

Holes in the Circular Economy:

WEEE Leakage from Europe



basel action network

Front cover: Electronics Junkyard in the Sriracha area of Thailand where the German LCD was "recycled".
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Holes in the Circular Economy

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A Report of the e-Trash Transparency Project

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Introduction

I first heard the term "leakage" in reference to illegal export of waste about a decade ago, and I laughed. As an American, I was amused by the term. It sounded like classic British understatement -- an all-too polite term for what is most often a criminal activity --an externalization of costs with real consequences in terms of harm to human health and the environment. Over time, the term has caught on in Europe, and we make use of it here in our title. We also make reference to another term which is a clarion call of our time, wholly embraced in Europe and within emerging EU policy -- the "circular economy." If there is a theme of this report, it is that the *circular economy* will never be realized as long as the *leakage* we have documented is allowed to continue.

As I talk to European Recyclers here at the 2019 International Electronics Recycling Congress (IERC), the term "leakage" is a common lament. I find the sentiment reflected perfectly in a statement from the chairman of the newly formed Approved Authorised Treatment Facilities (AATF) Forum -- a UK based consortium of national WEEE processors. In September of last year, Chairman Phil Conran said:

> *"The WEEE Directive was designed to reduce the environmental impact of WEEE disposal and to ensure it was treated under best available techniques. Clearly this is not happening, with significant quantities either being treated in substandard processes or being exported illegally. The emphasis for further work must therefore be to identify this leakage and ensure the full weight of effective enforcement is brought to bear."*[1]

Mr. Norbert Zonneveld, Senior Advisor of the European Electronics Recyclers Association and Recipient of this year's prestigious IERC Cowbell Award here at the Congress summarized the lament this way:

> *"The consequences of leakages are not only the devastating effects on environment and health, but also on the economy because of the disruptive effect on the prize setting of legitimate treatment in the European market place. Illegal trade and treatment is always cheaper and creates the wrong price pressure".*

To be fair, the EU is not the only place where the circular economy is under attack via negative externalities. The EU offences we have revealed are less flagrant than those we found taking place in the United States. If Europe is leaking, the U.S. is hemorrhaging.

But in the US, environmental law, particularly international environmental law, lies in a political coma -- a sad case of arrested development. They are not a Party to the Basel Convention, let alone the Ban Amendment. They have almost no national legislation to inhibit wholesale exports of hazardous waste as long as it moves under the disingenuous password "recycling" -- no matter how sham or dirty that so-called recycling often turns out to be. The U.S. has no national producer responsibility legislation like Europe's WEEE directive.

We now expect more of Europe, however. The EU has been the global environmental leader for the last 30 years. They have not only been among the first Parties to the Basel Convention, but I was there when they chose to become the political force that joined together with the developing countries and China to ensure passage of the Ban Amendment to the Basel Convention -- a full export ban on all forms of hazardous wastes to developing countries. This Amendment was adopted globally in 1995, after being championed by the late Danish Environment Minister Svend Auken.

Europe was also among the first countries to place the Ban Amendment into binding legislation even before its entry into international legal force. They have taken strides to ramp up enforcement of the ban, demonstrating the political will to better control WEEE exports in order to protect the environments and peoples of developing countries.

[1] "Treatment firms' warning over unreported WEEE" by Corin Williams, 28 September 2018, MRW Magazine. https://www.mrw.co.uk/latest/treatment-firms-warning-over-unreported-weee/10035638.article

While we can applaud these past efforts, the export rates identified in this study following real WEEE in real time remain far too high when one considers that we have only been able to put an eye on the tip of an iceberg of the vast quantities of toxic WEEE generated per annum in the EU. When extrapolated, as we have shown, the figures represent truly frightening amounts of EU leakage.

But worst of all, is the fact that we have seen the European Union in recent months and years making moves to undo their leadership role in protecting the interests of developing countries from the scourge of hazardous waste dumping. They have done so by pushing to blur the strict divide between what is defined as waste and what is defined as non-waste with respect to used electronics.

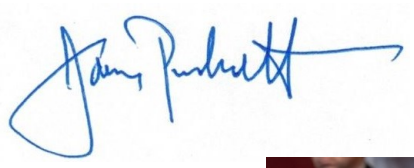
Responding to a strong lobby push by industry, the EU first created inappropriate exceptions in Annex VI of their recast WEEE directive.[2] And, more recently have led a surprising charge at the Basel Convention to do even more damage to the waste definitions there.[3] These efforts undermine the past gains by Europe for environmental justice and bely the effort to be the global champions for a responsible circular economy. We explore this frightening new development further in the section in this report entitled "The Repairables Loophole." One can but fear that these efforts led by Germany, are a harbinger of Europe renouncing its leadership role in human rights and the environment.

At this same time, Europe is rightly promoting what has been called the "circular economy." A circular economy, rather than a linear one (take, make, dispose), is a very good thing -- cycling resources more efficiently while giving new vigor to the upper reaches of the waste management hierarchy. However, a true circular economy cannot tolerate cost externalities -- for example allowing actors to avoid paying for proper waste disposal by dumping it on those that can never present the actor with the bill for the damage done -- ie. populations and environments of developing countries.

The EU circular economy, for it to survive as a valid policy must address the fundamental avenues inherent in any system that does make strong legislative effort to close the holes of externalities and leakage made all too fluid by massive disparity in relative wealth on our finite planet. Weaker economies and communities are being exploited by richer one's who are now intent on pressing for "cradle to cradle" and "waste is food" while turning a blind-eye to the fact that "recycling" and "re-use" and now "circular economy" are increasingly being misappropriated as green passwords to a global waste circus and horror show. Indeed, we are already hearing the EU and industry lobbyists using the term "circular economy" as a justification for allowing more toxic exports to move to disproportionately burden the global South with difficult-to-recycle toxic waste electronics.

As we have learned long ago, being circular by itself does not a more *just* economy make. Our circles and arrows, our theories, will only function as designed if drawn on a level playing field, where the rules of wastes movements across the globe are accomplished justly and responsibly and are designed to eliminate externalities and not exploit them.

In our final recommendations in this reporting, we highlight concrete actions to be taken by stakeholders and governments to achieve a truly responsible circular economy with respect to electronics. One that takes care of all corners of the globe. Even those magic places called "away" [4] where we humans conveniently throw things and pretend that they just disappear....



-- Jim Puckett,
Salzburg, Austria,
January 2019



[2] The exceptions found in paragraph 2 of Annex VI have been justified as "fostering a circular economy" by promoting re-use. However, they create a loophole through which waste traders can move wastes as non-wastes.

[3] Reference is made here to the hard promotion of a new Paragraph 31(b) in the Technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention.

[4] See "Away is a Place" by Jim Puckett. http://archive.ban.org/library/AwayIsAPlaceEssayFINAL.pdf

Key Findings

1. Of the 314 tracked units of equipment deployed in the study, 19 (6%) were exported out of the countries from which they were deployed.

2. The EU country exporting the most e-waste was the UK (all to developing countries) with 5 followed by Denmark and Ireland with 3 each.

3. Of the 19 exported units found in this study, more than half (11 of 19, 61%) went to developing countries. These exports were highly likely to be illegal.

4. The UK, Germany, Italy, Ireland, Poland, and Spain all allowed such e-waste exports to developing countries which are likely to be illegal. The UK was the most egregious apparent violator with 5 illegal exports to Nigeria (3), Tanzania (1), and Pakistan (1).

5. The likely illegal exports of hazardous wastes from the EU flowed to the developing countries of Nigeria, Ghana, Tanzania, Romania, Ukraine, Pakistan, Thailand and Hong Kong. These exports consisted of 9 LCD monitors, 1 CRT monitor, and 1 desktop computer.

6. Africa was by far the region of the world most targeted by EU e-waste exporters. The continent received 7 exported units (5 to Nigeria, 1 to Ghana, and 1 to Tanzania) of tracked equipment (64% of the shipments leaving the EU).

7. Europe's 6% exportation rate was far less than the 40% rate BAN found in the United States, which has no laws forbidding exports, two years earlier.

8. Extrapolation of the export rates to developing countries from our study from all of the 28 member states of the EU, gives a total of 352,474 metric tonnes exported per annum, which could fill 17,466 40-foot intermodal containers which would stretch back-to back on 18-wheel trucks for 401 kilometers.

9. The 18 exports travelled an average of 4,127kilometers each and a total of 78,408 kilometers.

10. Due to the lack of proper waste management in the recipient developing countries, including open burning of residual unrepairable fractions, there is certain to be local contamination, human exposure, and crop contamination. The pollutants would include highly toxic heavy metals such as lead, cadmium, and mercury, as well as cancer-causing dioxins, furans, and polycyclic aromatic hydrocarbons.

Executive Summary

In order to determine the rate and flows of "leakage" from the European Union of consumer-generated WEEE (Waste from Electrical and Electronic Equipment) or "e-waste", as it is referred to in other parts of the world, BAN deployed used electronic equipment fitted with hidden GPS trackers at consumer recycling destinations in 10 representative countries of the European Union.

BAN completed the deployments in the period between April 15 and September 2 of 2017. The countries chosen were Austria (18), Belgium (29), Denmark (20), Germany (54), Hungary (17), Ireland (24), Italy (48), Poland (20), Spain (45), and the United Kingdom (39). The quantities deployed were roughly proportional to the populations of the countries

In order to make best use of the GPS tracker and battery technology, the study utilized larger IT equipment of four types: Liquid Crystal Display (LCD) monitors, Cathode Ray Tube (CRT) monitors, desktop personal computers, and printers.

All of the equipment qualified as hazardous under the Basel Convention definitions due to the presence of either a cathode ray tube (CRT), mercury-bearing lamps (all of the LCDs were of this type), or circuit boards (containing high levels of lead, tin, and brominated flame retardants). All of the units also qualified as waste under EU rules as they were rendered non-functional and economically unrepairable.

The results of the study revealed that of the 314 tracked electronic units, 19 (6%) were exported from the countries from which they were deployed. Of the 10 countries surveyed in our study, only Hungary did not reveal any exports. The UK exported the most with 5 exports all to developing countries. And Nigeria received the most imports with 5.

Of the 19 exported units, more than half (11 of 19, or 58%) went to developing countries. As the European Union has implemented the Basel Convention's Ban Amendment (Decision III/1) in its legislation known as the Waste Shipment Regulation's (WSR) Article 36, these 11 exports were likely to be illegal.

Further, the EU requires shipments of wastes of all kinds within Europe to be notified, carry a financial instrument, and involve a proper contract to be in place prior to export. As we did not have the time to investigate each of these types of exports between EU member states, we have declared the legality of these shipments as "unknown," although experts tell us it is unlikely these were legally accomplished.

The 19 exported units travelled a total distance of 78,408 kilometers with an individual average distance travelled being 4,127 kilometers each. This is about the same distance as the journey from Milan, Italy to Lagos, Nigeria. Based on this knowledge, it seems apparent that shipping costs are not a strong deterrent to long-distance exportation.

While 19 exported hazardous waste electronic devices out of 314 may not seem like a serious concern, it is what these might well represent that is. Perspective can be gained by extrapolation of the national export rates, using the weights those countries produce each year. In doing this math, we learn that the 19 exported units could represent as much as 421,603 tonnes of WEEE exported each year filling around 19,165 forty-foot intermodal containers, and of that 20,887 tonnes, filling 16,821 containers would be flowing to developing countries, just from the 10 countries studied. To get a picture of how much WEEE that would represent flowing to developing countries each year, we can imagine that if 16,821 containers were each loaded onto an 18-wheel truck, those trucks lined up back-to-back, would stretch for 387 kilometers.

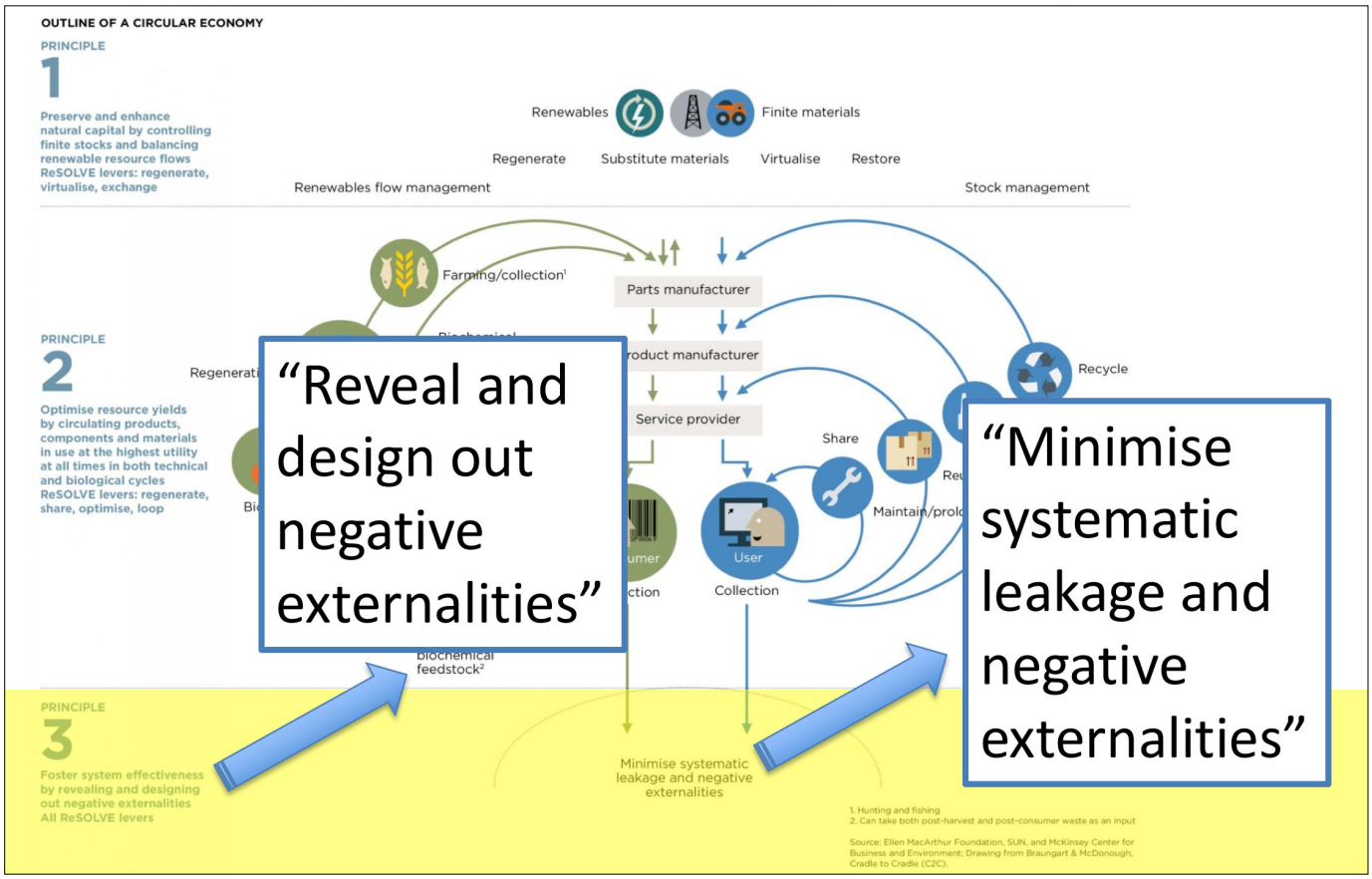
If we look at how those trucks might stack up if we observe the entire 28 countries of the EU exported to developing countries we extrapolate to 352,474 metric tonnes, filling 17,466 40-foot intermodal containers which would stretch back-to-back on 18-wheel trucks for 401 kilometers.

BAN concludes from this study that while the EU is far ahead of the United States, for the 28 countries of the EU which have ratified the Basel Convention and the Basel Ban Amendment and thus have legal barriers to international waste dumping in place, 339,446 tonnes of hazardous electronic waste per annum flowing to developing countries is unacceptable. Far more can be done to prosecute the robust illegal

trade, including working with target countries such as Nigeria to stem the toxic tide.

Further BAN calls upon the EU not to corrupt the worthy goals of the Circular Economy to use that term of art as a new password for increasing externalization of costs and harm to developing countries through liberalizing trade in broken, non-functional electronic waste with a new "Repairables Loophole" in the laws of Europe or at the Basel Convention.

Outline of a Circular Economy



The famous diagram of a circular economy. Its 3rd Principle -- too often forgotten is an exhortation to reveal and design out negative externalities. Externalities undermine any truly circular economy. Source: Ellen MacArthur Foundation, SUN, and McKinsey Center for Business and Environment. Drawing from Braungart & McDonough Cradle to Cradle (C2C).

By the Numbers

Total WEEE Deployed

Between 15 April 2017 and 2 September 2017, BAN deployed a total of 314 used consumer electronic devices containing GPS trackers across Europe in the 10 countries of Austria (18), Belgium (29), Denmark (20), Germany (54), Hungary (17), Ireland (24), Italy (48), Poland (20), Spain (45) and the United Kingdom (39).

Of the types deployed across Europe, we used a total of 143 LCD monitors, 55 CRT monitors, 65 desktop computers and 51 printers.

Totals Exported / Within Europe and to Developing Countries

Of the 314 tracked units of equipment deployed in the study, 19 (6.05%) were exported out of the countries from which they were deployed. 11 went to developing countries and 8 to other EU member states. The EU country exporting the most was the UK (all to developing countries) with Denmark and Ireland following with 3 exports each. Only the country of Hungary registered no exports. (See Tables 1 and 2 below).

Of the 19 exported units found in this study, more than half (11 of 19, or 58%) went to developing countries (defined in this report and in accordance with EU and international norms, as not being member countries of either the OECD or the European Union (non-OECD/EU). The percentage of exports that left the EU entirely was 3.5%.

37% of the total 19 exports went to Africa (7) representing the most common regional destination outside of the EU. Indeed, of all of the exports from the EU, 64% went to Africa. And most of these, (5 of 7) went to the country of Nigeria. The entire list of the seven developing country recipients is: Nigeria, Ghana, Tanzania, Thailand, Pakistan, Ukraine and Hong Kong.

The rest of the exports (8 of 19) moved between member states of the EU. The final recipient countries in these instances were Austria, Germany, Belgium, Poland, Romania, and Hungary.



From West to East, and from North to South, European WEEE is flowing. Representation of the 11 European exports discovered by GPS trackers moving to developing (non-OECD) countries. Copyright BAN.

TABLE 1. EU EXPORTS by EXPORTING COUNTRY					
Exporting Country	**Importing Countries**	**OECD/EU Destinations?**	**Type of Device**	**Number of Devices**	**Export Likely to be Illegal**
United Kingdom	Nigeria (3), Tanzania (1), Pakistan (1)	No (5)	LCD (5)	5	Yes (5)
Denmark	Germany (1), Poland (1), Romania (1)	Yes (3)	Desktop (2), LCD (1)	3	Unknown (2) No (1)
Ireland	Hong Kong (1), Belgium (2)	Yes (2) No (1)	LCD (3)	3	Unknown (2) Yes (1)
Italy	Ghana (1), Nigeria (1)	No (2)	Desktop (1), LCD (1)	2	Yes (2)
Spain	Nigeria	No	LCD	1	Yes
Germany	Thailand (1) Austria (1)	No (1) Yes (1)	LCD (1) Printer (1)	2	Yes (1) No (1)
Poland	Ukraine	No	CRT	1	Yes
Belgium	Germany	Yes	CRT	1	Unknown
Austria	Hungary	Yes	Printer	1	No
Hungary	N/A	N/A	N/A	0	N/A
9 of 10 Countries Exported	**13 Country Destinations** **8 OECD/EU** **11 Non-OECD/EU** **1 = CEE** **3 = Africa** **3 = Asia** **6 = EU**	**Yes = 9** **No = 10**	**LCDs (12), CRTs (2), Printer (2), Desktop (3)**	**19 Total**	**Yes (11)** **Unknown (5)** **No (3)**

TABLE 2. EU EXPORTS by IMPORTING COUNTRY				
Importing Country	**Importing Country OECD/EU?**	**Exporting Country**	**Type of Device**	**Number of Devices**
Nigeria	No	United Kingdom (3), Italy (1), Spain (1)	LCD (5)	5
Ghana	No	Italy	LCD	1
Tanzania	No	United King-	LCD	1
Pakistan	No	United King-	LCD	1
Austria	OECD/EU	Germany	Printer	1
Germany	OECD/EU	Belgium (1),	CRT, Desktop	2
Poland	OECD/EU	Denmark	Desktop	1
Romania	EU	Denmark	LCD	1
Thailand	No	Germany	LCD	1
Hong Kong	No	Ireland	LCD	1
Belgium	OECD/EU	Ireland (2)	LCD (2)	2
Ukraine	No	Poland	CRT	1
Hungary	OECD/EU	Austria	Printer	1
13 Different Countries **1 = CEE** **3 = Africa** **3 = Asia** **6 = EU**	**Yes = 6** **No = 6**	**9 Countries** **United Kingdom (5), Italy (2), Spain (1), Belgium (1), Denmark (4), Ireland (3), Germany (2), Poland (1),**	**LCDs (13), CRTs (2), Printer (2), Desktop (2)**	**19 Total** **8 = OECD/EU** **11 = Non-OECD/EU** **1 = CEE** **7 = Africa** **2 = Asia** **9 = EU**

Equipment Deployed

With respect to the types of equipment used and exported please refer to the table below.

Table 3. Types of Equipment Deployed and their Destinations

	Total Deployed (percent of all units)	Total and Percent Exported	Total and Percent Exported to Developed Countries	Total and Percent Exported to Developing Countries
LCD Monitors	143 (46%)	13 (9%)	4 (3%)	8 (6%)
CRT Monitors	65 (20%)	2 (3%)	1 (2%)	1 (2%)
Desktop Computers	55 (18%)	2 (4%)	2 (4%)	1 (2%)
Printers	51(16%)	2 (4%)	2 (4%)	0 (0%)
TOTALS	**314**	**19**	**8**	**10**

Distance Travelled

It is clear from our calculations of the total distance travelled by the 18 exported units, that the cost of transport is likely not a significant factor in the decisions over whether export takes place or not, compared to other factors such as costs of labor, processes employed, and cost of environmental and health protections.

Our 19 trackers travelled a total distance of **78,408 kilometers** with an individual average of **4,127 kilometers**. To get an idea of how far that is, 4,127 kilometers is roughly the distance between Milan, Italy and Lagos, Nigeria.

Legality of Exports

The world has made great strides in trying to prevent countries from dumping costs and harm on weaker economies through international law and national legislation implementing such accords. The European Union legislation is at the global forefront of this movement to prevent such exploitation made possible via waste trade. In the Legal Section of this report below, we explain why and how we make the claim of some exports being "likely illegal", "likely legal", or "unknown" with respect to this body of EU law.

In our study, we found that of the 19 exports, 11 were deemed to be "likely illegal." The legality of 6 exports were "unknown" and 2 more were thought to be "likely legal." With respect to the countries most involved in exports deemed likely to be illegal, the UK was the biggest violator with 5 such exports. Italy with 2 such exports being second. Germany, Spain, and Poland and Ireland with one likely illegal export rounds out the list. The countries of Denmark, and Belgium were involved in exporting to other member states of the EU which was suspect but unknown as to being conducted illegally or not.

Extrapolation

While 19 exported hazardous waste electronic devices out of 314 may not seem like a serious concern, perspective can be gained by extrapolation of the national export rates. Doing the math, based on the amount of e-waste generated in each of the 9 countries involved per annum, as illustrated in the table below, we arrive at some more frightening numbers.

Table 4. Extrapolation of Export Rates / Total Metric Tonnes of WEEE / Per Annum					
Country	e-Waste Produced (tonnes)[1]	Percent of Exports to Developing Countries	Extrapolated Amount to Developing Countries (tonnes)	Percent of Exports to EU member States	Extrapolated Amount to EU member Countries (tonnes)
UK	1,632,000	12.82%	209,222	0%	0
Italy	1,156,000	4.17%	48,205	0%	0
Denmark	141,000	0%	0	15%	21,150
Spain	930,000	2.22%	20,646	0%	0
Poland	453,000	5%	22,650	0%	0
Belgium	241,000	0%	0	3.45%	8,315
Germany	1,884,000	1.85%	34,854	1.85%	34,854
Ireland	93,000	4.16%	3,869	8.3%	7,719
Austria	182,000	0%	a	5.56%	10,119
Hungary	136,000	0%	0	0%	0
TOTALS for 10 Countries Studied	**6,848,000**	**4.96%**	**339,446**	**.69%**	**47,303**
TOTALS for all 28 EU Countries	**10,070,700**	**3.5%[2]**	**352,474**	**2.23%[3]**	**224,577**

By extrapolating the export rates to better understand what the true amounts of export might be in the course of a year, we find that the 19 exported units could represent as much as 421,603 metric tonnes, which would fill around 20,887[4] forty-foot intermodal containers of such WEEE exported in the 10 countries observed in the study. And for the amounts flowing to developing countries we are looking at 339,446 tonnes, filling 16,821 intermodal containers.

If we generalize the results to all 28 EU member states we arrive at a figure of 609,276 metric tonnes, which would fill 30,185 forty-foot intermodal containers of exported WEEE. And for the amounts flowing just to developing countries that could be 352,474 tonnes filling 17,466 intermodal containers.

[1] Derived from figures published by the UNU. https://collections.unu.edu/eserv/UNU:6341/Global-E-waste_Monitor_2017__electronic_single_pages_.pdf

[2] Derived from EU export to developing countries percentage (11 out of 314 units) observed in this study.

[3] Derived from intra EU export percentage (7 of 314 units) observed in this study

[4] Derived from figure of safe loading figures provided at: https://www.ukpandi.com/knowledge-publications/article/overweight-container-guide-28/

Study & Discussion

Our objective in the study, was to learn what happened to the WEEE once it was collected; we wanted to learn about the back-end of the system. We wished to answer the question: Was the public and the global environment well-served by the WEEE directive and the schemes that had been set up to implement it? In order to best achieve this examination, we made random deposits of GPS tracker-enabled household computing equipment to replicate what could be expected to be delivered across Europe on average by consumers.

In recent years, due to the extended producer responsibility legislation known as the WEEE Directive, most EU countries have created user-friendly collection centers for consumer WEEE. The Americans on our team were very impressed with the ease by which we could dispose of electronics throughout the study area as such facilities do not generally exist in the US. These collection depots were our primary deployment targets.

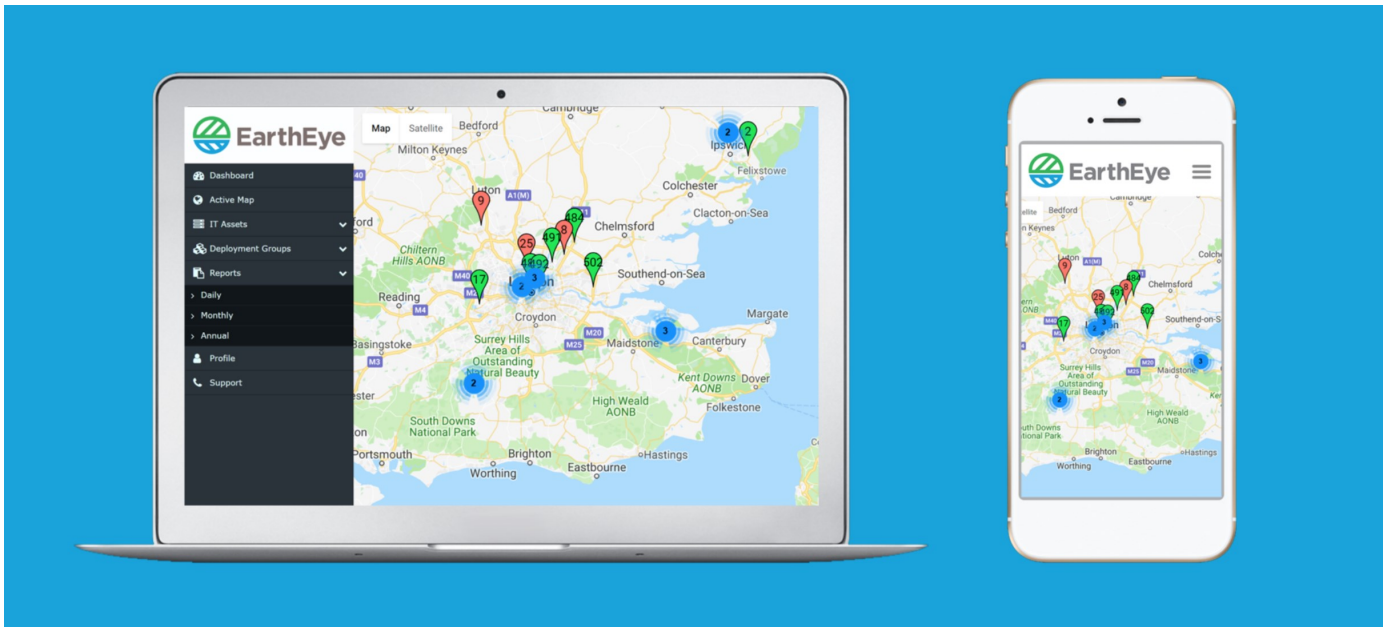
We did not intentionally target what might have appeared to be high-risk locations. Nevertheless, we did make some street drops because we know that despite the convenience of the collection centers, it is even more convenient to simple set old computers and monitors on the street. This remains a common practice throughout European cities.

Advantages of Using GPS Trackers

This is the first study of its kind in Europe. Never before has an effort been made to randomly replicate the actions of European consumers to determine the final fate of their WEEE disposal actions. Never before has such a study of WEEE flows in Europe been accomplished using GPS trackers with the ability to follow real WEEE in real time to its final destination.

Most prior studies seeking to determine WEEE flows used paper documentation such as trade data derived from bills of lading and harmonized tariff codes. Paper studies also assume rates of waste generation based on sales data and assumptions on rates of how quickly such equipment is discarded. Other studies rely on surveys or questionnaires of businesses. But the fundamental flaw of "paper studies" lies in the fact that they depend on truthful reporting. Due to the fact that exporting waste to developing countries, if not illegal, is at least shameful, the studies are suspect as the paperwork could be completed fraudulently and thus serve as a source of inaccurate data.

It is preferable in our view, despite the relatively high expense involved, to conduct studies using real data by either using hidden electronic tracking devices or "people in ports" that can actually observe the openings of containers. With both of these methods, one can "see" actual movement of actual WEEE and thus, even if the sample size is small compared to total flows, they can show the actual route and environmental fate at the final end-points.



EarthyEye Tracking portal, www.eartheye.org. Copyright BAN 2018

History of BAN Tracking

BAN pioneered the use of large-scale GPS studies, starting first in the US, with our e-Trash Transparency Project in 2015, and then replicated it in Australia and Canada. BAN's tracking exercises lie within the general context of BAN's WEEE Campaign, which began in 2001. A short history of that campaign is written up in an Annex of our US report entitled "Scam Recycling"[1] so we will not replicate it here. However, it is of interest that BAN is, as of last year, now offering their GPS know-how commercially to recyclers, government agencies, compliance schemes, other civil society organizations, and academics in a service known as EarthEye.[2] It is also of interest that both Samsung and Dell utilize the services of EarthEye.

The results of our study in Europe showing an export rate of 6% can now be compared with our earlier studies in the United States (34%) (*Scam Recycling: e-Dumping on Asia by US Recyclers)*, in Australia (6%) (*Illegal Export of e-Waste from Australia*[3]*),* and in Canada (12%) *(Export of e-Waste from Canada*[4]). The considerably higher rate of export discovered in the U.S. is likely most indicative of the fact that the U.S. is not a Party of the Basel Convention, and has not seen fit to control hazardous waste exports via legislation. Clearly the presence of reasoned legislation, and its diligent enforcement, makes for a difference in behavior.

Other Recent European Studies

For a good example of a Person in the Port (PiP) study, and also a first of its kind, one can look to the recent study by the United Nations University (UNU) published in 2018 entitled "Assessing Import of Used Electrical and Electronic Equipment into Nigeria"[5] which, besides examining shipping documents made available by the Nigerian government, also inspected thousands of vehicles and hundreds of intermodal containers. They identified around 46,200 tonnes of WEEE that was exported to Nigeria from Europe in a year, with most of it being likely illegal. The study also noted a singular lack of proper enforcement of existing import laws in Nigeria.

Our study corroborated that Nigeria is being hit hard with illegal exports from Europe. Nigeria was the country most targeted in our study, with 5 of the 10 exports to developing countries ending up there. If we extrapolate our figures (albeit a small sample size), we project a total per annum import estimate for Nigeria at 167,761 metric tonnes.

Another significant study funded by the European Commission was done as part of the CWIT (Countering WEEE Illegal Trade) program. It was released in 2015. This study used 2012 paper data of recorded destinations in comparison with waste generation estimates. It was estimated that exports of WEEE from the EU were about 4.23% of the total volume of European Union WEEE arising per annum. If we calculate the export rate of only the tracked equipment leaving the EU as they did, our study's export rate from member states is 3.14%. These two figures are not far apart.

Two important distinctions in our study that are worthy of noting are first, that our study did not attempt to place trackers in business-derived WEEE. It is not known whether export rates of business WEEE differ generally from those of consumer generated WEEE, and thus we are unsure whether our limitation to consumer waste made a difference.

Second, GPS tracker data cannot report on scrap equipment that, for reasons of malfunction or lost signals (e.g. loss of battery power), might have been exported but unable to report that export. These incidences could be considered "false negatives" of our technology. On the other hand, our GPS technology gives almost no "false positives" -- that is, if they do report from outside the EU, then one can almost certainly expect that the device did indeed go outside of the EU via trade of some kind. The consequence of these facts is that our reported rates of export must be seen as the lowest end of a range of actual rates.

We caution readers that due to the relatively small sample size of our tracking programs, our reported rates and extrapolations based on them are given only as indicative. They should not be quoted out of context as actual rates. Nevertheless, the reported exports are almost certainly representative of much larger rates of export. Thus, it is logical to extrapolate to get an idea of the scale of the problem.

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[1] http://wiki.ban.org/images/1/16/ScamRecyclingReport-print.pdf
[2] www.eartheye.org
[3] http://wiki.ban.org/images/7/7c/Australian_e-Waste_Report_-_2018.pdf
[4] http://wiki.ban.org/images/6/6c/Export_of_e-Waste_from_Canada_-_A_Story_as_Told_by_GPS_Trackers_Print.pdf
[5] http://collections.unu.edu/eserv/UNU:6349/PiP_Report.pdf, press release: https://unu.edu/media-relations/releases/

Feature: Germany to Thailand

While the export track record in Germany appears to be good, with only 1 of 54 deployed devices finding its way out of the country, the one that did get exported is an illustrative ‘case in point’ of the global WEEE trade we should all be working very hard to prevent.

A & B Recycling / Apparent Exporter

The first part of the story, presented on page 59, indicates that the A & B Elektro Recycling company of Bochum, Germany, Northeast of Dusseldorf, was the apparent exporter of a mercury-laden LCD device that was dropped off by BAN at the Stadtreinigung Dresden GmbH municipal waste management company in Dresden, Germany. We can say that A & B was the apparent exporter with some certainty due to the little time (one day) that elapsed between the LCD device being in the A & B facility and the port of Antwerp, where it quickly disappeared from our view (indicating a voyage on the sea away from the international cell phone system) before showing itself in a transit port of Sri Lanka a few days prior to arriving in Thailand.

A & B Elektro Recycling itself appears to not be a very impressive location. Their website does not picture the site, but does boast numerous certifications including the WEEELABEX certification, the ISO 9001 certification, and a private certification made by the firm S.M.V (Sachverständige für Managementsysteme und technischen Umweltschutz) or "experts in management systems and technical environmental protection." They also state that they support the UN Global Compact, a self-made commitment by companies vowing to protect the environment, human rights, and labor principles.



Satellite view of the apparent exporter of LCD DE178678 -- A&B Elektro Recycling. Map data: Google, DigitalGlobe



WEEELABEX Organisation
Certification body Operators
U Habrovky 11/247, 140 00 Praha 4, Czech Republic

Certification of Conformity

Waste of electrical and electronic equipment (WEEE) treatment process
With the requirements of normative document:

to the audited company (WEEE treatment Operator):

AB Elektro Recycling Inhaber Mikayil Polat
Jung-Stilling-Strasse 64, 44867 Bochum, Germany , GERMANY
VAT number DE294483677

For the following WEEE treatment streams:

WEEE treatment stream *	Operator Type *	Exclusions & Details
Mixed equipment	(Operator Type 1)	
Flat panel display equipment	(Operator Type 1)	

Certificate No.: 18-0012
Lead Auditor (General Audit): Christoph Becker
Lead Auditor (Surveillance Audit): ——
Registration Date: 28th November 2018
Date of Expiry: 27th November 2020

In Prague
28th November 2018
Date

V 3238

Petr Novotný
Managing Director

WEEELABEX Certificate given to A & B. Source: A & B website.

The website further continues to describe their services:

You want to sell your old IT equipment and components and do not know to whom? Then you are exactly right with us!
A & B Elektro-Recycling is a certified disposal specialist and buys your old IT equipment and components at a fair price and at the same time ensures a professional and professional disposal.

Please note that we do not accept goods from private persons.

The graphic below shows the circular economy. The blue sections illustrate the activities of A & B Elektro Recycling.



Precious metals such as gold, silver and copper are in great demand on world markets, so we work closely with certified, up-close recyclers to reclaim the sought-after raw materials from IT equipment and components.

Even with large purchase quantities, we guarantee a speedy processing of the goods and the resulting payment. Customer satisfaction is our top priority. Our trading partners are convinced of our professionalism and fairness.

on request we can organize the collection of the goods on site. We work exclusively with reputable and reputable freight forwarders.

Further irony is presents itself on the Facebook Page of the company, where it is noted that a University program that wanted to assist the developing country WEEE disaster area known as Agbogbloshie in Accra, Ghana visited A & B Recycling to learn more about WEEE recycling just last year. Below is the translated post:

Enactus Ruhr-University Bochum e. V.

March 2, 2017 ·

The team at our Agbocycle project in Ghana for safe and environmentally friendly WEEE recycling was at A & B Elektro Recycling today to pick up some valuable tips and get a small workshop on electronic waste recycling. Thank you A & B Elektro Recycling for the productive day and we look forward to further cooperation!



We describe the above website entries to contrast the stated intentions of A & B Elektro Recycling and the subsequent fate of the LCD device handled by them.

Following the Track to Thailand

After identifying and viewing the site on Google Earth from its GPS coordinates, we visited the site in person on February 2, 2018. The site lies off a main road in a semi-urban area near Sri racha, Thailand, 134 km Southeast of Bangkok. It seemed larger in person than it appeared from the street view on Google Earth. Inside, and in the back area of the property, we found large amounts of imported CRTs and LCD monitors being crudely broken apart by the labor force.



Prior to arriving in person, this is the view we were able to see from afar of the facility where LCD DE178678 -- last reported at A&B Elektro-Recycling -- ended up. Map data: Google, Digi-talGlobe.



Drone shot of South front side of the facility showing LCD housings, gaylord boxes full of circuit boards, crates, and polystyrene packing for CRTs. Copyright BAN, February 2018.



BAN Director Jim Puckett filming the Thai operation where the LCD from Germany -- DE178678 -- was tracked. Copyright BAN, February 2018.









Top left: View from just inside a wall topped with broken glass at the site after making entry. Copyright BAN, February 2018.

Top right: Drone shot of north front side of the facility showing CRTs waiting to be broken down, LCD shieldings and crates, and polystyrene packing for CRTs. Copyright BAN, February 2018.

Bottom left: LCD and CRT parts scattered behind the property of the site where the LCD from Germany -- DE178678 -- ended up. Exporting scrap LCDs from Europe to Thailand is illegal due to the Basel Convention and the EU Waste Shipment Regulation. Copyright BAN, February 2018.

Bottom right: Imported CRTs, complete with yokes. Part of what this site was doing was processing these by breaking off the yokes for copper recovery. Exporting scrap CRTs from Europe to Thailand is illegal due to the Basel Convention and the EU Waste Shipment Regulation. Copyright BAN, February 2018.

Yian Hai / Working Conditions

About 20 persons were working in Yian Hai, almost entirely coming from Myanmar according to our translator, and presumed to be both undocumented and underpaid. In a subsequent interview with a longtime Myanmar activist now living in Bangkok, he estimated they are likely making between 150-200 Bhat per day (4.50-6.00 US dollars). It was their job to disassemble and sort personal computer monitors of both CRT and LCD types.

They were all employees of a Chinese company named Yian Hai Electronics Co. LTD. The working environment was poorly lit, requiring us to use special night-vision filming. Dirt and dust were found everywhere. Sadly, it was clear that many of the workers were living on the site, in "houses" put together from gaylord boxes and polystyrene CRT "pallets." It was in these squalid quarters that the workers bathed, cooked, and did their laundry. One very dirty bathroom was found at the facility, presumably shared by all of the 20 or so laborers living onsite.









Top left: Burmese, likely undocumented, workers at the Yian Hai facility near Sriracha, Thailand where the German LCD from Dresden ended up. Lighting here was so poor that we were forced to use night-vision video. Copyright BAN, February 2018.

Top right: Another area of the facility where DE178678 from the Dresden area ended up. Here, workers are removing LCD panels from imported LCDs and scrapping the remains. Copyright BAN, February 2018.

Bottom left: A picture of living conditions at the site where the tracker DE178678 from Germany ended up. Workers sleep, cook, and do their laundry here in houses made from cardboard and polystyrene boxes, on the site where hazardous electronic waste is broken apart. Copyright BAN, February 2018.

Bottom right: Another view of some of the houses made from polystyrene CRT crates and cardboard boxes where the Burmese laborers lived while working at Yian Hai. Copyright BAN, February 2018.

Yian Hai's Import Business

The primary business of the company Yian Hai was dismantling, and if possible, remarketing the usable fractions of CRTs (circuit boards and copper yokes) and LCDs (circuit boards and panels). It seemed the main focus was CRT yokes and LCD panels.

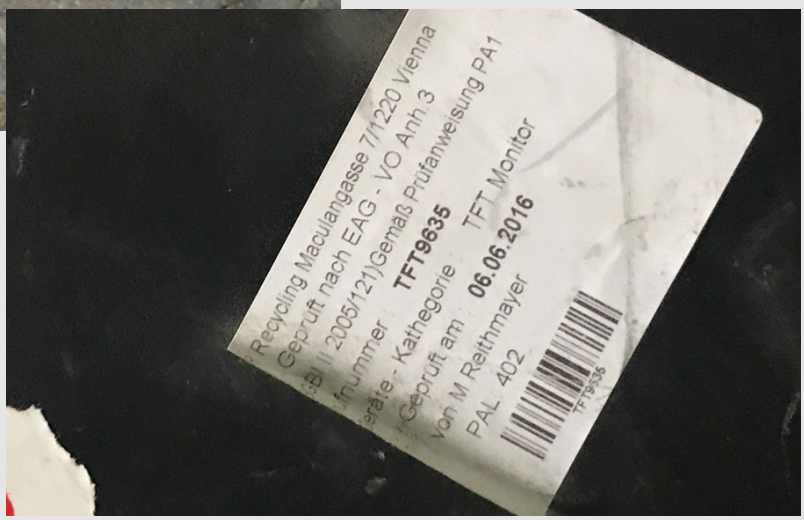
At the site we visited, we could find plenty of LCDs being opened and disassembled, but could not find any trace of mercury-containing CCFL lamps there. The reason for this became apparent. It was this site's job to disassemble to the point where they liberated the panel assembly, and not to dig into the units deeper. The screen assemblies, we learned later, were sent to their other facilities for refurbishment.

We found substantial evidence of importation from labels from both North America and Europe (e.g. Germany and Austria), as well as UK-style power plugs, indicating imports from the UK or Hong Kong.

There was a significant number of LCDs in gaylords stored for future processing. Many of these had labels on them that referred to “R2 Ready for Resale” -- a reference to the R2 standard. This could either mean they were of US origin, or Yian Hai was using that label and designation themselves despite not being listed on the R2 website as an R2 Certified company. This R2 designation "Ready for Resale" has no legal relevance whatsoever under the Basel Convention, though it may be used here to make it seem as if the imports are acceptable when they are very likely illegal.



German LCD from the Piepenbrock Instandhaltung in Bremen found at the Yian Hai facility in Thailand. Copyright BAN, February 2018.

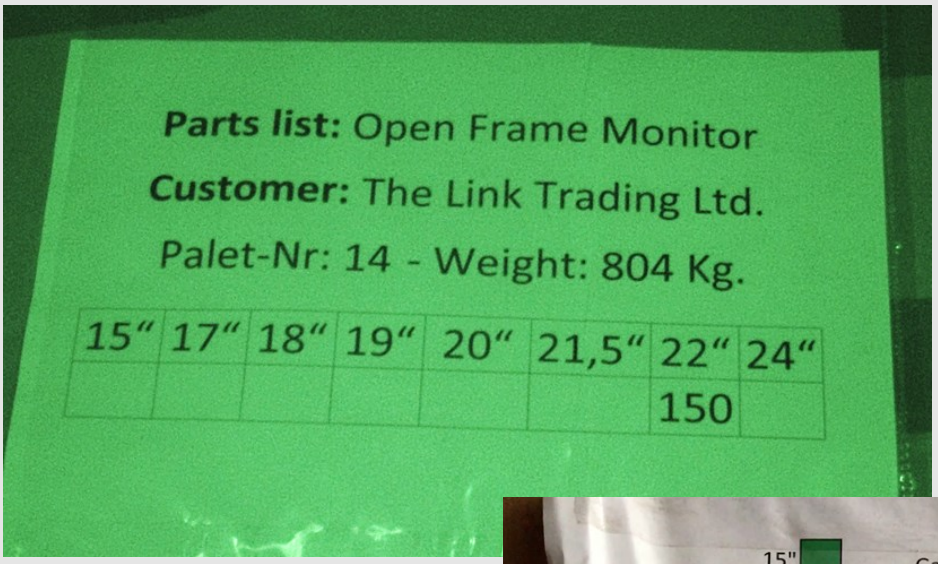


Another example of a European import of LCD waste from a recycler in Vienna known as L. S. Recycling. It is likely that this company http://www.ls-recycling.at/web/cms/front_content.php exported this LCD to the Thai facility. Copyright BAN, February 2018.

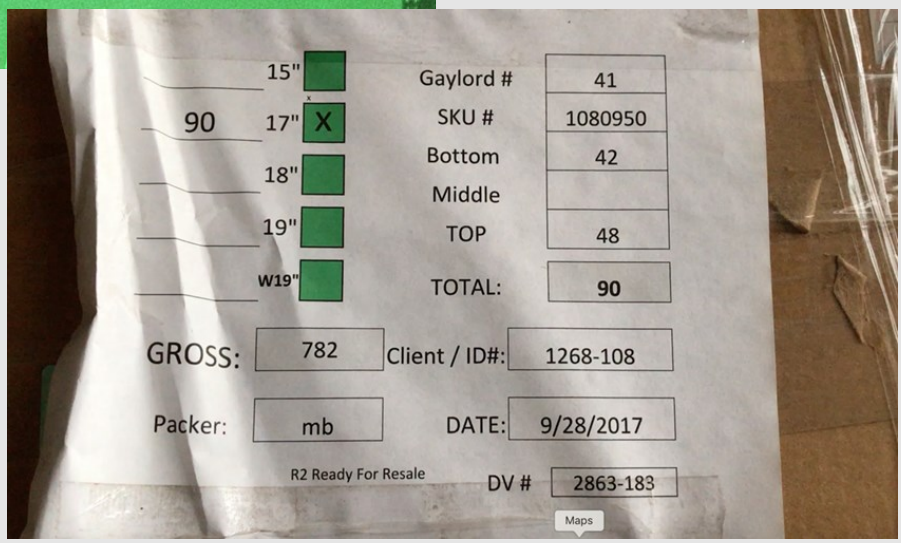
There was also a large number of gaylords full of circuit boards pulled out of the monitors. The presence of these made it obvious that any pretense of true repair of the monitors was limited to the panel displays of the LCD screens. We expect these circuit boards found their way to other nearby smelters we discovered in Thailand during our visit. These were extremely polluting sites, burning circuit boards with few pollution controls. We have included a photo of just such a site in the Notes section of this feature.

There was nobody in charge of the facility while we were there, but a worker gave us the phone number of the owner. We called him and at first he did not want to have us visit their other two facilities nearby, which are adjacent to each other in a duty-free zone in the port of Laem Chebang. Upon our visit, we discovered those facilities to be vastly more up-scale and clean, employing Thai workers. This indicated to us that this company is content with having its Burmese workers live and work in squalid conditions while maintaining show-places for their Thai workers and potential buyers of LCD panels that might visit them at the port.

The product they were preparing at the port facilities were the panel assemblies -- upgraded and refurbished. This company removed and replaced CCFL lamps with LED strips by hand. This would seem a very legitimate form of re-use -- substituting toxic and fragile parts with less toxic and more durable parts -- except that they were abusing their labor force at the hidden site. When we asked the manager what they did with the old mercury-laden CCFLs, we learned they throw them away.



Reference is found here to the Link Trading Company, based in Panama City, Panama -- a broker of wastes which likely assists in facilitating trade to Yian Hai. Copyright BAN, February 2018



Labels used by shipper mentioning "R2 Ready for Resale." This designation, created by the R2 Standard in the US, is meaningless under the Basel Convention. Copyright BAN, February 2018.

The Impact

The primary human health and environmental concerns identified at the sites as part of the importation from Germany of DE178678 included:

1. Uncertainty as to what happens to the CRT glass after yokes are removed. They are likely dumped in landfills.

2. Realization that the scrap circuit boards are likely to end up in the highly polluting smelters that have sprung up in Thailand.

3. Squalid, unsanitary living and working conditions that could lead to disease. Food was being prepared around electronic waste dusts, which workers constantly inhaled. Eyesight damage from lack of light in much of the plant is likely.

4. Large volumes of mercury-bearing CCFL tubes from these imports are admittedly dumped in the trash -- likely going to unlined landfills.

5. Exploitation of undocumented informal labor -- which by definition will not be eligible for any governmental protection.

6. No observable fire protection/abatement equipment. Site could easily catch fire due to plastic and cardboard content, as well as workers smoking and cooking at the site.



Burmese workers trying to protect themselves from the fume and smoke from the cooking of circuit boards in a primitive site in Thailand receiving e-waste from North America and Europe. Copyright BAN, February 2018.

Postscript

In late May of this year, 2018, the Thai government surprised many observers by taking dramatic action against WEEE importers. In a stunning move against a major scrap trader/recycler known as Wai Mei Dat -- a member of the International Institute of Scrap Recycling Industries and R2 Certified company based in Hong Kong, with offices in California -- was raided and shut down. Following this action, the Thai government raided about a dozen other recyclers, and in June, banned the import of WEEE. We have learned in December of 2018 that the site in Sriracha area recorded here, has been raided by the government and is now closed. It is unclear whether the Yian Hai facilities at the port were also closed.

We can only hope that Thailand will maintain this ban and ratify the Basel Ban Amendment to ensure that all such toxic waste imports will be forbidden. We also hope that other countries in the region, and around the world, do the same. Finally, we hope that Germany will enforce against such exports to prevent the problem at its source.



Drone shot of Wai Mei Dat grounds, sprawling with imported WEEE in Super Sacks. Photo Copyright The Nation, Thailand Portal. May 22, 2018.



Wai Mei Dat during a raid by the Thai government. Thailand subsequently discovered many such plants, run by Chinese businessmen, illegally importing and polluting the environment. Photo Copyright The Nation, Thailand Portal. May 22, 2018.



Drone shot of site discovered by BAN during the same February visit when we visited the location where the German LCD ended up. This site was dubbed the dioxin factory when BAN observed it mass melting/burning circuit boards and belching out dioxin-laden, carcinogenic smoke over the dairy farms in the area. A truck can be observed delivering more imported waste. A subsequent visit in August found this site it to be "shut down," but still employing workers. Copyright BAN, February 2018.

Feature: Ground Zero / Africa

The Basel Action Network first exposed the environmental and health effects of the WEEE trade from Europe and North America to Africa in our 2005 documentary film and report entitled “The Digital Dump: Exporting Re-Use and Abuse to Africa.”[1] In that report we revealed that 3/4 of what was imported into Africa for alleged re-use was in fact unusable, and that material and unusable parts from active repair were dumped in waysides near the Alaba and Ikeja markets. These wayside landfills, and even the formal landfills, were routinely burned – creating far more toxicity than the original material.

Subsequent to the Digital Dump reporting undertaken in Lagos, Nigeria, BAN encouraged journalists to seek out other problem areas on the African continent. Soon, journalists had discovered another, rather shocking scene of open electronics burning and dirty recycling in Accra, Ghana at a slum and estuary area known as Agbogbloshie. BAN participated closely in a documentary by the U.S. Public Broadcasting Service (PBS) which featured Agbogbloshie[2], and toured the area themselves in 2009. Following that visit, BAN's founder Jim Puckett wrote an essay to the photographic book "Permanent Error" by Pieter Hugo on the subject of Agbogbloshie, entitled "A Place Called Away."[3] He was interviewed for the book and film on poverty entitled "Living on a Dollar a Day" featuring Agbobbloshie, produced by the organization The Forgotten International.[4]



Piles of desktop computers arriving at Tin Can Port, Lagos, Nigeria from "The Digital Dump." Copyright BAN, 2005.



Dump just outside of the Alaba market in Lagos, Nigeria. Copyright BAN, 2005.

[1] https://static1.squarespace.com/static/558f1c27e4b0927589e0edad/t/55d79038e4b069c9055c8720/1440190520196/BANsDigitalDump-2005.pdf and for the video -- https://vimeo.com/60532457

[2] http://www.pbs.org/frontlineworld/stories/ghana804/

[3] http://archive.ban.org/library/AwayIsAPlaceEssayFINAL.pdf

[4] https://www.theforgottenintl.org/build-awareness/living-on-a-dollar-a-day-the-documentary/

At Agbogbloshie, the imported electronic equipment that could not be repaired and re-sold in the market in town was smashed and burned so that the impoverished community making up the surrounding slums could recover some value from the metals.



Roadside sales of imported equipment in Accra. Copyright BAN, 2009.

Following our first reporting on Africa in 2005, there was considerable concern and interest expressed about finding solutions. At the very next Basel Conference of Parties held at the end of 2006 (COP8) in Nairobi, which was the first of its kind held in Africa, we presented the film version of Digital Dump.

A general call to action on WEEE ensued, and as a result, the Nairobi Declaration[5] on WEEE was adopted. During the same meeting, the European Commission donated 1 million Euros to a new Basel Convention WEEE Africa Program, which conducted research and workshops; this culminated in a report entitled "Where are WEEE in Africa."[6] As a further response, at COP9 (June of 2008), the Basel Parties launched PACE -- the Partnership for Action on Computing Equipment.

Meanwhile, the European Union conducted work and produced policy FAQs and Guidance documents that made it clear that with respect to interpreting their laws, with few exceptions, any untested or tested non-functional used electronics would be considered as waste. This was later made official in a more legally binding form in Appendix VI of the recast WEEE directive.



When the e-scrap does not sell it is hauled by young men to Agbogloshie in carts like this one, where it is then burned to liberate the valuable metals, such as copper. Copyright Kevin McElvaney, 2014.

[5] http://www.basel.int/Portals/4/Basel%20Convention/docs/meetings/cop/cop8/NairobiDeclaration.pdf
[6] http://www.basel.int/Portals/4/Basel%20Convention/docs/pub/WhereAreWeeInAfrica_ExecSummary_en.pdf

Present Day

Today, 13 years after our first reporting in Lagos and Accra, BAN's GPS trackers continue to reveal eerily similar evidence of what are still significant flows of hand-it-down used electronic equipment and scrap moving steadily from Europe to Africa. Our European study found the following exports that moved to Africa:

	Tracker Number	Type of Equipment	Exporting Country	Importing Country	Destination Description / Likely Fate
1	UK135413	LCD	UK	Nigeria	Alaba market in Lagos, moved to residence
2	UK140926	LCD	UK	Nigeria	Sold at Lagos market moved inland to farm
3	UK140694	LCD	UK	Nigeria	Alaba market, Lagos.
4	UK141304	LCD	UK	Tanzania	Stone Town, Zanzibar, likely moved to open market
5	ES136437	LCD	Spain	Nigeria	Lagos, likely moved to open market
6	IT141684	Desktop	Italy	Nigeria	Sold at Lagos market, moved to residence
7	IT136494	LCD	Italy	Ghana	Sold at Accra market, went inland

This continuing flow was also corroborated in the April 2018 report by the United Nations University (UNU) entitled "Assessing Import of Used Electrical and Electronic Equipment into Nigeria" as part of the People in the Port program.

Despite the high levels of awareness today, the trade we are witnessing with our GPS trackers and UNU's "People in the Port" remains largely uncontrolled and illegal, as most of the equipment is untested or non-functional. All of the electronic equipment used in our study was rendered non-functional and not economically repairable. Coming from Europe -- a continent that has already implemented the Basel Ban Amendment, even prior to the amendment's global entry into force -- the export of non-functional or untested used electronic equipment is a violation of both the Waste Shipment Regulation and the Waste Electrical and Electronic Equipment (WEEE) Directive.

The exports revealed in our current study continue to flow from North to South, driven by simple economics. They move both to avoid strict and expensive WEEE recycling requirements adopted at EU level in the new CENELEC set of recycling standards, and to feed a constant demand for low-cost electronic equipment in poorer, developing countries. This demand is manifest in African cities where a vigorous, informal repair-for-re-use market operates in the context of traditional open markets and sadly, primitive waste management methods associated with them.



Youths burning wires at Agbogbloshie, on the outskirts of Accra, Ghana. Copyright BAN, 2009.

This time, the revealed destinations were Nigeria, Ghana and a new one -- the Island of Zanzibar, in Tanzania, arriving in the ports of Lagos, Accra, and Stone Town respectively. We can assume many other port cities in Africa are similarly receiving large volumes of the same types of discarded European consumer products.

In our study, Africa was the foreign continental destination where most of our trackers ended up, with 2% of the total deployed and 39% of the total exported across national borders. If we extrapolate based on continental volumes and our study's percentages, we arrive at an estimated flow of 152,600 tonnes per annum moving from Europe to Africa.

While we had previously visited Lagos and Accra, BAN's investigative team was curious as to how large the market in a small island like Zanzibar might be, and whether it was a sign of a much larger East African transshipment port. We visited Stone Town, the primary city on Zanzibar Island and the general location (cell readings only) where our Tanzanian tracker was traced.

That visit, and the help of our volunteer contacts in West Africa, provided us with an updated snapshot of the situation today in Africa.



Ghanaian journalist and BAN associate Mike Anane of Accra, who assisted us in the making of this report, staring at the digital debris scattered over the wetlands of Agbogbloshie. Copyright BAN, 2009.

Tanzania

BAN visited Zanzibar, Tanzania in April 2018. There, we did not find evidence of the feared WEEE hub, but rather, yet another steady stream of European imports being brought from the port directly to the small market shops, stalls, and alleyways of the central open market and neighborhood roadside shops.

In our tour of the large open market, in areas off the tourist pathways, we were presented with ample evidence of significant and regular volumes of imported used electronic equipment coming primarily from Europe. It was clearly being imported with the general purpose of preparation for re-use and re-sale via a vibrant cottage industry for back alley repair, operating completely apart from the constraints of regulation.

While the importers/operators hope to receive working or easily repairable equipment of higher quality, they asserted that there was no guarantee the incoming equipment was not obsolete, even in Tanzania. It was also uncertain if it would be economically repairable, or, with so many different brands and models, that salable equipment could be cobbled together with an accumulation of spare parts derived from the imports. Regardless, that was clearly the intent and hope of the operators. The shops on the street perpendicular to the alleyways attested to the workers' ability to make enough repairs in these primitive "workshops" to be able to stock their shelves and make a living.



Men repairing old CRT monitors and TVs in a side alley. Zanzibar, Tanzania. Copyright BAN, 2018.



Another side alley electronics repair business. Men try to repair the imported used electronics while women prepare food in the background. Zanzibar, Tanzania. Copyright BAN, 2018

Much of the actual work took place in the streets and alleys. As in all such operations, there was waste generated including unrepairable circuit boards, plastic housings, CRT tubes, etc. Unlike the situation in Lagos years earlier, however, in Stone Town we did not see evidence of dumps directly adjacent to the electronics market. It is quite possible that some scrap is sold to peddlers, which in turn might sell it to consolidator brokers. The operators generally claimed that they either saved waste for spare parts for future repairs, or deposited it in the city waste collection system. We did find informal neighborhood metal and plastic scrap collection sites where scrap was accumulated, hopefully for recycling, but they seemed to be largely idle. Most of the mixed metal/plastic electronic waste fractions we presumed were not saved for parts, were indeed picked up by the municipal waste haulers and trucked off to the landfills. There are no recycling or processing facilities for electronics on the island of Zanzibar and shipping to Dar es Salaam is unreasonable due to the logistics and cost. So, while the landfills in Zanzibar are organized and formal, as is the case in much of Africa, they are sites of open waste burning; the accumulated urban detritus is routinely set ablaze to reduce the volumes. A profound ignorance of the ensuing hazards from dioxin, furan, and polycyclic aromatic hydrocarbon generation from open burning persists all over the world. Such compounds are extremely toxic and carcinogenic, rendering the "waste management" a form of hazardous waste generation -- rendering an environmental outcome far worse than the original materials.



A small laptop repair shop owner in Zanzibar discussing his business model, where the electronics originated from, and how he learned his trade with Jim Puckett. Copyright BAN, 2018



BAN's Jim Puckett examining a burned circuit board found in the smoldering landfill. Zanzibar, Tanzania. Copyright BAN, 2018.



An informal waste collection operation on the outskirts of Stone Town. Here, mostly plastics, including electronic housings, are collected for later sorting. Copyright BAN, 2018.



Close-up of some of the as of yet unburned electronic waste found dumped in a formal Zanzibar landfill. Copyright BAN, 2018.



A truck arrives at a Zanzibar landfill with Stone Town trash as BAN Research and Logistics Manager, Chris Brandt, surveys the scene where the waste is scattered and then set ablaze. Copyright BAN, 2018.

Nigeria and Ghana

Likewise, in Lagos, Nigeria, improper and uncontrolled importation of WEEE continues today. A major importer revealed to our field researcher that most of the incoming goods came from Europe – mainly from the United Kingdom, but also from Asia, Canada, and the United States. Electrical and electronic equipment and appliances were reported as being mostly near-end-of-life or non-working and were imported and sold as untested goods, with the buyer accepting the risk of non-repairable and thus non-salable equipment. When electronics were beyond repair, however, usable parts were most often saved for possible future repairs. Our researcher in Lagos attested to the fact that very little has changed since our original visit. The imports continue, the dumping and burning continues, and while the law became stricter with respect to importation for a time, backsliding has now occurred with very little enforcement of existing rules.

Ghana displayed similar re-use markets as those found in Zanzibar, Tanzania and Lagos, Nigeria with open air re-use shops selling a wide range of household goods. Our field researcher interviewed a woman working at one of the shops which imported our tracker from Italy. She stated most of their items came from Italy.

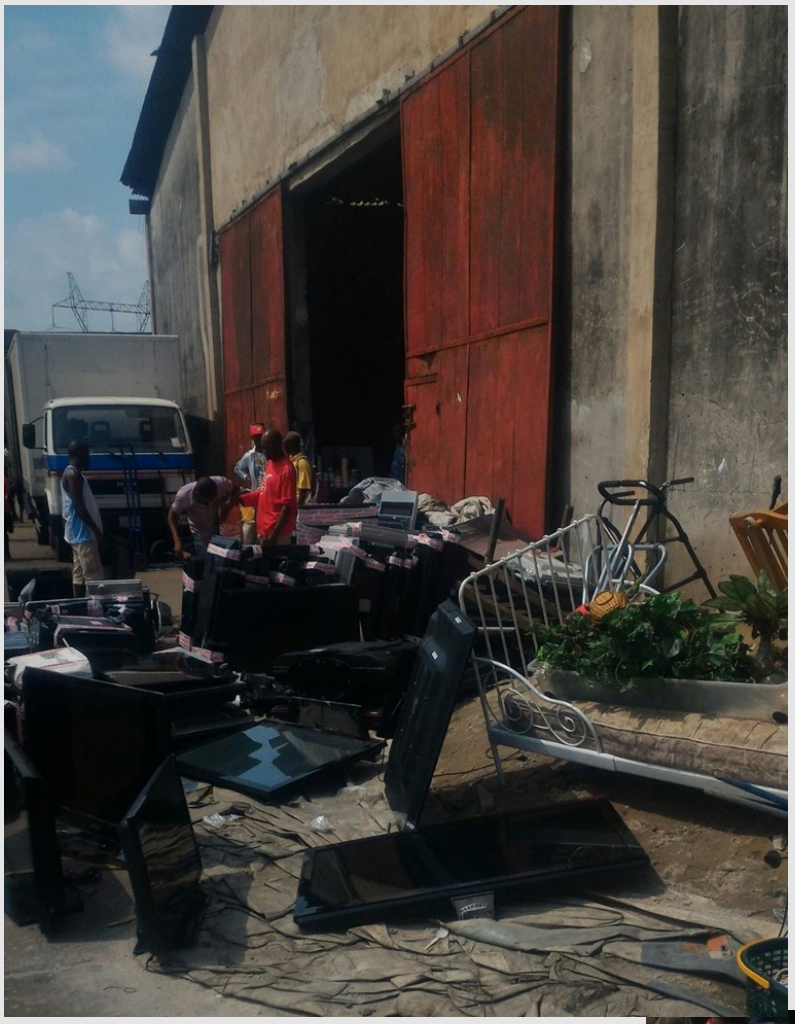
In the Accra region, the imported devices that cannot be sold are taken to the Agbogbloshie dump area by boys toting heavy carts made with old car wheels and scrap. While electronic scrap and cars containing electronics are not directly dumped at Agbogbloshie, they often very quickly end up there.

There have been numerous stories in the press over the years about Agbogbloshie, and with it much denial by some that the location is really a significant global dumpsite for imported electronic waste -- or that banning export is part of the solution.[8] The reality is that by any barometer it is an environmental and human health tragedy. There is currently talk about a complete removal and transformation of Agbogbloshie, with the aid of the German government, but such talk has been heard for over a decade. We hope that if and when the transformation initiative is conducted, it is done wisely and prioritizes protecting both livelihoods and lives.



Customers in an Accra neighborhood survey used goods from Italy in the stall where our tracked LCD from Milan, Italy was traced. Copyright Mike Anane, 2018.

[8] See for example: https://resource-recycling.com/e-scrap/2017/06/01/can-export-incentives-help-clean-agbogbloshie/ and BAN's subsequent reply: https://resource-recycling.com/e-scrap/2017/06/08/opinion-africa-solution-unwanted-pollution/



Odo Olowu Warehouse in Nigeria, located a few kilometers away from the Nigerian main port of Apapa. Here, imported used consumer goods ranging from home electronics and household goods to canned foods, wines, pre-owned infant and adult clothes, toys, and automobiles are sold to merchants and informal repair operations in the markets. Copyright BAN, 2017.



Used LCDs imported to the Odu Olowu market for sale Nigeria. Copyright BAN, 2017.

Ignoring the Law

All of the European Union (EU) countries studied in our report, as well as the three African countries of Ghana, Nigeria, and Tanzania, that were on the receiving end of EU exports are Parties to the Basel Convention. Moreover, each of these countries has also ratified the 1995 Basel Ban Amendment that calls for a full prohibition on the exports of hazardous wastes of any kind, including electronic waste, from member states of the Organization for Economic Cooperation and Development (OECD) or the EU or Liechtenstein (Annex VII countries), to any country outside of that group (e.g. African nations). While the Ban Amendment is not yet in international legal force, it is implemented in full in the law of the EU member states by virtue of the EU Waste Shipment Regulation[9] and elaborated upon for WEEE in Annex VI of the Waste Electronic and Electrical Equipment (WEEE) directive.[10]

Meanwhile, and apart from the Basel Ban Amendment, all African State Parties to the Basel Convention are obliged to uphold the export prohibitions of any other Basel Parties and prosecute such illegal exports to them as illegal traffic. Further, Tanzania is a party to the African Bamako Convention.[11] The Bamako Convention forbids all importation of hazardous wastes into the continent of Africa.[12]

Electronic equipment, if non-functional, is generally considered to be hazardous waste due to the presence of lead, mercury, cadmium, brominated flame retardants, other toxic organic chemicals, and rare Earth metals. So far, attempts by the Electronics Industry and the EU to classify WEEE as non-hazardous if subject for repair under certain conditions have been rebuffed by most countries, by all of civil society, and certainly by the Bamako Convention Parties in Africa. Bamako Decision 15[13] adopted at their first conference of Parties in 2013 in paragraph 3:

> *-- Calls upon, Parties and other African states that have not already done so to legally consider all non-functional or untested used electronic equipment as hazardous waste and prevent their importation into the African Continent.*

Thus, it is likely that the seven exports from the EU countries of Spain, UK, and Italy to the three African states Tanzania, Nigeria, and Ghana discovered by our GPS trackers and described in this report are illegal.



[9] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02006R1013-20180101&rid=1
[10] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0019&from=EN
[11] https://bit.ly/2MRpxtk
[12] https://www.informea.org/en/treaties/bamako/text
[13] https://www.informea.org/en/decision/prevention-hazardous-WEEE-and-near-end-life-importation-and-dumping-africa

First, this would be true from the standpoint of the exportation under the European Union's body of law implementing the Basel Convention and Basel Ban Amendment. Secondly, it would be illegal from the point of view of the three African States who are also Basel Parties, and as such have an obligation to prosecute illegal traffic coming from any source -- and especially from other Basel Parties. Additionally, in the case of Tanzania, which is a Party of the Bamako Convention, the import of any hazardous waste from outside of the continent is strictly illegal.

Surprisingly, however, while there is ample evidence of the European Union taking its enforcement obligations on transboundary movements of waste seriously, there is evidence that both Ghana and Nigeria, two of the African countries most hard-hit by past WEEE export transgressions in the past, have actually refused to enact appropriate legal restraints against this unsustainable trade, and, in the case of Nigeria, appear to have weakened a former strict prohibition of it. Of the three African countries, according to the national reporting section of the Basel Convention website,[14] only Tanzania has implemented the Ban Amendment.

Ghana has not ratified the Bamako Convention and their recent law on hazardous waste failed to implement any form of import ban despite their having ratified the Ban Amendment.[15] Nigeria also appears to have regressed from its previous hard stance against WEEE importation. The latest report from the United Nations University on exports to Nigeria entitled "Assessing Import of Used Electrical and Electronic Equipment into Nigeria"[16] notes in its conclusion that numerous imports occur regularly without authorization or permits, but also without any consequence to the criminal traders. Compared to the days when the agency NESREA (The National Environmental Standards and Regulations Enforcement Agency) was created due to WEEE import violations revealed in BAN's Digital Dump report, it appears that there has been considerable decline due to a seeming lack of will to protect the Nigerian environment more vigorously than protecting the monetary gain by some actors. While the imports we observed in Tanzania are no doubt at least in part illegal due to toxicity and lack of functionality, we heard no evidence that the importers were in the least bit aware of or concerned about any law forbidding imports of WEEE.

Despite the disappointing legal and enforcement response from Nigeria and Ghana compared to their former laudable stance, the trade identified in this report is nevertheless illegal traffic as defined in the Basel Convention and as such, a criminal offense. Every day, it results in chronic and acute pollution of the African environment and African communities. It should therefore be prosecuted aggressively. In the case of Tanzania, it appears that the laws are correct but more emphasis needs to be placed on enforcement.

Clearly, there is an obvious and urgent need for greater cooperation and capacity building between the EU officials (e.g. via their environmental enforcement agency -- IMPEL) and their African counterparts to enforce existing laws. But in the case of Nigeria and Ghana, it appears that the political will to enact strong laws to enforce are needed first. We hope these nations will step up to the challenge and once again play their decisive role in both legislating and enforcing laws to protect the African continent from the scourge of WEEE importation and mismanagement.

[14] http://www.basel.int/Countries/ImportExportRestrictions/tabid/4835/Default.aspx
[15] http://greenadgh.com/images/documentsrepository/HazardousandElectronicWasteControl.pdf
[16] http://collections.unu.edu/eserv/UNU:6349/PiP_Report.pdf

Austria / 18 Trackers / 1 Export



In the period from September 4-5, 2017, BAN deployed 18 non-functional units of electronic waste in the two Austrian cities of Vienna and Amstetten. These LCDs, printers, CRTs, and desktop computers were handed over to municipal collection centers, electronics recyclers, and retail WEEE take-back locations. The destinations were selected from the websites set up by state governments to direct people to approved recycling locations. We also made a few deployments on the streets of these cities. Austria's municipal collection centers and electronics recyclers were all very clean, clearly marked, and easy to use. The retail WEEE take-back locations were also very user-friendly.

Parking to get to these retail stores was not very easy.

Out of the 20 units of scrap electronic equipment, one printer was exported to the town of Rábaszentmihály, Hungary after being dropped at the retail WEEE take-back location called Saturn Gerngross in Vienna, Austria.

We did notice that two devices went to Verwertungsinitiative Sperrmüll GmbH, at Gewerbepark 13, 3484 Grafenwörth, Austria.

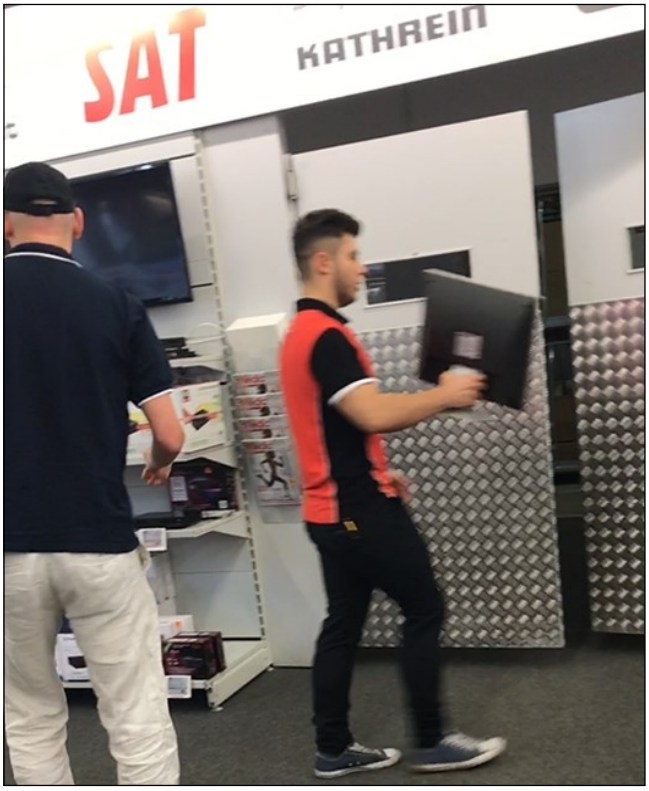
Summary of All Deployed Trackers and Destinations (bold indicates export)

Tracker Number	Deployment Location	Device Type	Final Location
AT178207	Altstoffsammelzentrum (ASZ) (Recycling Center) Korneuburg Gemeinde, 2100 Korneuburg, Austria	Desktop	Korneuburg, Lower Austria, Austria
AT178264	Mistplatz Liesing Seybelgasse 7, 1230 Wien, Austria	LCD	Wien, Austria
AT181425	Altstoffsammelzentrum (Recycling Center) Amstetten Ost Jacob-Mayer-Straße 1, 3300 Amstetten, Austria	LCD	Caritas Recycling Pöchlarn Anton Lasselsberger Straße 3, 3380 Pöchlarn, Austria GPS 48.211217, 15.234911
AT180823	Altstoffsammelzentrum (Recycling Center) Enns Industriehafenstraße 2a, 4470 Enns, Austria	Printer	7 Linzer Straße, Steyregg, Upper Austria, Austria GPS 48.283921, 14.368596 (appears to be last seen at roadside by restaurant)
AT178256	ASZ (Recycling Center) Asten-St.Florian Ipf-Landesstraße 2, 4481 Asten, Austria	LCD	Wels, Upper Austria, Austria
AT179411	Altstoffsammelzentrum (Recycling Center) St. Martin Allersdorf 3, 4113 Sankt Martin/ Mühlkreis, Austria	CRT	Weppersdorf, Burgenland, Austria

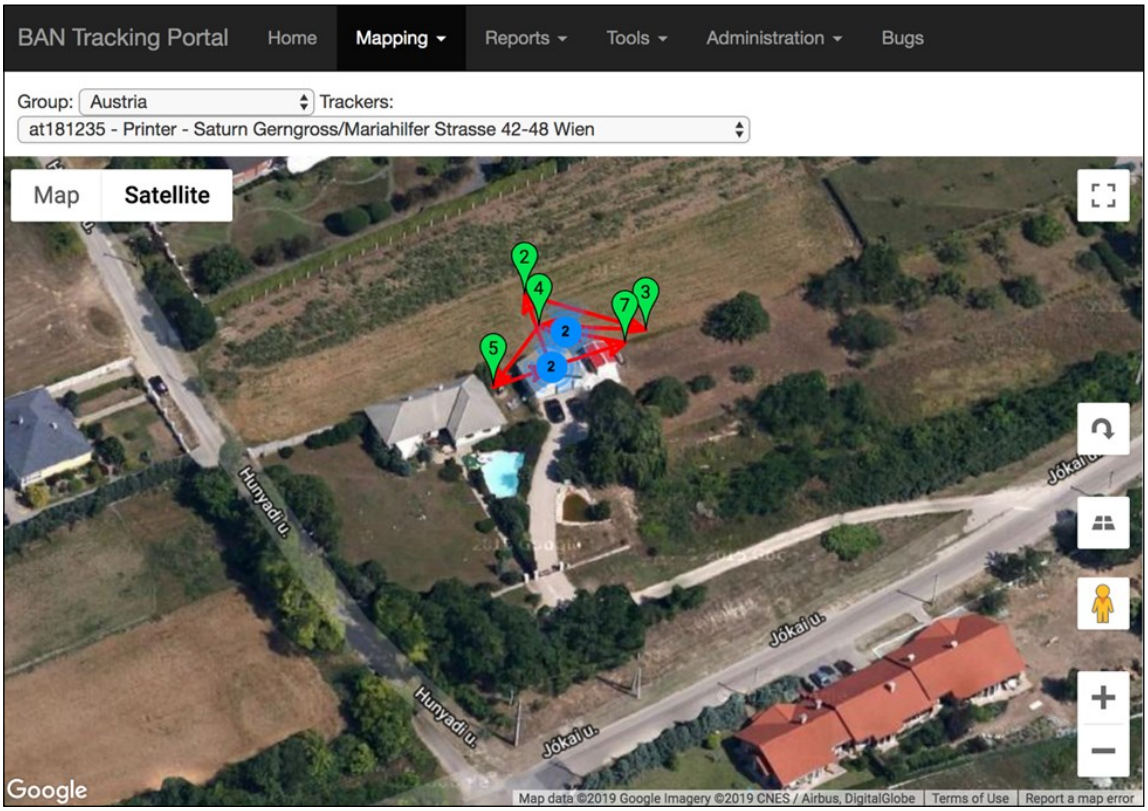
AT181151	Saturn Gerasdorf G3 Shopping Resort Gerasdorf G3 Platz 1, 2201, Austria	Desktop	Lower Austria, Austria
AT181235	**Saturn Wien Gerngross Mariahilfer Str. 42-48, 1070 Wien, Austria**	**Printer**	**Private Residence 81 Hunyadi utca, Győrújbarát, Hungary GPS 47.599291, 17.628663**
AT180724	Media Markt Lugner City Lugner City, Gablenzg. 5-13, 1150 Wien, Austria	LCD	Timelkam, Oberösterreich, Austria
AT181367	Burgenländischer Müllverband - Deponie Nord Am Föllig 3, 7051 Großhöflein, Austria	LCD	Umweltdienst Burgenland GmbH Rottwiese 65, 7350 Oberpullendorf, Austria GPS 47.487942, 16.528872
AT179155	Mistplatz Ottakring Kendlerstraße 38A, 1160 Wien, Austria	CRT	Wien, Austria
AT177571	Mistplatz Auhof Wientalstraße 51, 1140 Wien, Austria	CRT	Wien, Austria
AT177878	Altstoffsammelzentrum (ASZ) (Recycling Center) Gablitz Linzer Strasse 165 B 3003 Gablitz	CRT	Verwertungsinitiative Sperrmüll GmbH. Gewerbepark 13, 3484 Grafenwörth, Austria GPS 48.414802, 15.775545
AT173877	ASZ (Recycling Center) Langenzersdorf Alleestraße 111, 2103 Langenzersdorf	CRT	7 Maculangasse, Vienna, Vienna, Austria GPS 48.261402, 16.457563 (unknown building)
AT179007	ASZ (Recycling Center) Purkersdorf Tullnberbachstrasse 59 Purkersdorf	Desktop	Amstetten, Niederösterreich, Austria
AT187315	District Leibnitz Illegal collector	Desktop	Steiermark, Austria
AT188859	Energie AG Upper Austria Environment Service GmbH Steyr Wilhelm-Schaumberger-Strasse 2, 4400 Steyr, Austria	Desktop	Steyr, Upper Austria, Austria
AT190962	Collection point Hagenbrunn Hagenbrunn Hofweidlingerstraße 1 Hagenbrunn	CRT	Verwertungsinitiative Sperrmüll GmbH. Gewerbepark 13, 3484 Grafenwörth, Austria GPS 48.414929, 15.775816



BAN volunteer dropping off a desktop computer at an electronics recycler in Vienna, Austria. Copyright BAN, 2018.



BAN volunteer handing over an LCD screen to an employee at the retail WEEE take-back location called Media Market in Vienna, Austria. Copyright BAN, 2018.



Screenshot from BAN's tacker portal showing the signals sent while at the residence in Győrújbarát, Hungary. It is unknown how this printer, which was left for recycling at the Saturn retail store, ended up moving to a residence in Hungary. Map data: Google, DigitalGlobe.

AT181235

Saturn Gerngross

Address of Deployment: Mariahilfer Strasse 42-48 Wien

Website: https://www.saturn.at/mcs/marketinfo/_Saturn-Saturn-Wien-Gerngross,93452,-15.html

Government Approved Deployment Location: Not Applicable

Distance Travelled: 162.80 Kilometers

Notes: BAN dropped off a printer at Saturn Gerngross in Vienna, Austria on September 4, 2017. Saturn is a German chain of department stores, now found in several European countries. Saturn sells household appliances, home entertainment, and media such as CDs and DVDs. It is known for its slightly coarse German-language advertising slogan "Geiz ist geil!" ("Stinginess is cool!"). With around 128 stores Saturn is one of the big players in German electronics retail business. It also has thirteen stores in Austria, seventeen in Poland, two in Luxembourg, and three in Russia.

After being dropped off at the Saturn store in Vienna, our tracked equipment next sent a signal from a residence in Győrújbarát, Hungary on September 21, 2017. It ceased to send signals from that location on October 28, 2017. It is difficult to understand how this printer ended up in a residence in Hungary.

Legality: *Likely Legal.* While this printer may have been taken from the Saturn department store without proper authorization by somebody and moved to Hungary, the fact that it went to a residence makes it appear to possibly have been but a shipment of a single unit, and thus would likely be seen under the law as "personal property." For this reason, the transboundary movement rules would be unlikely to apply. If it was an organized commercial shipment of more than one or two personal items, then of course notification from Austria to Hungary would have been necessary under the European Waste Shipment Regulation.

Tracker Number	Type of WEEE	Deployment Date	Date of Arrival	Position, Chain of Export	Destination	Chain of Export Summary
AT181235	Printer	Sept 4, 2017		First and Last		Saturn Gerngorss Mariahilfer Strasse 42-48 Wien
			Sept 21-Oct 28, 2017		Hungary	81 Hunyadi utca, Győrújbarát, Hungary, GPS 47.599285, 17.628711 (residence)

Belgium / 29 Trackers / 1 Export



From April 26-27 of 2017, BAN, with assistance from local contacts, deployed 29 non-functional units of electronic waste in three major Belgian cities -- Antwerp, Brussels, and Charleroi. LCDs, printers, CRTs, and desktop computers were handed over to the designated collectors -- usualy retailors or private recyclers. The destinations were selected from the websites set up by takeback schemes authorized by the WEEE Directive to direct the population to approved locations. We deployed a few electronic waste items on the street to observe the informal waste flows.

With respect to municipal collection sites, Belgium has a convenient and efficient recycling system in place, making it easy for consumers to recycle properly. Out of the 30 pieces of electronic waste we dropped off in Belgium, one CRT was exported; and it went to Northeim, Germany, where we believe it was recycled. That piece of electronic waste was dropped off at the private sector recycler known at the time as Van Gansewinkel Groep B.V., but has since been bought by Renewi and started operating under the new name.

We noticed that 5 of our tracked units went to a non-profit recycler in Tienan, Belgium called Bebat. Bebat's website states: "For 20 years, Bebat has been giving new life to used batteries by collecting, sorting and recycling them. The metals and valuable components are extracted and reused as raw materials. Of course, all other substances are properly processed. We are an environmental organisation with world-class collection results and we are continuously looking to optimize the recycling process with regard to both quantity and quality."

Bebat claims to only collect batteries, so it appears the units that went there were carefully dismantled prior to Bebat, and the batteries/ tracker units were removed by hand. We say "carefully" because we registered no loss in power prior to the units arriving at Bebat. Our units were fragile and attached with thin wires to external battery packs, so any kind of grabbing and pulling would have shown a significant loss of power prior to arrival at Bebat. As this did not occur, we can surmise that they were very carefully removed. We can only hope the rest of the printers, LCDs, and desktop computers were managed as responsibly after they were separated from their batteries and trackers.

Summary of All Deployed Trackers and Destinations (bold indicates export)

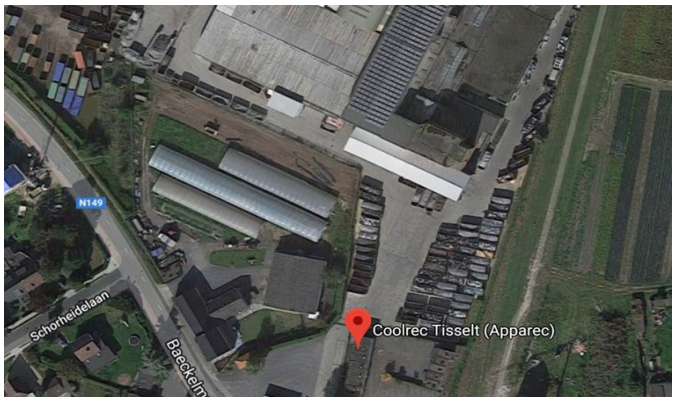
Tracker Number	Deployment Location	Device Type	Final Location
BG135728	Brussels Recycling Metal Budasteenweg 1-2, 1130 Brussels, Belgium	LCD	Charleroi, Wallonie, Belgium
BG135587	Bulmetal bvba Van Praetstraat 90, 2660 Antwerpen, Belgium	Printer	Bebat Walstraat 5, 3300 Tienen, Belgium GPS 50.806395, 4.924691
BG139985	Containerparks Berchem Arbeidersstraat 2, 2600 Antwerpen, Belgium	Printer	Bebat Walstraat 5, 3300 Tienen, Belgium GPS 50.806905, 4.924764
BG136379	De Kringwinkel SPIT IJzerenmolenstraat 10-12 3001 Heverlee	Printer	Recytec 272-288 Lageweg, Menen, Vlaanderen, GPS 50.788597, 3.091743
BG135330	Van Havere Eikendreef 5, 2950 Kapellen,	LCD	Kapellen, Vlaanderen, Belgium

BG136460	CometSambre Rivage de Boubier, 6200 Châtelet, Belgique	LCD	Aciers Grosjean Rue de Zone 23, 6032 Mont Sur Marchienne, Belgium GPS 50.397398, 4.402547
BG135363	Macro Krijgsbaan 1a, 2100 Deurne, Belgium	CRT	Antwerpen, Vlaanderen, Belgium
BG135637	Vanden Borre Bredabaan 974, 2170 Antwerpen, Belgium	CRT	Wervik, Vlaanderen, Belgium
BG141445	Bruxelles-Propreté Avenue de Broqueville 12, 1150 Woluwe-Saint-Pierre, Belgium	LCD	Wervik, Vlaanderen, Belgium
BG140710	Krëfel Wilrijk Boomsesteenweg 651, 2610 Wilrijk, Belgium	Printer	Bebat Walstraat 5, 3300 Tienen, Belgium GPS 50.788483, 3.091772
BG140504	Tibi Rue du Déversoir 1, 6010 Charleroi, Belgium	Printer	Charleroi, Wallonie, Belgium
BG135314	Street Drop 6 Rue Godefroid Guffens, Schaerbeek, Bruxelles, Belgium	LCD	Bruxelles-Propreté 1120 Brussels, Belgium GPS 50.904522, 4.405993
BG140371	Transmetaux Rue Panier Jules 17, 6040 Charleroi, Belgium	LCD	Magazijn, Menen, Vlaanderen, Belgium GPS 50.784613, 3.103044
BG141338	S.A. George and Co 74 Rue de la Providence, Charleroi, Wallonie, Belgium	CRT	Galloo Wallonie sa Ghislenghien Avenue des Artisans 10, 7822 Ath, Belgium GPS 50.655707, 3.852556
BG142153	Street Drop 50 Condorlaan, Antwerpen, Vlaanderen, Belgium	Desktop	Vlaanderen, Belgium
BG141759	Carrefour Belgium Boulevard Joseph Tirou 20, 6000 Charleroi, Belgium	LCD	Charleroi, Wallonie, Belgium
BG136668	Decathlon Antwerp Noorderlaan 53, 2030 Antwerpen, Belgium	LCD	Recytec 272-288 Lageweg, Menen, Vlaanderen, Belgium GPS 50.788497, 3.093566
BG140595	De Knop Recycling Quai de Mariemont 20, 1080 Molenbeek-Saint-Jean, Belgium	LCD	Molenbeek-Saint-Jean, Bruxelles, Belgium
BG135504	Mayers Metals Rue d'Anethan 34, 1030 Schaerbeek, Belgium	Desktop	No movement

BG140603	MIROM Menen Industrielaan 30, 8930 Menen, Belgium	Desktop	Bebat Walstraat 5, 3300 Tienen, Belgium GPS 50.806752, 4.924859
BG135157	MediaMarkt Woluwe-Saint-Lambert - Brussels Chaussée de Louvain 1200, 1200 Woluwe-Saint-Lambert, Belgium	LCD	Bebat Walstraat 5, 3300 Tienen, Belgium GPS 50.806041, 4.924872
BG136445	Cora Brussels Avenue des Communautés 101, 1200 Woluwe-Saint-Lambert, Belgium	Desktop	No movement
BG136783	Street Drop 35 Rue Isaac, Charleroi, Wallonie, Belgium	CRT	Châtelet, Wallonie, Belgium
BG135181	Street Drop 21-85 Hortensia, Zaventem, Vlaanderen, Belgium	LCD	Evere, Bruxelles, Belgium
BG141494	AA IJzerland De Hoge Keer 1A, 2160 Wommelgem, Belgium	Desktop	Ranst, Vlaanderen, Belgium
BG140157	Adam's Computer sprl Boulevard Jacques Bertrand 23, 6000 Charleroi, Belgium	LCD	Galloo Wallonie sa Ghislenghien Avenue des Artisans 10, 7822 Ath, Belgium GPS 50.655239, 3.851722
BG139381	**Van Gansewinkel Nijverheidsstraat 2 Puurs, 2870 Belgium**	**CRT**	**Northeim, Germany**
BG141650	Trans'Form - Charleroi CPAS Avenue de Philippeville 290, 6001 Charleroi, Belgium	LCD	Anderlecht, Bruxelles, Belgium
BG141643	Stevens and Co. Quai des Armateurs 8, 1000 Bruxelles, Belgium	Desktop	Bruxelles, Bruxelles, Belgium



Location of where the CRT which subsequently was exported to Germany was deployed. Map data: Google, DigitalGlobe.



Google satellite shot of Coolrec Tisselt (Apparec) in Vlaanderen, Belgium. Where CRT BG139381 that was dropped at the private recycler called Van Gansewinkel anded before being sent to Niedersachsen, Germany. Map data: Google, DigitalGlobe.

BG139381

Van Gansewinkel Groep B.V./Renewi

Address of Deployment: Nijverheidsstraat 2 Puurs, 2870 Belgium

Website: https://www.renewi.com/en

Government Approved Deployment Location: Yes

Total Distance Travelled: 424.32 Kilometers

Notes: We dropped off the tracker-enabled CRT at the Van Gansewinkel recycling company on April 26, 2017 in the town of Puurs, Belgium. The Van Gansewinkel company operates in 7 countries (the Netherlands, Belgium, Luxembourg, Hungary, France, Germany, and Portugal). Van Gansewinkel Groep was active in the entire waste chain with its subsidiaries Van Gansewinkel, Coolrec, Maltha, and Van Gansewinkel Minerals. It has now merged with the British company Shanks and is rebranded as Renewi. Their website states: "Our vision is to be the leading waste-to-product company – contributing to a sustainable society for all our key stakeholders: customers, employees, our local communities and our shareholders."

The last signal in Belgium was from Willebroek, Vlaanderen at the recycler Coolrec on May 4, 2017. It then sent one signal from Northeim, Germany on May 14, 2017. This was its final signal and was not a precise GPS reading. Near Northeim is the Gröschel Recycling Gmbh. recycling company that processes copper (e.g. from the CRT yoke), as well as the TSR Company in nearby Einbeck which is known to process electronic waste. It is likely that the final destination was one of these two recyclers.

Legality: *Unknown.* Under the terms of the EU Waste Shipment Regulation, non-functioning CRTs are considered as a controlled hazardous waste. The government of Ireland is thus required to pre-notify the government of Belgium prior to export. The exporters would need to also fulfill other requirements of the EU Waste Shipment Regulation, including ensuring that the shipment is accompanied by a Movement Document, a Financial Guarantee, a contract etc. We are unsure if this notification took place.

Tracker Number	Type of WEEE	Deployment Date	Date of Arrival	Position, Chain of Export	Destination	Chain of Export Summary
BG139381	CRT	April 26, 2017	 May 4-13, 2017 May 14, 2017	First (Apparent Exporter)	Germany	Van Gansewinkel Nijverheidsstraat 2 Puurs, 2870 Belgium Coolrec Tisselts 125 Baeckelmansstraat, Willebroek, Vlaanderen, Belgium GPS 51.040462, 4.347825 Northeim, Germany

Denmark / 20 Trackers / 3 Exports



In the period from April 19-21, 2017, BAN deployed 20 non-functional units of electronic waste in or near the two major Danish cities of Copenhagen and Aarhus. These LCDs, printers, CRTs, and desktop computers were delivered to municipal collection centers. The destinations were selected from the websites set up by state governments to direct consumers to approved locations. A few of the tracker enabled devices were also left on the street.

Denmark had some of the most well-organized and clean recycling centers of any of the countries targeted in this project. All the bins were consistently and carefully labeled, with numerous separations and categories to recycle virtually everything imaginable.

Out of the 20 units of tracker enabled electronic scrap dropped off, two desktop computers and one LCD were exported. The first desktop computer was dropped off at a municipal recycler called Rødovre Genbrugsplads in Rødovre, Denmark and was later exported to Dortmund, Germany. The second desktop computer exported was dropped off at the municipal recycler called Ringsted genbrugsstation in Ringsted, Denmark and went to Kepno, Poland. The LCD exported went to Târgu Jiu, Romania after being dropped off on the street at Dexter Gordons Vej in Copenhagen, Denmark.

We did not notice any internal migration to any one specific central processor in Denmark.

Summary of All Deployed Trackers and Destinations
(bold indicates export)

Tracker Number	Deployment Location	Device Type	Final Location
DK135553	Lindved-Odense genbrugsstation Energivej 10, 5260 Odense S, Denmark	LCD	Fredericia, Denmark
DK140322	Genbrugsstation Holkebjergvej Holkebjergvej 136, 5250 Odense, Denmark	LCD	Fredericia, Denmark
DK135934	Horsens Gensbrugsstation 24, Endelavevej, 8700 Horsens, Denmark	CRT	10X Erritsø Møllebanke, Fredericia, Denmark GPS 55.545974, 9.691678
DK135223	Genbrugspladsen vedslet Gl Århusvej 50, 8732 Hovedgård, Denmark	Desktop	Trige, Denmark
DK135454	ARC Vindmøllevej 6 2300 København S	LCD	Fredericia, Denmark
DK135173	Slagelse Genbrugsplads Skovsøvej 8, 4200 Slagelse, Denmark	Printer	No movement
DK140702	Ishøj Genbrugsstation Industrivangen 34, 2635 Ishøj, Denmark	Printer	No movement
DK140181	Vissenbjerg Genbrugsstation Højmarken 1, 5492 Vissenbjerg, Denmark	CRT	8 Klattrup Bygade, Fredericia, Denmark GPS 55.638325, 9.554849
DK135256	**Street drop, Dexter Gordons Vej, København, Denmark**	**LCD**	**Aleea Constructorilor, Rovinari, Județul Gorj, Romania** **GPS 44.894247, 23.164929**

DK140207	Sorø Genbrugsplads Metalvej 15, 4180 Sorø, Denmark	LCD	Tracker disconnected from host device on May 30, 2017. Last signal before disconnection came from Fredericia, Denmark
DK140777	Hvidovre Genbrugsplads Avedøreholmen 97, 2650 Hvidovre, Denmark	Printer	No movement
DK140165	**Ringsted Genbrugsstation Møllevej 14, 4100 Ringsted, Denmark**	**Desktop**	**Kępno, wielkopolskie, Poland**
DK135355	Genbrugsstation Eskelund Eskelundvej 13, 8260 Viby, Denmark	LCD	Fredericia, Denmark
DK135470	Street drop Ahornsgade 16, 2200 Kobenhavn N	LCD	København, Denmark
DK140215	Langeskov Genbrugsstation Mariesmindevej 2, 5550 Langeskov, Denmark	Printer	No movement
DK140314	Renosyd I / S Norgesvej 13 8660 Skanderborg	LCD	No movement
DK142245	Hendensted Genbrugsstation Industrivænget 9, 8783 Hornsyld, Denmark	LCD	DanWEEE Recycling A / S Hovedgaden 501, 2640 Hedehusene, Denmark GPS 55.645364, 12.174742
DK135231	Kirstinnehoj Gerbrusplads Kirstinehøj 25C, 2770 Kastrup, Denmark	Desktop	No movement
DK135702	Kulbanevej Genbrugsstation Retortvej 4, 2500 Valby, Denmark	LCD	Fredericia, Denmark
DK140421	**Rødovre Genbrugsplads Valhøjs Alle 182, 2610 Rødovre, Denmark**	**Desktop**	**Lünen, Nordrhein-Westfalen, Germany**



Cages for WEEE at a municipal collection center in Copenhagen, Denmark. Copyright BAN, 2018

DK135256

1. Street drop at 32 Dexter Gordons Vej, Copenhagen

Address of deployment: Dexter Gordons Vej

Website: N/A

Government approved deployment location: No

Distance travelled: 2,036.87 Kilometers

Notes: BAN placed a large LCD monitor against the wall on a modern new Copenhagen street named Dexter Gordons Vej -- on April 20, 2017. We were curious to learn what might happen to it. It first moved just about 50 meters away to a Red Cross Recycling Collection site on May 5, 2017. We believe it could have been carried there by a resident wishing to clean up the street. Its last signal in Denmark was from Frederiksberg on June 2, 2017. It then sent a signal from Romania on June 15, 2017 and finally ceased to send signals from Judetul, Gorj, Romania on July 3, 2018. In between those dates it did send a few definitive GPS pings as if it were being driven around this township area of Romania. Two of the GPS signals from Romania, though, were at a corner where it seemed there may have been Roma people collecting and storing material in sheds (see photos).

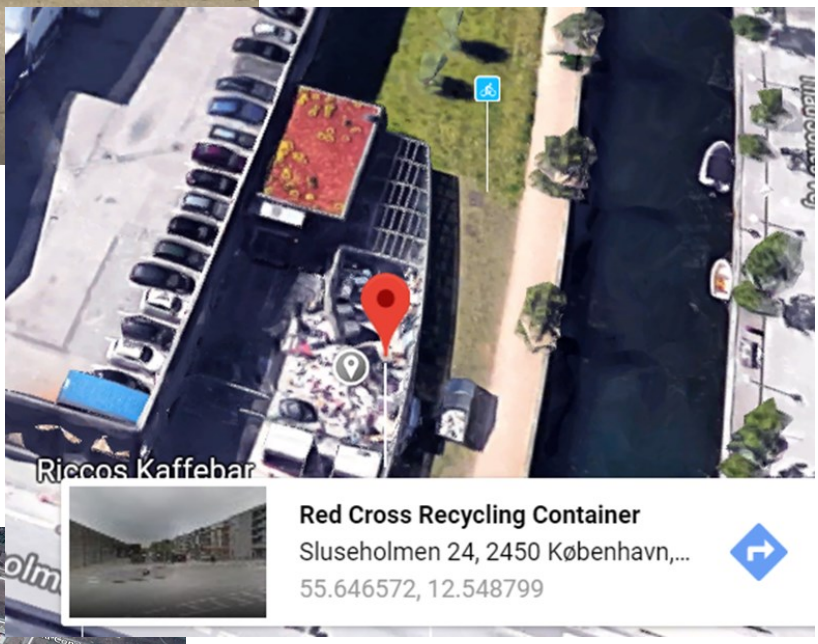
From this we surmise that scavengers in Copenhagen might have removed the monitor from the Red Cross Recycling Container area and moved it by car or van to Romania to sell. It stayed in Romania for more than a full year before finally ceasing to report, but with 50% battery power still intact. Its final fate is unknown.

Legality: *Likely Legal.* While this non-functional LCD monitor may have been stolen from the Red Cross Recycling Container in Copenhagen, it would likely be seen by a judge as being "personal property" due to the fact that it appears to have been an individual shipment and not a commercial operation. Thus, the transboundary movement rules would be unlikely to apply. If it was an organized commercial shipment of more than one or two non-functional electronic items, then of course prior notification from Denmark to Romania would have been necessary under the European Waste Shipment Regulation.

Tracker Number	Type of WEEE	Deployment Date	Arrival Date	Position, Chain of Export	Destination	Chain of Export Summary
DK135256	LCD	April 20, 2017		First	Romania	Dexter Gordons Vej, København, Denmark GPS 55.647646, 12.549017
			May 5-6, 2017			Red Cross Recycling Container 33 Sluseholmen, København, Denmark GPS 55.646567, 12.548934
			May 8 -June 2, 2017			Frederiksberg, Denmark
			June 3, 2017			Târgu Jiu, Județul Gorj, Romania
			June 15, 2017			Aleea Constructorilor, Rovinari, Județul Gorj, Romania GPS 44.894247, 23.164929
			July 3, 2018			Târgu Jiu, Județul Gorj, Romania



LCD screen DK135256 that was left on the sidewalk of Dexter Gordons Vej in Copenhagen, Denmark. Later this screen was exported or driven to the Târgu Jiu, Romania area. Copyright BAN, 2018.



Google Satellite view of the next location the LCD DK135256 moved after being dropped on the sidewalk. This is listed as a Red Cross Recycling Container, and is just a very short distance (about 50 meters) from where it was left. Map data: Google, DigitalGlobe.



View of part of the town of Rovinari where there is a massive coal-fired electricity generation station. The location indicated by the yellow pin (see picture below as well) is not far from the power plant. This is where the device signaled from twice (GPS). Map data: Google, DigitalGlobe.



Precise location where the LCD screen DK135256 signaled from twice as seen from Google Street view. It is a corner that appears to indicate scavenging activity. Note storage sheds where the device could have been stored for many months. Map data: Google, DigitalGlobe.

DK140165

2. Ringsted genbrugsstation

Address of deployment: Møllevej 14, 4100 Ringsted, Denmark

Website: https://www.affaldplus.dk/genbrugsplads/ringsted

Government approved deployment location: Yes

Distance travelled: 694.64 Kilometers

Notes: BAN dropped off a desktop computer at the Ringsted Genbrugsstation on April 21, 2017. Ringsted Genbrugsstation is a municipal collection center in Ringsted, Denmark run by AffaldPlus. AffaldPlus is a waste company for Faxe, Ringsted, Næstved, Slagelse, Sorø, and Vordingborg municipalities. Our desktop computer's last signal in Denmark was from Hvidovre on May 23, 2017. Its first signal and final location in Poland was from Kępno, Wielkopolskie, Poland where it ceased to send signals on July 25, 2017. Its fate is unknown.

Legality: *Unknown.* As this device was rendered non-functional, it likely needs to be exported within the European Community as hazardous waste in accordance with the Waste Shipment Regulation as well as the WEEE directive's Annex VI. It is not illegal to make such shipments, but the equipment would need to be tested, and when found to be non-functional, notified in accordance with the Waste Shipment Regulation's Title II. It is uncertain whether these procedures, which include prior notification and consent, took place. This would need to be determined by checking with the Danish authorities.

Tracker Number	Type of WEEE	Deployment Date	Date of Arrival	Position, Chain of Export	Destination	Chain of Export Summary
DK140165	Desktop Computer	April 21, 2017	May 23, 2017 May 25-July 25, 2017	First and Last	Poland	Ringsted genbrugsstation Hvidovre, Denmark Kępno, wielkopolskie, Poland

BAN operative dropping off a CRT at a municipal collection center in Copenhagen, Denmark. Copyright BAN, 2018.



DK140421

3. Rødovre Genbrugsplads

Address of deployment: Valhøjs Alle 182, 2610 Rødovre, Denmark

Website: https://www.rk.dk/affald/

Government approved deployment location: Yes

Distance travelled: 559.41 kilometers

Notes: We dropped off a Desktop Computer at Rødovre Genbrugsplads on April 13, 2017. Rødovre Genbrugspladsis a municipal collection center run by the city of Rødovre, Denmark. Its last signal in Denmark was from the Rødovre Genbrugsplads on April 24, 2017. Its next signal was in Hamburg, Germany on April 25, 2017. It signaled from Lünen, Nordrhein-Westfalen, Germany on the following day, April 26, 2017, which was its last signal. There are numerous recyclers of electronics and metals in Lünen, as this is the location of the Aurubis copper smelter. We believe it was likely shredded and recycled in Lünen.

Legality: *Unknown.* As this device was rendered non-functional, it likely needs to be exported within the European Community as hazardous waste in accordance with the Waste Shipment Regulation as well as the WEEE directive's Annex VI. It is not illegal to make such shipments, but the equipment would need to be tested, and when found to be non-functional, exported in accordance with the Waste Shipment Regulation's Title II. It is uncertain whether these procedures, which include prior notification and consent, took place. This would need to be determined by checking with the Danish authorities.

Tracker Number	Type of WEEE	Deployment Date	Arrival Date	Position, Chain of Export	Destination	Chain of Export Summary
DK140421	Desktop Computer	April 21, 2017	 April 25, 2017 April 26, 2017	First and Last	Germany	Rødovre Genbrugsplads Hamburg, Germany Lünen, Nordrhein-Westfalen, Germany

WEEE deposit door and signs at a municipal collection center in Copenhagen, Denmark. Copyright BAN, 2018.



Germany / 54 Trackers / 2 Exports

In the period from July 24-28, 2017, with the assistance of Greenpeace Germany, BAN deployed 54 non-functional units of electronic waste in the six major German cities of Köln, Hamburg, Frankfurt, Berlin, Leipzig, and Munich. These LCDs, printers, CRTs, and desktop computers were handed over to municipal collection centers, private recyclers, and retail recyclers. The destinations were selected from the websites set up by state governments to direct people to approved collection sites. We experienced a very well-organized and clean recycling system in the cities we visited. All recycling depots were clearly marked and easy to find.

Out of the 54 pieces of electronic waste dropped off in Germany, two devices were exported (one LCD and one printer). The printer stayed in the EU and the LCD went to Thailand. and the BAN investigative team subsequently visited that site at Nong Sadao, Laem Chabang, Chang Wat Chon Buri, Thailand -- about 134km Southeast of Bangkok. That unit was originally dropped off at a municipal collection center called Wertstoffhof Hammerweg in Dresden, Germany, however, it appears to have been passed to A&B Elektro-Recycling of Jung-Stilling-Straße 64, 44867 Bochum, Germany. A&B was the apparent exporter. The story of this export is described in greater detail in a featured story in this report (see page 13).

We also noticed a common movement of 3 tracked units that went to BRAL Reststoff-Bearbeitungs GmbH in Berlin, Germany of the ALBA group.

Summary of All Deployed WEEE Trackers and Destinations / Germany (bold indicates export)

Tracker Number	Deployment Locations	Device Type	Final Location
DE175617	Stadtreinigung Hamburg Bullerdeich 19, 20537 Hamburg, Germany	LCD	ETH Entsorgungs-Management GmbH Carl-Zeiss-Straße 12, 21465 Reinbek, Germany GPS 53.524948, 10.243155
DE175658	BSR Recyclinghof Behmstraße Behmstraße 74, 10439 Berlin, Germany	LCD	BRAL Reststoff-Bearbeitungs GmbH Marzahner Str. 36, 13053 Berlin, Germany (ALBA Group) GPS 52.545886, 13.524182
DE175625	City cleaning Leipzig recycling center Max-Liebermann-Straße 97, 04157 Leipzig, Germany	LCD	Lehrte, Lower Saxony, Germany
DE178900	BSR Recyclinghof Fischerstraße Fischerstraße 16, 10317 Berlin, Germany	LCD	BRAL Reststoff-Bearbeitungs GmbH Marzahner Str. 36, 13053 Berlin, Germany GPS 52.545868, 13.524156
DE175583	FES Frankfurter Entsorgungs- und Service GmbH - Wertstoffhof Ost Weidenbornstraße 40, 60389 Frankfurt am Main, Germany	LCD	GWR-Recyclingzentrum Lärchenstraße 131, 65933 Frankfurt am Main, Germany GPS 50.096038, 8.593003
DE175575	AWB Abfallwirtschaftsbetriebe Köln GmbH AWB Hauptverwaltung, Maarweg 271, 50825 Köln, Germany	LCD	Meotec GmbH & Co. KG Philipsstraße 8, 52068 Aachen, Germany GPS 50.775121, 6.138355
DE175641	AWB Abfallwirtschaftsbetriebe Köln GmbH AWB Hauptverwaltung, Maarweg 271, 50825 Köln, Germany	LCD	Barntrup, North Rhine-Westphalia, Germany
DE175393	GWR recycling center Lärchenstraße 131, 65933 Frankfurt, Germany	CRT	No movement

DE177951	Establishment Frankfurt-Sachsenhausen (Recycling Center South) FES GmbHSeehofstraße 48 60594 Frankfurt am Main	LCD	Accurec Recycling GmbH Wiehagen 12, 45472 Heißen, Germany GPS 51.442752, 6.942663
DE175732	AWM - Abfallwirtschaftsbetrieb MÜnchen, Thalkirchner Straße 260 81371 Munich	LCD	ALBA Electronics Recycling GmbH, 28 Eisenbahstraße, Eppingen, Baden-Wuerttemberg, Germany GPS 49.139722, 8.923952
DE175567	AWM - Abfallwirtschaftsbetrieb MÜnchen, Großhadern Tischlerstraße 3 81377 München	LCD	ALBA Electronics Recycling GmbH, 28 Eisenbahstraße, Eppingen, Baden-Württemberg, Germany GPS 49.139777, 8.924000
DE178793	Stadtreinigung Dresden GmbH Pfotenhauerstraße 46, 01307 Dresden, Germany	LCD	Dresden, Sachsen, Germany
DE178876	BSR Recyclinghof Rahnsdorfer Straße Rahnsdorfer Str. 76, 12623 Berlin, Germany	Printer	Berlin, Germany
DE178785	Establishment Frankfurt-Sachsenhausen (Recycling Center South) FES GmbH Seehofstraße 48 60594 Frankfurt am Main	LCD	Frankfurt am Main, Hessen, Germany
DE177993	City cleaning Leipzig recycling center Max-Liebermann-Straße 97, 04157 Leipzig, Germany *but taken at the entrance by bandit recy-clers	LCD	Espelkamp, Nordrhein-Westfalen, Germany
DE178678	**Stadtreinigung Dresden GmbH Wertstoffhof Hammerweg Hammerweg 23, 01127 Dresden, Germany**	**LCD**	**Nong Sadao, Laem Chabang, Chang Wat Chon Buri, Thailand GPS 13.048678, 100.941683**
DE178694	ENNA Import-Export-Handelsgesellschaft mbH Billstrasse 214, 20539 Hamburg, Germany	LCD	Hamburg, Germany
DE178660	ENNA Import-Export-Handelsgesellschaft mbH Billstrasse 214, 20539 Hamburg, Germany	Printer	Hoffmann Metallhandel GmbH Mühlenhagen 152, 20539 Hamburg, Germany GPS 53.536362, 10.069996
DE178843	AWM - Abfallwirtschaftsbetrieb MÜnchen, Allach Am Neubruch 23 80997 München, Germany	Printer	MER Metall-ElektroRecycling GmbH Bayerwaldstraße 13, 94377 Steinach, Germany GPS 48.946039, 12.616999
DE178702	Hamburg Stadtreinigung Hamburg GmbH, 4 Rotenbrückenweg 26 und 32, Billstedt, Germany	Printer	Hamburg, Germany
DE182589	Hamburg Stadtreinigung Leipzig GmbH, Krönerstraße 13, Hamburg, Germany	CRT	Hudewald, Flensburg, Schleswig-Holstein, Germany
DE177894	AWB Abfallwirtschaftsbetriebe Köln GmbH AWB Headquarters, Maarweg 271, 50825	CRT	WE3Philipsstraße 8, 52068 Aachen, Germany GPS 50.775345, 6.138383

DE189147	Hamburg Stadtreinigung Hamburg GmbH, Kampweg 9, Hamburg, Germany	Printer	No movement
DE188545	AWB Abfallwirtschaftsbetriebe Köln GmbH AWB Hauptverwaltung, Maarweg 271, 50825 Köln, Germany	Printer	Hudewald, Flensburg, Schleswig-Holstein, Germany
DE188586	Wertstoffhof Hammerweg Hammerweg 23, 01127 Dresden, Germany	LCD	7 Industriegebiet, Elterlein, Sachsen, Germany, GPS 50.566670, 12.884721
DE189022	BSR Recyclinghof Rahnsdorfer Straße Rahnsdorfer Str. 76, 12623 Berlin, Germany	LCD	BRAL Reststoff-Bearbeitungs GmbH Marzahner Str. 36, 13053 Berlin, Germany (ALBA Group) GPS 52.545941, 13.523902
DE189204	Hamburg Stadtreinigung Leipzig GmbH, Augustinerstrasse 8, Leipzig, Germany *but observed being taken at the entrance by bandit recyclers	Printer	Leipzig, Sachsen, Germany
DE189188	Stadtreinigung Dresden GmbH, Hertelstrasse 3, Dresden, Germany	LCD	Dresden, Sachsen, Germany
DE188719	AWM - Abfallwirtschaftsbetrieb München, Germany	Printer	Munich, Bavaria, Germany
DE189063	Hamburg Stadtreinigung Hamburg GmbH, Neulander Ramp 6, Hamburg, Germany	LCD	Harburger Umgehung, Hamburg, Germany
DE189253	Stadtreinigung Dresden GmbH, Scharfenberger Str. 146, Dresden, Germany	LCD	Dresden, Sachsen, Germany
DE188834	Stadtreinigung Dresden GmbH, Altonaer Str. 15, Dresden, Germany	LCD	Dresden, Sachsen, Germany
DE189014	Umweltzentrum Köln Niehler Str. 254, 50735 Köln, Germany	Printer	*Disconnected from host device on July 28, 2017 Last signal before disconnect from Cologne, North Rhine-Westphalia, Germany
DE188966	BSR Recyclinghof Ruppiner Chaussee Ruppiner Chaussee 341 Zufahrt über, Am Dachsbau, 13503 Berlin, Germany	Printer	Georg-Knorr-Platz, Berlin, Berlin, Germany
DE189543	AWM - Abfallwirtschaftsbetrieb München, Großhadern Tischlerstraße 3 81377 München, Germany	Printer	Wiedergeltingen, Bayern, Germany
DE188958	IT-Recycling – Condrobs Beschäftigungs GmbH, Waldmeisterstraße 95b , Germany	CRT	München, Bayern, Germany
DE189196	Krönerstraße in Leipzig (Volkmarsdorf) Krönerstraße 13 04315 Leipzig, Germany	Printer	Environplasma Verwertungscenter GmbH 3 Pleetzer Weg, Friedland, Mecklenburg-Vorpommern, Germany GPS 53.669274, 13.530765
DE189212	Stadtreinigung Hamburg Bullerdeich 19, 20537 Hamburg, Germany	Printer	Hamburg, Germany
DE189451	FES Frankfurter Entsorgungs- und Service GmbH - Wertstoffhof Ost Weidenbornstraße 40, 60389 Frankfurt am Main, Germany	Printer	Polyplast Müller GmbH Am Ockenheimer Graben 17, 55411 Bingen am Rhein, Germany GPS 49.964566, 7.947624

DE189220	BSR Recyclinghof Fischerstraße Fischerstraße 29, 10317 Berlin, Germany	Printer	Berlin, Germany
DE189154	BSR Recyclinghof Ruppiner Chaussee Ruppiner Chaussee 341 Zufahrt über, Am Dachsbau, 13503 Berlin, Germany	CRT	Ber GmbH Wilhelm-Maybach-Straße 6, 14974 Ludwigsfelde, Germany GPS 52.321658, 13.261224
DE189006	AWB Abfallwirtschaftsbetriebe Köln GmbH AWB Hauptverwaltung, Maarweg 271, 50825 Köln, Germany	LCD	Köln, Nordrhein-Westfalen, Germany
DE182712	BSR Recyclinghof Behmstraße Behmstraße 74, 10439 Berlin, Germany	Printer	Berlin, Germany
DE175351	MS recycling Frankfurt E. K. Eichenstraße 25, 65933 Frankfurt am Main, Germany	Desktop	E & O Recycling GmbH Am Ockenheimer Graben 24, 55411 Bingen am Rhein, Germany GPS 49.962627, 7.946816
DE177886	AWB Köln GmbH, Recyclables Center Ossendorf Butzweilerstraße 50, 50829 Köln, Germany	LCD	Grevenbroich, North Rhine-Westphalia, Germany
DE177753	Stadtreinigung Dresden GmbH Pfotenhauerstraße 46, 01307 Dresden, Germany	Printer	HSI Turbinenstahlbau Dresden-Übigau GmbH Werftstraße 5, 01139 Dresden, Germany GPS 51.068617, 13.695375
DE177910	AWB Abfallwirtschaftsbetriebe Köln GmbH AWB Hauptverwaltung, Maarweg 271, 50825 Köln, Germany	Printer	Cologne, North Rhine-Westphalia, Germany
DE174776	AWB Abfallwirtschaftsbetriebe Köln GmbH AWB Hauptverwaltung, Maarweg 271, 50825 Köln, Germany	LCD	Hamburg, Germany
DE174735	Recycling Center Frankfurt Lärchenstraße 131 65933 Frankfurt - Griesheim, Germany	LCD	GWR-Recyclingzentrum Lärchenstraße 131, 65933 Frankfurt am Main, Germany GPS 50.095052, 8.593329
DE177563	Recycling yard Hamburg-Bergedorf Kampweg 9, 21035 Hamburg, Germany	LCD	ETH Entsorgungs-Management GmbH Carl-Zeiss-Straße 12, 21465 Reinbek, Germany GPS 53.526026, 10.242724
DE179197	ENNA Import-Export-Handelsgesellschaft mbH Billstrasse 214, 20539 Hamburg, Germany	Printer	Hoffmann Metallhandel GmbH Mühlenhagen 152, 20539 Hamburg, Germany GPS 53.536321, 10.070246
DE175344	Hamburg Stadtreinigung Leipzig GmbH Johannes-R.-Becher-Straße 13 Leipzig, Germany	LCD	Leipzig, Saxony, Germany
DE178025	FES Frankfurt Disposal and Service GmbH - Recycling Center East Weidenbornstrasse 40, 60389 Frankfurt, Germany	Printer	Scholz Recycling GmbH Berndt-Ulrich-Scholz-Str. 1, 04579 Rötha, Germany GPS 51.185803, 12.489267
DE177845	AWB Abfallwirtschaftsbetriebe Köln GmbH AWB Headquarters, Maarweg 271, 50825 Köln, Germany	Printer	No movement

DE178678

1. Stadtreinigung Dresden GmbH

Address of Deployment: Pfotenhauerstraße 46, 01307 Dresden, Germany

Website: https://www.srdresden.de/startseite-herzlich-willkommen/

Government Approved Deployment Location: Yes

Distance Travelled: 11,505 kilometers

Notes: We dropped off an LCD screen at Stadtreinigung Dresden GmbH in Dresden, Germany -- a municipal waste management company -- on July 27, 2017. Its next location was a Metal Construction Company called HSI Turbinenstahlbau Dresden-Übigau GmbH in Dresden, Germany.

Its next signal came from A & B Elektro-Recycling in Bochum, Germany where it stayed from August 25-October 29, 2017. A & B Elektro-Recycling is a certified electronics recycler founded in April 2014. Its core business is the recycling of used and disposable IT equipment and components.

After remaining at A & B for several months, the LCD was next noticed leaving from the Port of Antwerp, Belgium on October 30, 2017. It next sent a signal from the Port of Sri Lanka on December 1, 2017. Its final signal came from Chang Wat Chon Buri, Thailand on December 6, 2017; it ceased to send signals from this location on December 26, 2017.

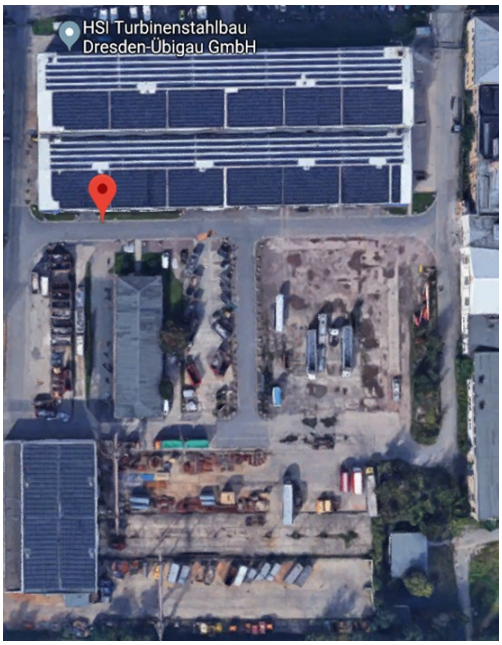
This particular export is highlighted in the feature section found on page 13.

Legality: *Likely Illegal.* The LCD in question was rendered non-functional and economically unrepairable. It was also of the type containing hazardous CCFL mercury-bearing backlights. It thus seems clear that this export was illegal under the Waste Shipment Regulation (WSR)[1] (Article 36), as well as under the clarification provided in Annex VI of the WEEE directive[2]. Under Article 36 of the WSR, all exports to non-OECD countries of hazardous wastes is prohibited. Thailand is not a member of the OECD.

Tracker Number	Type of WEEE	Deployment Date	Arrival Date	Position, Chain of Export	Destination	Chain of Export Summary
DK178678	LCD	July 27–July 31, 2017		First	Thailand	Stadtreinigung GmbH Pfotenhauerstraße 46, 01307 Dresden, Germany
			July 31-Aug 24, 2017	Intermediary		HSI Turbinenstahlbau Dresden-Übigau GmbH Werftstraße 5, 01139 Dresden, Germany- GPS 51.068736, 13.694839
			Aug. 25-Oct. 29, 2017	(apparent exporter)		A&B Elektro-Recycling Jung-Stilling-Straße 64, 44867 Bochum, Germany GPS 51.466952, 7.137162
			Oct. 30 -Nov. 3, 2017			Antwerpen, Vlaanderen, Belgium (port)
			Dec. 1,2017			Sri Lanka (port)
			Dec. 6-26, 2017			Nong Sadao, Laem Chabang, Chang Wat Chon Buri, Thailand GPS 13.048750, 100.941470

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02006R1013-20180101&qid=1454069470717&from=EN
[2] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0019&qid=1544284407562&from=EN







Top left: The LCD DE178678 being deployed at Stadtreinigung Dresden GmbH that was later exported to Thailand. Copyright BAN, 2018

Top right: Satellite view of the second stop on the long journey of LCD DE178678, HSI Turbinenstahlbau Dresden-Übigau GmbH. Map data: Google, DigitalGlobe.

Bottom: Gaylords of circuit boards seen at the site in Thailand where DE 178678 ended up. Copyright, BAN February 2018.

DE189451

2. FES Frankfurter Entsorgungs-und Service GmbH

Address of Deployment: Wertstoffhof Ost-Weidenbornstraße 40, 60389 Frankfurt am Main, Germany

Website: https://www.fes-frankfurt.de/leistungen/service/kofferraumservice/

Government Approved Deployment Location: Yes

Distance Travelled: 608.25 Kilometers

Notes: We dropped off a tracker-enabled printer at the FES Frankfurter Entsorgungs-und Service GmbH in Frankfurt, Germany on July 25, 2017. The device then moved to the GWR company also of Frankfurt. The device sent its last signal from Germany on Aug 7, 2017 from the third location -- Polyplast Müller GmbH, a plastic fabrication company in Bingen am Rhein, Germany. Its next signal came from Amstetten, Austria on August 14, 2017 and ceased to send a signal from that location on August 15, 2017. We are fairly certain that this printer moved to the electronics plastics recycling firm of Müller-Guttenbrunn GmbH, located at Industriestraße 12, 3300 Amstetten, Austria, less than a kilometer from the cell tower reading.

Legality: *Likely Legal.* As this printer contained a hazardous circuit board within it, and as the device was rendered non-functional and economically unrepairable prior to deployment, the export from Germany to Austria would have to consider the printer as a hazardous waste under the terms of the Waste Shipment Regulation as well as the WEEE directive's Annex VI. It is not illegal to make such shipments, but the equipment if untested, would need to be notified in accordance with the Waste Shipment Regulation's Title II. In this case, the company Müller-Guttenbrunn GmbH, has notified us that they have all of the permissions agreed by the authorities. BAN has a copy of this permission.

Tracker Number	Type of WEEE	Deployment Date	Date of Arrival	Position, Chain of Export	Destination	Chain of Export Summary
DE189451	Printer	July 25, 2017		First	Austria	FES Frankfurter Entsorgungs-und Service GmbH - Wertstoffhof OstWedenbornstraße 40, 60389 Frankfurt am Main, Germany
			July 26, 2017			GWR-Recyclingzentrum Lärchenstraße 131, 65933 Frankfurt am Main, Germany GPS 50.095538, 8.592553
			July 28-August 7, 2017	Apparent Exporter		Polyplast Müller GmbH Am Ockenheimer Graben 17, 55411 Bingen am Rhein, Germany GPS 49.964210, 7.947615
			August 14-August 15, 2017			Amstetten, Lower Austria, Austria (No GPS signal but we believe the device ended up at: Müller-Guttenbrunn GmbH, located at Industriestraße 12, 3300 Amstetten, Austria.)



Top left: FES Frankfurter Entsorgungs-und Service GmbH where DE189451 was dropped. Map data: Google, DigitalGlobe.

Top right: The first stop of DE189451 was at GWR-Recyclingzentrum, a waste management site in Frankfurt, Germany. Map data: Google, DigitalGlobe.

Bottom: The apparent exporter of DE189451 was Polyplast Müller GmbH, a plastic fabrication company in Bingen am Rhein, Germany. Map data: Google, DigitalGlobe.

Hungary / 17 Trackers / No Exports



In the period from August 27-29, 2017, BAN, with the help of Greenpeace Hungary, deployed 17 non-functional units of used electronic equipment in the two Hungarian cities of Budapest and Tatabánya. The LCDs, CRTs, and desktop computers were handed over to municipal collection centers, electronics recyclers, and retail WEEE take back locations. The destinations were selected from the websites set up by local governments to direct people to approved recycling locations. We also made a few deployments on the street.

At most of Hungary's electronic recyclers, you had to go into a front office and check in, and at some of those electronic recyclers, you had to pay a small fee based on the weight of your WEEE to leave it with them. The further we got outside of Budapest, the less organized the collection centers were. Often, we would just be instructed to throw the WEEE into a pile of other WEEE. The municipal collection centers were easy to use and clearly marked. The retail take-back locations were also very easy to use; most of them had cages or bins situated near the door inside to deposit your WEEE.

Out of the 17 units of scrap electronic equipment left, no WEEE was exported out of Hungary. Hungary was the only country we studied that did not have a single export.

We did notice that 6 of our deployments appeared to go to Elektronikai Hulladékhasznosító Kft. Karcag, József Nádor út 6, 5300 Hungary.

Summary of All Deployed Trackers and Destinations

Tracker Number	Deployment Location	Device Type	Final Location
HU188750	ARIES Nonprofit Kft 2310 Szigetszentmiklós, Határ út 12, Hungary	LCD	No movement
HU188636	NHS Vértes Vidék Waste Management Nonprofit Kft, Street E. ép., 2800 Tatabánya, Erdész Hungary	CRT	No movement
HU188610	Street Drop 77 Szily Kálmán út, Biatorbágy, Hungary	LCD	Moved to downtown Budapest, Hungary
HU187687	OBI Budapest, Fogarasi út 28-54, 1148 Hungary	LCD	23 Szabadság út, Budaörs, Hungary GPS 47.460363, 18.960690 (residential area)
HU187174	Gu Mu-Waste and Material Processing Ltd. Dealer. Budapest, Ócsai út 4, 1239 Hungary	CRT	Fe-Group Invest Zrt.- Papírhulladék átvétel, felvásárlás Budapest, Sírkert út 2-4, 1108 Hungary GPS 47.475112, 19.172416
HU188412	FKF hulladékudvar Budapest, Füredi u. 74, 1144 Hungary	LCD	Likely went to Elektronikai Hulladékhasznosító Kft. Karcag, József Nádor út 6, 5300 Hungary

HU177936	FKF Hulladékudvar Budapest, Ugró Gyula sor 1, 1044 Hungary	CRT	Elektronikai Hulladékhasznosító Kft. Karcag, József Nádor út 6, 5300 Hungary GPS 47.303144, 20.934328
HU188743	NHSZ Tatabánya Zrt. Csömör, 9,, Határ út 17, 2143 Hungary	LCD	Likely went to Elektronikai Hulladékhasznosító Kft. Karcag, József Nádor út 6, 5300 Hungary
HU188495	DESIGN Kft. 6000 Kecskemét, Ipar u. 6. Hungary	LCD	(appears to be a used car parts location) Mogyoród, Hungary GPS 47.590351, 19.241842
HU187992	MediaMarkt Buda (Mammut) Budapest, Lövőház u. 2-4, 1024 Hungary	Desktop	Most likely to MEH TELEP Tököl, Hungary
HU188602	Városi Szolgáltató Nonprofit Zrt. Szentendre, Szabadkai u. 9, 2000 Hungary	Desktop	66 Béke út, Tahitótfalu, Hungary GPS 47.748021, 19.096166 (residential area)
HU187984	Elektronikai Hulladékhasznosító Kft. Karcag, József Nádor út 6, 5300 Hungary	CRT	Likely went to Elektronikai Hulladékhasznosító Kft. Karcag, József Nádor út 6, 5300 Hungary
HU188420	Budapest I. kerület Budavári Önkormányzat GAMESZ Budapest, Iskola u. 16, 1011 Hungary	LCD	no movement
HU188727	FKF Hulladékudvar Budapest, Besence u. 1, 1186 Hungary	Desktop	Likely went to Elektronikai Hulladékhasznosító Kft. Karcag, József Nádor út 6, 5300 Hungary
HU187760	Inter-Metal Recycling Ltd -. Rákospalota Budapest, Károlyi Sándor út 164, 1151 Hungary	CRT	Elektronikai Hulladékhasznosító Kft. Karcag, József Nádor út 6, 5300 Hungary GPS 47.303105, 20.933897
HU188289	Praktiker Budapest, Bécsi út 136, 1034 Hungary	LCD	Budapest, Hungary
HU189121	MediaMarkt Stop Shop Budapest, Bécsi út 136, 1037 Hungary	Desktop	Most likely to MEH TELEP Tököl, Hungary









Images of Greenpeace Hungary assisting BAN in WEEE deployments around Hungary. Copyright, BAN 2018







Top left: BAN Volunteer from Greenpeace Hungary, deploying off an LCD screen at an electronics recycler in Veresegyház, Hungary. Copyright, BAN 2018.

Top right: The location (Elektronikai Hulladékhasznosító Kft. Karcag, József Nádor út 6, 5300 Hungary GPS 47.303105, 20.933897) where 6 of the units ended up. Map data: Google, DigitalGlobe.

Bottom: Another view of Elektronikai Hulladékhasznosító Kft. Karcag, József Nádor út 6, 5300 Hungary site. From the website: http://www.e-hull.hu/#&panel1-1.

Ireland / 24 Trackers / 3 Exports



From October 24-26, 2017, BAN deployed 24 non-functional units of electronic waste in the four major Irish cities of Dublin, Galway, Limerick, and Cork. LCDs, printers, CRTs, and desktop computers were handed over to an assortment of municipal collection centers, retail take-back locations, and electronics recyclers. The destinations were selected from websites set up by county and provincial governments to direct people to approved recycling locations. Additionally, a few street deployments were performed in order to analyze informal waste flows.

Ireland's recycling system is very consumer friendly for individuals looking to dispose of their electronic waste. Staff at each site were professional and helpful in directing consumers to the appropriate bins for their e-waste.

Out of the 24 units of scrap electronic equipment deployed, three LCDs were exported -- all to EU countries (Belgium and Romania). The first exported LCD was deployed at a municipal collection center called Cashel Recycling Centre in Cashel, Co. Tipperary, Ireland, and went to the recycler Coolrec Tisselt (Apparec) in Merkezeelstraat, Willebroek, Vlaanderen, Belgium. A second LCD was deployed at an electronics recycler called Midleton Skip Hire Limited in Midleton, Co. Cork, Ireland. It also went to the recycler Coolrec Tisselt (Apparec) in Merkezeelstraat, Willebroek, Vlaanderen, Belgium. The third LCD was deployed at municipal collection center called Kilmallock Civic Amenity Centre in Kilmallock, Co. Limerick, Ireland and went to a commercial door warehouse in Valea Mare-Podgoria, Romania. It stayed there for many months and then finally was placed on a ship which went out of the Black Sea, passed Turkey and then the Suez Canal and then went all the way to Hong Kong's New Territories' Ping Che area where it now sits in one of the notorious Hong Kong electronics junkyards awaiting a fate of being crudely dismantled, likely by undocumented laborers.

We noticed a common movement of six pieces of tracked e-waste to The Recycling Village in the Duleek Buisness Park in Meath, Ireland. Another common movement of three pieces of tracked e-waste was to KMK Metals Recycling Limited in Tullamore, Co. Offaly, Ireland.

Summary of All Deployed Trackers and Destinations
(bold indicates export)

Tracker Number	Deployment Location	Device Type	Final Location
IE134098	Recycle IT Unit 14/2, Crag Terrace, Clondalkin Industrial Estate, Clondalkin, Dublin, Ireland	LCD	KMK Metals Recycling Limited Cappincur Industrial Estate, Daingean Rd, Cappincur, Tullamore, Co. Offaly, Ireland GPS 53.274426, -7.462785
IE821702	**Cashel Recycling Centre Waller's-Lot, Cashel, Co. Tipperary, Ireland**	**LCD**	**Coolrec Tisselt (Apparec) Baeckelmansstraat 125, 2830 Tisselt, Belgium GPS 51.040061, 4.349051**
IE156398	Athlone Civic Amenity Site Golden Island, Golden Island (Kilmaine), Athlone, Co. Westmeath, Ireland	LCD	Golden Island (Kilmaine), Co. Westmeath, Ireland GPS 53.418900, -7.934500
IE164922	O'Brien Skip Hire Limited Ballyrussell, Midleton, Co. Cork, Ireland	LCD	Unnamed Road, Ringaskiddy, Co. Cork, Ireland GPS 51.830509, -8.306537
IE137141	Kyletalesha Landfill Kyletalesha, Portlaoise, Co. Laois, Ireland	LCD	KMK Metals Recycling Limited Cappincur Industrial Estate, Daingean Rd, Cappincur, Tullamore, Co. Offaly, Ireland GPS 53.274721, -7.462286

IE827295	Ballyogan Recycling Park Ballyogan, Dublin, Ireland	LCD	9 Cherrybrook Dr, Cherrybrook, Drogheda, Co. Louth, A92 RW7R, Ireland, GPS 53.274721, -7.462286
IE819045	**Midleton Skip Hire Limited Knockgriffin, Midleton, Co. Cork, Ireland**	**LCD**	**Coolrec Tisselt (Apparec) Baeckelmansstraat 125, 2830 Tisselt, Belgium GPS 51.039921, 4.348965**
IE155507	Silliot Hill Recycling Centre & Civic Amenity Silliot Hill, Kilcullen, Co.Kildare, Ireland	LCD	The Recycling Village Ltd Unit 21 Duleek Business Park, Commons, Duleek, Co. Meath, Ireland, GPS 53.663583, -6.407674
IE155788	**Kilmallock Civic Ammenity Centre Shannon Development Industrial Estate, Bruree Road, Kilmallock, Co. Limerick**	**LCD**	**Hong Kong's New Territories Ping Che area, via Romania. GPS 22.526328, 114.145515**
IE708595	Harvey Norman Kinsale Rd, Ballyphehane, Ballycurreen, Co. Cork, T12 CX96, Ireland	LCD	Ballytrasna Co. Cork, Ireland GPS 51.896242, -8.348015
IE819573	Greenstar Civic Amenity Site Dock Rd, Ballykeeffe, Limerick, Ireland	LCD	Galway Metals Carrowmoneash, Oranmore, Co. Galway, Ireland GPS 53.281693, -8.921935
IE825497	Clonmel Waste Disposal Limited Lawlesstown, Clonmel, Co. Tipperary, Ireland	LCD	Fleet Tyre Services Ltd Cloncollig Industrial Estate, Cloncollog, Tullamore, Co. Offaly, R35 X8H1, Ireland, GPS 53.269049, -7.470422
IE826214	D.I.D Electrical 6, Poppyfield Retail Park, Cahir Rd, Ballingarrane South, Clonmel, Co. Tipperary, Ireland	LCD	8 St Joseph's Terrace, Elm Park, Clonmel, Co. Tipperary, E91 HF80, Ireland, GPS 52.358819, -7.713456
IE050428	Raffeen Civic Amenity Site Raffeen Kerrycurrihy Co. Cork, Ireland	LCD	Raffeen Civic Amenity Site Dump and Recyling Facilities L2489, Ballyfouloo, Monkstown, Co. Cork, Ireland GPS 51.841648, -8.361023
IE785866	Street Drop Crabbs Land and Bally Simon Rd., Ireland	LCD	Greenstar Dock Rd, Ballykeeffe, Limerick, Ireland, GPS 52.650498, -8.662507
IE146852	Poolboy recycling site Barna Recycling/ Headford Rd, Carrowbrowne, Galway, Ireland	LCD	Bushfield, Co. Galway, Ireland GPS 53.275081, -8.886124
IE670563	Shannon Recycling Centre Smithstown, Shannon, Co. Clare, Ireland	CRT	The Recycling Village Ltd Unit 21 Duleek Business Park, Commons, Duleek, Co. Meath, Ireland, GPS 53.663869, -6.407763
IE052788	Scotch Corner Recycling Letterbane, Annyalla, Castleblayney, Co. Monaghan, A75 P267, Ireland	CRT	The Recycling Village Ltd Unit 21 Duleek Business Park, Commons, Duleek, Co. Meath, Ireland, GPS 53.663558, -6.408346
IE138783	Derryclure Landfill Portlaoise Road, Tullamore, Co., Ireland	CRT	Derryclure recycling centre Derryclure, Co. Offaly, Ireland GPS 53.231822, -7.471336

IE817247	Corranure Recycling Centre Cootehill Road County Cavan, Ireland	CRT	The Recycling Village Ltd., Unit 21 Duleek Business Park, Commons, Duleek, Co. Meath, Ireland, GPS 53.663922, -6.407810
IE772351	Kinsale Road Civic Amenity Recycling Centre Ballinlough, Cork, Ireland	CRT	KMK Metals Recycling Limited Cappincur Industrial Estate, Daingean Rd, Cappincur, Tullamore, Co. Offaly, Ireland GPS 53.274314, -7.462529
IE816959	Drogheda Civic Ameniy Site (V&W Recycling) Trinity St, Mell, Drogheda, Co. Louth, Ireland	CRT	Rathdrinagh, Ballinlough, Co. Meath, Ireland, GPS 53.663155, -6.526491
IE844085	Electrical Waste Management Ltd Greenogue Facility, Rathcoole, County Dublin. Ireland	LCD	The Recycling Village Ltd Unit 21 Duleek Business Park, Commons, Duleek, Co. Meath, Ireland, GPS 53.663349, -6.408493
IE149609	Estuary Recycling Centre Two Little Ducks, 22 The Ct, Seatown Park, Swords, Co. Dublin, K67 FH29, Ireland	CRT	The Recycling Village Ltd Unit 21 Duleek Business Park, Commons, Duleek, Co. Meath, Ireland, GPS 53.664047, -6.408209



Excavator sorts mixed waste at O'brien Skip Hire Ltd. in Midleton, Ireland where we deployed an LCD. Copyright BAN, 2018.



BAN operatives dropping off an LCD at a retail collection point called Harvey Norman in Cork, Ireland. Copyright BAN, 2018.

IE821702

1. Cashel Recycling Centre

Address of Deployment: Waller's-Lot, Cashel, Co. Tipperary, Ireland

Website: https://www.tipperarycoco.ie/environment/cashel-civic-amenity-sitWEEE-transfer-centre

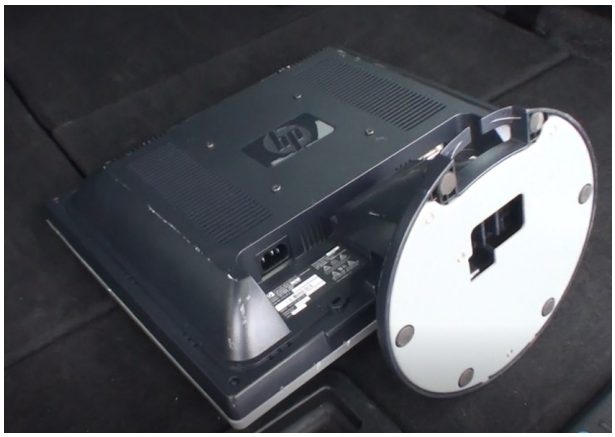
Government-Approved Deployment Location: Yes

Distance Traveled: 997 km

Notes: We deployed an LCD screen at the Cashel Recycling Centre on October 26, 2017. Cashel Recycling Centre is a government-approved consumer recycling center in Cashel, County Tipperary. Its last signal from Ireland was from County Westmeath, Ireland on November 8, 2017. That signal came from the roadside, so we can assume it was likely pinging from a moving lorry or truck filled with other electronics. Its next and final signal came from Coolrec Tisselt in Belgium on November 28, 2017. We cannot be certain how the shipment moved across the North Sea from Ireland to Belgium, but most likely it was on a roll-on/roll-off vessel or on a container ship. Once at Coolrec, we can assume it was recycled quickly since it ceased to send signals after the first ping from Coolrec.

Legality: *Unknown.* Under the terms of the EU Waste Shipment Regulation, non-functioning LCDs with mercury backlights would be considered a controlled hazardous waste. The government of Ireland is thus required to pre-notify the government of Belgium. They would need to also fulfill other requirements of the EU Waste Shipment Regulation, including being accompanied by a Movement Document, a Financial Guarantee, a contract etc. We are unsure if this notification took place.

Tracker Number	Type of WEEE	Deployment Date	Date of Arrival	Position, Chain of Export	Destination	Chain of Export Summary
IE821702	LCD	Oct 26, 2017	 Nov 3-8, 2017 Nov 28, 2017	First and Last (Apparent Exporter)	Belgium	Cashel Recycling Centre Waller's-Lot, Cashel, Co. Tipperary, Ireland R446, County Westmeath, Ireland GPS 53.371221, -7.509287 Coolrec Tisselt (Apparec) Merkezeelstraat, Willebroek, Vlaanderen, Belgium GPS 51.040061, 4.349051



The HP LCD IE821702 that later surfaced in Vlaanderen, Belgium. Copyright BAN, 2018.



BAN operative dropping off IE821702 at the Cashel Recycling Centre in Tipperary, Ireland. Copyright BAN, 2018.

IE819045

2. Midleton Skip Hire Limite

Address of Deployment: Owenacurra Business Park, County Cork, Ireland.

Website: http://www.midletonskiphire.ie/

Government Approved Deployment Location: No

Notes: We deployed an LCD screen to Midleton Skip Hire Limited in Midleton, County Cork on Oct 25, 2017. Midleton Skip Hire rents out skips to the public. In October 2011, Midleton Skip Hire Ltd. offered a new service to the public by opening a recycling and waste disposal facility in Knockgriffin, Midleton Co Cork. The LCD screen went to KMK Recycling Limited in Tullamore, County Offaly from Oct 26-31, 2017. Then it went to a second KMK Metals Recycling Limited location in Kilbeggan R446, County Westmeath and sat there from Oct 31-Nov 13, 2017. Its next, and final, signal was from Coolrec Tisselt in Belgium on Nov 28, 2017. The Coolrec Tisselt website states: "If we ask you for your ideal picture, do you have a picture? Do you see a world in which you work and live in a pleasant way, without the environment suffering from it? A thriving economy in which we prevent, reuse and recycle waste. As a result: the raw materials that still exist are not even scarcer. We keep the CO2 emissions at a minimum. And so we counter the burden and exhaustion of the earth together."

Legality: *Unknown.* Under the terms of the EU Waste Shipment Regulation, non-functional LCDs with mercury backlights would be considered a controlled hazardous waste. The government of Ireland is thus required to notify the government of Belgium prior to shipment. The exporter would also need to fulfill other requirements of the EU Waste Shipment Regulation, including ensuring that the shipment is accompanied by a Movement Document, a Financial Guarantee, a contract etc. We are unsure if this notification took place

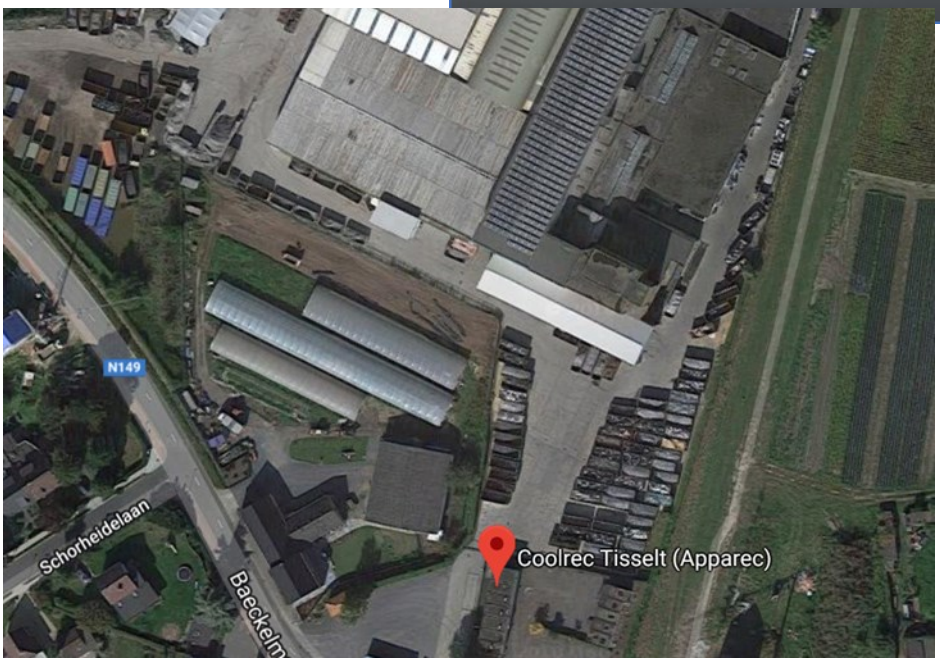
Tracker Number	Type of WEEE	Deployment Date	Date of Arrival	Position, Chain of Export	Destination	Chain of Export Summary
IE819045	LCD	Oct 25, 2017	 Oct 26-31, 2017 Oct 31-Nov 13, 2017 Nov 28, 2017	First (Apparent Exporter)	Belgium	Midleton Skip Hire Limited Owenacurra Business Park, County Cork, Ireland, GPS 51.920032, -8.185168 KMK Metals Recycling Limited Tullamore, County Offaly, Ireland GPS 53.275626, -7.462717 KMK Metals Recycling Ltd. Kilbeggan R446, County Westmeath, Ireland, GPS 53.371085, -7.508762 Coolrec Tisselt (Apparec) Merkezeelstraat, Willebroek, Vlaanderen, Belgium GPS 51.040006, 4.349082



The Philips LCD IE819045 that was dropped at the recycler called Midleton Skip Hire in Cork, Ireland that later surfaced in Vlaanderen, Belgium. Copyright BAN, 2018.

BAN operative dropping off LCD screen IE819045 at the recycler called Midleton Skip Hire in Cork, Ireland. Copyright BAN, 2018.





Google satellite shot of Coolrec Tisselt (Apparec) in Vlaanderen, Belgium. This is where the LCD IE819045 that was dropped at the recycler called Midleton Skip Hire Limited ended up. Map data: Google, DigitalGlobe.

IE155788

3. Kilmallock Civic Ammenity Centre

Address of Deployment: Kilmallock Civic Ammenity Centre, Shannon Development Industrial Estate, Bruree Road, Kilmallock, Co. Limerick, Ireland

Website: http://limerickrecyclingcentres.ie/

Government Approved Deployment Location: Yes

Distance traveled: 11,885 km

Notes: We deployed an LCD screen at the Kilmallock Civic Ammenity Centre on October 25, 2017 in Limerick, Ireland. The Kilmallock Civic Ammenity Centre is a municipal drop-off site run by the city of Limerick. Their website says they accept WEEE equipment. The next location it went to was the Recycling Village in Meath, Ireland, where it stayed for a period January 25-April 19, 2018. The Recycling Village website states that it: "works very closely with the two national WEEE compliance schemes, WEEE Ireland and ERP." The site also notes that: "all activities at The Recycling Village Ltd are carried out in a sound environmental manner and in compliance with national and European legislation. The Recycling Village Ltd's operations are continuously monitored under a certified ISO 14001 Environmental Management System, which ensures that our high-quality products are produced by methods that are safe for employees while protecting the environment."

Next, the tracker-enabled LCD monitor was exported out of Dublin Port landing in Rotterdam on April 24, 2018. From there it appeared to move by train and arrived at its first major stopping point -- a building whose sign indicates it to be a commercial door warehouse near the town of Valea Mare-Podgoria where until December 6, 2018 it reported regularly. It is not well understood why a company such as this would collect broken LCD screens from Ireland, and then, many months later export them to Hong Kong. It could very well be that EU enforcement is less alert in Romania than in Ireland and this is the mechanism by which material is able to flow legally unimpeded from Ireland to low-cost disposal options in developing countries. Nevertheless, as this report's final touches were being completed, the device appeared in one of the well-known New Territories electronic junk yards in Hong Kong in the notorious Ping Che area, documented thoroughly in our earlier report "Scam Recycling."[3] In total the device travelled 11,885 kilometers.

Legality: *Likely Illegal.* The exportation came in two stages in this case. First Irish actors exported the LCD monitor to Romania. Then Romanian actors exported to Hong Kong. Under the terms of the EU Waste Shipment Regulation and Annex VI of the WEEE directive, LCDs with mercury backlights which are non-functional would be considered a controlled hazardous waste. As such, the first stage of the export (EU member state to EU member state) would require the government of Ireland to pre-notify the government of Romania prior to export. The exporter would need to also fulfill other requirements of the EU Waste Shipment Regulation, including having the shipment accompanied with a Movement Document, a Financial Guarantee, a contract etc.[4] We are unsure if these requirements took place but it is doubtful. The second stage (EU member state to non-OECD country) would be prohibited by the WSR's Article 36.

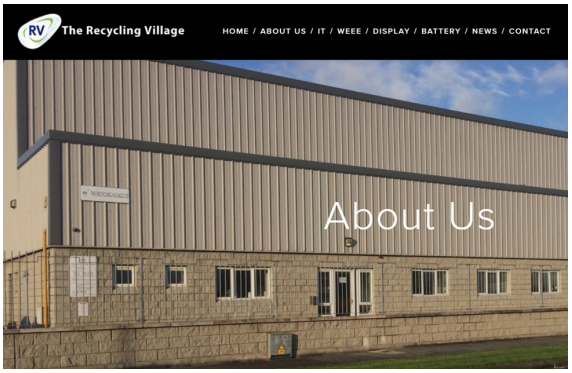


Municipal collection center Kilmallock Recycling Centre in Limerick, Ireland. Copyright BAN, 2018.

[3] https://www.emco-electrice.ro/

[4] Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on Shipments of Waste.

Tracker Number	Type of WEEE	Date of Deployment	Date of Arrival	Position, Chain of Export	Destination	Chain of Export Summary
IE155788	LCD	Oct 25, 2017		First	Romania	Kilmallock Civic Ammenity Centre Shannon Development Industrial Estate, Bruree Road, Kilmallock, Co. Limerick, Ireland GPS 52.406948, -8.582081
			Jan 25-April 19, 2018	(Apparent Exporter)		The Recycling Village Duleek Business Park, County Meath, Ireland GPS 53.663939, -6.407280
			April 19-22, 2018			Dublin Port Alexandra Rd, Dublin, County Dublin, Ireland, GPS 53.350684, -6.212611
			April 24, 2018			Port of Rotterdam A15, Botlek Rotterdam, ZH, Netherlands GPS 51.895759, 4.242270 (loaded on Train)
			April 25, 2018			Aktienweg, DU, NRW, DE GPS 51.424985, 6.799738 GPS (en route on train)
			April 26, 2018			33 Ingling, Ingling, Oberösterreich, Austria GPS 48.554607, 13.439793 (en route on train) 1, Hegyeshalom, Hungary GPS 47.922687, 17.128392 (en route on train)
			April 30-Aug 24, 2018			Door Warehouse site. Strada Cavalerului, Valea Mare-Podgoria, AG, Romania GPS 44.876698, 24.895098
			Jan. 21, 2019			Unnamed Road, New Territories, Ping Che area, Hong Kong GPS 22.526328, 114.145515



The outside of The Recycling Village LTD in Meath, Ireland. This is where LCD Screen IE155788 went after leaving the Kilmallock Civic Ammenity Centre. This is the apparent exporter. Recycling Village website.



Commercial door warehouse location where LCD monitor IE155788 ended up in Valea Mare-Podgoria 117721, Romania. Map data: Google, DigitalGlobe.



The location in the Ping Che area where the Irish tracked LCD monitor IE155788 ended up. Note the "salt and Pepper" appearance from above of the many electronics junk yards in the area. Map Data: Google, DigitalGlobe

Street view of the location in the Ping Che area where the Irish tracked LCD monitor I E155788 ended up. Note wrapped flat screen LCD monitors towering over the wall. Map data: Google, DigitalGlobe





Street view of a truck full of imported LCD monitors just a 50 meters down the road from where IE155788 ended up in New Territories, Hong Kong. How many of these are from the EU?. Map data: Google, DigitalGlobe.

Italy / 48 Trackers / 2 Exports



In the period from May 6-12, 2017, with the assistance of Greenpeace Italy, BAN deployed 48 non-functional units of electronic waste in the five major Italian cities of Milano, Venice, Bologna, Rome, and Naples. These LCDs, printers, CRTs, and desktop computers were handed over to an assortment of municipal collection centers, retail take-back locations, and electronics recyclers. The destinations were selected from the websites set up by state governments to direct people to approved recycling locations. We also left some of the units in automated public WEEE recycling machines, and made a few deployments on the street.

Italy has a substantial Romani presence, who often could be found standing outside of the recycler facilities and centers trying to persuade consumers into leaving the electronic equipment with them instead of with the designated collector. As we got into Rome and Naples we noticed more Romani camps and presence. We expect that most of the street drops we made ended up being taken in by the Romani community, but we cannot know for sure.

Out of the 50 units of scrap electronic equipment deployed in Italy, one desktop computer and one LCD were exported. The desktop computer was deployed at a municipal recycling center called Ecocentro Pianiga in Venice. It went to Lagos, Nigeria, and after first going to an electronics market there, ended up in a residential area. It was presumably purchased from the market even though it was rendered unrepairable prior to deployment.

The LCD was left at a street corner in Milano, and ended up in Kumasi, Ghana. In Ghana, one of our contacts -- WEEE activist and environmental journalist Michael Anane -- went into the field and tracked it down. He was able to find it by virtue of GPS accuracy in a roadside shop in a suburb of Accra called Israel. Verification of the exact device was possible by matching the serial number with our records. The shop owner was not available to interview, but the saleswoman stated that the used electronics were shipped in from Italy. She said the electronic waste and other items were offloaded from a container at the port and then transported by truck to their shop.

We did notice a common movement of 4 of the tracked units to Nec S.R.L. New Ecology in Venice, Italy.

Summary of All Deployed Trackers and Destinations (bold indicates export)

Tracker Number	Deployment Location	Device Type	Final Location
IT139670	Ecological Station CAAB – Bologna Via delle Viti, 7, 40127 Bologna, BO, Italia	Desktop	Via Fratelli Agrizzi, 56A, 32031 Fener, BL, Italia GPS 45.906891, 11.939228
IT135512	AMA - Centro di Raccolta Vigne Nuove Via dell'Ateneo Salesiano, 00139 Roma, RM, Italia	Desktop	Lazio, Italy (near Latina)
IT135629	Street Drop Via degli Stradelli Guelfi 73, 73/73A, Bologna, Italia	CRT	53 Via degli Stradelli Guelfi, Bologna, Emilia-Romagna, Italia GPS 44.485552, 11.411360

IT139530	Ecocentro santa Maria di Sala Viale Ferraris, 22, 30036 L.p. Santa Maria di Sala VE, Italia	CRT	Nec S.R.L. New Ecology 115 Via IX Strada, Fossò, VE 30030, 30030 Fossò VE, Italia GPS 45.399409, 12.044557
IT141577	Isola Ecologica Via da Mugnano a Marianella, 80145 Napoli NA, Italia	CRT	Viale della Resistenza, Napoli, Campania, Italy GPS 40.904196, 14.229456
IT140512	Centro Di Raccolta Ama - V Municipio (Ex VI e VII) Via Teano 38 - 00177 Roma (RM), Italia	LCD	Lazio, Italia (near Gavignano)
IT136346	Street drop piazza impolitic nievo Roma, Lazio, Italia	Desktop	Ponte Galeria-la Pisana, Lazio, Italia (near Fontignani)
IT140553	AMA - Centro di Raccolta Acqua Acetosa Via dei Campi Sportivi, 100, 00197 Roma RM, Italia	LCD	Vallone S.R.L., 03012 Zona Industriale Paduni-Selciatella FR, Italia GPS 41.696354, 13.143567
IT139761	Ama Bufalotta Centro di Raccolta Rifiuti Ingombranti e Raee Via della Bufalotta, 592, 00139 Roma RM, Italia	LCD	Roma, Lazio, Italia (near Cesarina)
IT141684	**Ecocentro Pianiga Via Po, 30030 Pianiga VE, Italia**	**Desktop**	**22a Adisa Oyelumade Street, Lagos, Lagos, Nigeria GPS 6.522792, 3.244704**
IT138755	Mobile Collection Van Largo Enrico Berlinguer Napoli, Campania, Italia	Printer	Ri.Plastic Spa Via Zona Industriale, Scalo Di Baragiano, PZ 85050, 85050 Zona Industriale Baragiano PZ GPS 40.695561, 15.553086
IT135520	Stazione ecologica Hera Via Tolmino, 54, 40134 Bologna BO, Italia	CRT	Via Crosaron, Veneto, Italia (near Cherubine)
IT134358	Ecocentro Mestre Via Porto di Cavergnago, 99, 30173 Venezia VE, Italia	Printer	Veneto, Italia (near Tugurio)
IT139803	Stazione ecologica Borgo Panigale Via Marco Emilio Lepido, 186, 40132 Bologna BO, Italia	Printer	Tred Carpi Srl Via Remesina Esterna, 27, 41012 Fossoli MO, Italia GPS 44.853397, 10.909988
IT140587	EDICOLA C/O CENTRO BORGO Via Lepido 186 - 40132 Bologna (BO), Italia	LCD	Lama di Reno, Emilia-Romagna, Italia (near Lama Di Reno)
IT140447	Consorzio Marte Euroservice Via Melibeo, 81, 00155 Roma RM, Italia	LCD	Palazzo Mancinelli-vaccara, Umbria, Italia (near Vaccara)

IT139837	Euronics Corso Lodi, 6, 20135 Milano MI, Italia	LCD	Lombardia, Italia (near Robecco)
IT140728	AMSA - Ricicleria Corelli Via Arcangelo Corelli, 37/2, 20134 Milano MI, Italia	CRT	Rho, Lombardia, Italia (near Biringhello)
IT135538	AMSA Ricicleria Pedroni Via Lisiade Pedroni, 40/1, 20161 Milano MI, Italia	Desktop	Veneto, Italy (near Ca' Del Lago)
IT136494	**Street drop** **Via dei Mandorli 6 20090 Cesano Boscone, Milano Italia**	**LCD**	**Unnamed Road, Kumasi, Ashanti Region, Ghana** **GPS 6.651689, -1.652357**
IT135694	AMA - Centro di Raccolta Cinecittà Viale Palmiro Togliatti, 69, 00175 Roma RM, Italia	Desktop	Lazio, Italy (near Borgo San Michele)
IT140850	ASIA Napoli - Centro di Raccolta Isola Ecologica Colli Aminei Via Saverio Gatto, 80131 Napoli NA, Italia	Printer	Ri.Plastic Spa Via Zona Industriale, Scalo Di Baragiano, PZ 85050, 85050 Zona Industriale Baragiano PZ, Italia GPS 40.695921, 15.552473
IT136858	Isole ecologiche Via Emilio Salgari – Ponticelli, Naples, Italia	Desktop	Napoli, Campania, Italia (near Rione Incis)
IT136320	Container drop Vialarga Centro Commerciale, Via Larga 40138 Bologna, Italia	LCD	Rho, Lombardia, Italia (near Stellanda)
IT135868	AMA - Corviale Collection Center Viale Arturo Martini, 00148 Roma RM, Italia	Desktop	SIRMET Srl CXMH+PH Borgo San Michele, Latina, Province of Latina, Italia GPS 41.435043, 12.979327
IT135249	Amsa - Ricicleria Milizie Piazzale delle Milizie, 1/1, 20144 Milano MI, Italia	Printer	Rho, Lombardia, Italia (near Rho)
IT135918	IKEA Bologna Via John Lennon, 6, 40033 Casalecchio di Reno BO, Italia	LCD	Bologna, Emilia-Romagna, Italia (near Pilastro)
IT139373	AMA - Centro di Raccolta Macchia Saponara Via di Macchia Saponara, 7, 00125 Municipio X RM, Italia	LCD	VALMEG SMALTIMENTO BATTERIE Zona Industriale Due, Via dei Pini, 01014 Montalto di Castro VT, Italia GPS 42.374133, 11.574145
IT140827	ANDREA COSTA container drop 2 Via del Partigiano, Bologna, Emilia-Romagna, Italia	LCD	Rho, Lombardia, Italia (near Passirana)

IT138789	Recycling container-retail Via Amilcare Ponchielli 23 - 40141 Bologna (BO), Italia	LCD	Lama di Reno, Emilia-Romagna, Italia (near Lama Di Reno)
IT140520	Azienda Municipale Ambiente Piazza Giovanni Battista Bottero, 16, 00122 Lido di Ostia RM, Italia	Desktop	neara Villaggio Dionisi, Veneto, Italia
IT138383	B4 Labs srl Via Palmanova, 30, 20132 Milanoo MI, Italia	CRT	No movement
IT134820	Eso Recycling srl Via Luigi Galvani, 26/2, 36066 Sandrigo VI, Italia	LCD	Colico Piano, Lombardia, Italia (near Fumiarga)
IT134812	AMSA - Riciclerie Olgettina Via Olgettina Milano, 35, 20132 Milano MI, Italia	CRT	RELIGHT Italia Via Lainate, 98/100, 20017 Rho MI, Italia GPS 45.542880, 9.035131
IT139944	Ecocentro Maerne-Martellago Via Roviego, 30030 Maerne VE, Italia	CRT	Nec S.R.L. New Ecology 115 Via IX Strada, Fossò, VE 30030, 30030 Fossò VE, Italia GPS 45.398570, 12.044315
IT139357	Ama Roma S.p.A. Via Riccardo Boschiero snc 00128 Roma, Italia	LCD	Via degli Artigiani, Palazzo Mancinelli-vaccara, Umbria, Italia GPS 43.262227, 12.759821
IT133491	Ecocentro pessegia Via Buratti Antonio, 33, 30037 Scorzè VE, Italia	LCD	Nec S.R.L. New Ecology 115 Via IX Strada, Fossò, VE 30030, 30030 Fossò VE, Italia GPS 45.399261, 12.044711
IT139654	Street drop via italo calvino Bologna, Emilia-Romagna, Italia	Desktop	Napoli, Campania, Italia (near Ponti Rossi)
IT135975	Ecocentro Veritas Via G. Marconi, 30020 Quarto d'Altino VE, Italia	Printer	near Sandrigo, Veneto, Italia
IT136296	Romani camp informal waste stream Circumvallazione esterna di Napoli, Campania, Italia	CRT	388 Via Comunale Limitone d'Arzano, Napoli, Campania, Italia GPS 40.902628, 14.262187
IT135983	Street drop Scalo Lambrate Milano, Lombardia, Italia	Desktop	7 Via Pietro Andrea Saccardo, Milano, Lombardia, Italia GPS 45.481802, 9.239284
IT135819	AMSA - Riciclerie Via Riccardo Lombardi 13 20153 Milanoo, Italia	CRT	RELIGHT Italia Via Lainate, 98/100, 20017 Rho MI, Italia GPS 45.543422, 9.034521
IT136023	Ecocentro vigonovo Via Silvio Pellico, 7, 30030 Vigonovo VE, Italia	CRT	Nec S.R.L. New Ecology 115 Via IX Strada, Fossò, VE 30030, 30030 Fossò VE, Italia GPS 45.399419, 12.044421

IT140751	Euronics Milanoo Corso Buenos Aires Corso Buenos Aires, 64, 20124 Milano MI, Italia	LCD	Rho, Lombardia, Italia (near Cascina Bruciata)
IT137310	Euronics Castoldi Viale Aretusa, 37, 20147 Milanoo MI, Italia	CRT	No movement
IT136577	AMA - Centro di Raccolta Vigne Nuove Via dell'Ateneo Salesiano, 00139 Roma RM, Italia	LCD	I.T.E.C. 03043 Fontana Livia-Solfegna Province of Frosinone, Italia GPS 41.474122, 13.783592
IT141296	Ecocentro Mirano Viale Venezia, 3, 30035 Mirano VE, Italia	LCD	Paluello, Veneto, Italia (near Paluello)



Greenpeace Italy, dropping off WEEE at the recycling company RAE Cycle in Rome, Italy. Copyright BAN, 2018.

Step one in the automated electronic take-back machine. These machines are theft-proof and activated by municipal ID cards. Copyright BAN, 2017.





Greenpeace volunteer placing an LCD monitor into the cage at an Ecological Station. Venice, Italy. Copyright BAN, 2017.

Greenpeace Italy volunteer leaving desktop computer at an abandoned rail car at a Romani camp near Milan. Copyright BAN, 2017.





CRTs being loaded into a truck at Italian Ecological Station. Copyright BAN, 2017.

IT136494

1. Street drop Via dei Mandorli 6 20090 Cesano Boscone, Milano Italy

Address of Deployment: Via dei Mandorli 6 20090 Cesano Boscone, Milano Italy

Website: N/A

Government Approved Deployment Location: No

Notes: We dropped off an LCD screen at a street corner at Via dei Mandorli 6, 20090 Cesano Boscone, Milano, Italy on May 9, 2017. Its last signal in Italy was from Lombardia, on February 22, 2018. Its next signal came from the Accra area of Ghana on April 12, 2018. The tracker-enabled LCD was located by BAN contact Michael Anane in the Israel neighborhood of Accra, at a roadside shop selling a variety of used goods (see photos). He was able to match up the serial numbers of the device, which was at that time still for sale. After he left, the LCD was apparently sold (the price as-is was $25) as it next moved inland to its final destination of Kumasi, Ghana on April 27, 2018. Its last signal from there took place on June 20, 2018. The final location appeared to be a private residence.

Legality: *Likely Illegal.* The equipment in this case contained mercury phosphor CCFL backlight tubes. It was also rendered completely non-functional, and thus, in accordance with the EU WEEE directive's Annex VI and the EU Waste Shipment Regulations, the export was one of hazardous waste. The export of hazardous waste from the EU to countries outside of the OECD is completely illegal under the EU Waste Shipment Regulation's Article 36.

Tracker Number	Type of WEEE	Deployment Date	Date of Arrival	Position, Chain of Export	Destination	Chain of Export Summary
IT136494	LCD	May 9, 2017	 May 10-Feb 22, 2018 April 12-24, 2018 April 27-June 20, 2018	First and Last	Ghana	Roadside of dei Mandorli 6 20090 Cesano Boscone, Milano, Italy Lombardia, Italy Shop on road in Israel neighborhood, Ghana GPS 5.631728, -0.269674 Unnamed Road, Kumasi, Ashanti Region, Ghana GPS 6.651689,-1.652357

Roadside used goods vendor where we found the LCD IT136494 in Accra, Ghana. Copyright M. Anane, for BAN, 2017.









Top left: Dell LCD IT136494 that was exported from a street corner in Milano, found in roadside used goods shop in suburb of Accra, Ghana. Copyright Michael Anane, for BAN, 2017

Top right: Shop in Ghana suburb where LCD IT136494 left on a street corner in Milano ended up. Copyright Michael Anane, for BAN, 2017.

Bottom: Google satellite view of the final location (a residence) in Kumasi, Ghana where the tracked LCD monitor IT136494 ended up. Map data: Google, DigitalGlobe.

IT141684

2. Ecocentro Comune di Pianiga

Address of Deployment: via Po, Mellaredo di Pianiga 30030 Pianiga

Website: https://www.comune.pianiga.ve.it/

Government Approved Deployment Location: Yes

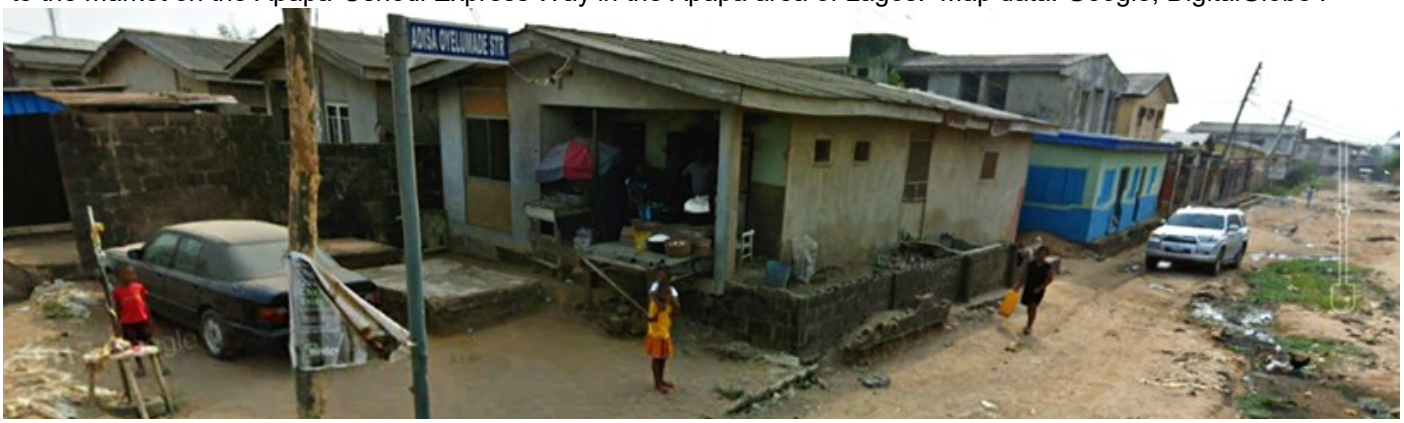
Distance Traveled: 4,452 km

Notes: We dropped off a desktop computer at the Ecocentro Pianiga municipal recycling center in Pianiga, Venice, Italy on May 10, 2017. The last signal from Italy was sent on May 20, 2017 from the region around Mejaniga, Veneto, Italy. It was not a GPS reading so we could not know precisely where it arrived there. Its next signal was sent from what appears to be a wholesale market on the Apapa-Oshodi Express Way. From there, three days later on July 17, 2017, it reported at a residential neighborhood at 18 Babatunde Adekola Street, Ijegun, Lagos, Nigeria and ceased sending signals on July 28, 2017 from that same location.

Legality: *Likely Illegal.* The equipment in this case was a desktop computer containing a large motherboard with lead-tin solder and brominated flame retardants. These boards are considered to be hazardous waste by most countries around the world due to their inherent toxicity and potential to create dioxins and furans when burned, and are listed under Annex VIII of the Basel Convention in A1180. Further, we know the desktop computer was a defined waste, as BAN rendered it completely non-functional prior to leaving it at the recycling center. In accordance with the EU WEEE directive's Annex VI and the EU Waste Shipment Regulation, the export was thus one of hazardous waste. The export of hazardous waste from the EU to countries outside of the OECD group of countries is illegal under the EU Waste Shipment Regulation's Article 36.

Tracker Number	Type of WEEE	Date of Deployment	Date of Arrival	Position, Chain of Export	Destination	Chain of Export Summary
IT141684	LCD	May 10, 2017	May 12-20, 2017 July 14, 2017 July 17 - 28, 2017	First and Last	Nigeria	Ecocentro Pianiga via Po, Mellaredo di Pianiga 30030 Pianiga Mejaniga, Veneto, Italy Apapa-Oshodi Express Way, Lagos, Lagos, Nigeria GPS: 6.497295, 3.322000 18 Babatunde Adekola Street, Lagos, Lagos, Nigeria GPS: 6.522826, 3.244642

Below: Location in the Ijegun neigborhood of Lagos, Nigeria where desktop computer IT141684 ended up after going to the market on the Apapa-Oshodi Express Way in the Apapa area of Lagos. Map data: Google, DigitalGlobe .



Poland / 20 Trackers / 1 Export



In the period from August 20-22, 2017, with the assistance of Greenpeace Poland, BAN deployed 20 non-functional units of electronic waste in the three major Polish cities of Warsaw, Łódź, and Gdańsk. These LCDs, printers, CRTs, and desktop computers were handed over to electronics recyclers which were selected from the websites set up by state governments to direct people to approved collection locations. We also left some used electronic devices in public WEEE recycling bins, as well as a few deployments directly on the street. Poland has a mix of different electronics recyclers and public WEEE bins to dispose of consumer-generated WEEE. The electronics recyclers were not very easy to use, and there would have been no way we could have done the deployments without someone helping who speaks the language.

Out of the 20 units of scrap electronic equipment, one CRT was exported to Volochys'k, Khmel'nyts'ka oblast, Ukraine. This CRT was dropped at the electronics recycler called SWWH Surowce Wtórne Wojciech Hanc in Pruszkowski, Poland, and spent the next week moving around in what seemed to be a car before ending up in a location near Volochys'k, Khmel'nyts'ka oblast, Ukraine.

We did not notice any unusual or common movements of the tracked units within Poland.

Summary of All Deployed Trackers and Destinations (bold indicates export)

Tracker Number	Deployment Location	Device Type	Final Location
PL189949	Remondis Electrorecycling Sp. z o.o. Pryncypalna 132, 91-071 Łódź, Poland	LCD	Łódź, województwo łódzkie, Poland
PL173182	System A-Z Mozaikowa 31b, 04-888 Warszawa, Poland	LCD	Warszawa, mazowieckie, Poland
PL180740	MPO ŁÓDŹ Sp. z o.o. 91-842 Łódź, ul. Tokarzewskiego 2, Poland	Printer	Łódź, województwo łódzkie, Poland
PL183983	ELECTRICITY RECOVERY POINT 80-344 Gdańsk, ul. Gospody 10, Poland	LCD	Starogard Gdański, pomorskie, Poland
PL184064	Complex. PH Jakuba Mortkowicza 5, 02-823 Warszawa, Poland	LCD	Zaklad nr 2 MB Recycling Wrzosowa 44, 26-065 Micigózd, Poland GPS 50.898916, 20.425196
PL180757	Zakład Utylizacyjny Sp. z o.o. w Gdańsku Jabłoniowa 55, 80-180 Gdańsk, Poland	LCD	Gomb-Złom. Skup złomu stalowego, metali kolorowych, usuwanie azbestu Krusza Zamkowa 12 88-101 Krusza Zamkowa Poland GPS 52.741016, 18.223358

PL191408	Street Drop Pryncypalna 179 93-303 Łódź Poland	Desktop	Łódź, województwo łódzkie, Poland
PL180161	Zbiórka elektrośmieci Gdańsk, ul. Szczęśliwa 3, parking przed sklepem Auchan, Poland	LCD	świętokrzyskie, Poland
PL189477	EL-recycling Ireneusz Szablewski 93-404 Łódź ul. Helen 3/5, Poland	LCD	Piotrków Trybunalski, województwo łódzkie, Poland
PL189998	SM RECYCLING SP Z O O Al. Niepodległości 723/6, 81-853, Sopot, Poland	LCD	Bydgoszcz, kujawsko-pomorskie, Poland
PL191002	Pbtech ul. Patriotów 110 04-844 Warsaw Poland	Desktop	Karczew, mazowieckie, Poland
PL189873	Hydrem sp.j. Domański M., Smółka W. Wał Miedzeszyński 155, 04-987 Warszawa, Poland	LCD	Chorzów, śląskie, Poland
PL191325	PARTNER Dariusz Apelski Płytowa 1, 03-046 Warszawa, Poland	Desktop	Warszawa, mazowieckie, Poland
PL175542	Sortownia odpadów i skład balastu. Zamiejska 1, 91-001 Łódź, Poland	CRT	Leszno, wielkopolskie, Poland
PL190103	Panta Sp. o.o. Uczniowska 52, 80-001 Gdańsk, Poland	LCD	No movement
PL176243	Street Drop Drewnowska 58 90-001 Łódź Poland	LCD	Łódź-Bałuty, województwo łódzkie, Poland
PL183934	Elektrośmieci Jana Kilińskiego 29693-160 Łódź, Poland	Desktop	Łódź, województwo łódzkie, Poland
PL189519	Wastech recycling sp. O.o. Krakowiaków 68/70, 02- 255 Warszawa, Poland	Printer	BayWa Agro Poland Sp. o.o. Romualda Traugutta 42a, 5-825 Grodzisk Mazowiecki, Poland GPS 52.118179, 20.622687
PL173646	**SWWH Surowce Wtórne Wojciech Hanc ul. Jesionowa 1 05-816 Michałowice, Poland**	**CRT**	**Volochys'k, Khmel'nyts'ka oblast, Ukraine**









Top left: Greenpeace Poland deploying at an overflowing public WEEE recycling bin in Gdańsk, Poland. Copyright BAN, 2018.

Top right: Greenpeace Poland dropping off a printer at the electronics recycler called Pestar in Gdańsk, Poland. Copyright BAN, 2018.

Middle right: Greenpeace Poland dropping off a desktop computer in a public WEEE bin in Warsaw, Poland. Copyright BAN, 2018.

Bottom: BayWa Agro company, seen from a satellite view, appears to be a recycler of all manner of electronics. Map data: Google, DigitalGlobe.

PL173646

SWWH Surowce Wtórne Wojciech Hanc

Address of Deployment: ul. Jesionowa 1 05-816 Michałowice, Pruszkowski, Poland

Website: www.swwh.prv.pl

Government Approved Deployment Location: No

Distance Travelled: 586.72 Kilometers

Notes: We dropped off a CRT at a very small waste collection company known as SWWH Surowce Wtórne Wojciech Hanc in Pruszkowski, Poland on August 21, 2017. The recycling.info.pl website states that the company provides the purchase and sale of secondary raw materials, including paper waste collection service from offices. The company has appropriate permits to conduct waste paper collection, and thus certifies the recycling of waste using the Waste Transfer Card.
The device sent its last signals from Poland between August 23-30, 2017 from the street area around Warszawam, Mazowieckie, Poland. It appeared as if the device was inside a car parked in various locations in this period. Its next signal came from the region around Volochys'k, Khmel'nyts'ka oblast, Ukraine on September 25, 2017, and ceased to send a signal from that location on April 16, 2018. It is unclear precisely where in this region of Ukraine it ended up.

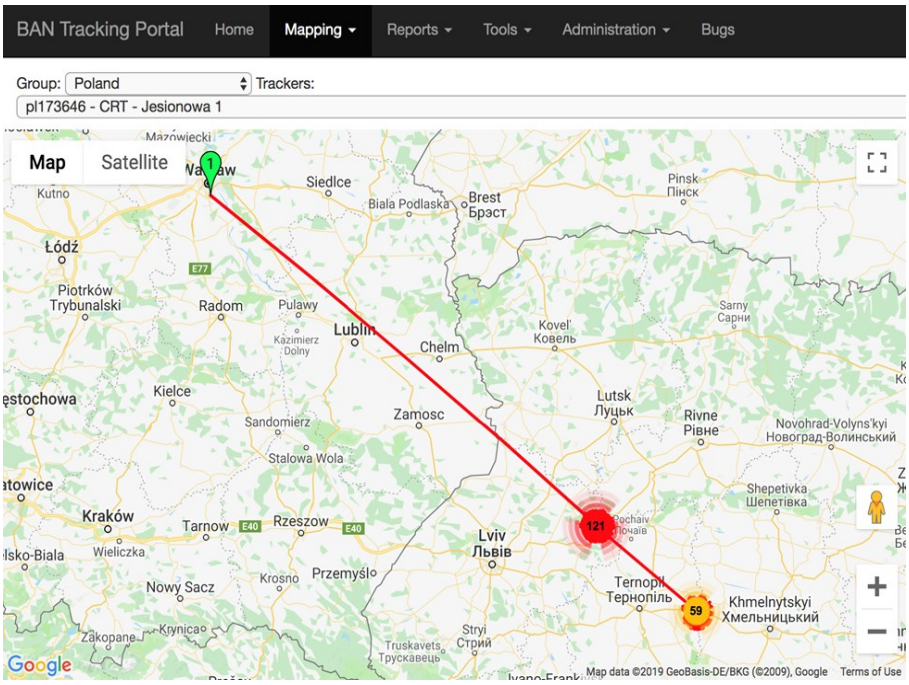
Legality: *Likely Illegal.* The CRT in question was rendered non-functional and economically unrepairable. CRTs are considered to be hazardous waste, appearing on Annex VIII of the Basel Convention, and is transcribed as hazardous waste in the EU Waste Shipment Regulation (WSR)[1]. Thus, it seems clear that this export was illegal under WSR's Article 36, as well as under the clarification provided in Annex VI of the WEEE directive[2]. Under Article 36 of the WSR, all exports to non-OECD countries of hazardous wastes is prohibited. Ukraine is not a member of the OECD.

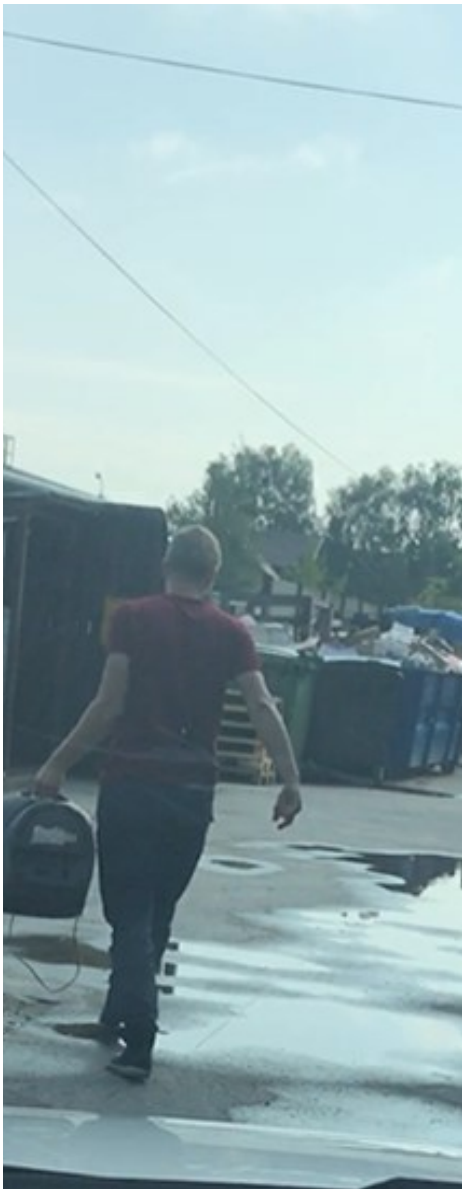
Tracker Number	Type of WEEE	Date of Deployment	Date of Arrival	Position, Chain of Export	Destination	Chain of Export Summary
PL173646	CRT	Aug 21, 2017		First and Last	Ukraine	SWWH Surowce Wtórne Wojciech Hanc, ul. Jesionowa 1 05-816 Michałowice, Poland, GPS 52.177438, 20.882531
			Aug 23-30, 2017			15 Ciszewskiego, Warszawa, mazowieckie, Poland GPS 52.155411, 21.042435
			Sept 25, 2017-April 16, 2018			Volochys'k, Khmel'nyts'ka oblast, Ukraine

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02006R1013-20180101&qid=1454069470717&from=EN

[2] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0019&qid=1544284407562&from=EN







Right: Greenpeace Poland dropping off the CRT PL173646 that was exported to Volochys'k, Khmel'nyts'ka oblast, Ukraine at SWWH Surowce Wtórne Wojciech Hanc in Pruszkowski, Poland. Copyright BAN, 2018.

Top left: Photo from Google street view of the same deployment location on a sunnier day. Map data: Google, DigitalGlobe.

Bottom left: A map of the signal pings from the Warsaw area to Ukraine. While this export was very likely to be illegal, little more is known about it. Map data: Google, DigitalGlobe.

Spain / 45 Trackers / 1 Export



In the period from May 22-May 26, 2017, with the assistance of The Green Party of Spain (EQUO), BAN deployed 45 non-functional units of electronic waste in the five major Spanish cities of Madrid, Bilbao, Barcelona, Valéncia, and Seville. These LCDs, printers, CRTs, and desktop computers were handed over to municipal collection centers which were selected from the websites set up by state governments to direct people to approved locations. We deployed a few electronic waste items on the street to observe the informal waste flows. Spain has a very well organized and clean recycling system in place with easy-to-understand marked bins in Madrid, Bilbao, and Barcelona. In Valéncia and Seville, it was harder to find the recyclers. Out of the 45 pieces of electronic waste we dropped off in Spain, one LCD was exported. It was deployed at a municipal collection center called Ecoparque Picassent - Punto Limpio in Valéncia and it went to Lagos, Nigeria.

We did notice a common movement of 4 tracked units going to Recyberica Ambiental in Madrid. A CRT appears to have gone to the informal sector -- a street dismantler outside of the city of Seville.

Summary of All Deployed Trackers and Destinations (bold indicates export)

Tracker Number	Deployment Location	Device Type	Final Location
ES136247	San Blas-Canillejas District Landline Calle San Romualdo, 20, 28037 Madrid, España	LCD	Alcalá de Henares, Comunidad de Madrid, España
ES141528	Barrio Verde Point Carrer de Carmen Amaya, 10, 08005 Barcelona, España	LCD	Manresa, Catalunya, España
ES136825	street drop 8 Calle Gladiolo, Sevilla, Andalucía, España	Desktop	7 Calle Príncipe de Asturias, Bormujos, Andalucía, España GPS 37.365095, -6.072968 *Note: Appears to have ended up in a residential parking area.*
ES139704	Punto Limpio Fijo Distrito Puente de Vallecas Calle José Paulete, 43, 28038 Madrid, España	LCD	Alcalá de Henares, Comunidad de Madrid, España
ES136205	Alcala del Rio Punto Limpio Av. Manuel Acuña y Bella Ruiz, 41200 Alcalá del Río, Sevilla, España	Desktop	111D Avenida de la Paz, Sevilla, Andalucía, España GPS 37.365253, -5.963998 *Note: appears to have ended up on an island in a street.*
ES139712	Clean point Huesca Calle Fornillos, 20, 22006 Huesca, España	LCD	No movement

ES139787	LIPASAM Clean Point "Los Naranjos" Ctra. Su Eminencia, 26, 41006 Sevilla, España	Desktop	Aznalcóllar, Andalucía, España
ES134440	Punt Verd zona Vall d'Hebron c. Jorge Manrique, 2 cantonada av. Estatut, Barcelona, España	Printer	No movement
ES142211	Punto Limpio - Madrid City Council Av. De Daroca, 112, 28032 Madrid, España	Desktop	Indumetal Recycling Cantera Errepidea, 11, 48950 Asúa-Lauroeta, Erandio, Bizkaia, España GPS 43.298349, -2.948336
ES134671	Clean point Los Pinos Ctra Sevilla-Málaga, Km. 1, 41006, Sevilla, España	CRT	RECILEC, S.A. Parque de Actividades Medio Ambientales, C/ El Matorral, parcela 36-37, 41870 Aznalcóllar, Sevilla, España GPS 37.506243, -6.251447
ES141205	Hortaleza fixed clean point Calle Tomás Redondo, 8, 28033 Madrid, España	LCD	No movement
ES136437	**Ecoparque Picassent - Punto Limpio** **Carrer Barranc, 37C, 46220 Picassent,** **València, España**	**LCD**	**Lawanson area, Lagos, Nigeria**
ES136551	Punt Verd barri les Corts Carrer de Nicaragua, 101, 08029 Barcelona, España	Printer	ElectroRecycling S.A. Ctra, BV-1224, km 6, 750, 08254, Barcelona, España GPS 41.705923, 1.880117
ES134754	Fixed Point Arganzuela Calle Estrella Denébola, 5, 28045, Madrid, España	LCD	Recyberica Ambiental P.I. Casablanca, Calle Mario Vargas Llosa, 17, 28850 Torrejón de Ardoz, Madrid, España GPS 40.476391, -3.432402
ES141007	Ecoparc Albal - Ecoparque Punto Limpio Calle Riu Turia, 43, 46470, València, España	Desktop	Camino de Corte de Peleas a Lobón Por Villarreala, Badajoz, Extremadura, España
ES136270	Deixalleria de Collserola Carrer de Collserola, 2, 08035 Barcelona, España	Printer	Barcelona, Catalunya, España
ES141387	Clean District Usera Punto Fijo Calle Cristo de la Victoria, 245, 28026 Madrid, España	LCD	Alcalá de Henares, Comunidad de Madrid, España

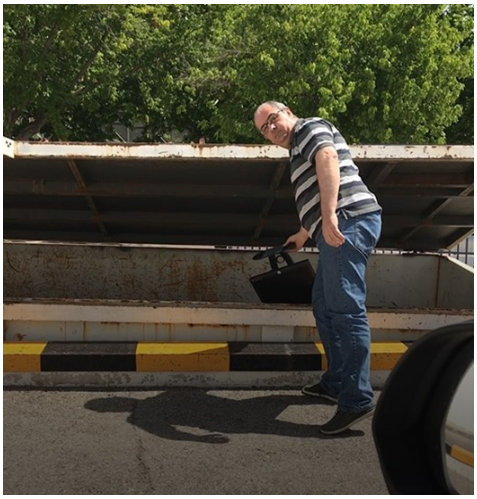
ES136403	Garbigune Derio 48160 Zamudio, Biscay, España	Printer	No movement
ES136569	Vicálvaro Clean Point Calle Sepiolita, 6, 28032 Madrid, España	LCD	Madrid, Comunidad de Madrid, España
ES134796	Urbaser S.A Fòrum Av. del Litoral, 115, 08030 Barcelona, España	LCD	No movement
ES141114	Punt Verd Mòbil Diagonal Mar	LCD	Sant Fost de Campsentelles, Catalunya, España
ES141098	Punt Verd zona Montjuïc Carrer del Foc, 56, 08038 Barcelona, España	Desktop	No movement
ES136411	Street drop Luis Braille/Larrakotorrie Euskadi, España	LCD	Barakaldo, Euskadi, España
S137294	Clean Point "Brenes" (Poligono de Brenes) Brenes Polygon, Seville, España	CRT	11 Calle Bonifacio IV, Carmona, Andalucía, España GPS 37.463231, -5.652494 *Note: Google Street View identifies a man who seems to regularly scavenge scrap metal from old refrigerators. We believe this is where the CRT ended up. See photos below.*
ES141668	Alboraia Ecopark - Punto Limpio Carrer Partida Calvet, 4, 46120 Alboraia, València, España	Desktop	Movilex Recycling Group C/ Don Benito, Polígono Industrial de Lobon, 06498 Lobón, Badajoz, España GPS 38.841006, -6.621515
ES141502	EcoparkValéncia Sur - Punto Limpio Camino Alqueria de la Morera, s / n, 46014 Valéncia, España	Desktop	Colonia Muela los Mangas, Chiva, Comunidad Valénciana, España
ES141551	Garbigune Zorroza Zorrozgoitibidea, 807, 48013 Bilbo, Bizkaia, España	Desktop	Bilbao, Euskadi, España
ES141510	Punt Verd de Zona - Deixalleria de Vallbona Castelladral, 6*10 Nou Barris Vallbona, 08033,Barcelona	CRT	ElectroRecycling S.A. Carrer Sant Roma, 38P, 08254, Barcelona, España GPS 41.705970, 1.879851
ES141411	Clean point mobile Barajas Calle de La Rioja, 27, 28042 Madrid, España	LCD	Zangroiz area, North of Bilbao, Euskadi, España

ES141544	Ecoparc Sagunto Carrer Benjamín Franklin, 16A, 46500 Sagunt, València, España	Desktop	Beniparrell, Comunidad Valénciana, España
ES137138	GESCRAP S.L. Calle Chavarri, Zona Industrial, 48910 Sestao, Bizkaia, España	CRT	Garbigune Erandio, Universidad Errepidea, 10, 48950, Erandio, Bizkaia, España
ES141288	Bilbogarbi Artxanda 48015 Bilbao, Biscay, España	Desktop	Contenor, S.L. Poligono Industrial Trapaga - Ugarte s/n, 48510 Trapagaran, Vizcaya, España GPS 43.296431, -3.015512
ES140983	Street Drop 123 Avenida de Alfonso XIII, Madrid, Comunidad de Madrid, España	LCD	No movement *Note: Likely picked up and destroyed or disassembled within 24 hours.*
ES136288	Bilbogarbi Larraskitu Calle Larraskitu, 62, 48003 Bilbao, Vizcaya, España	Printer	No movement *Note: Likely picked up and destroyed or disassembled within 24 hours*
ES136643	Ecopark Manises - Punto Limpio 46940, Carrer del Comtat, 46, 46940 Manises, Valéncia, España	CRT	Recyberica Ambiental P.I. Casablanca, Calle Mario Vargas Llosa, 17, 28850 Torrejón de Ardoz, Madrid, España GPS 40.476486, -3.431396
ES140934	Punto Limpio Fijo Carabanchel 28044, Calle del Cidro, 5, 28044 Madrid, España	CRT	Recyberica Ambiental P.I. Casablanca, Calle Mario Vargas Llosa, 17, 28850 Torrejón de Ardoz, Madrid, España GPS 40.476467, -3.431673
ES134390	Ecoparque Catarroja C / 31, S / N (Pol. Ind de Catarroja), Catarroja, España (just South of Valéncia)	LCD	Movilex Recycling Group C/ Don Benito, Polígono Industrial de Lobon, 06498 Lobón, Badajoz, España GPS 38.840605, -6.621695
ES141403	Fixed Point of the Madrid City Council. District of Villa de Vallecas Calle de Luis I, 40, 28031 Madrid, España	CRT	Alcalá de Henares, Comunidad de Madrid, España

ES135942	Garbigune Sopelana Kalea Sabino Arana, 120A, 48600 Sopela, Bizkaia, España	CRT	Erandio, Euskadi, España
ES135793	Bilbogarbi Elorrieta 48015 Bilbao, Biscay, España	Desktop	Bilbao, Euskadi, España
ES134655	Ecoparque Sedaví - Punto Limpio Carrer Metge Andreu Minguet, 3, 46910 Sedaví, València, España	CRT	Note: Tracker appears to have been disconnected from host device on June 7, 2017. Last signal before disconnect came from Movilex Gir Sl Avinguda de la Ribera Baixa, 46430 Sollana, València, España GPS 39.274824, -0.375133
ES141676	Villaverde Clean Point Calle de Bascuñuelos, 3, 28021 Madrid, España	CRT	Alcalá de Henares, Comunidad de Madrid, España
ES141437	Punt Verd barri Sant Andreu Carrer de Rovira i Virgili, 14, 08030 Barcelona, España	Desktop	No movement *Note: Likely picked up and destroyed or disassembled within 24 hours*
ES140017	Clean Point Écija 41400 Écija, Seville, España	CRT	Aznalcóllar, Andalucía, España
ES136502	Punt Verd barri la Barceloneta Passeig de Salvat Papasseit, 3, 08003 Barcelona, España	LCD	Sant Feliu de Llobregat, Catalunya, España



Worker at a municipal collection site in Puente de Vallecas, Madrid, Spain taking the LCD screen we deployed. Copyright BAN, 2018.



BAN volunteer dropping off an LCD screen at a municipal collection center in Madrid, Spain. Copyright BAN, 2018.



BAN volunteer dropping off a CRT monitor at a municipal collection center in Madrid, Spain. Copyright BAN, 2018.



Location where scavenger “station” is identified by tracker ES137294 and its end point in the town of Carmona, in Andalucía. See street view photo below of this location. Map data: Google, DigitalGlobe.



Google Street View of scavenger "station" and man harvesting metal and parts from old refrigerators. Note compressor in foreground and oily soil from long periods of this type of activity. This is where tracker enable CRT ES137294 ended its journey in the town of Carmona, in Andalucía. It could also be a location of illegal releases of CFC gases. Map data: Google, DigitalGlobe.

ES136437

Ecoparque Picassent - Punto Limpio

Address of deployment: Carrer Barranc, 37C, 46220 Picassent, València, España

Website: http://emtre.es/ecoparques/mapa/

Government approved deployment location: Yes

Distance travelled: 3,693.78 Kilometers

Notes: BAN dropped off an LCD screen at Ecoparque Picassent - Punto Limpio in Picassent, València, Spain on May 24, 2017. Ecoparque Picassent is a municipal collection center run by the city of Picassent. The tracked equipment sent its next signal, after leaving from Ecoparque Picassent, from Alaquàs, Comunidad Valenciana, Spain on June 2, 2017. The device may have been at Chatarras Hermanos Guerrero S.L., a waste recycling center near the cell tower where we received the signal, but we cannot be certain. The device's next and final signal came from the Lawanson neighborhood of Lagos, Nigeria on February 28, 2018, but this too was a cell tower signal so we were unable to determine the precise location and fate of the tracked equipment in Nigeria. See African Feature section on page 22.

Legality: *Likely Illegal.* The equipment in this case contained mercury phosphor CCFL backlight tubes. It was also rendered completely non-functional, and thus in accordance with the EU WEEE directive's Annex VI and the EU Waste Shipment Regulation, the export was one of hazardous waste. The export of hazardous waste from the EU to countries outside of the OECD is completely illegal under the EU Waste Shipment Regulation.

Tracker Number	Type of WEEE	Deployment Date	Date of Arrival	Position, Chain of Export	Destination	Chain of Export Summary
ES136437	LCD	May 24, 2017	June 2, 2017 Feb 28,2018	First (apparent exporter)	Nigeria	Ecoparque Picassent - Punto Limpio Carrer Barranc, 37C, 46220 Picassent, València, España In the Alaquàs, Comunidad area, Torrent, España Lawanson area, Lagos, Nigeria



Google satellite picture of the municipal collection site that exported the LCD ES136437 to Lagos, Nigeria called Ecoparque Picassent - Punto Limpio. Map data: Google, Streetview.

U.K. / 39 Trackers / 5 Exports



In the period from April 12-April 16, 2017, BAN deployed 39 non-functional units of electronic waste in and around the four major English cities of London, Liverpool, Manchester, and Leeds, as well as the two major Scottish cities of Glasgow and Edinburgh. These LCDs, printers, CRTs, and desktop computers were handed over to an assortment of municipal collection centers, retail take-back locations, WEEE recycling bins, and electronics recyclers. The destinations were selected from the websites set up by state governments to direct consumers to approved drop-off locations. We also made a few deployments on the street. The United Kingdom had a very well-organized recycling system; we had no troubles replicating the likely activity of consumers, and it was easy and convenient to recycle our WEEE.

Out of the 39 units of scrap electronic equipment, 5 LCDs were exported to non-OECD countries. The UK thus had the highest rate of exports of any of the 10 nations we studied. The first piece of equipment exported was an LCD we dropped at the Kemp Place Car Park Recycling Drop in the Hertsmere Borough of London. It was exported to Nigeria. The device sat in Lagos, Nigeria for 3 months before moving to Llorin, Nigeria.

The second LCD exported was dropped at the Bury St Edmonds Household Waste Recycling Site in Bury St Edmonds, Suffolk, England. It was exported to Lagos, Nigeria.

The third LCD exported was dropped at Ipswich Household Waste Recycling Centre in Ipswich, England and was also exported to Lagos, Nigeria. It sent a final signal from the Alaba International Market, where it was likely sold.
The fourth LCD exported was dropped at Dawsholm Recycling Centre in Glasgow, Scotland and was exported to Zanzibar, Tanzania. BAN operatives followed this device with a physical visit and found a vibrant electronics market in Zanzibar serving the second-hand electronics demand of the island. Many individuals were employed in informal repair operations in back alleys and shops.

The fifth LCD exported was dropped at Renfrewshire Recycling Centre in Renfrewshire, Scotland and was exported to Rawalpindi, Punjab, Pakistan. BAN had a volunteer track down the device in Rawalpindi. The device was by our volunteer to the house of man who owns a computer repair shop in his house. He said he gets a container of LCDs every 15 days. He either repairs them for resale, or dismantles them and sells them as scrap.

Summary of All Deployed Trackers and Destinations
(bold indicates export)

Tracker Number	Deployment Location	Device Type	Final Location
UK139621	Chanters Household Waste Recycling Centre Arley Way, Atherton, Manchester M46 9BP, UK	LCD	Hindley, England, United Kingdom
UK140488	Gatewarth Community Recycling Centre Gatewarth Industrial Estate, Barnard St, Great Sankey, Warrington WA5 1DD	CRT	Lymm, England, United Kingdom
UK135561	Foxhall Household Waste Recycling Centre Foxhall Rd, Ipswich IP10 0HT, UK	Printer	No movement GPS 52.049332, 1.263545 GPS
UK135579	Craigmillar Community Recycling Ctr Old Dalkeith Road, Craigmillar, Edinburgh EH16 4TB, UK	Desktop	Viridor Collection Services Friarton Bridge Park, Friarton Road, Perth PH2 8DD, UK GPS 56.375995, -3.414517

UK135397	Hanford Household Waste Recycling Centre Campbell Rd, Stoke-on-Trent ST4 4DX, UK	CRT	Wales, United Kingdom
UK140645	Poplars Landfill/Tip Lichfield Rd, Norton Canes, Cannock WS11 8NQ, UK	LCD	Midland Tech Unit A3, Faraday Business Park, Bridgnorth WV15 5BA, UK GPS 52.529285, -2.401815
UK135447	FCC Environment- Milton Recycling Centre Butt Ln, Milton, Cambridge CB24 6DQ, UK	Desktop	Loughton, England, United Kingdom
UK140686	Hemel Hempstead Household Waste Recycling Centre Hemel Hempstead Industrial Estate, Eastman Way, Hemel Hempstead HP2 7DU, UK	CRT	No movement GPS 51.769818, -0.445825
UK140637	Bruntsfield/Morningside Street drop-Edinburgh, UK	LCD	Edinburgh, Scotland, United Kingdom
UK140439	Stafford Recycling Centre Stafford ST16 3DR, UK	LCD	Stafford, England, United Kingdom
UK135421	Erskine Ferry Road Recycling Centre Erskine Ferry Rd, Old Kilpatrick, Glasgow G60 5EU, UK	Desktop	Glasgow, Scotland, United Kingdom
UK140538	Otterspool Household Waste Recycling Centre Jericho Ln, Liverpool L17 5AR, UK	CRT	Loversall, England, United Kingdom
UK140330	Regis Road Recycling Regis Rd, London NW5 3EW, UK	LCD	Sittingbourne, England, United Kingdom
UK135413	**Bury St Edmonds Household Waste Recycling Site Rougham Hill, Bury Saint Edmunds IP33 2RW, UK**	**LCD**	**88 Shibiri Road, Ojo, Lagos, Nigeria GPS 6.461608, 3.152088**
UK141320	Bins and Recycling Wellington St, Bolton BL3 5DX, UK	Printer	Stretford, England, United Kingdom
UK140561	ITAD Works 132 Dunsfold Park, Cranleigh GU6 8TB,	LCD	SWEEP Gas Rd, Sittingbourne ME10 2QB, United Kingdom GPS 51.461703, -0.462523 (SWEEEP is a recycler that found the tracker and returned it to BAN)
UK140546	Sandwell Council Refuse Centre Shidas Ln, Oldbury B69 2BP, UK	Desktop	No movement
UK140926	**Kemp Place Car Park Recycling Drop Kemp Place car park, Kemp Place, WD23 1DB UK**	**LCD**	**Ilorin, Kwara, Nigeria GPS 8.490271, 4.564142**
UK135736	Sittingbourne Household Waste Recycling Centre Gas Rd, Milton, Sittingbourne ME10 2QD, UK	CRT	Gas Road, Sittingbourne, England, United Kingdom GPS 51.347122, 0.738262
UK140678	Leigh Waste and Recycling Centre Slag Ln, Lowton, Leigh WA3 1BZ, UK	Printer	No movement GPS 53.491168, -2.561268
UK135280	Stowmarket Household Waste Recycling Old Bury Rd, Stowmarket IP14 3QB, UK	Desktop	Tavistock Road, London, England, United Kingdom
UK140454	Leycett Household Waste Recycling Ctr Leycett Ln, Newcastle ST5 6AE, UK	LCD	Likely went to Sims Metal Management Rabone Ln, Smethwick B66 2LF,

UK135744	Sighthill Community recycling Bankhead Avenue Edinburgh EH11 4DE, UK	Printer	Viridor Bonnyrigg, UK GPS 55.861807, -3.088578
UK135439	Lambeth Reuse and Recycling Centre 2 Vale St, West Norwood, London SE27 9PA, UK	LCD	London, England, United Kingdom
UK135462	Pottery Street Recycling Centre Pottery St, Greenock PA15 2UH, UK	Printer	No movement
UK140256	Barnet civic amenity site Summers Ln, North Finchley, London N12 0RF, UK	CRT	No movement
UK140918	**Renfrewshire Recycling Centre 52 Underwood Rd, Paisley PA3 1TLp, UK**	**LCD**	**local Street, Rawalpindi, Punjab, Pakistan GPS 33.608171, 73.044177**
UK135611	MK Waste Disposal and Recycling Centre 10 Newport Rd, New Bradwell, Milton Keynes MK13 0AD, UK	LCD	Stone Row Head, Lancaster, England, United Kingdom GPS 54.052851, -2.771256
UK135660	Islington Household Reuse and Recycling Centre 40 Hornsey St, London N7 8HU, UK	CRT	London, England, United Kingdom
UK140652	Elstree Household Waste Recycling Centre Radnor Hall, Allum Ln, Elstree, Borehamwood WD6 3NN, UK	CRT	Environcom England Ltd Level, Spittlegatehouse, Grantham NG31 7UH, UK GPS 52.890847, -0.634853
UK135710	Sea field Community Recycling Fillyside Rd, Edinburgh EH7 6RD, UK	LCD	17 Arley Road, Appleton, England, United Kingdom GPS 53.350093, -2.538790
UK135496	Viridor Recycling Lumns Ln, Clifton, Manchester M27 8LN, UK	Printer	Prestwich, England, United Kingdom
UK141304	**Dawsholm Recycling Centre 75 Dalsholm Rd, Glasgow G20 0TB, UK**	**LCD**	**Zanzibar, Stone Town Urban/West Region, Tanzania**
UK140892	Burnham Household Waste Recycling Centre Crowpiece Lane, Slough SL2 3TG UK	LCD	England, United Kingdom
UK135926	Newton-le-Willows Household Waste Recycling Centre Junction Ln, Newton-le-Willows WA12 8ED, UK	LCD	HMP Wymott Ulnes Walton, Leyland PR26 8LW, UK GPS 53.677537, -2.752076
UK140694	**Ipswich Household Waste Recycling Centre Portman's Walk, Ipswich IP1 2DW, UK**	**LCD**	**Anthony Wudili Ezeokeke Street, Ojo, Lagos, Nigeria**
UK140405	Kingwegar Recycling Centre Haddington Road A199, Wallyford, Musselburgh EH21 8JU, UK	Desktop	Viridor Collection Services Friarton Bridge Park, Friarton Road, Perth PH2 8DD, UK GPS 56.375972, -3.414776
UK141312	Perry Barr Household Waste Recycling Holford Drive, Perry Barr, B42 2TU	CRT	Birmingham, England, United Kingdom

UK140926

1. Kemp Place Car Park Recycling Drop

Address of Deployment: Kemp Place Car Park, Kemp Place, WD23 1DB

Website: https://www.hertsmere.gov.UK/Environment-Refuse--Recycling/Recycling--Waste/Waste--Recycling-collections/Local-recycling-banks.aspx

Government Approved Deployment Location: Yes

Distance Travelled: 5,570.37 Kilometers

Notes: We deployed the UK140926 LCD monitor at the Kemp Place Car Park Recycling designated drop-off location on April 13, 2017. The drop-off location was found through the www.recyclenow.com website designed to aid consumers in finding a proper WEEE recycler. The website says: "Recycle Now is the national recycling campaign for England, supported and funded by Government, managed by WRAP and used locally by over 90% of English authorities." The Waste and Resources Action Programme (WRAP) is a registered UK Charity. A video on their website claims that waste electrical and electronic equipment (WEEE) are collected at council recycling centers and at some retailers. It is then taken to a reprocessing plant where the equipment is "shredded into small pieces."

The Kemp Place Car Park Recycling drop-off consists of a secure WEEE bin in the middle of a parking lot. The last signal of the tracked equipment in the UK was from Welwyn Garden City, England on August 8, 2017. We are not sure what kind of facility this location might have been as we did not receive a precise GPS read, but it appears the apparent exporter was in that vicinity. It signaled from the coast of Andalucia, Spain on a ship on August 28, 2017 and then landed in Nigeria on October, 5, 2017. It sat on Ugwunmadu Street, Ojo, Lagos, Nigeria at 6.455522, 3.189493, a location which appears to be an electronics market, from November 10, 2017 to February 19, 2018. It then moved to Llorin, Nigeria many miles away and ceased to send further signals as of May 20, 2018.

Legality: *Likely Illegal.* The device was rendered non-functional prior to deployment. As such there is no doubt that the LCD, which contained mercury backlights, is a hazardous waste. Under the Waste Shipment Regulation's Article 36, it is forbidden to export hazardous waste to any country outside of the OECD group of countries for any reason.

Tracker Number	Type of WEEE	Date of Deployment	Date of Arrival	Position, Chain of Export	Destination	Chain of Export Summary
UK140926	LCD	April 13, 2017		First	Llorin, Nigeria	Kemp Place car park recycling drop
			April 29-Aug 2, 2017			Watford, England, United Kingdom
			Aug 3-8, 2017	Apparent exporter		Welwyn Garden City, England, United Kingdom
			Aug 28, 2017			Algeciras, Andalucía, Spain (port)
			Oct 5, 2017			Lagos, Nigeria (port)
			Nov 10, 2017-Feb 19, 2018			Ugwunmadu Street, Ojo, Lagos, Nigeria GPS 6.455522, 3.189493
			Feb. 20, 2017-May 30,2018			Ilorin, Kwara, Nigeria GPS 8.490271, 4.564142

Right: Property where the LCD UK140926 device ended up in Nigeria. It appears to be a small business that sells flat screen monitors. See other monitors behind the car in the center of the frame. Taken from Google, not photographed in real time. Map data: Google, DigitalGlobe.



Below: The electronic waste recyclg bin at the Kemp Place Car Park Recycling Drop in the Hertsmere Borough of London where the LCD UK140926 was dropped. Copyright Hertsmere Borough Council.





Middle Eight: Google Satellite shot of where the LCD UK140926 last signaled after being dropped at the Kemp Place Car Park Recycling Drop in Hertsmere Borough of London and then moving to Lagos, Nigeria. This location appears to be a small farm near the town of Llorin, Nigeria. Map data: Google, DigitalGlobe.

Bottom right: BAN Operative installing in an LCD to be deployed in the UK. Copyright, BAN, 2017



UK135413

2. Bury St Edmunds Household Waste Recycling Site

Address of Deployment: Rougham Hill, Bury Saint Edmunds IP33 2RW, UK

Website: http://www.greensuffolk.org/recycling/HWRC/bury-st-edmunds-hwrc/

Government Approved Deployment Location: Yes

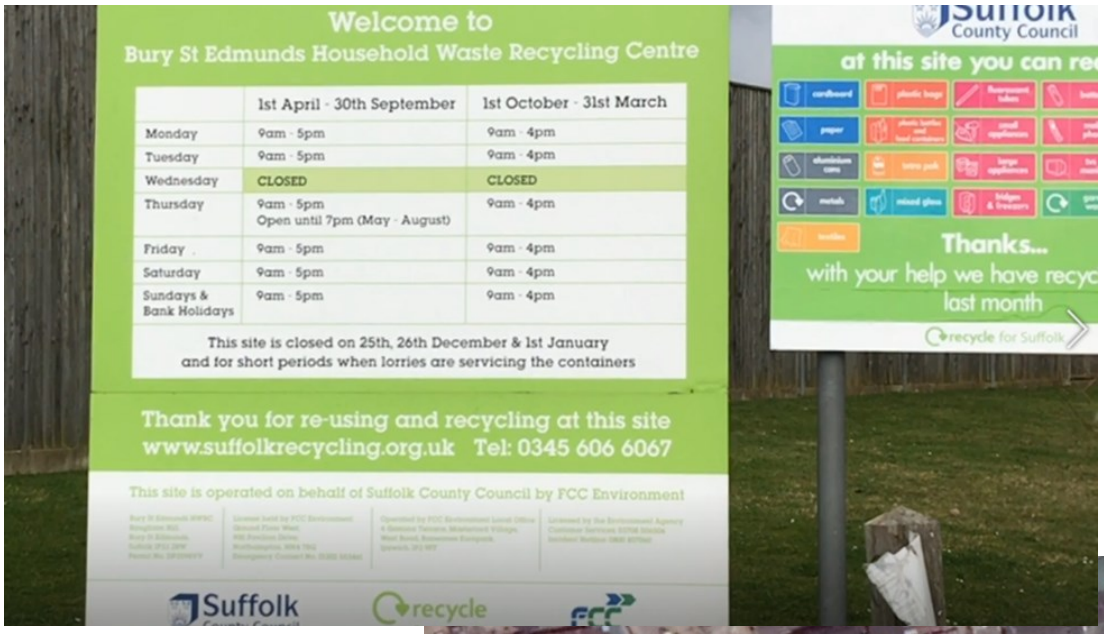
Distance Travelled: 5,149.30 Kilometers

Notes: We deployed the LCD screen at the Bury St Edmunds Household Waste Recycling Site on April 14, 2017. The drop-off location was found through the www.recyclenow.com website designed to aid consumers in finding a proper WEEE recycler. The website says: "Recycle Now is the national recycling campaign for England, supported and funded by Government, managed by WRAP and used locally by over 90% of English authorities." The Waste and Resources Action Programme (WRAP) is a registered UK Charity. A video on their website claims that waste electrical and electronic equipment (WEEE) are collected at council recycling centers and at some retailers. It is then taken to a reprocessing plant where the equipment is "shredded into small pieces." The Bury St Edmunds Household Waste Recycling Site is a municipal drop site run by the city of Suffolk.

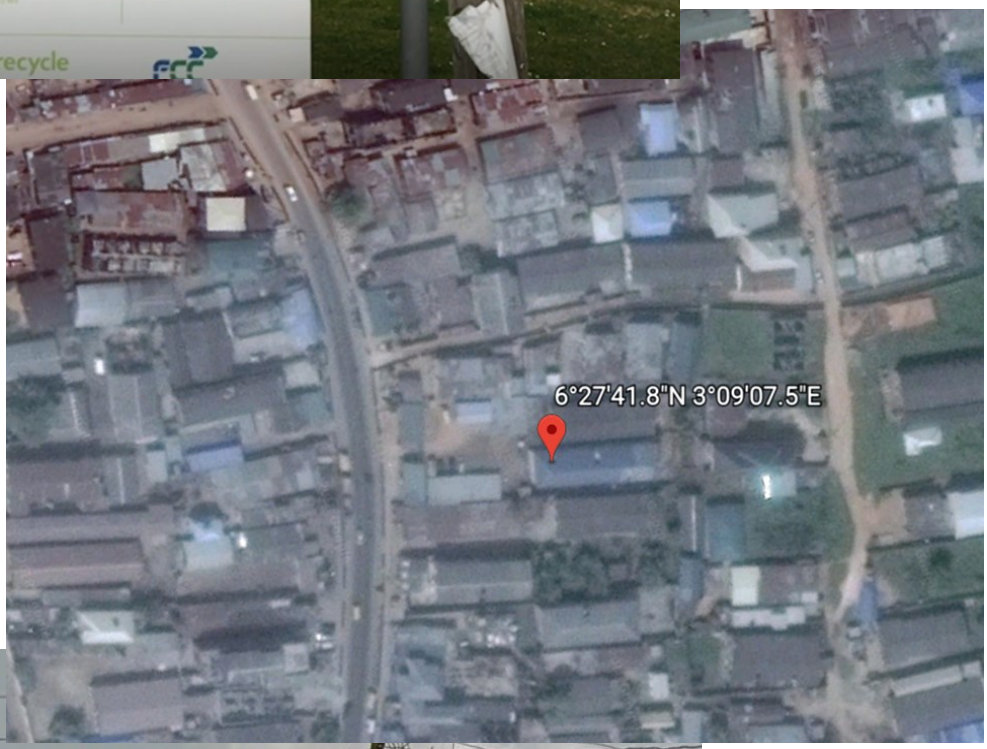
Our LCD unit's last signal was in Rainham, England on June 11, 2017. It was likely on its way to the Port of Tilbury to be put onto a container ship. It landed in Nigeria on June 12, 2017. It then moved to 88 Shibiri Road, Ojo, Lagos, Nigeria where we received a solid GPS signal at 6.461608, 3.152088 on July 30, 2017, and it remained in that area until August 20, 2017 when it gave its last signal. The final building where it ended up is residential.

Legality: *Likely Illegal.* The device was rendered non-functional prior to deployment. As such there is no doubt that the LCD, which contained mercury backlights, is a hazardous waste. Under the Waste Shipment Regulation's Article 36, it is forbidden to export hazardous waste to any country outside of the OECD group of countries for any reason.

Tracker Number	Type of WEEE	Deployment Date	Date of Arrival	Position, Chain of	Destination	Chain of Export Summary
UK135413	LCD	April 14, 2017		First and Last	Lagos, Nigeria	Bury St Edmunds Household Waste Recycling Site
			April 26, 2017	transit?		Rainham, England, United Kingdom
			June 12, 2017			Lagos, Nigeria
			June 20 - 24, 2017			Alaba Market area, Lagos
			July 28- Aug 20, 2017			88 Shibiri Road, Ojo, Lagos, Nigeria GPS 6.461608, 3.152088 and vicinity.



Signs photographed at the entrance of Bury St. Edmonds Household Waste Recycling Centre during the deployment. Copyright, BAN 2017



Street view of the building indicated above from satellite view. The residential blue peaked building in the center of the photo is where the LCD UK135413 ended up. Map data: Google, DigitalGlobe.



Street view of the building indicated above from satellite view. The residential blue peaked building in the center of the photo is where the LCD UK135413 ended up. Map data: Google, DigitalGlobe.

UK140694

3. Ipswich Household Waste Recycling Centre

Address of Deployment: Portman's Walk, Ipswich IP1 2DW, UK

Website: http://www.greensuffolk.org/recycling/HWRC/ipswich-hwrc/

Government Approved Deployment Location: Yes

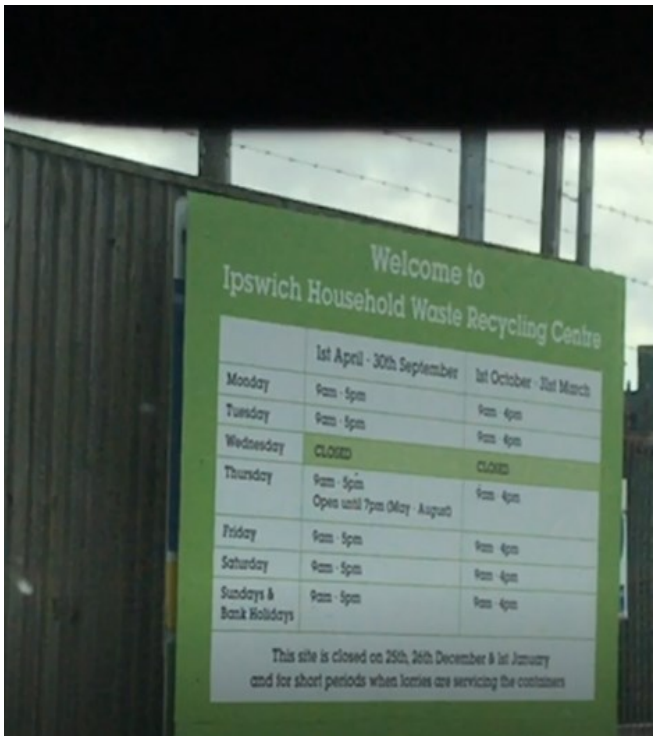
Distance Travelled: 5,488.95 Kilometers

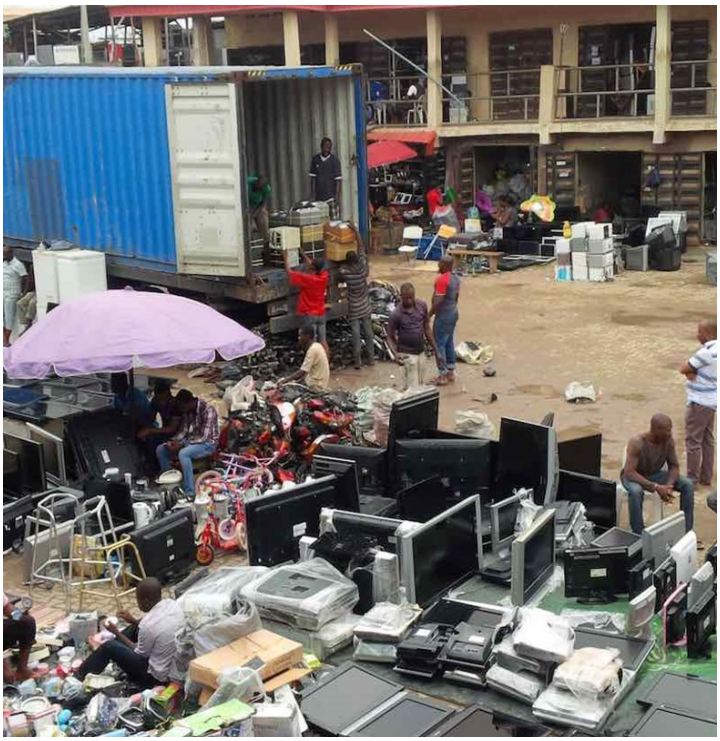
Notes: We dropped off an LCD screen at the Ipswich Household Waste Recycling Centre on April 13, 2017. The drop-off location was found through the www.recyclenow.com website designed to aid consumers in finding a proper WEEE recycler. The website says: "Recycle Now is the national recycling campaign for England, supported and funded by Government, managed by WRAP and used locally by over 90% of English authorities." The Waste and Resources Action Programme (WRAP) is a registered UK Charity. A video on their website claims that waste electrical and electronic equipment (WEEE) are collected at council recycling centers and at some retailers. It is then taken to a reprocessing plant where the equipment is "shredded into small pieces." The Ipswich Household Waste Recycling Centre is a municipal drop site run by the city of Suffolk.

The LCD's last signal in the UK was from Nottingham, England on July 2, 2017. We did not get a precise reading, but it is possible the device was received by PPX Metal Management in Bulwell, or possibly Sims Metal Management or EMR in Nottingham -- all metals recyclers. Next it reported in the Tin Can Island port area of Lagos, Nigeria on September 8, 2017. It then moved to the well-known Alaba electronics market area on Alaba International Market Road in Lagos, Nigeria, where it ceased to report further.

Legality: *Likely Illegal.* The device was rendered non-functional prior to deployment. As such there is no doubt that the LCD, which contained mercury backlights, is a hazardous waste. Under the Waste Shipment Regulation's Article 36, it is forbidden to export hazardous waste to any country outside of the OECD group of countries for any reason.

Tracker Number	Type of WEEE	Deployment Date	Date of Arrival	Position, Chain of Export	Destination	Chain of Export Summary
UK140694	LCD	April 14, 2017		First	Lagos, Nigeria	Ipswich Household Waste Recycling Centre
			June 1-July 2, 2017	Apparent Exporter?		Nottingham, England, United Kingdom
			Sept 8, 2017			Tin Can Island Access, Ojo, Lagos, Nigeria
			Sept 9-13, 2017			Alaba International Market Road, Ojo, Lagos, Nigeria







Top left: Signs observed while driving into Ipswich Household Waste Recycling Centre in England to drop off an LCD UK140694 screen that was later exported to Alaba International Market in Lagos, Nigeria. Copyright BAN, 2018

Top right: Workers unload a container filled with WEEE at the Alba International Market in Lagos, Nigeria. This is where BAN first went in 2005 when we published Digital Dump. Electronics continue to arrive here. This is the likely destination of LCD UK140694. Copyright noodlesonlus.org.

Bottom: A sea of CRTs repaired for re-use at the Alba International Market in Lagos, Nigeria. This is where the LCD UK140694 likely ended up. Copyright businesshilights.com/ng 2018.

UK141304

4. Dawsholm Recycling Centre

Address of Deployment: 75 Dalsholm Rd, Maryhill/Kelvin, Glasgow G20 0TB, UK

Website: https://www.glasgow.gov.UK/index.aspx?articleid=17040

Government Approved Deployment Location: Yes

Distance Travelled: 10,292.14 Kilometers

Notes: We dropped off an LCD screen at the Dawsholm Recycling Centre on April 16, 2017. The drop-off location was found through the www.recyclenow.com website designed to aid consumers in finding a proper WEEE recycler. The website says: "Recycle Now is the national recycling campaign for England, supported and funded by Government, managed by WRAP and used locally by over 90% of English authorities." The Waste and Resources Action Programme (WRAP) is a registered UK Charity. A video on their website claims that waste electrical and electronic equipment (WEEE) are collected at council recycling centers and at some retailers. It is then taken to a reprocessing plant where the equipment is "shredded into small pieces." The Dawsholm Recycling Centre is a municipal household waste recycling center run by the city of Glasgow.

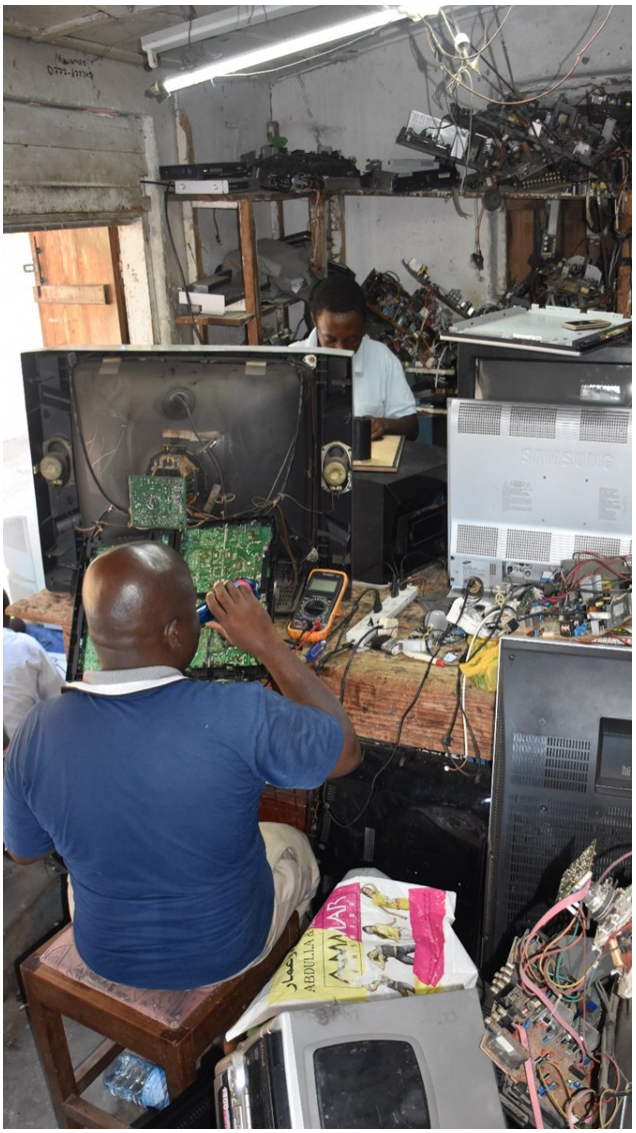
The LCD last sent a signal in Glasgow on May 7, 2017 from Greenock, Scotland, about a mile away from the port of Glasgow. It was then placed on a ship and sent a signal as it passed by Normandy, France on May 8, 2017. It arrived in Sharjah, UAE on May 29, 2017 and stayed there until June 11, 2017, likely still in its container in the port. It arrived in Zanzibar, Tanzania on July 21, 2017. It is likely to have gone to one of the many stalls in the electronics market in Stone Town, Zanzibar, where they seek to repair and remarket used equipment. It ceased to send signals on December 26, 2017. BAN visited Zanzibar in early April of 2018. The account of that visit is found on page 22.

Legality: *Likely Illegal.* The device was rendered non-functional prior to deployment. As such there is no doubt that the LCD, which contained mercury backlights, is a hazardous waste. Under the European Waste Shipment Regulation's Article 36, it is forbidden to export hazardous waste to any country outside of the OECD group of countries for any reason.

Tracker Number	Type of WEEE	Deployment Date	Arrival Date	Position, Chain of Export	Destination	Chain of Export Summary
UK141304	LCD	April 16, 2017		First	Zanzibar, Tanzania	Dawsholm Recycling Centre GPS 55.895786, -4.311780
			May 8, 0217			Normandy, France (port)
			May 29-June 11, 2017			Sharjah, United Arab Emirates
			July 21-Dec 26, 2017			Zanzibar, Stone Town Urban/ West Region, Tanzania







Top left: Proud shop owner at the electronics market in Zanzibar, Tanzania. All electronics have been repaired for the re-use market. This is the type of location where the LCD UK141304 likely ended up. Copyright BAN, 2018.

Bottom left: BAN's Executive Director, Jim Puckett, documenting a large collection of LCDs in a repair/resale shop in Zanzibar, Tanzania. This is the type of destination where the LCD UK141304 likely ended up. Copyright BAN, 2018

Right: Shop workers repairing imported electronics at the electronics market in Zanzibar, Tanzania. This is the kind of location where the LCD UK141304 likely ended up. Copyright BAN, 2018

UK140918

5. Renfrewshire Recycling Centre

Address of Deployment: 52 Underwood Rd, Paisley, Scotland PA3 1TL, UK

Website: http://www.renfrewshire.gov.UK/article/4129/Household-waste-recycling-facilities

Government Approved Deployment Location: Yes

Distance Travelled: 8,123.26 Kilometers

Notes: We dropped off another LCD screen at the Renfrewshire Recycling Centre in Scotland on April 16, 2017. The drop-off location was found through the www.recyclenow.com website designed to aid consumers in finding a proper WEEE recycler. The website says: "Recycle Now is the national recycling campaign for England, supported and funded by Government, managed by WRAP and used locally by over 90% of English authorities." The Waste and Resources Action Programme (WRAP) is a registered UK Charity. A video on their website claims that waste electrical and electronic equipment (WEEE) are collected at council recycling centers and at some retailers. It is then taken to a reprocessing plant where the equipment is "shredded into small pieces." Renfrewshire Recycling Centre is a municipal drop site run by the Renfrewshire Council.

The first stop on the LCD's journey appears to have been BSX WEEE Recycling and Waste Management Ltd. in Bolton, England, where it arrived on May 6, 2017. The BSX website proudly claims that the "Environment is our first concern." The company displays numerous certifications and authorizations, including ISO 14001 and letters of registration as an authorized recycler issued by the Environment Agency. They boast of always aiming to avoid landfilling electronic waste.

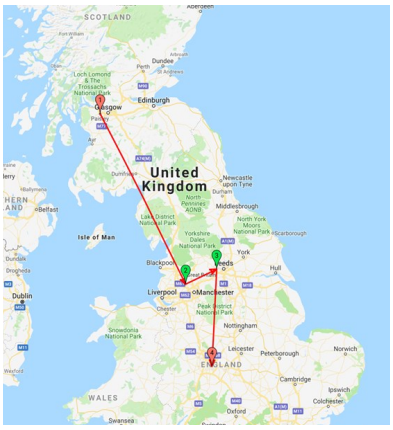
Next, the LCD moved to Juz Electronic Ltd in Bradford in a largely immigrant Pakistani community. The Juz Electronic Ltd website states: "Our global IT recycling solution provides you with a cost-effective method to safely dispose all your IT and electronic equipment. As a fully certified and compliant IT recycling firm you can be assured that your IT equipment is being handled in a responsible manner. We do this through our Site Waste Management Plans (SWMP) which exceeds government regulations. These plans guarantee that your electronic waste is recorded and treated in the correct way; from the point of collection, until it is treated. We carry out regular internal audits to ensure these procedures are adhered to, and we are also regularly audited by the Environment Agency to ensure we are compliant."

LCD UK140918's last signal in the UK was from Birmingham, England on June 8, 2017.

It landed in Pakistan on July 14, 2017 via the Port Muhammad Bin Qasim. It then traveled North through Pakistan, arriving at Rawalpindi, South of Islamabad on July 26, 2017. It stayed in a building there until finally failing to report further on January 2, 2018. BAN sent a volunteer living in Pakistan to visit the location. The volunteer found an electronics repair shop in a house. The proprietor said he receives a container of LCDs every 15 days. He repairs some and sells them, or dismantles them and sells them as scrap.

Legality: *Likely Illegal.* The device was rendered non-functional prior to deployment. As such there is no doubt that the LCD, which contained mercury backlights, is a hazardous waste. Under the European Waste Shipment Regulation's Article 36, it is forbidden to export hazardous waste to any country outside of the OECD group of countries for any reason.

Tracker Number	Type of WEEE	Date of Deployment	Date of Arrival	Position, Chain of Export	Destina-tion	Chain of Export Summary
UK140918	LCD	April 16, 2017		First	Pakistan	Renfrewshire Recycling Centre 52 Underwood Rd, Paisley PA3 1TL, UK
			May 6-12, 2017	Second		BSX Recycling Unit 5 & 6 Royal House. Tennyson St Bolton, Lancashaire BL1 3HW, UK GPS 53.590740, -2.441507
			May 15-31, 2017	(Apparent Exporter)		Juz Electronic Ltd (UK), Carter Gate Works, Thornbury Rd, Bradford BD3 8HE, UK, GPS 53.797004, -1.718282
			June1-8, 2017			Birmingham, England, United Kingdom
			July 14, 2017			Port Muhammad Bin Qasim T2 Lane 5, Pakistan GPS 24.766784, 67.323739
			July 26, 2017-Jan 2, 2018			Rawalpindi, Punjab, Pakistan GPS 33.608171, 73.044177



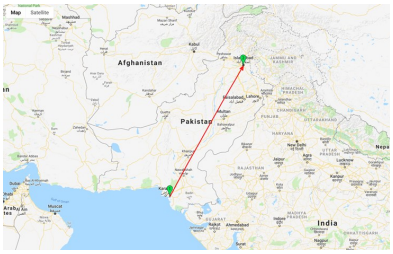




Top left: Map of recorded stops within the UK of tracked device UK140918. Map data: Google, DigitalGlobe.
Bottom left: Location in Rawalpindi where the LCD ended up Map data: Google, DigitalGlobe.

Right: The streets of Rawalpindi, Punjab, Pakistan near the house where LCD UK140918 from the Renfrewshire Recycling Centre was found. Copyright BAN, 2018.

Below: Movement from the port of Karachi to Rawalpindi area south of Islamabad. Map data: Google, DigitalGlobe.



England's Environment Agency Reacts

The Environment Agency takes these matters very seriously with a pro-active criminal intelligence led team in place that is dedicated to detecting and preventing illegal waste shipments from England. This team enables us to use our resources effectively preventing thousands of tonnes of waste from being illegally exported each year.

However, our challenge is vast. Detecting illegal waste shipments is the ultimate hunt for the needle in a haystack, and this is where partnerships allow us to extend our reach and effectiveness. By providing the Environment Agency with an early insight into their tracker deployment, the Basel Action Network enabled us to quickly and efficiently close down four illegal waste operators who exported the electrical waste containing their trackers.

Working alongside the Basel Action Network over many years now has been hugely beneficial. However, there is still much work to do to stop the illegal shipment of waste. Whilst our partnership has achieved positive environmental outcomes we must continue to adapt and evolve to tackle the fluid and ever-changing waste export market with enhanced engagement from the competent authorities in countries receiving illegal waste shipments. This is essential in supporting our drive to bring illegal waste exporters to justice.



- Chris Smith, National Intelligence Manager, Environment Agency

The “Repairables” Loophole

Europe Quietly Undermines Basel Convention and its Own Law

Even though their aim is contrary to EU law, European bureaucrats attending Basel Convention meetings have been working quietly to change the convention's definitions via the Guideline on the Transboundary Movement of WEEE which has been adopted on an interim basis. A loophole which has been proposed by the EU, still under debate, if adopted by the Parties would exempt a majority of the world's WEEE from falling under the Basel Convention and under the EU Waste Shipment Regulation. The loophole is a new Paragraph 31(b) of the Guideline.

If adopted with this paragraph, the Guideline will "guide" unscrupulous traders to export all manner of hazardous broken or untested consumer electronics outside of the control procedures of the Basel Convention simply by making a claim of "export for repair." Yet, it is well known that *all* electronic equipment can be called "repairable" and almost all actual exports for repair involve exports of non-functional parts which are "waste upon arrival."

Electronics Industry and the EU in Unholy Alliance

The earlier policy within the Basel Convention, agreed by all Parties just a few years earlier, was that if equipment was not functional then it was defined as waste. Notwithstanding the exceptions noted in paragraph 2 of Annex VI of the WEEE Directive, the EU law makes that very clear. The attempt to reverse this vital Basel policy was suddenly promoted by the Electronics industry through their lobby associations Digital Europe and ITI (Information Technology Industry Council). However, this notion would never have had a chance were it not for Germany taking up the industry cudgel and managing to convince the EU to go along. Within the meetings, while the rest of the EU remained silent, Germany, Belgium, and the European Commission, aided by meeting chairpersons from the EU, seemed forcefully compelled to do the bidding of the electronics manufacturers, even as this new paragraph runs directly contrary to the WEEE directive (Annex VI) as well as the Waste Shipment Regulation.

Corruption of the Circular Economy

Ironically, even while this effort has been justified by the industry as assisting the circular economy, this move actually subverts that movement by sowing distrust and allowing gross externalities to be exploited for industry profits. The architects of the circular economy concept warn against allowing externalities which can subvert the perceived circle. If the 31(b) "Repairables Loophole" is sanctioned by Basel guidance and exploited by traders, the "circular economy" will be identified as yet another corrupt buzzword to institutionalize dumping and global irresponsibility -- providing benefits for developed countries at the expense of the global South.

Reject this Loophole

Today, with the abdication of the US from multilateralism and the environment, the EU has become all powerful in multilateral environmental treaties (MEAs). It is clear that as long as the EU has a political stranglehold on this important Guideline, there will be little chance of reforming it -- even while it flies in the face of the principles of the Basel Convention, the Basel Ban Amendment, and EU law. BAN will be urging Parties *not* to adopt this Guideline and, if it is adopted by EU forcefulness, that it not be used. It is not binding law, but a very dangerous precedent which the European Parliament and member states of conscience should reconsider.

Conclusion

GPS tracking has revealed European WEEE export rates moving steadily from West to East and from North to South, away from Europe to their continental neighbors in Africa, Eastern Europe, and Asia. These rates of export to non-OECD (developing countries) are certainly less frightening than those in BAN's study two years earlier in the United States, however, what these exports represent when extrapolated are nevertheless a serious cause for concern. 352,474 projected tonnes of hazardous electronic waste per annum flowing from the EU to developing countries is simply unacceptable.

The U.S. has neither ratified the Basel Convention nor the Ban Amendment, and they have almost no environmental laws controlling the gross externalities of the global waste trade. The EU, on the other hand, has passed appropriate legislation to implement the Basel Convention and its amendment. It is imperative now that they move to diligently enforce these important laws and prosecute violators to a degree that serves as a deterrent. Far more can be done to

prosecute the all-too robust illegal trade, including working with target countries such as Nigeria to stem the toxic tide.

As noted in the box herein, written by Environment Agency enforcer Chris Smith, GPS tracker data is a very useful intelligence gathering and enforcement tool -- he used the very data in this study to prosecute all of the UK exports. It is hoped that GPS tracking is harnessed more and more routinely in both governmental and voluntary certification programs to augment audits and inspections.

On the contrary, we have witnessed an alarming European shift in the other direction, away from a rejection of using the developing world as a global dumping ground for hazardous waste and towards a fundamental re-definition of waste. Anything that is non-functional but theoretically repairable might not fall under the European waste definition (see the Repairables Loophole box in this report).

We have even seen the laudable concept of The Circular Economy which Europe has embraced, used as a rationale for relaxing basic Basel Convention principles. Yet the Circular Economy cannot function if externalities are tolerated and allowed to be routinely exploited. The Circular Economy can only play out on a level economic global playing field where all costs are internalized and where waste and materials management is conducted without disproportionate harm to anyone. Closing the holes in the economy, such as the leakage of harm to weaker economies, is a prerequisite to its being circular. The world relies heavily on Europe to uphold this principle with its previous conviction.



Recommendations

1. The European Union must ensure that externalities and exploitation of poorer communities are never justified by a merely technocratic definition of, and desire to achieve, a "Circular Economy."

2. The European Union and its member states should enhance their ability to gather intelligence on illegal exports of WEEE, including by use of port investigators and GPS tracking techniques. More funding must be allocated to enforcement across the EU, starting particularly in the UK and Italy.

3. Efforts to collaborate on intelligence and enforcement between the EU and target countries in Africa, Eastern Europe, Latin America, and Asia should be enhanced. Such coordination can be achieved via existing programs and networks including IMPEL, ENFORCE, and INTERPOL's Environmental Crime programs.

4. Prosecutions of violations of the EU Waste Shipment Regulation should be more aggressive and penalties should be serious enough to prove to be a real deterrent.

5. All countries around the world that have not already done so should ratify the Basel Ban Amendment, and likewise all African countries that have not as yet done so should ratify the Bamako Convention.

6. Ghana, Nigeria, Pakistan, and all other target countries on the Basel Convention's Annex VII should simply prohibit all imports of non-functional electronics. The residual effects far outweigh any benefits from import, as China has learned.

7. The European Union should amend the WEEE directive to remove the exceptions found in paragraph 2 of Annex VI.

8. The EU likewise should halt its dangerous promotion of the repair loophole at the global level (paragraph 31b) of the Basel Convention Technical Guidelines on Electronic Waste, which not only undermines the Basel Convention, but the Waste Shipment Regulation and WEEE directive as well.

9. All WEEE processors in Europe should become certified to the CENELEC, WEEELABEX, or e-Stewards Standards. Governments and the Private Sector should not utilize processors that do not meet these high standards or use other standards that do not implement the Basel Convention and Basel Ban Amendment.

10. Private companies and institutions, and certification programs such as WEEELABEX and CENELEC, that generate, process, or monitor WEEE in Europe should utilize GPS tracking such as BAN's EarthEye (www.eartheye.org) program to ensure that downstream material flows (business-to-business) are legal and moving in accordance with agreed contracts.

Appendix 1: Legal Matters

Transboundary Movements of e-Waste from the EU to non-EU/OECD Countries

Ever since 1994, the European Community has respected that developing countries should not become the target for hazardous waste shipments, even when such shipments might be characterized as exports for recycling. This was not their original position, but at the second conference of the Parties to the Basel Convention COP2 meeting, the EU chose to honor the wishes of their former African, Caribbean, and Pacific colonies and other developing countries. At that meeting they broke away from the rest of the developed world (including the United States, Canada, Japan, South Korea, Australia, and New Zealand -- now known collectively under the acronym JUSCANZ) to support what at the next meeting (COP3) was adopted as the Basel Ban Amendment in Decision III/1. The Ban Amendment is a strict prohibition of all expoats of defined hazardous wastes moving from developed to developing countries. Developing countries are defined in a newly proposed Basel Annex 7 listing all member states of the EU, the Organization for Economic Cooperation and Development (OECD), and Liechtenstein. In January of 1997, the European Community amended their older Waste Shipment Regulation (EC/259/93) to make the Basel Ban the law of Europe. At that time the ban became a centerpiece of the later, and current, version of the Waste Shipment Regulation (EC/1013/2006) in its Article 36. The beginning of that Article is clear:

> *Exports from the Community of the following wastes destined for recovery in countries to which the OECD Decision does not apply are prohibited.* (Article 36, para. 1)

The OECD decision referred to above applies to all OECD countries. Even at the time of writing of this report, while the Ban Amendment is not in legal force globally, it is fully implemented into the law of all 28 members states of the European Union. Under it, there is a full ban on the export of hazardous wastes from a member state of the EU to non-OECD countries that are outside of the EU.

Transboundary Movements of e-Waste within the EU

Further, even shipments *within* the European Community moving from one member state to another must be notified and consented to prior to export. These rules, derived from the Basel Convention and OECD agreements, are spelled out in the Waste Shipment Regulation's Title II. Such rules apply in the EU to hazardous and non-hazardous wastes. Among other requirements, all such shipments should include a full description of the contents, a financial guarantee, and a valid contract. Destination member states have 30 days to respond and consent to receiving the wastes or not. If a response is not sent to the exporting country within 30 days, tacit consent is assumed -- but the notification, financial guarantee, and valid contract must be present in any case.

Hazardous Waste or Not?

It is fairly well-established that most electronic waste being managed today is considered hazardous waste. This is due primarily to the following materials found within such wastes, which are listed on Annex I of the Basel Convention and can be shown to possess a hazardous characteristic listed on Annex III: 1) Lead and tin containing solders in circuit boards. 2) Leaded glass found in cathode ray tubes (CRTs). 3) Lead found elsewhere such as in solders or as a plastic additive. 4) Mercury phosphor lamps (e.g. in some flat screen monitors). 5) Batteries containing lead, cadmium, or mercury. 6) Lithium ion and other batteries containing flammable solvents. 7) Circuit boards and plastics containing brominated flame retardants (BFRs) or other halogenated hydrocarbons.

Elaboration of these issues can be found in the Guidelines produced by the Partnership for Action on Computing Equipment (PACE) under

[1] https://europa.eu/european-union/about-eu/countries_en

[2] http://www.oecd.org/about/membersandpartners/list-oecd-member-countries.htm

[3] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02006R1013-20180101&qid=1454069470717&from=EN

[4] https://europa.eu/european-union/about-eu/countries_en

the auspices of the Basel Convention. While the EU controls trade in hazardous and non-hazardous wastes (sometimes referred to in the OECD or EU as green listed wastes), the other Basel Convention Parties control just hazardous wastes.

In our study, we intentionally utilized equipment (CRTs containing leaded glass and toxic phosphors, LCDs containing mercury phosphor backlights, desktop computers and printers containing circuit boards made with BFRs and lead-tin solders) to unambiguously be able to claim that the equipment was hazardous. And as is noted below, we made certain that the equipment was defined as "waste" as well.

EU Clarity as to When Electronic Equipment is Waste and when it is Used Goods

In recent years, BAN's and others' discoveries of e-waste being dumped or processed in sub-standard conditions around the world has led to new legislative and enforcement efforts to prevent illegal exports and close loopholes in existing laws. One major loophole involved exporters seeking to claim that secondhand electronics were not really waste.

In the recasting of the Waste Electrical and Electronic Equipment Directive (2012/19/EU), the EU saw fit to make further clarifications in this regard with respect to shipments of used electronics. They provided new rules in a new Annex VI, referred to in Article 23, to distinguish electronic waste (WEEE) from used non-waste electronics (EEE). Annex VI stipulates that the burden of proof must be upon the holder of the waste wishing to export it to prove that the equipment is not waste by having available the following:

(a) a copy of the invoice and contract relating to the sale and/or transfer of ownership of the EEE which states that the equipment is destined for direct re-use and that it is fully functional;

(b) evidence of evaluation or testing in the form of a copy of the records (certificate of testing, proof of functionality) on every item within the consignment and a protocol containing all record information according to point 3;

(c) a declaration made by the holder who arranges the transport of the EEE that none of the material or equipment within the consignment is waste as defined by Article 3(1) of Directive 2008/98/EC; and

(d) appropriate protection against damage during transportation, loading and unloading in particular through sufficient packaging and appropriate stacking of the load.

The Annex then lays out some exceptions to the above, which are transactions that take place in a business-to-business transaction wherein the equipment is sent across borders for repair under warranty, or it is professional equipment for repair or root cause analysis of defective equipment. Professional equipment is presumably WEEE other than "WEEE from private households" as defined in the directive.

Finally, Annex VI states very pointedly in its paragraph 5 that:

> *In the absence of proof that an object is used EEE and not WEEE through the appropriate documentation required in points 1, 2, 3 and 4 and of appropriate protection, member state authorities shall consider the item to be WEEE and presume that the load (declared as non-waste) is an illegal shipment.*

The importance of the above in the context of our study is that any European actor wishing to export the equipment we used in our study, which we rendered non-functional and economically unrepairable, would not be able to claim that the equipment was secondhand working goods and not a "waste." Untested or non-functional material is waste, with few exceptions, and thus would be required to follow the rules of the Waste Shipment Regulation noted above.

[5] http://www.basel.int/Implementation/TechnicalAssistance/Partnerships/PACE/PACEGuidelines,ManualandReports/tabid/3247/Default.aspx

[6] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0019&from=EN

[7] Article 3 of the WEEE directive.

Importation Laws in Recipient Countries

All of the 13 importing countries involved in this study -- Nigeria, Ghana, Tanzania, Thailand, Pakistan, Austria, Hungary, Germany, Belgium, Ukraine, Romania, Hong Kong (China) and Poland -- are Parties to the Basel Convention. As such, all imports taking place without the requisite notifications taking place in accordance with the Basel Convention's Article 6 would be illegal traffic as defined in Article 9 of the Basel Convention and deemed a criminal act. While the Ban Amendment is not yet in legal force internationally, some countries, like the EU member states, have implemented it. Further, other waste import bans made on a national basis must be respected under the terms of the Basel Convention.[10] With respect to the non-EU countries that became importers in our study, we include the following relevant notes derived in part from the National Reporting database found on the Basel Convention website:

Ghana: Allows hazardous e-waste imports for recycling by permit and in accordance with the normal transboundary notification rules of the Basel Convention. Ghana is not a Party to the African Bamako Convention but it is surprising that they don't honor the African position of Bamako in their national law by a full import prohibition of non-functional e-waste.

Nigeria: Allows hazardous e-waste imports for recycling by permit and in accordance with the normal transboundary notification rules of the Basel Convention. Nigeria is not a Party to the African Bamako Convention but it is surprising that they don't honor the African position of Bamako in their national law by a full import prohibition of non-functional e-waste.

Tanzania: Beyond the normal Basel rules mentioned above, Tanzania is also a Party to the Bamako Convention, which implies a national prohibition of any hazardous wastes entering the country from outside of Africa.

Hong Kong: Implements the established norms of the Basel Convention and the Ban Amendment in all respects save one. Hong Kong has independently refused to consider equipment containing circuit boards (e.g. printers, desktop computers) as hazardous waste unless there is something else inside them qualifying them as hazardous waste (e.g. mercury lamps, toxic batteries). However circuit boards removed from equipment *are* controlled as a hazardous waste as are LCD and CRT monitors and batteries (containing lithium ion cells, lead, mercury, or cadmium). Further, as a result of BAN's recent work to expose the electronics junkyards found in New Territories, the Government as of the beginning of 2019 have implemented strict permitting requirements which will ensure that many of the operations will be forced to close. The LCD imported into Hong Kong from Ireland found in this study is clearly violating the laws of Hong Kong as well as the EU.

Thailand: Beyond the normal Basel rules mentioned above, this year Thailand enacted a national ban on the import of electronic waste.

Pakistan: Beyond the normal Basel rules mentioned above, Pakistan requires any imports of hazardous wastes to be approved by the Ministry of Environment.

Ukraine: Normal Basel rules apply only.

Legal Determinations Used in this Study

In this study, with a view to be conservative in our approach, uses the following determinations to define three categories of legality:

- **"Likely Illegal"** -- As described above, the Waste Shipment Regulation's Article 36 makes it very clear that exports out of the EU to non-OECD countries are strictly prohibited. Because our equipment was not able to be deemed non-waste due to our rendering it non-functional and non-repairable, we are almost certain that such exports would not be able to be called non-waste. However, legality in our view is technically a judicial matter. As BAN is not a court of law and the discoveries in our report have not been tried in a legitimate court of law, we use the terms "*likely* illegal" to ensure respect for a jurisdiction's judicial process.

In our study we have identified 11 exports which fall into the "likely illegal" category.

[8] As noted in Article 4, paragraph 3.

[9] As of this publication date it lacks but 2 more Parties from those that were there in 1995 for it to enter into force.

[10] Article 1,1,b and Article 4,1 of Basel.

- **"Unknown"** -- As described above, the Waste Shipment Regulation also stipulates that shipments within the community must have a contract, a financial guarantee, and be pre-notified to the transit and importing EU member states. Because our equipment was not able to be deemed non-waste due to our rendering it non-functional and non-repairable, we almost certain that such exports would not be able to be called non-waste. While we strongly doubt that most of the intra-EU shipments we identified in this study were properly notified with financial guarantees etc. obtained, we did not have the time or resources to determine whether they were or were not notified. For this reason, we conservatively designate the legality of these exports as "unknown."

In our study we have identified 5 exports which fall into the "unknown" legal category.

- **"Likely Legal"** -- In our study, there were two exports which appeared to have been accomplished by some entity on a small individual scale. While these movements may have involved theft, we cannot know for sure. From the standpoint of violating transboundary movement law, authorities are not likely to see these movements as anything other than moving one's personal effects, functional or not, across a national frontier. Prosecution of these as waste trading would be unlikely.

In our study we have identified 3 exports which fall into the "likely legal" category.

Appendix 2: Methodology

In the European study it was our aim to find out where the WEEE of the average consumer might end up. We attempted to replicate what a citizen might do in the target countries of the United Kingdom, Denmark, Belgium, Italy, Spain, Germany, Poland, Hungary, Austria, and Ireland. We had a country representative in each location who researched the collection depots consumers would likely find online and use in the largest cities.

We used the same tracking hardware as in the initial U.S. e-Trash Transparency Project, but made an important battery re-engineering to eliminate lithium-ion batteries and their potential fire risk.

The device types used were: a) CRT (cathode ray tube) monitors or televisions; b) LCD (liquid crystal display) computer monitors or TVs containing CCFLs (mercury-containing cold cathode fluorescent lamp); c) Inkjet or LaserJet printers, and d) desktop computers.

These devices were chosen because they each contain components that qualify the equipment as hazardous waste, and thus each should be controlled under international law (e.g. the Basel Convention or the EU Waste Shipment Regulation). Additionally, these devices have sufficient room inside to plant trackers and batteries. All units were made non-functional and not economically repairable prior to deployment in order to make the legality of the export issue more certain, and eliminate the possibility of anyone claiming exports are to support alleged reuse.

To establish and maintain a chain of custody, and proof of delivery, BAN recorded a video of each tracker installation in the WEEE equipment as well as each delivery. The videos were shot covertly and included views of the serial numbers and the deliveries -- usually a walk-up to a loading dock or office. Proof of recycling was also received (e.g. receipt) when provided.

How the GPS Devices Work

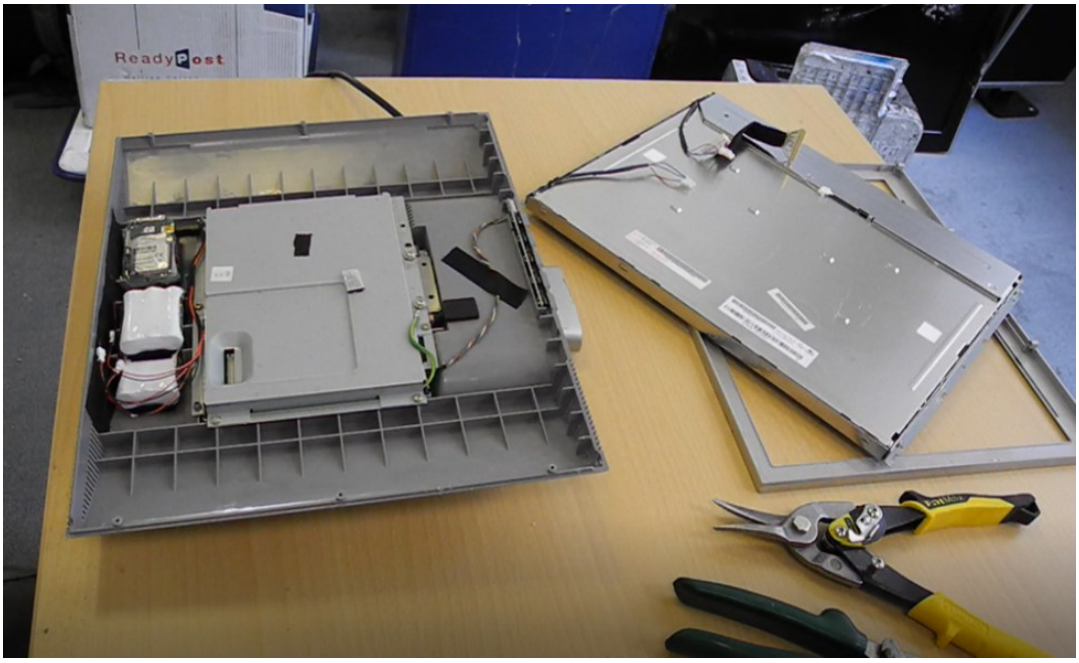
The trackers are like a stripped-down smartphone with no keyboards, screens, cameras, audio recording devices, or speakers. They can, however, use the global cellular phone systems to send text messages to our server, and they have a GPS reader. These trackers were attached to non-lithium ion battery packs to ensure a life-span of one year or more. The trackers can respond from virtually any country in the world.

The trackers can be programmed remotely. Typically, we program them to "wake up" from a low-energy consuming sleep mode every 24 hours. They then "look" for satellites. If they find 3 or more, they can geo-locate the tracker very accurately (within a radius of about 20 meters), record the latitude and longitude, and send that data to our server. If the tracker cannot find the satellites, then they simply send the latitude and longitude of the nearest cell tower. The latter type of signal can tell us what city and country the tracker is in, but cannot provide a reading of the property it is on. In the tables below, we only list latitudes and longitudes when actual GPS readings are made. All other location listings are from cell tower readings and are usually accurate within a range of 20km.

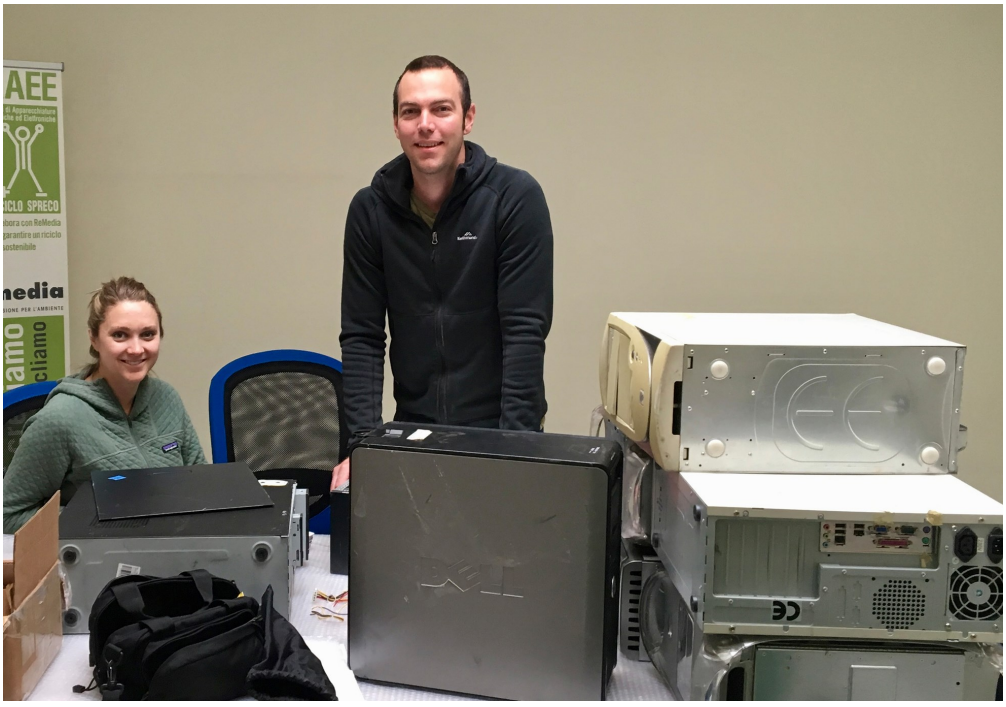
For more information regarding our tracking technology, visit BAN's website for our commercial service EarthEye: www.eartheye.org



BAN staff Chris Brandt, installing a tracker into a LCD screen in Ireland. One of the Irish tracked LCDs ended up in Hong Kong's New Territories after spending months in Romania. Copyright BAN, 2018



GPS tracker installation in Germany. Arrow inidicates tracker and battery packs. This devices was deployed at Stadtreinigung Dresden GmbH and later ended up in Thailand. Copyright BAN, July 2017.



BAN staff Hayley Palmer and Chris Brandt installing trackers near Milan, Italy. Copyright BAN, May 2017



Women working at crude WEEE site in Thailand. Copyright BAN, 2018.

