITC Code 776:

The total amount by weight of data processing equipment exports from the select European countries to the select West-African countries has peaked in 2006 with 24 563 t and has since then steadily declined to 7 794 t in 2009. The major importing country is Nigeria (Figure 20).

The second major finding is the dominant share of UK exports of television receivers and monitors. Great Britain's share was 93 % in 2005, 57 % in 2008 and fell to 39 % in 2009. This is by far much larger than its share on the global export of communications and consumer electronic products, which was 23.8 % in 2005 and fell to 8.9 % in 2008

(ZEIV 2010). A second observation is the increase in exports from Germany. It is constantly rising from a share of the total EU27 exports in this category of 0.4 % in 2005 to 54 % in 2009. However, Germany's share on exports to the world is with 27 % in 2005 and 23 % in 2008 larger than that of Great Britain. All other countries play essentially no role in exports of television receivers and monitors.

When normalized to the population, the Ghanaian imports in 2005 and 2006 stand out. (Figure 21). The statistical data do not allow more detailed analysis.

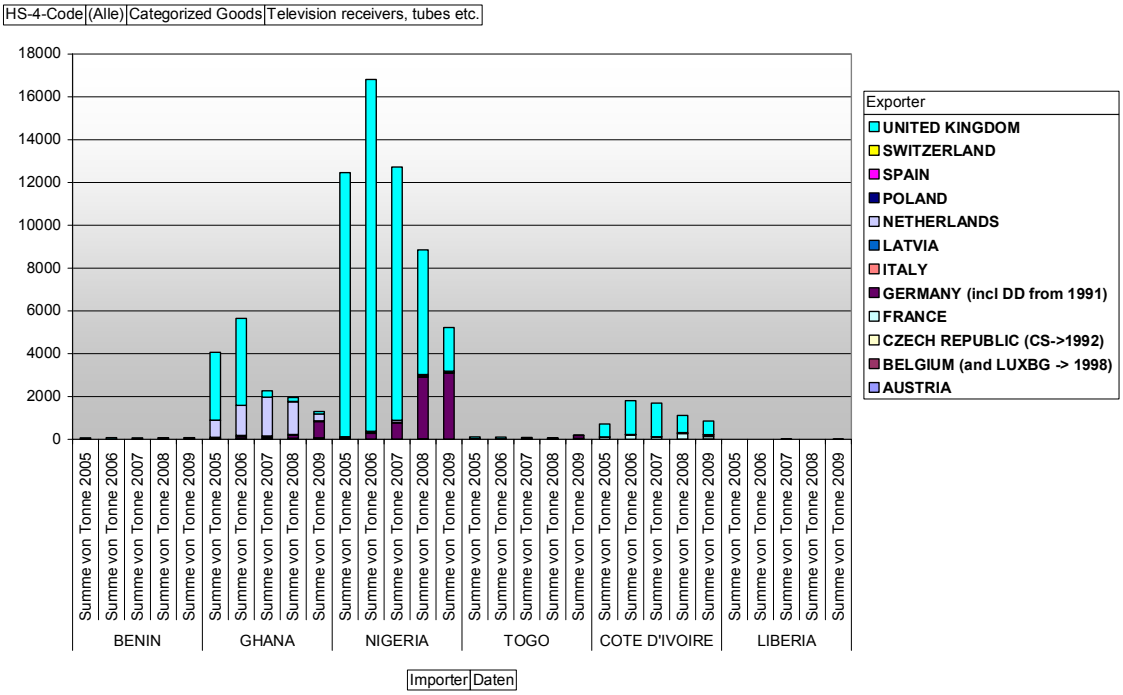

Figure 20: Seaborne import of television receivers and monitors in tonnes 2005 – 2009. EUROSTAT data.

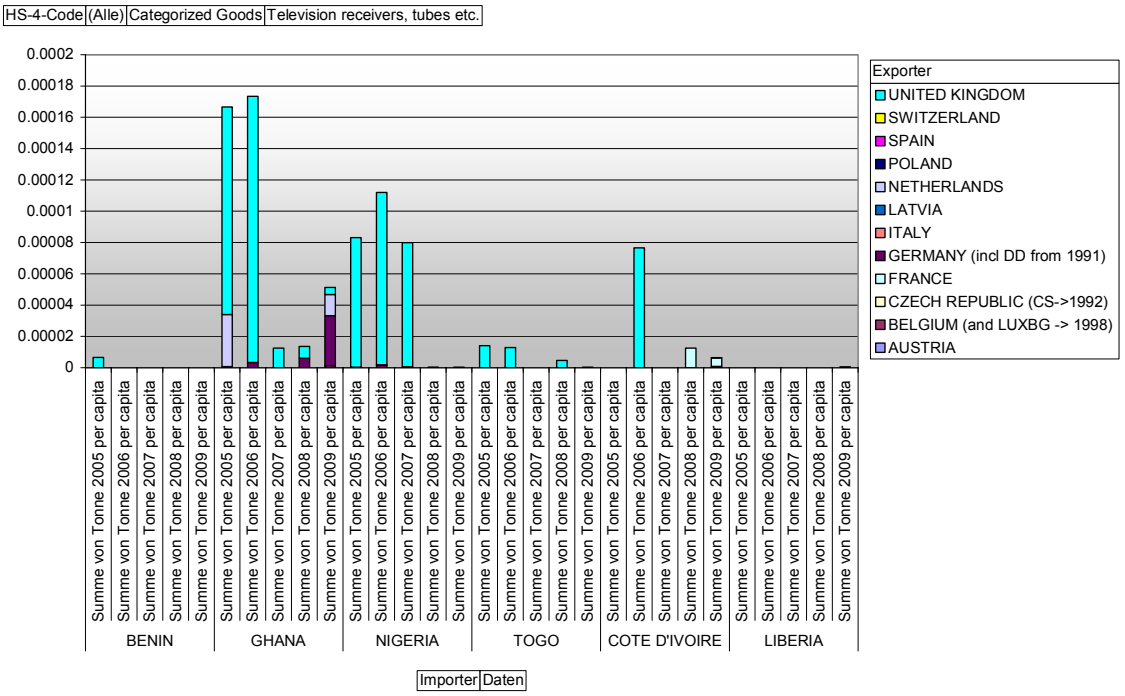

Figure 21: Seaborne import of data processing equipment in tonne per capita 2005 – 2009. EUROSTAT & CIA data.

Vehicles; HS Code 87; SITC Code 78

The reason for also including vehicle trade when investigating in electric and electronic equipment exports to West-Africa is that vehicles are often used as 'transport packaging' for used and end-of-life products (see chapter 3). Furthermore, the value of export vehicles lies on average below €10 000 per metric tonne, which may be assumed as a value threshold for new cars (Figure 22). It can be therefore assumed that most of the exported vehicles are used vehicles. One other reason for the low value per tonne, most of which lie below €3 000 per tonne might be that additional goods are packed with the vehicles, increasing the weight per vehicle without contributing significantly to the export value.

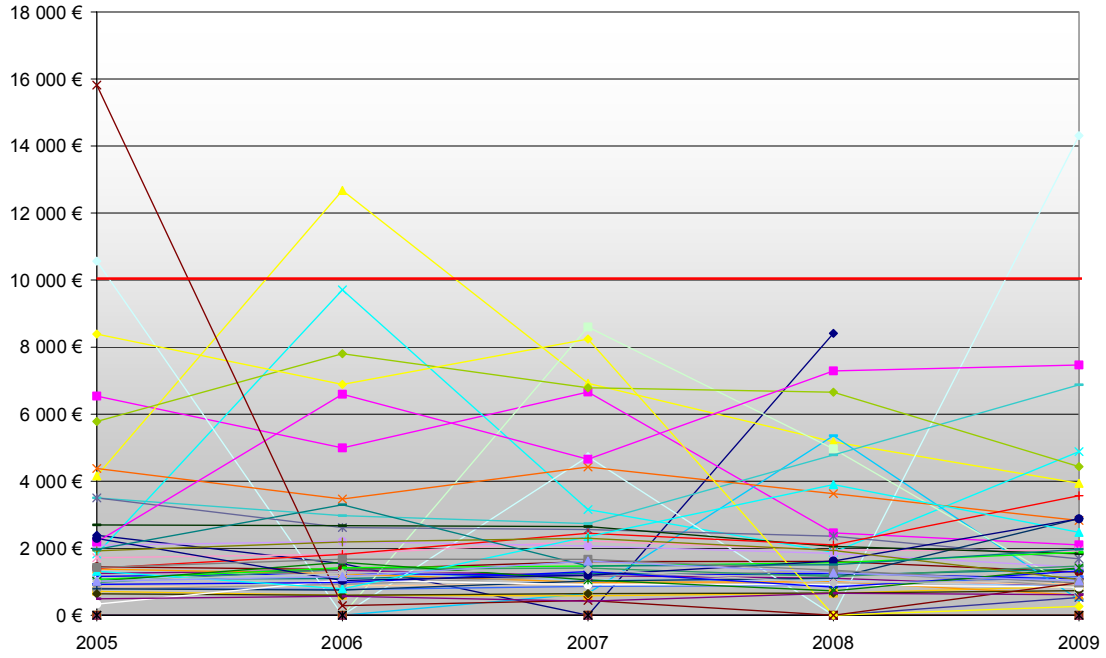

Figure 22: Average value of exported vehicles in € per tonne from Europe to West-Africa. Each line represents one country to country trade. Source: EUROSTAT.

The total weight of vehicle exports from select European countries to select West-African countries is significant and has increased constantly. Passenger vehicles are the second largest import commodity for Nigeria, number eight for Togo and number nine for Benin. The total exports of the EU27 peaked in 2008 with 566 940 tonnes and declined to 531 116 t in 2009 (Figure 23). The coverage of European export by the select countries represents generally more than 97 % of EU27 exports.

The vehicle exports are dominated by Germany (27 % in 2009), UK (24 %), Belgium (24 %) and The Netherlands (11 %). Interestingly, Benin imports the largest amounts of passenger vehicles, dominated by German exports (Figure 25), while Nigeria imports the largest amount of vehicles designed to carry goods (Figure 26). According to customs agents, trucks and vans are preferably used to also carry used and end-of-life goods. Sometimes, the same used chassis or vehicle appears several times in customs declarations, travelling back and forth between Europe and West-Africa.

Normalized to the country's population, Benin and Togo receive more vehicles per capita than Ghana and Nigeria. Furthermore, the UK is much less present in the export to those two countries, similar as for the other categories.

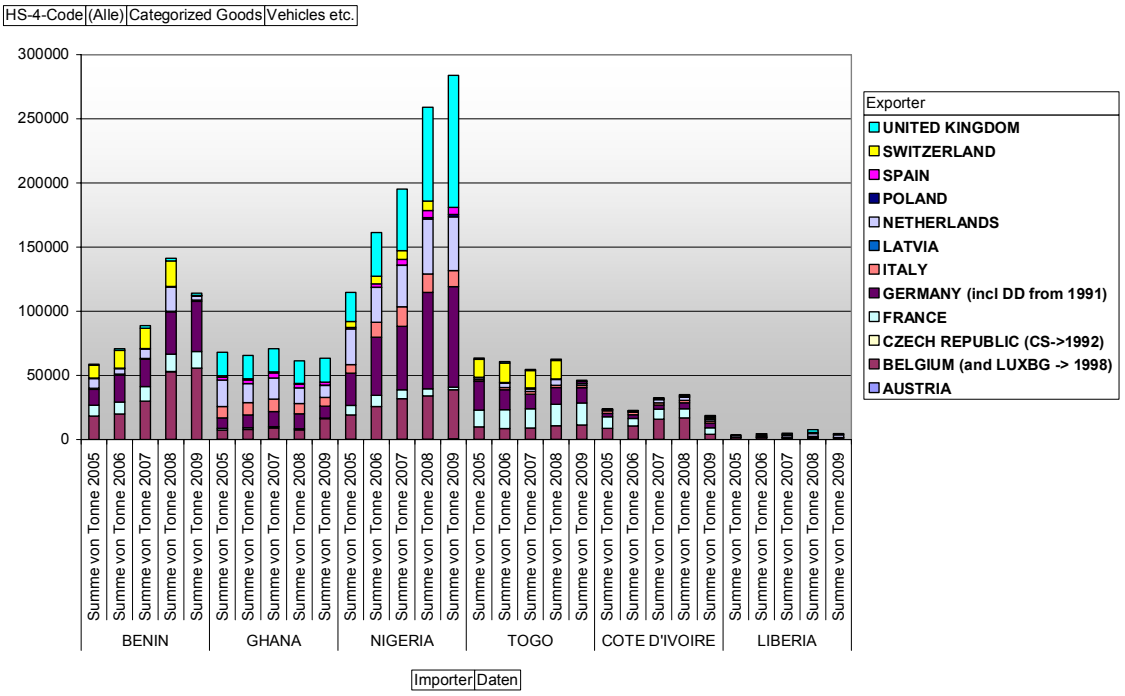

Figure 23: Seaborne import of vehicles in tonnes 2005 – 2009. EUROSTAT data.

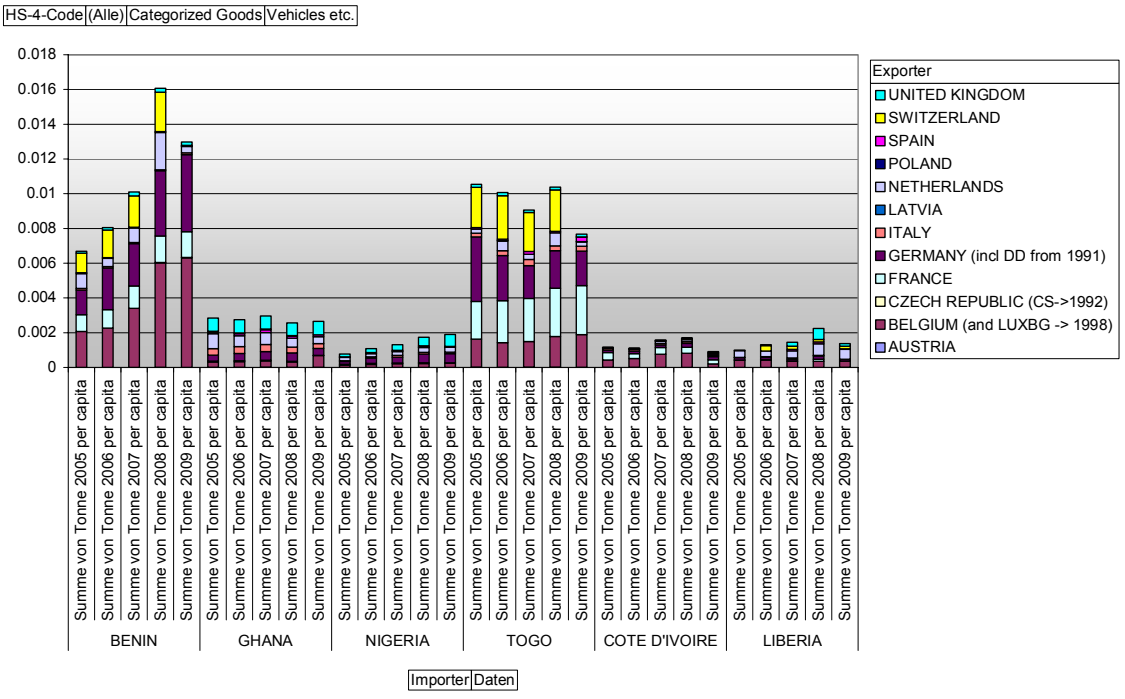

Figure 24: Seaborne import of vehicles in tonne per capita 2005 – 2009. EUROSTAT & CIA data.

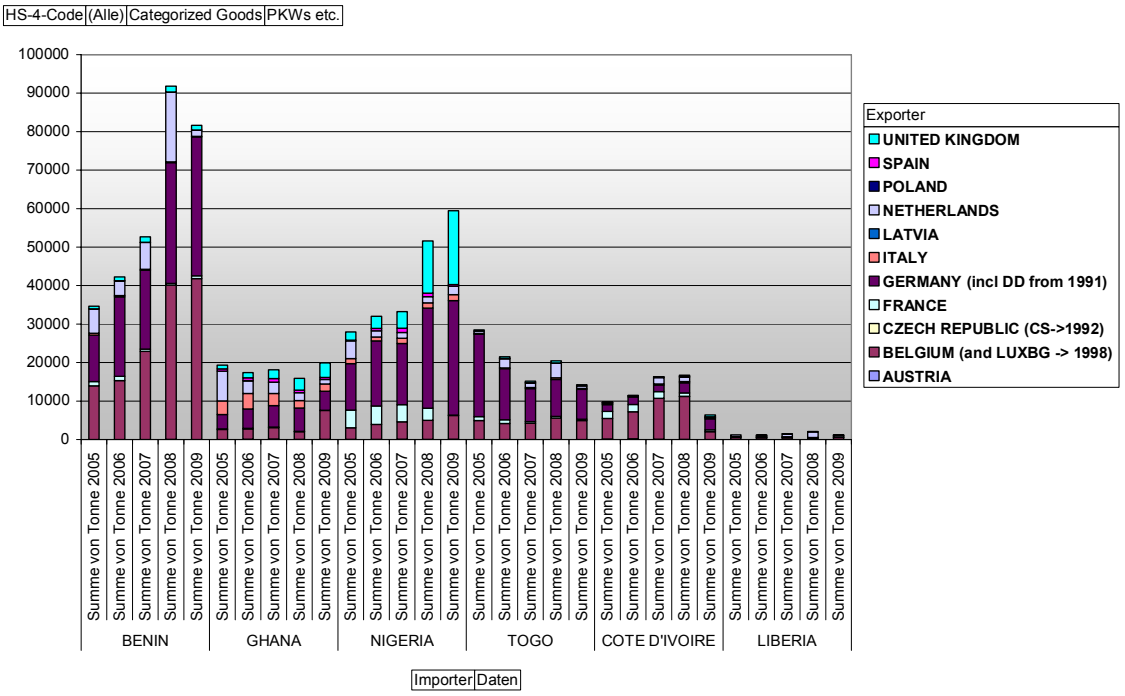

Figure 25: Seaborne import of passenger vehicles in tonnes 2005 – 2009 without Switzerland. EU-ROSTAT data

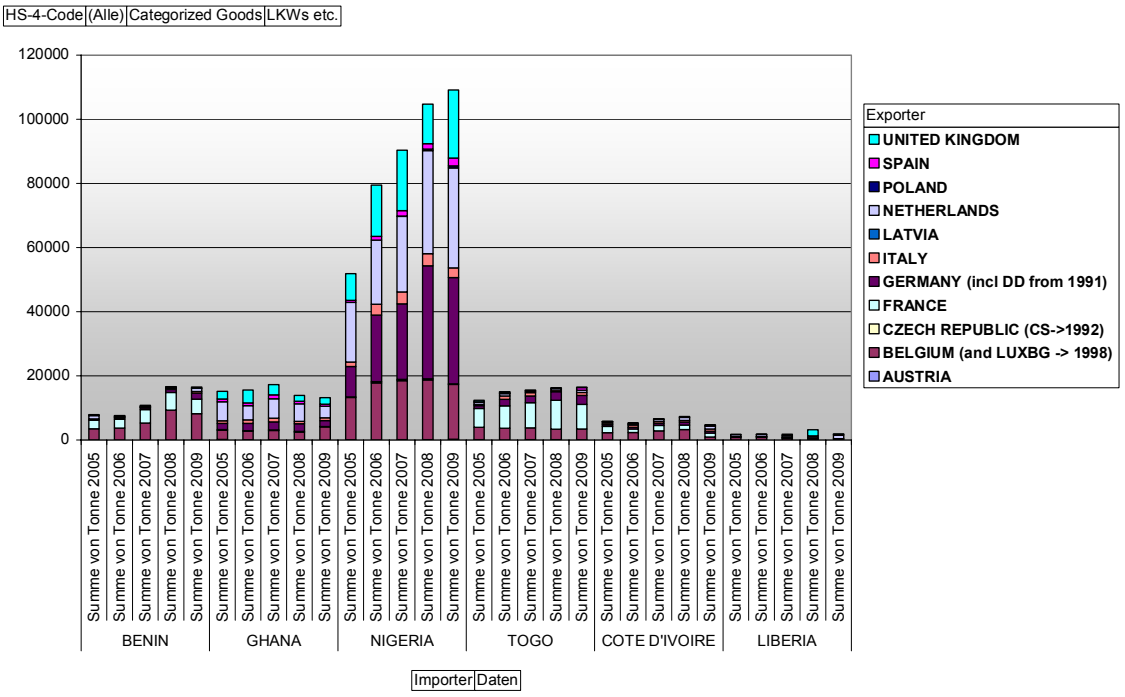

Figure 26: Seaborne import of vehicles designed to carry freight in tonnes 2005 – 2009 without Switzerland. EUROSTAT data

Miscellaneous goods, not elsewhere reported; HS Codes 99 and 99.RR

Another trade category investigated is goods that use the custom codes 99 and subsequent codes for goods that cannot be clearly allocated to any other export category. According to custom agents, those code numbers often contain used and end-of-life goods. Typical and proper example of goods to be declared under HS 99 ff would be private household goods and moving articles.

Miscellaneous goods imports to West-Africa have declined in the past years from 295 525 t in 2005 to 36 824 t in 2007, but again rose to 95 568 t in 2009. Thus the overall amount of not specifically customs declared traded goods is astonishing and changes the export picture dramatically (compare Figure 11 with Figure 27).

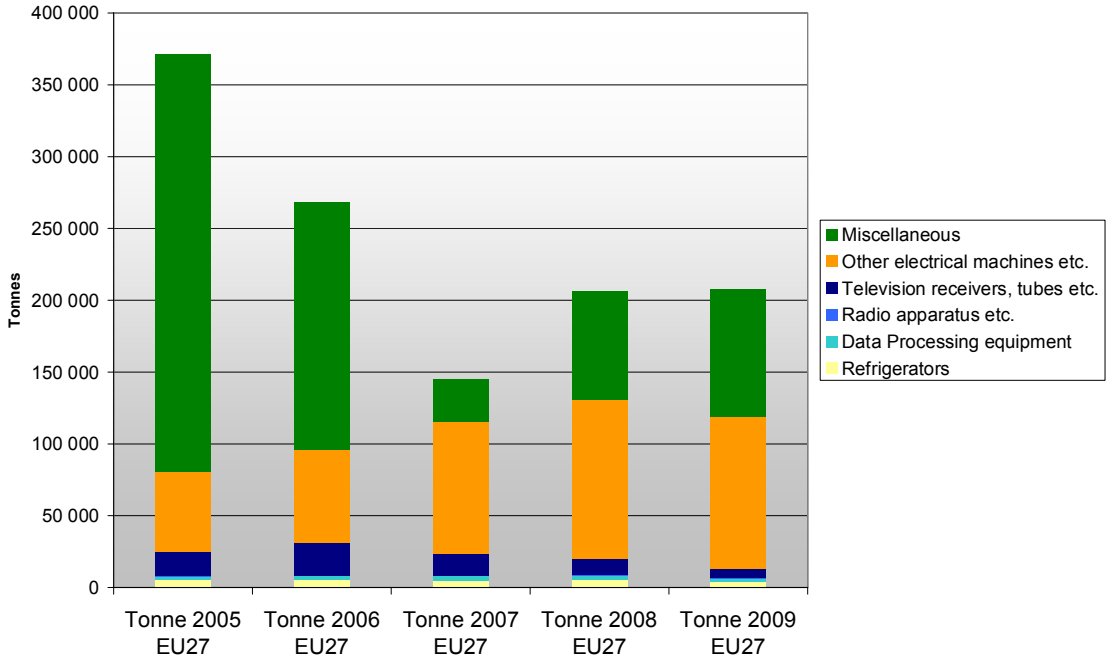

Figure 27: Export of electric, electronic and miscellaneous goods from EU27 to select West-African countries 2005 – 2009. Source EUROSTAT.

Belgium dominates the export of goods reported under HS 99 ff, except for Nigeria, where Spanish exports play a major role. Germany also plays some role in exporting such items to Nigeria, but not to any of the other countries. The other European countries export goods with this declaration only in very small quantities. Benin, Ghana, Togo and Nigeria are the dominant importing countries for miscellaneous goods. While Nigeria receives constantly large amounts of miscellaneous goods, the amounts in Benin, Ghana and Togo show higher fluctuations.

4.3.3 Interpreting the export statistics

The statistical data used lack specifics of the composition of the goods exported. The exports include new and used equipment, although the value per tonne often indicates that a significant portion of the exports are comprised of used equipment. Other estimates assume that 5 % - 16 % of custom declared exports are used or end-of-life electric and electronic equipment, of which 40 % - 50 % were deemed illegal (IMPEL 2006, 2008). Thus we conclude that – despite the fact that the statistical data do not permit deriving numeric values for used and end-of-life exports – the data and its analysis is sufficient to draw qualitative conclusions. Interpreting from the statistics analysis, the following conclusions can be drawn:

- Nigeria is the most dominant importing country for electric and electronics equipment and vehicles, followed by Ghana and Benin.
- The UK is the dominant exporting country for electric and electronic equipment, followed with large distances by France and Germany.
- Germany and Belgium are the dominant exporting countries for vehicles, followed by the UK and The Netherlands. Since it can be assumed that used vehicles dominates the Europe – West Africa trade and much of used EEE and WEEE products are co-shipped in vehicles, this trade is relevant.
- The increase in inter-Sub-Saharan trade of the goods under study indicates that the port of entry is not necessarily within the country of the final destination. The analysis and control of those goods movements would need to extend to neighbouring countries in order to be effective.
- The normalization on a per capita or per GDP basis in the importing countries indicates that in particular Ghana may import more electric machines destined for other African countries. Benin, Cote D'Ivoire and Togo import potentially more goods in other categories destined to other African countries, although at low levels.
- Benin, Cote D'Ivoire and Togo show generally a high share of French imports, which may be explained by traditional relationships between francophone countries dating back until colonial times.
- After a continuous rise of European exports of electric and electronic goods, a decline can be observed since 2008. This may be due to high resources prices in early 2008, which may have made the recycling within Europe or elsewhere more lucrative. Secondly, it is assumed that the purchasing power of West-African consumers have suffered significantly in light of the global financial crisis starting in the second half of 2008 and a subsequent decline of remittances.
- About 15 % to 20 % of the European refrigerator exports were not captured with the selected European countries. A further investigation which other European country exports refrigerators is warranted.
- The case of refrigerators also shows that countries other than Germany, Belgium and The Netherlands (the core countries in focus of the 'port component study') are relevant – here Italy. It may be an indication that exports also utilize other European ports, in particular in Southern Europe. Cooperation of national customs agencies

should reach out to in particular France, Spain and Italy in order to prevent the evasion of used and illegal waste shipments.

- The UK is the dominant country for exports of electric and electronic equipment to West-Africa. This can only partially explained by its colonial history (Nigeria, Ghana and Togo post World-War I were colonies of the British Empire). Together with news of lacking recycling infrastructure in Great Britain, the UK should be one focus of further efforts. Furthermore, the UK may act as European transit country for equipment exports to West-Africa.
- Exports of data processing equipment are generally declining since 2007.
- The large fluctuations in the category data processing equipment may indicate a high share of used goods.
- The Netherlands' sharp decline of data processing equipment exports may indicate successful customs control that made the country less attractive for transit shipments of used and end-of-life goods.
- The relatively high import per capita and GDP of data processing equipment to Benin, Ghana and Togo may indicate that those trades are transit trades.
- Radio reception apparatus trade is not significant.
- The export of television receivers and monitors is on sharp decline since 2006. This may be an indicator that old technology monitors have a sharp declining market value including in countries such as West-African countries.
- With television receivers and monitors it is apparent that German exports are sharply rising, while UK exports are declining. Both countries make nearly 100 % of the television and monitor exports to West-Africa. An intensive control on the legality of these exports from the two countries would be warranted.
- Vehicle trade should be further investigated as potential carrier of used and end-of-life products. While the used vehicles themselves may enter a second useful life and provide income and development in West-African countries, strong indications exist that large amount of co-shipments are transported together with the vehicles.
- Although in 2009 the total amount of vehicles exported declined somewhat (eventually due to the vehicle take-back rules in Germany), the vehicle exports from Europe to West-Africa are generally increasing.
- Vehicle exports are declared mainly by four European countries – Germany, UK, The Netherlands and Belgium – probably due to suitable vehicle loading and port infrastructure in those countries. Although while such infrastructure may move to other ports, its relocation is more challenging than the rerouting of containers. Vehicles are furthermore transported by dedicated roll-on-roll-off vessels, operated by a limited number of carriers.
- Nigeria is the main recipient of vehicles for the transport of goods. Those in particular are often used as 'transport packaging' of used and end-of-life products.
- Miscellaneous goods not declared elsewhere are a significant share of the imports to West-African countries. Since they originate mainly in only two European countries – Belgium and Spain – those countries should further investigate in the characteristics of those goods.

5 Conclusions

The Component 1 on flows of used and end-of-life e-products from Germany, The Netherlands and Belgium aims to identify particular pathways and stakeholders that play major roles in the export of used and end-of life EEE to West-African countries. The major concern for the overall project is to develop guidance on managing the potential health risks and environmental hazards that stem from such exports and their subsequent, potentially unsound, treatment.

Concluding from the component 1 analysis it can be stated that it is difficult – if not impossible – to exactly quantify the flows of used and end-of-life EEE from Europe to West-Africa. The available data and expert opinion only allows for qualitative assessments, because the current statistical systems are not set up in ways that would capture those exports. Moreover, in order to disguise illegal shipments false or general custom declarations are used and there is still a grey zone to distinct used EEE and WEEE.

The statistical trade data used lack specifics of the composition of the goods exported. The exports include new and used equipment, although the value per tonne often indicates that a significant portion of the exports are comprised of used equipment. Other estimates assume that over 10 % of all custom declared electronics exports are used EEE or WEEE. According to the customs agents interviewed, up to 80 % of targeted exports for inspections have at least problematic customs declaration and potentially up to 90 % of all used EEE exports are co-loaded with cars. Thus we conclude that while the statistical trade data do not permit deriving numeric values for used and end-of-life exports, they are sufficient to draw qualitative conclusions. In summary some key findings can be made based on trade statistics:

For particular goods under investigation, the UK is one major exporting country while Nigeria is the dominant importing country in West-Africa. The over-proportional share of UK exports indicates that either WEEE generated in the UK does not reach national treatment facilities or that the UK acts as transit country to West-Africa. In some categories, such as television sets, other countries such as Germany also stand out. Furthermore, since it is assumed that many used and end-of-life e-products are also shipped together with vehicles, vehicle exports are also relevant. Here, Germany and Belgium are the dominant exporters. An increase in inter-Sub-Saharan trade indicates that cross trade between West-African countries also plays some role.

Some product category export declarations show a declining trend, which may be due to changes in the marketability of those products (e.g. CRT monitors), but may also stem from evasions from certain declaration categories. The European – West-African trade in the brought statistical category ‘electrical machineries’ and ‘vehicles’ have been increasing steadily, while those of particular goods (e.g. television sets) show declining trends. With regard to refrigerators, a significant number is exported from other countries than those under study. Here, a further investigation would be warranted.

Another observation is that trade categories such as “miscellaneous, not elsewhere reported” can be of significant magnitude. It is recommended to particular focus in inspections on exports that are declared without specific link to the products. As a general conclusion from the investigation into the trade statistics, it can be concluded that a trade category for “used” goods would be a helpful addition. It is expected that traders would use such codes, since it can be assumed that due to complicated distinction between used EEE and WEEE not every trader is aware of the potential illegality of his exports.

The study also revealed that for certain products, trades are declared in European countries other than the countries under study. Those countries include in particular France and Italy. A wide network of ocean carrier lines including transit ports can be observed, that make literally every European port to a potentially exporting port for WEEE. It is assumed that traders and ocean carriers easily shift the ports and countries of departure. Thus, a thorough management of the flows of used and end-of-life e-products from Europe to West-Africa would need to include the authorities in all relevant European port states, particularly those in Southern Europe. Therefore it is recommended to improve the cooperation between the competent authorities on the working level (e.g. with exchange programs between inspectors at MS ports) and the exchange of data (e.g. on suspicious traders of WEEE).

What is missing in Germany, the Netherlands and Belgium – the sample European countries that can stand as representative for the entire community – are adequate incentives for producers and end-consumers to ensure a proper disposal of WEEE. Despite that the WEEE Directive established a take-back system and quotas, it must be observed that it remains cost effective and convenient for stakeholders in the take-back chain and end-consumers to utilize informal networks of WEEE take-back. The existing system also does not establish closed chains of responsibilities throughout the entire life-cycle, but rather disconnects the waste management from production and end-user.

From the interviews with enforcement and customs agents it becomes clear that the issue of WEEE export from Europe cannot be fully solved by export controls. As interviewed stated it is a bucket with holes, where the detected problematic shipments rises analogue to the amount of controlled shipments. All customs and enforcement agencies complained about insufficient staffing and issues of national competencies. The process of international notification is often too rare and too slow so that even suspicious containers end up on board of vessels from which point they are unlikely to be returned.

It could be concluded that only a complete export ban of used and end-of-life e-equipment would provide instruments to dismantle the current trade-routes. However, this is not possible under word trade regulations in place and probably neither in the interest of the importing countries.

As an alternative:

- "used" and "warranty" equipment categories for trade should be introduced swiftly.
- Each "used" equipment would need to adhere to national criteria for "used EEE" and WEEE. The criteria of the importing countries or the most stringent should be applied. The adherence should be documented through independent system of certification and verification.
- All not as "used" or "warranty" declared and traded pieces of equipment that are not new could then – prima facie - be classified as illegal waste, which would fall under the Basel Convention.

With those measures in place it can be assumed that the real flow of used and end-of-life e-equipment would become more transparent, allowing for proper establishment of treatment and resource recovery systems in the destination countries. It can further be assumed that the tracking and enforcing of "illegal" shipments would become easier, because of the simplification in the categorization of "legal" and "illegal".

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7 List of Interviewed

The following persons were interviewed either on the telephone or in person between November 2009 and April 2010:

Name	Organization	Date
A.M. (Arie) Witte	Senior assistant-inspector at VROM-Inspectorate, Haarlem, The Netherlands.	11th of March 2010
A.J.M. Post	Assisstent Inspector at VROM-Inspectorate, Haarlem, The Netherlands.	11th of March 2010
Leo Buckers	VROM-Inspection, Rotterdam, The Netherlands.	11th of March 2010
Enno Christian	VROM-Inspection, Rotterdam, The Netherlands	11th of March 2010
Marc de Strooper	Technical Controller of waste transports at Health, Food Chain Safety and Environment (FPS), Brussels, Belgium.	12th of March 2010
Jeannine Pensaert	Attaché at Health, Food Chain Safety and Environment (FPS), Brussels, Belgium.	12th of March 2010
Thomas Wagner	Schrott.de, Germany	28th of January 2010
Mr. Storch	BRAL, Germany	18th of February 2010
Van Peterson	Grimaldi Line	2nd of February 2010
Thierry Bonnetete	CMA-CGM	23rd of February 2010
Mr. Bröhl	Werkstatt Frankfurt, Germany	3rd of February 2010

8 Annex I: Legal Background on the take back of EEE

The informal sector plays an important role in the export of used EEE and WEEE from EU to non-EU countries. Possible leakages will be explained in chapter 4. In order to understand the leakage of used EEE and WEEE from the formal sector in Germany, The Netherlands and Belgium to the informal sector, the legal background of the take back system in the three countries will explained in this chapter.

8.1 Used EEE and WEEE in Germany

8.1.1 Electrical and Electronic Equipment Act (Elektro- and Elektronikgerätegesetz - ElektroG)

According to the Electrical and Electronic Equipment Act[10] (Elektro- and Elektronikgerätegesetz - ElektroG) producers are obliged to take back end-of-life electrical and electronic equipment (WEEE) and either reuse, recycle or dispose of the collected items according to ecological standards. The ElektroG contains different regulations for WEEE from the commercial sector (B2B) and from private households (B2C):

Collection of WEEE from commercial sector (B2B):

According to Art.10 para 2 ElektroG producers are responsible for the disposal of WEEE from the purely commercial sector, provided it is electrical and electronic equipment that is placed on the market after 13 August 2005. Holders are responsible for equipment placed on the market before 13 August 2005. Producers and users may reach an agreement which departs from the before mentioned provisions. The party responsible for disposals shall either reuse WEEE or its components, treat or dispose of it in compliance with the provisions of the ElektroG and shall bear the costs of disposal.

The definition of B2B equipment depends on fact whether the equipment in practice is used exclusively by businesses, determined by the characteristics of the equipment (e.g. the type and place of use, special preconditions for the use of the equipment, qualified personnel). The distribution channels (e.g. delivery only to commercial distributors) are not relevant for the classification as B2B equipment.

B2B equipment shall not be delivered to public collection sites of local authorities and collected with WEEE from private households and therefore will not profit from the free of charge take-back obligations. Producers are not obliged to collect the B2B equip-

[10] Act Governing the Sale, Return and Environmentally Sound Disposal of Electrical and Electronic Equipment, as of: 23rd March 2005, Federal Law Gazette BGBl. I, p. 762.

ment. Furthermore producers must not pay a financial guarantee for the B2B equipment at the EAR.

Collection of WEEE from private households (B2C):

Since 24th March 2006, the disposer (consumer) of WEEE has been obliged to discard their WEEE in a system which is separated from the residual waste stream.[11] Public waste management authorities remain responsible for the collection of WEEE from private households. The procedure for collection is widely within the discretion of the local authorities. In any case they must ensure that private households can return WEEE free of charge (bring-back system). The number of collection points to be set up and the combination with collection systems is to be based on population density, other local conditions and the waste management objective of the greatest possible level of collection. Smaller municipalities may set up a joint collection point. A dealer that has taken over equipment (e. g. a washing machine) from a private household may also return this equipment free of charge to the collection point of the respective local authority. The local authorities may refinance the costs for collection via waste charge. Local authorities shall hold the WEEE available for collection by producers, separated into five groups (containers). Classification into the five groups will be decided on basis of technical disposal considerations.

The five categories are:

- large household appliances and automatic dispensers (Category 1),
- refrigerating appliances (Category 2),
- IT and telecommunications equipment and consumer equipment (Category 3),
- gas discharge lights (Category 4) and
- small household appliances, lighting equipment, electrical and electronic tools, toys, leisure and sports equipment, medical, monitoring and control instruments (Category 5).

Local authorities can also arrange for the disposal of WEEE themselves or commission a third party to do so: By providing three months' notice to the Clearing House (EAR[12]), the local authorities may choose not to make all the WEEE in a specific group available for collection for a period of at least one year. In this case they must also ensure that treatment and recovery requirements are met.

The main responsibility for the management of WEEE according to the EletkroG rests with the producers. ‘Responsibility’ covers the following issues:

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[11] Users of non-household WEEE - be it historical or WEEE of products sold after 13th August 2005 - may arrange solutions for keeping waste out of disposal with producers.

[12] The EAR is the focal point for information concerning the management of WEEE for public authorities and the private sector and it supports decision-making. The ElektroG provides that the clearing house be constituted with a council, whose members are producers, retailers, public entities responsible for waste management, representatives at the Federal level and from the German Länder (states), and consumer and environment protection associations (see: http://www.stiftung-ear.de/).

- Producers must take back WEEE collected from private households by public waste management authorities;
- Producers must provide public waste management authorities with containers for WEEE to be set up at collection points and must collect the containers in a timely manner when a certain volume is reached in a WEEE group;
- Organizing the transport and treatment of WEEE from the public collection site to the treatment facilities;
- Controlling whether old appliances can be reused;
- Removal of certain substances, according to the WEEE and ROHS Directive;
- Meet concrete recycling and recovery quotas for disposal;
- Informing consumers about the possibilities and the necessity of sound management of WEEE;
- Reporting of relevant data to the clearing house.

8.1.2 Competent Authorities / Compliance system

The Electrical and Electronic Equipment Act designates the responsibilities of "registering", "coordinating collection" and "issuing instructions for the provision of containers" to the Federal Environmental Agency (UBA) as the "Competent Authority" (central register). However, the Act provides for the competent authority to transfer these responsibilities by means of designation to the Clearing House of the producers.

In August 2004 the business associations ZVEI and Bitcom affected set up the foundation “Stiftung Elektro-Altgeräte Register- EAR” (Elektro-Altgeräte Register - WEEE register) based in Fürth/Bavaria. The EAR foundation is to fulfil the responsibilities of the Clearing House of the producers and will be available for designation by the Federal Environmental Agency.

The role of the EAR as clearing house is:

- registering producers placing EEE on the market in Germany for B2B as well as B2C equipment;
- Before producers can place EEE on the market in Germany, they have to provide a guarantee, i.e. insolvency-proof financial guarantee, independently of whether producer comply in groups or individually, that covers the cost of sound disposal of the household appliances that the producer plans to sell after 13th August 2005.
- Based on a formula, the Clearing House determines the collection volumes for the individual producer and calculates an even temporal and regional distribution of WEEE collection quotas among all producers.
- It also compiles data inter alia on equipment placed on the market, taken back and recovered equipment, and it submits the data to the Environmental Agency (Umweltbundesamt).
- The supervision of the transport of WEEE from the collection site to the treatment facility.

The EAR has no operational functions, like the take-back, dismantling, sorting or disposal of WEEE.

Once a certain amount of a category of WEEE has been collected, the municipality informs the clearing house. The clearing house decides to which of the five categories the appliance belongs, and calculates the respective volume of WEEE (including historical WEEE). The volume is important for the financing of WEEE waste management.

Concerning WEEE from private households (B2C) the ElektroG regulates:

From 24.03.2006 on producers must finance the waste management of "historical" WEEE (equipment put on the market before 13.08.2005) calculated on the basis of the producer's market share at the time the WEEE management costs arises.

Regarding "new" WEEE (equipment put on the market after 13.08.2005) producers are only responsible for financing the collection, treatment, recovery and disposal of their own products. To this aim the producers have to pay a financial guarantee.

Concerning business equipment (B2B) the ElektroG regulates:

Whereas the holder of historical WEEE (equipment put on the market before 13.08.2005) is responsible for financing the costs of disposal, the producers are responsible for the waste management of "new" WEEE (sold after 13.08.2005).

Furthermore, the clearing house has an obligation to inform the general public of disposal possibilities. It is not allowed to conclude or arrange contracts with disposal enterprises.

To raise the awareness of the general public, the ElektroG introduces obligations for producers, the clearing house and the competent authorities of the region (e.g. Bavaria) to inform the users of WEEE about the importance of collecting and recycling WEEE. To increase the efficiency of the treatment of WEEE, the producers have a duty to inform treatment facilities about the features of their products within a year of their placement on the market.

As a key instrument to measure the impact of the ElektroG, producers have the following monitoring obligations, i.e. they must collect and transfer data on the following aspects of WEEE management:

- Amount of products introduced to the market on a monthly basis;
- Annually recovered appliances by public collection site;
- Volume of collected, recycled, reused, recovered and exported appliances.

This information concerns the volume, components and materials of WEEE going into the first-treatment facility, coming out of that facility and going to recovery facilities. The so-called 'first-treatment site' is subject to an obligation to provide this information to the producers. Furthermore, the first-treatment facility is subject to an annual certifica-

tion. This certification will only be issued if the site proves that it can provide the data required by the producer.

8.1.3 Collection of WEEE

Recycling of waste

The first statistical figures concerning recovery, recycling and re-use of WEEE in Germany after the entering into force of the ElektroG are available for 2006. Statistics show that for B2C equipment the EU collection target of 4 kg per person per year are more than fulfilled with 8 kg WEEE per person per year in Germany.[13] Regarding the quota of the WEEE-Directive for the year 2007 for recovery (including energy recovery) and recycling (including re-use of components) Germany fulfils them already in the year 2007.

Nevertheless, it is questionable whether all the main purpose of the ElektroG are achieved. According to Art. 1 ElektroG the law aims to prevent waste from electrical and electronic equipment and to promote reuse, recycling and other forms of recovery to reduce both the volume of waste. The recovery and re-use of used equipment is hampered by the demolition of WEEE during collection or transport. Expert from the waste management branch claim the demolition rate of WEEE collected after the introduction of the ElektroG has increased significantly and the re-use quota fell from 10 % before 24.03.2006 to 3% in the year 2007. As reasons the diverged duties and responsibilities for collection and further treatment are stated. While the local authorities are responsible for the local collection and sorting of WEEE, producers are responsible for the re-use and recovery of WEEE – if not the local authorities bring the equipment to the market. Moreover as a consequence of the ElektroG many traditional and well-rehearsed business relationships between local authorities and waste management companies were cancelled. Producers commission supra-regional companies with the consequence that local companies have lost their “influence” on the collection and transport of WEEE (Enzinger 2007).

8.1.4 Financing the system

Producers have to guarantee the financing of the collection and treatment of their products by participating in a collective system or by setting up an individual compliance scheme. The disposal costs for Category 1 WEEE from private households may be indicated to the customer at the time of purchase up to 13 February 2013, and up to 13 February 2011 for all other categories of WEEE that come from private households and which were placed on the market before 13 August 2005. The costs indicated must

[13] Federal Environmental Ministry (BMU), Data on EEE in Germany in the year 2006 - BMU Explanations for the report to the EU-Commission, 5.09.2008, p. 2.

not exceed the actual costs incurred. Indication of disposal costs for electrical and electronic equipment placed on the market after 13 August 2005 is prohibited.

With the second amendment of the "Ordinance on fees regarding the ElektroG" (Zweite Änderungsverordnung zur Kostenverordnung zum ElektroG) having entered into force on 1st January 2008, the Federal Environmental Ministry has proposed a decrease in fees of up to 40%. Nonetheless, for 2008, the Federal Environmental Ministry predicts that the overall costs of the system, as financed by fees from producers, to be approximately €5,800,000.[14]

The consequences and behaviour of business and communities after two years experience with the new regulation can be summarized as follows:

Following the full implementation of free of charge disposal (24th March 2006), producers announced that they would re-finance the costs with price increases for new products. It is still unclear whether this has happened and to what extent. Gotthard Graß (General Executive Manager of the ZVEI) was reported as saying: "I expect that the prices for new appliances will increase." For some electric appliances like washing machines, recycling has probably been cost-neutral due to the high price received for scrap metal, of which there is a considerable quantity.

Experts have different opinions on whether the free of charge collection system for WEEE will lead to falling or even rising waste disposal charges of the local communities. It is reported that some municipalities will increase waste disposal charges, arguing that they will have to enlarge and reconstruct their collection points in order to comply with the ElektroG. By contrast, the German Environmental Ministry and the Bitkom-expert Mario Tobias, are of the opinion that waste disposal charges should fall, because following the new regulations, communities no longer have to pay for the transport and recycling the WEEE anymore, they only have to collect it. A speaker of the German Environmental Ministry is cited as saying that waste disposal charges are not very transparent anyway, as it is not known which other costs are covered as part of the charges.

[14] Second Amending Ordinance on the Cost Ordinance on the Electrical and Electronic Equipment Act, in the version of 6 July 2005 (Federal Law Gazette I 2005, p. 2020), last amended by Article 1 of the 2nd Ordinance Amending the Cost Ordinance on the Electrical and Electronic Equipment Act of 5 December 2007 (Federal Law Gazette I year 2007 p. 2825).

8.2 Used EEE and WEEE in the Netherlands

8.2.1 Waste Management Regulation and Electrical and Electronic Equipment (Management) Decree (BEA)

The Management of WEEE in the Netherlands is regulated with the WEEE Management Regulations[15] and the Electrical and Electronic Equipment (Management) Decree (BEA)[16] coming into effect in 2004. From that date the relevant producers and importers are responsible for the environmentally-friendly collection and recycling of the products they have sold on the Dutch market.

8.2.2 Competent Authorities / Compliance System

There are two collective schemes for recycling WEEE running in the Netherlands:

- The NVMP Foundation (the Dutch Foundation for the Disposal of Metal and Electrical Products)[17]

  The NVMP Foundation has been commissioned to implement the system. The Association was established on the initiative of the FME-CWM Association. More than 1,200 producers and importers have since affiliated themselves to the Association. The foundation is also responsible for managing the financial resources that are deployed to fund the system. Those resources are obtained from the 'disposal levies' charged to purchasers when new equipment is sold.

  The NVMP Foundation is also responsible for providing information about the disposal system, the disposal levy, monitoring and reporting to the Ministry for Housing, Regional Development and the Environment (VROM), and communication with producers, importers, retailers, collection and transfer centres, government bodies and consumers.

  To fulfil its aims the NVMP Foundation has set up a collective disposal system for the collection and recycling of discarded equipment covered by the Decree. All producers or importers may affiliate themselves to the Foundation.

  They can do this by participating in one of the following foundations:

  - White Goods Foundation,
  - Brown Goods Foundation,

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[15] Regulations laid down by the State Secretary for Housing, Spatial Planning and the Environment, on 19 July 2004 under reference no. SAS\2004072357, relating to waste electrical and electronic equipment (WEEE Management Regulations), in the following: WEEE-Regulation.

[16] WEEE Management Decree of July 6, 2004 establishing rules fort he management of waste electrical and electronic equipment and fort he use of certain hazardous substances in electrical and electronic equipment at the proposal of Minister of Housing, Spatial Planning and the Environment dated 14 May 2004, no. MJZ2004048257, in the following: WEEE-Management.

[17] See the homepage at: www.nvmp.nl.

- Foundation for the Removal of Central Ventilators,
- Foundation for the Disposal of Electrical Tools,
- Foundation for the Recycling of Metal and Electrical Products and
- Netherlands LightRec Foundation.

- The ICT Milieu Scheme[18]

  The take-back scheme of ICT Milieu covers IT, office and telecommunications equipment and was funded by 160 participating manufacturers and importers. Producers and importers participating are responsible for the collection and recycling of all "grey" goods, not just their own brands as it was the case before 2003. Appliances are taken back from all sources, like resellers, repair centres and local authorities. Participating companies are charged according to their market share. Accordingly companies have to report the total weight of equipment in each product category placed on the market in a 12-month period.

8.2.3 Collection of WEEE

According to § 2 Section 3 WEEE-Regulation the local authorities shall bear the responsibility for the separate collection of WEEE. To this aim each municipality must provide at least one location within the municipality where final holders and distributors can return end-of-life electrical and electronic equipment from private households free of charge.

Under an "Old for New"-provision distributors of new products must take back old items of end-of-life electrical and electronic equipment from private households on return for a similar new product (§ 2 section 4 WEEE-Management).

Without prejudice to the collection of the municipalities, producers may introduce and operate their own systems for taking back WEEE from private households, if such a system is consistent with the objectives of the WEEE-Directive (§ 2 section 6 WEEE-Regulation).

From 13 August 2005 at the latest, producers shall provide for the separate collection of WEEE originally produced by them from local authority and retail collection points.

8.2.4 Financing the system

The WEEE-Regulation contains different provisions regarding the finance mechanisms for WEEE from the commercial sector (B2B) and from private households (B2C):

WEEE from commercial sector (B2B)

[18] See: www.ictoffice.nl.

Producers shall finance the management of WEEE from private households produced by them and placed on the market after 13 August 2005 (§ 5 section 11 (1) WEEE-Management).

WEEE from private households (B2C)

Producers are responsible for financing and organising the management of WEEE from private households produced by them and placed on the market after 13 August 2005 (§ 5 section 12 (1) WEEE-Management).

Regarding EEE put on the market before the before 13 August 2005 (historical waste) the discarders shall finance the management of that waste. The management of the historical waste is financed by a producer according to an extent proportional to his market share at the time that the waste management costs were incurred (§ 5 section 11 (2) WEEE-Management).

The responsibility of the producers starts from the moment when an appliance is returned to the collection point or to the distributor (§ 5 section 11 (3) WEEE-Management).

The costs of the waste management shall not be made known to buyers of a new product as a separate item (§ 5 section 11 (6) and (7) WEEE-Management). For large Household appliances up to 13 February 2013 and for appliances falling under category 1 of Annex IA of WEEE-Directive up to the 13 February 2011 purchasers may be informed about the costs of managing the historical waste, if disclosed figures do not exceed the actual cost. However, for ICT products no visible fees are allowed.

8.3 Used EEE and WEEE in Belgium

Belgium had implemented electronic waste disposal legislation prior to the EU WEEE Directive. In Belgium the responsibility for the management of WEEE lies with the three Regions:

- Flanders,
- Wallonia and
- Brussels Capital.

Each region enacted its own WEEE regulations in line with the EU WEEE Directive, but with individual differences. Nevertheless, all producers and importers of electronic equipment must register with the Regional Environmental Administrations. On a national level, the directives are enforced by Belgium's Federal Public Service Health, Food Chain Safety and Environment agency.

8.3.1 Flemish Region

Regulations concerning the management of end-of-life electrical and electronic equipment (WEEE) in the Flanders (Flemish) Region are implemented by amendments to

the Waste Prevention and Management Ordinance (VLAREA) and came into force on December 1st 2004.[19]

8.3.2 Walloon Region

In Wallonia, an amendment to the existing Producer Responsibility Decree which came into force on June 3rd 2005[20] demands take-back obligations from the producers and importers of EEE.

8.3.3 Brussels Capital Region

In the Brussels Capital Region, a decree of June 3, 2003 imposed take-back obligations on producers. A second decree on June 3, 2004, established obligations for processors.[21]

8.3.4 Competent Authorities /Compliance System

Since 2001 the non-profit organisation Recupel[22] organizes the entire process of collection and treatment for seven sectorial organisations:

- BW-Rec - Large household appliances, professional large and small white goods and dispensers,
- Recupel AV - Domestic and professional audio-video appliances,
- Recupel SDA - Small household appliances,
- Recupel ICT - IT, telecommunication and office appliances, professional IT appliances and dispensers,
- Recupel ET&G - Domestic and professional electrical and electronic (garden) equipment,
- LightRec - Lighting equipment and gas discharge lamps and
- MeLaRec - Medical aids, laboratory equipment, sports equipment, thermostats, test and measuring equipment, blood glucose meters and smoke detectors.

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[19] Decree of the Flemish Government of July 14, 2004 modifying the decree of the Flemish Government of December 5, 2003 enacting the Flemish regulations concerning the prevention and management of waste, Official Journal, October 8, 2004 (transposition of Directive 2002/96/EG). Last Amendment by: Decree of the Flemish Government of February 13, 2009 modifying the decree of the Flemish Government of December 5, 2003 enacting the Flemish regulations concerning the prevention and management of waste, Official Journal, April 1, 2009.

[20] Decree of the Walloon Government of April 25, 2002 introducing an obligation to take-back certain waste with a view towards its recovery or management, Official Journal, June 18, 2002, as modified by the Decree of the Walloon Government of March 10, 2005, Official Journal, April 18, 2005.

[21] Decree of the Council of the Brussels Capital Region of June 3, 2004 modifying, concerning waste electrical and electronic equipment, the Decree of the Council of the Brussels Capital Region of July 18, 2002 introducing an obligation to take back certain waste with a view towards its recovery or elimination, Official Journal, July 28, 2004 (partial transposition of Directive 2002/96/EG).

[22] See the homepage: http://www.recupel.be/.

These 7 non-profit organisations, together with the professional federations, active in the sector of electrical and electronic appliances, are the founders of Recupel, the executing body.

National legislation obliges each importer or manufacturer that markets an electric or electronic appliance in Belgium to also take responsibility for the collection and recycling of end-of-life electrical and electronic appliances, i.e. importers and manufacturers are required to take back old appliances at the end of their lifespan and provide for their recycling.

8.3.5 Collection of WEEE

Basically, the WEEE legislations of all three regions in Belgium make every producer (or importer) responsible for the take-back and environmentally sound management of the waste of the electrical and electronic equipment. Producers and importers who have put EEE on the market after August 13th 2005, are required to provide arrangements for the collection, treatment, recycling and recovery of WEEE that is discarded (historic WEEE). Producers and importers are also required to provide arrangements for the collection, treatment, recycling and recovery of any new electrical and electronic equipment they put on the market after August 13th 2005, when that new equipment eventually becomes waste. This is referred to as New WEEE.

In practice, there are two options:

- To join a collective system that carries out your administrative and logistical obligations. In Belgium, there is for the moment only one collective system “Recupel”.
- Producers and importers taking care of the collection and treatment of the WEEE themselves by introducing an individual waste management plan. This plan gives the government detailed information on how the financing, collection, recycling and reporting will take place and hast to be approved by the three regions. Companies must submit their own waste management plan to the relevant regional authorities:
    - Région wallonne:

      Office wallon des Déchets (DGRNE - OWD)[23]
    - Région de Bruxelles-Capitale:

      Institut bruxellois pour la Gestion de l'Environnement (IBGE)[24]
    - Région flamande:

      Openbare Afvalmaatschappij voor het Vlaamse Gewest (OVAM)[25]

[23] http://environnement.wallonie.be/.

[24] http://www.ibgebim.be/.

[25] http://www.ovam.be/jahia/Jahia/pid/5.

When companies join the collective system or send in an individual waste management plan, they will be automatically registered. In the near future a centralized registration database for the 3 regions together will be organized.

Recupel collects B2C WEEE through six product divisions and all B2B categories since the 1st of January 2007.

Furthermore Recupel collaborates with shops, container parks and used-good centers in organising the collection of end-of-life equipment. Reusable appliances can also be given to used-good center, where the equipment is refurbished and sold second-hand.

Appliances which are no longer usable can discarded at the container park of the municipality or of the intermunicipal company. Moreover the law obliges retailers to take back an old appliance, free of charge, upon the purchase of a new, equivalent appliance.

8.3.6 Financing the System

The finance mechanism for WEEE from the commercial sector (B2B) and from private households (B2C) is different:

WEEE from commercial sector (B2B)

For household appliances, an all-in contribution is charged. This all-in contribution is used to finance the costs for the collection, sorting, transport and treatment of discarded appliances that are taken back to the container park or to the store at the time of purchase of a new, equivalent product. A part of this contribution is used to finance the coordination and communication by Recupel (administration, reporting, audits).

The amount of the all-in contribution varies per WEEE product group and is calculated on the basis of the average weight of the product group, the components of the various electrical and electronic appliances, the collection percentage, the treatment technique, the lifetime and other parameters.

WEEE from private households (B2C)

For all professional appliances, an administrative contribution is charged when the product is put on the market. This administrative contribution is used to cover reporting and administrative costs. For most appliances subject to an administrative contribution, a retroactive declaration has been in effect since 1 July 2005. This is an informative declaration; the administrative contribution will be invoiced as from the declaration of January 2007. This administrative contribution is not refundable.[26]

[26] Ministerial Decree of July 18, 2005 on the determination of additional rules for charging collection costs on container parks by producers in the framework of the take-back obligation, Official Journal, August 31, 2005.

9 Annex II: Questionnaire for stakeholder interviews (surroundings of harbours and management of used EEE)

Questionnaire for stakeholder interviews (surroundings of harbours and management of used EEE)

Part A: Stakeholders in the surroundings of harbours (Antwerp & Amsterdam).

- What is Your organizations responsibility regarding the export of WEEE / used EEE?
- How is the control of WEEE organised and which are the control strategies?
- What are typical custom codes used for the (illegal/legal) export of used EEE?
- What are the typical types of WEEE / used EEE exported from Your harbour?
- Do You have binding rules for the distinction between used EEE and WEEE and how far are these rules useful in practice?
- Can You quantify the amount of containers controlled and the amount of illegal WEEE detected?
- Can You identify and quantify the amount of WEEE which is trans-shipped, in particular via the ports of Antwerp & Amsterdam, to West-African ports?
- Can You classify and identify the types of traders exporting used EEE from Europe to West-Africa?
- What are the typical sourcing countries of used EEE exported through nearby ports, in particular Amsterdam and Antwerp?
- What are the typical destination countries of used EEE exported from the harbours?
- Can you identify the shipping-lines exporting used EEE from harbours in your jurisdiction?
- Do You have access to the bill of lading and which information is relevant for You?

Part B: Stakeholders in the management of used EEE in Germany, Netherlands and Belgium.

1) Types of used EEE

- Is Your organisation a collection point for used EEE
  ___ from private households ___ from business ___ from wholesaler?
- What types of used EEE are You collecting?
- Which types of used EEE are of special importance as secondary resources?
- Do You select the collected EEE according to quality and age of the equipment? What are criteria for that?
- Are the collected and treated amounts of used EEE reflect your expectations after the take-back obligations were introduced?

2) Pathways for used EEE

- What is Your role in the waste-management of WEEE?
- Who are Your downstream partners for the management of WEEE?
- In which countries are the downstream partners located?
- For which steps of the waste management are the downstream partners responsible for?
- Do have direct contacts to your partners or only via traders?
- Do have direct contract relations or is there a free market for the management of used EEE?
- Where do costs arise from the waste-management and where do profits result from?
- Does the amount of collected WEEE fluctuate throughout the year or over the past years?
- Are You aware of the reasons for such fluctuations? Did the high prices for resources in 2008 affect the collected amount of WEEE?
- Are You aware of in-official ways regarding the disposal, reuse or recycling of WEEE?
- Which pathways have You experienced yourself or heard of?
- If You are co-operating with traders do You follow and have control of the subsequent flow of used EEE?
- Do recyclers and traders contact You in order to acquire WEEE? How often and what are their reasons?