

# Electronic Waste in Israel

An Overview and Legal Analysis  
of the Electric & Electronic  
Waste Market in Israel, and Relations Between  
the Formal and Informal Markets



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# 1 Executive Summary

In 2014, the Environmental Treatment of Electrical and Electronic Equipment and Batteries Law came into force in Israel. The Law was designed to promote environmentally suitable treatment of electrical and electronic waste (e-waste), which has a significant potential for pollution. That same year, much media attention was given to a public protest held by residents in the Eastern Lachish area against the air pollution that affects them as the result of e-waste burning in several villages in the South Hebron Hills region in the West Bank. This particular environmental-health hazard in Lachish is symptomatic of a larger problem, pertaining to the management of the e-waste market in Israel, and the inter-relations between the so-called “formal market” (i.e., parties authorized to treat e-waste), and the “informal” one. In practice, even after the Law entered into force, e-waste from Israel routinely flows to unauthorized parties both within Israel and across the Green Line, where it is improperly disassembled and treated, thus posing risks to the environment and to the health of Israelis and Palestinians alike. It is a complex, cross-border environmental-social-economic problem, which must be addressed rationally, in order to formulate optimal policies given the existing circumstances and constraints. In this paper, we have surveyed the Israeli e-waste market, regulatory efforts around the world (focusing on e-waste flow from developed to developing countries) and legislation in Israel, as well as the ways in which the informal market’s activities affect its implementation. Finally, this paper puts forth a number of insights and recommendations for public policy changes.

## Electrical and Electronic Waste

Electrical and electronic devices are becoming increasingly important in our lives. The wasteful consumption patterns dominant in the West, combined with the technological-economic-cultural phenomenon of shorter product lifespans, have led to a constant increase in the amount of e-waste being produced.

E-waste is characterized by heterogeneity – the materials it contains vary from product to product (plastics, metals, oils, gasses, etc.); toxicity – e-waste contains metals and metalloids (arsenic, cadmium, copper, nickel, zinc, etc.), flame retardants, greenhouse gasses (such as CFCs), oils, etc.; and alongside these, there are also valuable materials such as iron and precious metals (gold, silver, palladium, platinum, and copper). Thus, despite making up a small percentage of the total waste produced every year, e-waste has significant potential for creating environmental and health hazards if not treated properly, while also being a potentially valuable economic resource.

## The Israeli Environmental Treatment of Electrical and Electronic Equipment and Batteries Law

In light of this, in 2012 Israel passed the Environmental Treatment of Electrical and Electronic Equipment and Batteries Law. The Law, based on the European WEEE (Waste, Electrical and Electronic Equipment) directive, applies the Extended Producer Responsibility principle (EPR) to producers and importers of electronic devices, including the obligation that end-of-life products be treated environmentally, meeting the recycling targets set by the Law. The Law defines authorized collection, transportation, and treatment mechanisms, assigning the management of the entire process to Accredited Compliance Bodies (ACBs), whose terms of accreditation are set by the Ministry of Environmental Protection. The formal collection channels are sellers (customers may

hand old products to the seller at the time of sale or delivery), local municipalities (collection arrangements set by each municipality), and waste holders (businesses who accumulate e-waste must remove it only through an ACB). Any waste not collected through one of these channels is unrecognized, or “informal.”

Thus, the Israeli law in effect distinguishes between the formal and informal e-waste markets. This distinction is relevant on two levels. From the moment, the Law came into force, informal market activities have largely been defined as criminal. In addition, this distinction affects how recycling targets are measured, since only waste treated in the formal channels can be counted towards meeting the producers and importers’ obligations as specified by the Law.

Although the Law came into force in early 2014, in practice most e-waste is still controlled by unauthorized parties, and is not treated by the ACBs or any of their sub-contractors. Clearly, this informal activity has economic motivations. Some of the unauthorized parties in the e-waste market had been operating for many years prior to the Law’s enactment, and now their activity is in apparent conflict with the Law’s stipulations and requirements.

The informal markets employ laborers from low socio-economic backgrounds, who have little awareness of the health hazards involved in their line of work and who lack employment alternatives. This situation results in unfavorable working conditions and lack of social benefits. In addition, the informal market is often accompanied by criminal activities, avoiding taxation. On the other hand, the informal market is also characterized by operational efficiency. In many countries around the world, including those where a well-developed formal market exists, the informal sector collects a substantial part of the e-waste.

In Israel, we see informal flow of e-waste to illegal sites both within Israel and in the West Bank. It is then disassembled in an unregulated manner for its valuable components, which are sold to be used industrially in Israel. In this paper, we have reviewed regulatory efforts around the world regarding e-waste management, focusing on the European legislation whose regulatory model was adopted by Israeli lawmakers. We have also reviewed legislation in Asian and African countries, who are contending with an illegal flow of e-waste from developed countries, and whose informal e-waste markets are enormous. As expected, high recycling rates can be seen in European countries where the EPR principle has been implemented, making producers responsible for their products at the end of their life-cycle. In contrast, in those Asian and African countries who suffer from large informal markets and are dependent on e-waste flow from developed countries, we have found scant legislation and ineffective enforcement.

One of the ways to address cross-border e-waste flow, in addition to enforcing record-keeping and reporting, is standardization of e-waste management. Globally, there are already numerous standards for the collection, storage, and treatment of e-waste. Nevertheless, in many countries, the adoption of these standards is not yet mandated by law, which sometimes leads to growing gaps between the formal and informal markets.

The Israeli Law requires producers and importers to engage only in “authorized recycling,” defined as the transfer of waste to “a recycling plant licensed under any law.” Unfortunately, the existing relevant legislation amounts only to business licensing, which in its current form do not make any special requirements regarding e-waste recycling. The Law also addresses the required recycling standards, detailing a number of “activities for the treatment of electrical and electronic

equipment.” However, these activities are only designed to remove potential pollutants, but do not specifically address the manner of their treatment after removal; no regulatory document has been found which addresses this point on a national level.

Another restriction imposed on treatment facilities prohibits the operator to hire workers who are not Israeli residents or citizens. This means that the Law, in its current form, does not allow the ACBs to work with Palestinian treatment facilities, both in Area C and in Palestinian Authority territory, even if they meet all environmental standards. In the current state of affairs, transfer of e-waste into PA territory is not considered exportation, since the PA is not recognized as a sovereign state, and even if it was, Israel has so far refused to acknowledge it as such.

### E-waste Management in Israel

Since the Law came into force and as of the writing of this paper, the Ministry of Environmental Protection has yet to publish any information or data regarding its implementation, in direct violation of the Law’s explicit requirement which stipulates that the Ministry must present the Knesset with an annual report. According to reports by the ACBs, they have met the Law’s recycling targets, however, since those targets are gradually raised and should reach 50% by 2021, representatives of the ACBs have expressed their worry that they may not be able to meet them if the current situation continues.

Thus, for example, one of the most problematic aspects of the Law’s implementation is the lack of a regulated mechanism to manage competition in the recycling market. Today, the ACBs have no incentive to contract with many of the local municipalities, due to the high costs involved relative to the meager waste yield. If it only makes economic sense to operate in certain geographic areas, the market is distorted and unfair competition conditions arise, which hamper the Law’s implementation efforts. Despite the MoEP’s promise to remedy this situation by the end of 2016, nothing was done in practice and only a handful of regional councils contracted Accredited Compliance Bodies (ACBs). Another obligation, to regulate treatment plants, standardization, and enforcement, has also not been realized so far.

### The Informal Waste Flows in Israel and Ways of Addressing Them

Much of the e-waste collected through unauthorized channels (and sometimes in the authorized ones as well) is transported by trucks across the Green Line, where it is treated in an uncontrolled and unregulated manner, often by burning to expose the cables and extract valuable raw materials. These practices are dangerous for workers and local inhabitants alike, due to the toxic substances released in the process, which pollute the air and the ground.

A study conducted by Dr. Akram Amro and Hadeel Tamimi and funded by the EU has estimated that about 62 trucks cross the Green Line every day, most of which carrying Israeli license plates. Most of the e-waste that crosses the Green Line finds its way to sites in the South Hebron Hills region (especially in the villages of Idhna, Deir Samet, and Beit Awwa), where it represents a significant contribution to the local economy. After the disassembly and exposure of valuable materials, most are sold back in Israel as industrial raw materials. In addition to disassembly and recycling workshops, there are also electronic devices refurbishment workshops in the area. Those businesses utilize components from used or faulty products to create new usable products which

are then sold cheaply in local markets. In recent years enforcement efforts at border crossings have increased, and dozens of trucks have been stopped, but in practice, despite the establishment of a special enforcement unit in the Israeli Civil Administration, authorities have failed to prevent the flow of e-waste into the West Bank.

As mentioned earlier, among the populations who suffer from the consequences of the unregulated e-waste treatment in the South Hebron Hills region, and the waste burning in villages in the area, are those of the East Lachish area, who for several years now have been complaining of black smoke billowing from neighboring villages and pungent smells which affects their health and quality of life. These environmental hazards also affect residents of those villages where the burning takes place, and in recent years there have been efforts to change this situation. For example, an initiative supported by Sida (Swedish International Development Cooperation Agency), that includes among other things updating the inventory of burn sites, boosts the capacities for local burn detection and enforcement, and operation of subsidized grinding at a facility as an alternative for the burning of cables. As part of a project led by AJEEC-NISPED (Arab-Jewish Economic Empowerment Center – Negev Institute for Strategies of Peace and Development) in collaboration with the GLSHD (Green Land Society for Health Development), funded by the EU, there have been focused efforts to increase awareness among the local population regarding the dangers of waste burning, efforts which include activities in local schools and the establishment of a regional educational center. In addition to initiatives by organizations, there have also been business initiatives for promoting environmental solutions to e-waste – for example, currently in the final stages of being established (including applying for permits from the PA) is a plant for shredding and chemical separation of precious metals, set to begin operations in the Bethlehem industrial area.

### Strategies for Contending with the Informal Market

As already stated, the purpose of this paper is to examine the relations in the Israeli e-waste market between the formal the informal sectors, and to offer policy strategies that might help to achieve the Law's goal: environmentally sound management of e-waste. The paper focuses on the West Bank, specifically on the South Hebron Hills region (the villages of Idhna, Deir Samet, and Beit Awwa), where e-waste is a major economic factor.

We have identified three main approaches currently applied to contend with the informal market activities in general, and the border crossings in particular:

- Strict enforcement
- Pragmatism
- Formal recognition

The strict enforcement approach, as its title suggests, means increased enforcement within Israel, and sealing the border against e-waste flow across the Green Line. This requires devoting more resources by the regulator, by controlling and enforcing the activity of the ACBs and the treatment facilities. Presumably, stabilizing the formal market (i.e., solving the issue of competition, setting clearer standards for what constitutes “approved recycling,” creating incentives for investment in advanced treatment facilities, and increasing the number of importers and producers signed with the ACBs) will increase the flow of waste in the formal channels, at the expense of the informal ones. Nevertheless, in light of the profitability of waste treatment in the West Bank, in our opinion,



this approach may not be feasible for technical reasons, and also would hurt the livelihood of the residents of the South Hebron Hills who rely on e-waste management.

The pragmatic approach in effect recognizes the existence of the informal market, while not fully sanctioning it. With this approach, the regulator works towards minimizing the negative consequences of the informal market activity on two fronts. The first is the development and strengthening of the local e-waste market, promoting uniform standardization. The second is investment in better quality treatment facilities for achieving approved recycling, while also supporting localized environmental solutions. The project supported by Sida can be categorized under this approach. The downside of this approach relates to its dependence on external factors (such as subsidies) and in the fact that this approach facilitates and even legitimizes activity that might not necessarily comply with the law. In addition, outside of Israel, there is but limited ability to control the extent of compliance with environmental standards.

The formal recognition approach effectively aims to regulate the informal market, i.e. to gradually transform it into a legal industry, which would fit into the authorized collection and treatment mechanisms, while bringing the management standards in the unauthorized facilities up to par with the authorized ones. E-waste flow into the West Bank then becomes legitimate, and waste properly treated there can be counted towards meeting the recycling targets.

This alternative faces several serious challenges. First, regulating the informal market may blunt its competitive edge, thereby destroying its economic basis. The ability of informal actors to offer attractive prices for e-waste stems to a large extent from not being subjected to inspection and reporting duties, not paying taxes, having lower management standards, and from the lack of enforcement of fair employment practices. In addition, it is highly doubtful that inspection and enforcement can be effective against actors operating beyond the Green Line, particularly in areas under the control of the Palestinian Authority. There are also difficulties that arise from international law considerations (the Basel Convention which limits cross-border waste flow). Additionally, the volatile security and political reality, which does not allow for the stability necessary for successfully implementing such arrangements, must not be discounted. There are also regulatory limitations, such as that which currently prohibits the ACBs to contract with facilities employing workers who are not residents or citizens of Israel.

In thinking about the strategy to adopt in this matter, we must take into consideration its potential for maximizing the benefits to public interests on the one hand, and its practical feasibility in such a complex reality on the other. In theory, the formal recognition approach seems to be the best one, since it may fully achieve its goals – a sustainable management of e-waste – regardless of how long it might take to implement, the scale of efforts required, or the political climate that is required for it to succeed. However, taking into account the whole range of constraints, it appears that at this stage it is more advisable to focus on developing the local market and establishing the standards for operating in it. Alongside sensible enforcement and creation of tools, this approach – in the long run - would encourage more environmental practices, both within Israel and the West Bank, in a manner that would minimize the hazards affecting Israelis and Palestinians alike.

## Insights and Recommendations for Achieving Proper Environmental Management of E-waste

In light of the above, this paper suggests a number of recommendations for steps that can be taken:

- **Immediate steps by the Ministry of Environmental Protection towards the implementation, management, and enforcement of the Law** – The Ministry must take full responsibility for the Law it has thus far neglected, and manage its implementation more vigorously by assigning more professionally trained staff to the task.
- **Establishment of a mechanism to manage competition** – Regulating the ACBs' activity through a competition management mechanism, alongside enforcement against importers, producers and local authorities who have yet to contract with the ACBs as required by the Law, or who collect e-waste in channels other than those authorized by the Law.
- **Coordinating the efforts by the Ministry of Environmental Protection and the Civil Administration** – Strengthening the coordination between the MoEP, charged with enforcement within Israel, and the Civil Administration's enforcement units in the West Bank. It must be guaranteed that when trucks carrying waste are stopped, the content will be treated properly.
- **Information pooling and transparency** – Implementing transparent and knowledge-based policy, based on, including but not limited to, information from the ACBs, MoEP audits and reports to the Knesset's Economic Affairs Committee.
- **Standardization** – Standardization of waste collection, transportation, storage and management by adopting a standard or a number of standards, defining what constitutes recycling and what constitutes environmental waste treatment, which would include setting minimum requirements for proper environmental treatment of e-waste.
- **Definition of recycling plants** – It is imperative that recycling plants be defined more precisely, including more detailed definition of the requirements for business licenses issued to plants which treat electrical and electronic waste and additional requirements imperative for e-waste treatment plants.
- **Ordinances** – Defining the subject of exportation through ministerial ordinances, regarding e-waste exported for recycling and recovery, and approved export quotas to be considered towards meeting recycling targets.
- **Amendments to the e-waste Law** – Changing the sections that prohibit recycling plants from employing workers who are not Israeli citizens, which prevents using legitimate treatment facilities in the West Bank, even when they follow all relevant environmental standards.

## 2 The Problem

### 2.1 Overview

In 2012, the Electrical and Electronic Equipment and Batteries Law<sup>1</sup> was legislated by the Israeli Knesset. The purpose of this law is to establish procedures regarding environmental management of electrical and electronic equipment, batteries, and accumulators, in order to encourage re-use, to limit the amount of waste generated and prevent its landfilling, as well as to reduce the negative environmental and health hazards associated with such waste. The law defines authorized waste collection, transport, and management channels, entrusting the management of these processes to special bodies, to be accredited by the Ministry of Environmental Protection according to specific conditions and requirements (“Accredited Compliance Body,” or ACB).

Alongside waste collected through the formal channels defined by the law, a significant amount of electrical and electronic waste (hereafter: “e-waste”) is collected, transported, and treated by other parties, independently of the ACBs or their sub-contractors. These parties (the “informal market”) operate out of economic motives, making a profit from materials extracted from the e-waste. From the point of view of the Israeli law, the inter-relations between the formal and informal markets are complex, affect many different stakeholders, and sometimes cross borders<sup>2</sup>.

The problem this paper addresses is twofold:

1. Environmental and health hazards: E-waste in the informal channels is usually treated in non-environmental ways, which results in air and ground pollution, as well as ozone layer depletion. Consequently, these processes entail external costs, in the form of environmental and health hazards, which endanger both e-waste management workers and local residents.
2. The Law’s failed implementation: As mentioned above, the Israeli E-waste Law’s success depends upon e-waste management by the ACBs. The Law’s intent appears to be that ACBs take over the e-waste market, thus marginalizing unauthorized competitors. In other words, fierce competition is expected to arise between authorized and unauthorized parties over control of the e-waste market, which should become even fiercer as recycling targets are gradually raised. However, as of the writing of this paper, regulatory enforcement by the MoEP has been feeble to nonexistent, which raises the question whether the ACBs can in fact compete against the vast and well-established networks of the informal market, and which policies should be implemented in these circumstances.

### 2.2 The Informal Market

Actors in informal e-waste markets are often characterized by low socio-economic background, little awareness of the health risks that they incur and as well as a lack of employment alternatives. Weighing potential income against the consequences of their exposure to pollution, it is clear that in the long-run their situation will become worse. On the other hand, the informal market activity is managed by actors who greatly profit from it and is often accompanied by criminal activities that

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1<http://www.sviva.gov.il/English/Legislation/Documents/Environmental%20Treatment%20of%20Electrical%20and%20Electronic%20Equipment/EnvironmentalTreatmentOfElectricalAndElectronicEquipmentLaw-2012.pdf>

2 Davis J-M. And Garb Y. A model for partnering with the informal e-waste industry: Rationale, principles and case study, Resources, Conservation and Recycling, 105 (73-83), 2015.

facilitate the supply, transport, and sale of the waste and its products. Alongside these considerations, it must be noted that most laborers in the informal waste industry lack social benefits, and that the income and profits made by the industry evade taxation, having economic implications on a national level. On the other hand, the informal e-waste industry indeed provides livelihood for people with few other employment opportunities. It is also highly efficient, and in many countries, even those where there exists a well-developed formal market, the informal sector is responsible for a significant volume of e-waste collection.<sup>3, 4</sup>

In the informal market, diversion of waste in the collection and treatment process (treatment sites) is evident. Whereas the downsides to e-waste flow through the informal market are clear, such informal channels also possess several advantages in certain stages of e-waste management. For example, the informal market maintains an efficient collection network and an accumulated knowledge base regarding waste disposal patterns, the value of its constituents and the ratio of economically valuable components contained in a given pile of waste. Another aspect considered an advantage of the informal market is the low labor costs and reduced expenses (untaxed cash transactions and no other legally required payments), which enable manual disassembly of components, thereby improving the treatment process and reducing the amount of material entering landfills.<sup>3</sup>

Diversion of e-waste to informal markets is a well-known phenomenon which occurs worldwide. As noted by Davis & Garb (2015), ways of contending with informal markets take the forms of legal prohibition and enforcement, indifference (informal markets that exist alongside the formal ones), or embracing of the informal markets while requiring them to operate under the same standards as formal ones.<sup>4</sup> Either way, informal markets still process significant quantities of e-waste, even in countries where the formal markets are well-developed. In Sweden, for example, whose e-waste recycling rates are among the highest in Europe,<sup>5</sup> there is evidence of an informal market activity, as detailed in a document produced by the Swedish Ministry of Environment and Energy, which notes several e-waste shipments intercepted at the border en route to Ghana and Germany.<sup>6</sup> In Israel, we see e-waste flowing to illegal management sites within Israel, as well as across the Green Line, where it is disassembled in an unregulated and uncontrolled manner, with valuable components sold back in Israel. See Section 6.2 below.

## 2.3 The Purpose of This Paper

The purpose of this paper is to examine the inter-relations between the formal and informal e-waste sector of the Israeli e-waste market, and to discuss possible strategies for achieving the goal of the E-waste Law – sustainable treatment of electronic waste. In particular, we wish to focus on the West Bank, where, for example, around 45% of the population in the South Hebron Hills region (especially in the villages of Idhna, Deir Samet, and Beit Awwa) are estimated to rely on e-waste management for their livelihood<sup>7</sup>.

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3 Heart S. and Pariatam by A. E-waste: a problem or an opportunity Review of issues, challenges and solutions in Asian countries. Waste Management & Research. 2012

4 A model for partnering with the informal e-waste industry: Rationale, principles and case study, Davis & Garb, Resources, Conservation and Recycling 105 (2015) 73-83.

5 <http://ec.europa.eu/eurostat/web/waste/key-waste-streams/weee>

6 WEEE Directive in Sweden – Evaluation with future study, Swedish Environmental Protection Agency, November 2009

7 Feasibility study report, EU funded project, Akram Amro and Hadeel Tamimi, GLSHD, 2016.

As mentioned above, even though the E-waste Law assigns e-waste management to officially sanctioned recycling corporations, in practice we find that it is handled mostly by the informal market, which does not treat e-waste in an environmental manner. This creates several difficulties:

1. The E-Waste Law's implementation: the informal market's activities make it difficult to reach recycling targets, and creates competitive imbalance with legitimate parties who incur the costs of obeying the law.
2. Environmental & health costs: in many cases, e-waste treatment standards in the informal sector are low, creating serious environmental as well as health hazards as a result of exposure, the latter particularly among laborers.
3. Economic dependency of entire populations on the processing of e-waste originating in Israel.

### Working Premises

The maximal recycling targets defined by the Law is 50% of the products sold each year (obligated waste). In other words, the Law does not address the problem in its entirety – **even if all recycling targets are reached, there would still remain a significant amount of non-obligated waste.** Since this waste can still be exploited profitably, it is expected that informal parties will continue to collect it. Stricter enforcement can reduce informal market activities, but in the long-term it cannot prevent the transport of e-waste across the Green Line.

In this paper, we have attempted to answer the following question: what is the optimal policy that would reap maximal benefits while taking into account all considerations?

## **3 Methodology**

The writing of this paper included literature review from around the world regarding e-waste in general, and informal markets and e-waste treatment standardization in particular. Meetings were held with the relevant stakeholders, including the two ACB's, the Ministry of Environmental Protection and the Civil Administration's Environmental Protection Officer – as well as a US-based expert consultant (Anne Peters). The analysis of possible strategies for achieving sustainable e-waste treatment is based, among other things, on literature review on the subject of informal markets around the world, and on analysis of Israeli legislative efforts.

It must be noted that data regarding the implementation of the E-waste Law in Israel is severely lacking, since such data have yet to be officially published. Clause 69 of the Law stipulates that the MoEP must report to the Knesset's Economic Affairs Committee once a year regarding the Law's implementation, and publish the data on its website. In the committee meeting of June 7, 2016, the Ministry's Director-General, Israel Danziger, promised to present the data for the years 2014-2015 by the end of 2016. However, as of the writing of this paper, the report has yet to be published, contrary to the Law's stipulation.

## 4 E-waste and its Characteristics

Electrical and electronic waste (e-waste) as referred to in this document, is the term used to describe old, end-of-life or discarded appliances using electricity or electro-magnetic fields. We have witnessed an increase in per-capita material consumption in Western societies in general, and in Israel in particular. More products contain electrical or electronic components – mobile phones, tablet computers, small kitchen appliances, and even children’s toys and clothes. The rate at which products become obsolete and are replaced by newer, more technologically advanced ones is on the rise for many reasons, including both socio-cultural and purely technological ones (such as keeping up with software updates). Another crucial reason for the rapid turnover of these products is the business strategy known as “designed for the dump” - products being deliberately designed with short life spans, such as light bulbs, printers (where ink cartridges are designed to cost more than a new printer), or products whose ever-changing design requires the purchase of different peripheral equipment with every new model (for example, changes to mobile phones’ charging sockets, which necessitate buying a different charger). As the turnover rate increases, so does the volume of e-waste produced every year.

Management of e-waste requires addressing its three main characteristics:

1. Heterogeneity: different e-waste products contain different materials. Generally, e-waste contains about 50% iron and steel, 20% plastics, 10% other metals, and 3% printed circuit boards (PCBs). Many products contain a wide variety of materials, which make end-of-life separation and treatment more difficult.
2. Toxicity: e-waste contains a wide range of toxic elements, depending on the type of product. Among these are metals and metalloids (arsenic, cadmium, copper, lead, mercury, nickel, zinc, etc.), flame retardants (containing large amounts of chloride and bromine in synthetic plastic polymers such as PVC), greenhouse gasses (such as CFCs), oils, and others.
3. Economically valuable components: alongside the toxic components, various e-waste products also contain valuable elements such as iron, aluminum, steel, precious metals (e.g. gold, silver, palladium, platinum and copper, ruthenium), etc.

To conclude, e-waste has a significant potential for pollution when it is treated in a non-environmental manner, for example when parts are disassembled without treatment of emissions to air, or leakage to the ground. However, using appropriate methods, it is possible to re-use or recycle a significant part of the e-waste, thus mitigating environmental hazards and even saving raw materials, as part of the approach known as Circular Economy, which has recently been adopted in Europe<sup>8</sup>. Due to these characteristics of e-waste, there are many legislative and regulatory efforts in place and underway around the world to establish standards for treating end-of-life electronic devices.

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8 Communication from the commission to the European parliament, the council, the European economic and social committee and the committee of the regions, Closing the loop – An EU action plan for the Circular Economy, European Commission, December 2nd 2015.

## 5 E-waste Regulation Around the World

The following is a review of these standardization efforts in the European Union, Africa, and Asia. These regions were selected for the similarities they share with the issues dealt with in this paper: the European regulatory model has been adopted in Israel through legislation, and certain countries in Asia and Africa contend with illegal transport of e-waste from developed countries into their territory, as well as with giant informal e-waste markets.

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal<sup>9</sup> is a focal axis in a discussion about e-waste and its transport. The Convention was signed in 1989 and enforced in 1992. In 1994, Israel ratified the Convention and it was enforced in 1995. The Hazardous Substances Regulations (Import and Export of Hazardous Wastes), 1994 provide the legal basis for the implementation of the Basel Convention.

The convention deals with transboundary movements of hazardous wastes defined as such by the Convention or the state. The Convention defines "hazardous waste" by categories detailed in Annex 1 and categories of waste requiring special consideration in Annex 2, flammable/toxic/corrosive waste, residues arising from solid urban waste disposal and waste defined as hazardous by the country of export, countries of transit and import countries. Thus, e-waste is included in the Convention.

The principle aims of the Convention as listed on the Ministry for Environmental Protection include:<sup>10</sup>

- To reduce the transboundary movement of wastes subject to the Convention to a minimum consistent with the environmentally-sound and efficient management of such wastes;
- To minimize the amount and toxicity of hazardous wastes generated and to ensure their environmentally-sound management as close as possible to the source of generation;
- To establish a regulatory system that will apply in cases where transboundary movements are permissible.

"Transboundary" movement is defined by the Convention as any movement through or from the jurisdiction of one state to an area that is outside it.

### 5.1 The European Union

In light of the increase in e-waste (including light bulbs and batteries), and due to its unique characteristics, the need for regulating its management has been a concern for more than 20 years. Much attention has been devoted to this issue, especially by the EU, which has regulated it by means of several legislative initiatives:<sup>11</sup>

1. The Restriction of Hazardous Substances Directive (RoHS): this directive (2002/95/EC),

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<sup>9</sup> <http://www.basel.int/Home/tabid/2202/Default.aspx>

<sup>10</sup>[http://www.sviva.gov.il/English/env\\_topics/InternationalCooperation/IntlConventions/Pages/BaselConvention.aspx#GovXParagraphTitle1](http://www.sviva.gov.il/English/env_topics/InternationalCooperation/IntlConventions/Pages/BaselConvention.aspx#GovXParagraphTitle1)

<sup>11</sup> [http://ec.europa.eu/environment/waste/weee/index\\_en.htm](http://ec.europa.eu/environment/waste/weee/index_en.htm)

which came into force in February 2003, regulates the use of certain hazardous substances as raw materials in the production of electrical and electronic devices. It requires that heavy metals such as lead, mercury, cadmium, hexavalent chromium, flame retardants such as polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE), be replaced by safer alternatives. An updated version of the directive came into force in January 2013 (RoHS Recast Directive 2011/65/EU). It aims to reduce the environmental footprint of end-of-life electrical and electronic devices.

2. Ozone Depleting Substances legislation: Regulation 2037/2000<sup>12</sup> addresses Ozone Depleting Substances (ODS). It covers the entire life-cycle of products imported, exported, or produced in Europe which contain Chlorofluorocarbons (CFCs), other similar halogen-containing materials, Halons, Carbon Tetrachloride, 1,1,1-Trichloroethane, Methyl Bromide, Bromochloromethane, and other materials listed in the Regulation's Annex II.
3. The Energy Using Products Directive (EuP): this directive (2005/32/EC) establishes a framework for ecological design requirements for energy-using products, in order to enable free movement of products within the EU. It defines a set of requirements for such products as a precondition for their marketing or use. The directive in fact directly addresses aspects of energy efficiency in electrical and electronic devices, and, from the environmental aspect, affects their composition indirectly.
4. The Waste Electrical and Electronic Equipment Directive (WEEE): this directive was drafted in 2002 and came into force in February 2003 (2002/95/EC). It aimed to increase the recycling or re-use rates of e-waste. In 2008, it was decided to update it in order to address the increase in e-waste production, and the updated version (2012/19/EU) was passed in August 2012, becoming effective in February 2014.

The WEEE Directive has advanced within the EU the principle of Extended Producer Responsibility (EPR), (sometimes also referred to as product stewardship) for electrical and electronic devices, according to which manufacturers are responsible for their products at the end of their life cycle. The main principles of EPR are: defining the extent of producers' financial responsibility for the responsible collection, transportation, and recycling of their products; setting collection and recycling targets; establishing reporting and enforcement procedures; creation of incentives for producers to take into account considerations of recycling or re-use in the design of their products; creation of incentives for consumers for returning used products. During the 2000's, in the wake of the Directive's enactment, EU countries began to implement the EPR principle in their own legislation, requiring producers and importers of electronic devices to finance the treatment of end-of-life products. Each EU member country is to transpose these Directives into their country law, and enforce those laws.

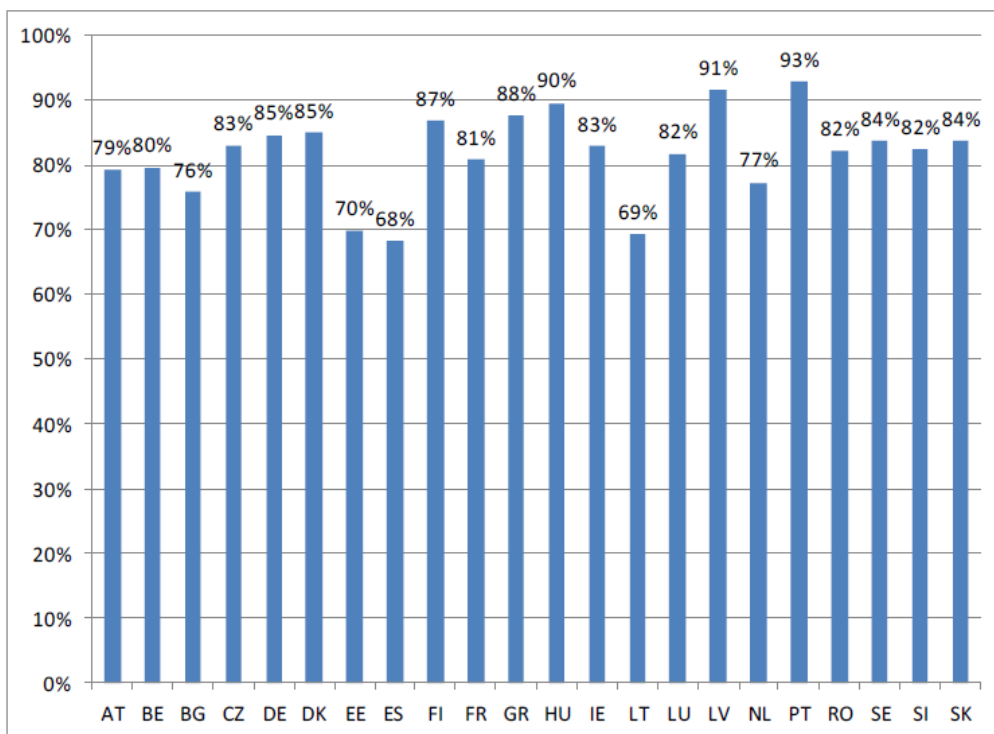
Indeed, this approach has led to high recycling rates in many countries, as is evident from **שגיאה!** **מקור ההפניה לא נמצא.** below. Collection rates per capita (in Euros) vary greatly between different countries, as is evident from Figure 2. shows that treatment costs for producers also vary significantly, which is explained by a number of reasons, including the relevant treatment standard.

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12 REGULATION (EC) No 2037/2000 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 June 2000 on substances that deplete the ozone layer.



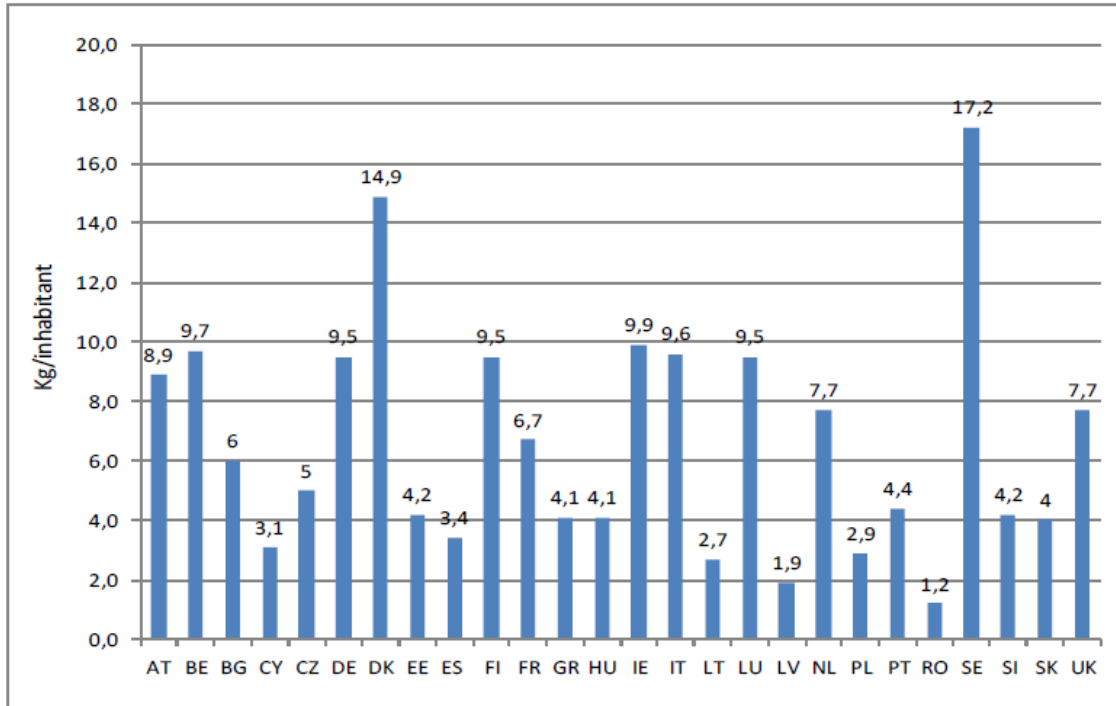
**Figure 1: E-waste recycling and re-use rates under EPR<sup>13</sup>**



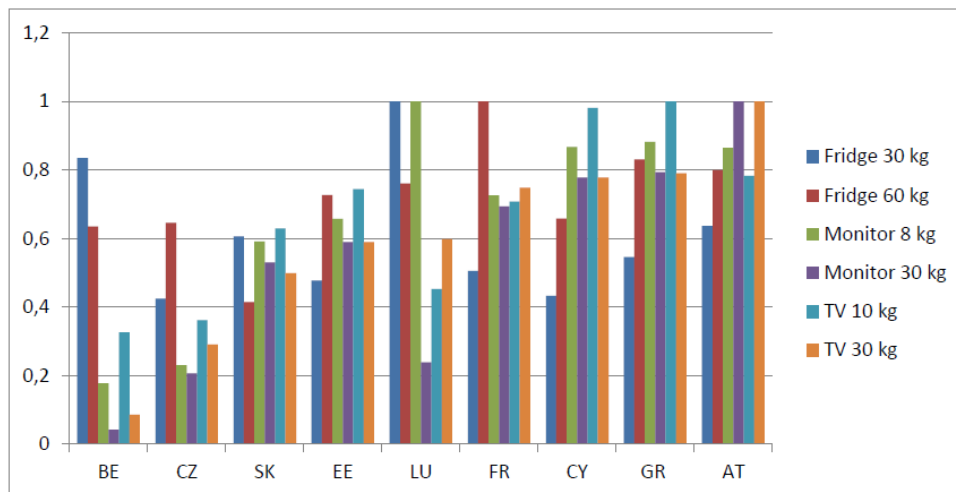
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13 Development of Guidance on Extended Producer Responsibility (ERP), European Commission – DG Environment, 2014. Figure 13, p. 52

**Figure 2: Per capita e-waste collection under EPR<sup>14</sup>**



**Figure 3: Normalized average cost of e-waste treatment<sup>15</sup>**



14 Development of Guidance on Extended Producer Responsibility (ERP), European Commission – DG Environment, 2014. Figure 12, p. 52.

15 Development of Guidance on Extended Producer Responsibility (ERP), European Commission – DG Environment, 2014.

## 5.2 Regulation in Asia and Africa

Many developing countries produce e-waste locally, but large quantities of waste are also imported from developed countries, exploiting the lack of environmental legislation or ineffective enforcement. This phenomenon is augmented by the presence of cheap and plentiful work force. It is common notably in various regions in China, India and in African countries. Nevertheless, and perhaps as a result of this unique problem, in recent years there has been an acceleration of e-waste legislation in Asian countries.

### 5.2.1 Asia

#### 5.2.1.1 China

Between 2002-2004, three legislative drafts were published in China regarding the treatment of e-waste: a technical policy document instructing Chinese environmental agencies regarding e-waste treatment; an administrative document which defines the use of chemicals during the manufacturing stages of electrical and electronic equipment (the equivalent of the RoHS directive); and a document addressing the treatment of e-waste (the equivalent of the WEEE directive). The latest two were issued by the state council in 2009 and became effective January 1 2011.<sup>16</sup> In addition, there is legislation prohibiting large-scale importation of e-waste.

#### 5.2.1.2 India

In India, there is a ban on e-waste importation in force, which was backed by a Supreme Court ruling, but waste continues to find its way into the country under the guise of “used equipment,” “reusable scrap metal,” and “used cables.” A significant part of the waste is treated in impoverished areas, in non-environmental conditions. In May 2012, the Indian regulative legislation regarding e-waste, a combination of the RoHS and WEEE directives, came into force.<sup>17</sup>

#### 5.2.1.3 Japan

In Japan, the Home Appliance Recycling Law (HARL)<sup>18</sup> is in force. Originally aimed at refrigerators, washing machines, television sets, and air conditioners, it was later expanded to include also dryers and LCD screens. All of these products constituted large parts, both in percentages and by weight, of the e-waste in Japan. Following the law’s enactment, producers joined together to form two collection and recycling umbrella organizations. The law, which defines “recycling” as pertaining only to waste components that can be recycled, and excludes environmentally hazardous substances, thus indirectly promoting a more sustainable product design.

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<sup>16</sup> <http://www.eiatrack.org/s/143?kw>

<sup>17</sup> [http://www.moef.nic.in/downloads/rules-and-regulations/1035e\\_eng.pdf](http://www.moef.nic.in/downloads/rules-and-regulations/1035e_eng.pdf)

<sup>18</sup> [http://www.meti.go.jp/policy/it\\_policy/kaden\\_recycle/en\\_cha/pdf/english.pdf](http://www.meti.go.jp/policy/it_policy/kaden_recycle/en_cha/pdf/english.pdf)

## 5.2.2 Africa

In Africa, there is currently no specific legislation targeting e-waste, and massive amounts of such waste is imported from developed countries under the aegis of “digital gap reduction,” even though the imported goods usually are not tested for functionality before being shipped.

### 5.2.2.1 Nigeria

In Nigeria, there is no effective enforcement of regulations pertaining to the treatment of hazardous waste, nor is there specific legislation for e-waste. In the last decade the amount of e-waste, particularly mobile phones, has constantly risen. Refurbished devices are widely used, however when those devices reach the end of their life cycle they still end up in landfills, often after being burned to reduce volume.

As of 2013, according to a lecture given at the third annual meeting of the Global E-Waste Management Network, only 25% of the imported waste in Nigeria is re-used, with the rest burned or landfilled<sup>19</sup>, despite the existence of some legislation and specific directives regarding e-waste:

- The Environmental Impact Assessment Act Cap E12 – requiring the taking into account of environmental concerns in decision-making processes.
- The Harmful Waste (Special Criminal Provisions) Act Cap HI – published in 1998 and updated in 2004. Prohibits the transportation or disposal of hazardous waste in unauthorized areas.
- National Environmental (Sanitation and Waste Control) Regulations, 2009 – stipulates that any activity which potentially creates hazardous waste, including importation, exportation, and transportation, must receive a permit. Places the responsibility for hazardous wastes and for preventing pollution from it on the waste producer.
- The National Environmental (Electrical/Electronic Sector) Regulations, 2011 – addresses the life-cycle of electrical and electronic equipment, based on the 5R principles,<sup>20</sup> and defines activities requiring permits.
- The Guide for Importers of Used Electrical and Electronic Equipment (UEEE) – stipulates that importers must be registered with the Nigerian National Environmental Standards and Regulations Enforcement Agency (NESREA), prohibits the importation of faulty electrical and electronic equipment, and requires that such equipment has documentation certifying its origins and functionality.

### 5.2.2.2 Kenya

Kenya is signed on the Basel Convention as well as the Bamako Convention which engaged with prohibition of the import of hazardous waste to the member African countries, and implementation of border control points. Never the less, policy and legislation in Kenya haven't successfully

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19 Update on E-waste management in Nigeria, Mrs. Miranda Amachree, National Environmental Standards and Regulations Enforcement Agency Nigeria (NESREA), Presentation for the 3rd annual meeting of the global E-waste management network (GEM3), San Francisco, USA, 15-19 July 2013

20 5Rs – Reduce, Repair, Re-use, Recycle, and Recover

reached the needed changes in the WEEE field.

## 5.3 Practices and Standardization Around the World

### 5.3.1 General

In reviewing e-waste professional literature, it is evident that informal markets are a worldwide phenomenon, which exists also in developed countries with high recycling rates. The literature describes cross-border transportation of waste in many countries, always in the direction of markets that offer cheaper solutions, usually in developing countries or where the environmental enforcement is weaker. Addressing the negative aspects of e-waste and its informal treatment takes three major forms:

1. Influencing the contents of electronic equipment and promoting “green” design – various initiatives exist around the world, whether legislative or voluntary, including environmental certification (such as Ecolabel and EPEAT), product design according to the European REACH regulation,<sup>21</sup> and even sustainable product design initiatives such as FairPhone, which aims to produce environmentally and socially responsible smartphones.<sup>22</sup>
2. Measures for addressing cross-border waste transportation – over the years, various measures have been developed to address this phenomenon, including enforcement of record-keeping and reporting, and standardization of e-waste treatment. A review of such measures and standards for the collection, storage, and treatment of e-waste can be found in section 5.3.4 below.
3. Promotion of refurbishment and re-use – in developing countries, there is an increasing number of small businesses for repairing and refurbishing electrical and electronic products, which helps in reducing the consumption of new products, in making advanced products accessible to populations who cannot afford new ones, and in utilizing the electrical and electronic equipment to its full potential life-span.

### 5.3.2 Europe

A research undertaken by the Countering WEEE Illegal Trade<sup>23</sup> (CWIT) for the EU refers inter alia to the routes used to carry out illicit WEEE from Europe to Africa and Asia but also from western Europe to its east and to the Middle East. Researchers estimate that around 70% of the products exported illegally to non-OECD countries are functioning second-hand items (UEEE) and 30% is waste (WEEE).

One of the mechanisms the CWIT proposes is a National Environmental Security Task Force (NEST) that will foster a coordinated multi-agency (police, customs, environmental protection agencies, the prosecution, government intergovernmental partners and non-governmental partners and other specialized agencies).

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21 <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32006R1907&from=EN>

22 <https://www.fairphone.com/en/our-goals/>

23 Countering WEEE Illegal Trade (CWIT) Summary Report, Market Assessment, Legal Analysis, Crime Analysis and Recommendations Roadmap, Huisman, J. et al, August 30<sup>th</sup> 2015

The European Electronics Recyclers Association (EERA) is a professional non-profit organization representing the interests of 36 large recycling corporations who process e-waste in Europe. It strives to harmonize relevant regulation on the international level and to promote a fair free market that operates according to the rules of supply & demand. The goals of the organization, as stated on its website, include lobbying at the EU level in favor of the recycling industry, and acting on burning issues at the local and international level, as well as the dissemination of relevant information to various parties in the e-waste business by publishing papers and organizing conventions<sup>24</sup>.

A paper published in February 2016 by DIGITALEUROPE, WEEE Forum, EERA, and CECED regarding compliance with the EN 50625 standard addressed the need to enforce the European standard for e-waste collection, storage, and treatment (so far only a final draft of the standard has been published).<sup>25</sup>

The paper also addressed the waste that informally flows into European countries that do not have high treatment standards, or have weak enforcement. It calls on all EU members to adopt and enforce the standard, as well as to require that e-waste from the EU be exported only to countries which adhere to the same standard. According to the paper, the Netherlands, Ireland, and France have already taken legislative measures to ensure that e-waste treatment facilities comply with the EN 50625 standard, once it is published. The standard addresses each and every stage of e-waste treatment, and is meant to supersede the WEEELABEX standard (see Section 5.3.4 below). The paper further notes that, since it is clear that the standard cannot be fully enforced in all countries, it is recommended to promote voluntary compliance with the parallel standards for waste treatment facilities, combined with third-party inspection. Furthermore, the paper recommends that working with treatment facilities outside of Europe be contingent upon their compliance with local or international standards. It is evident from the paper that the problem still exists worldwide, and that the need for standardization is both current and global.

### 5.3.3 Asia and Africa

Despite the existing legislation in China, which has led to the certification of e-waste treatment facilities, it seems that the lack of effective enforcement results in the continuous flow of illegal waste into the country, which is then treated in a non-environmental manner. Consumption of electric and electronic devices in China was estimated in millions of metric tons in 2007, and since then it has only increased. In addition to the familiar channels of e-waste flow, more waste is generated by defective devices produced by China's vast domestic industry. According to a 2011 review by Ongondo et al.<sup>26</sup> E-waste rarely ends up in the municipal waste flow. For the most part, electrical and electronic devices are sold in second-hand markets, and consumers tend not to discard broken or faulty equipment, in case it might be useful in the future. The most significant factor determining the duration of storage is the collection system and its accompanying costs. In addition to domestic consumption of electrical and electronic devices, China imports tens of millions of metric tons of E-waste in both legal and illegal channels (Ongondo et al. estimate at

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<sup>24</sup> <http://www.eera-recyclers.com/about-us>

<sup>25</sup> Compliance with EN 50625, CECED, DIGITALEUROPE, EERA and the WEEE Forum call on the European Commission to take appropriate measures to make compliance with the EN 50625 Series mandatory, 4 February

<sup>26</sup> How are WEEE doing? A global review of the management of electrical and electronic wastes, Ongondo F.O. et.al., Waste Management v.31 (2011) 714-730.

least 35 million metric tons per year). A combination of cheap labor costs and weak labor and environmental legislation, makes China a preferred destination for waste export from developed countries, and it is estimated that most of it is treated by the informal market.

In India as well, imports make-up a large part of the domestic E-waste market, and the country is a major export destination for E-waste from OECD countries, estimated at around 50,000 metric tons per year.<sup>27</sup> Even though India has an industry of refurbished electrical and electronic equipment, it is estimated that most of the imported waste ends up being disassembled for recycling in a non-environmental manner.

Another destination for e-waste export is various African countries. In Kenya, for example, a large part of the e-waste originates as imports from developed countries. The Kenyan e-waste treatment hierarchy is topped by refurbishment, followed by disassembly and recycling of valuable components. In the informal markets in Nigeria, e-waste components such as plastics, ferrous metals, and aluminum are smelted to be used as raw materials in the production of agricultural equipment. However, there is a lack in specialized equipment for handling hazardous materials or products containing such materials, such as PCBs, cathode-ray tubes (CRTs), and other equipment containing lead, mercury, and lithium, and those components which are useless to the recyclers are landfilled. Kenya is signed to the Basel Convention, as well as to the Bamako Convention. The latter prohibits the importation of hazardous waste into signatory African countries, and regulates cross-border waste transportation within Africa. Still, in the absence of a system of e-waste collection, it is often collected together with other types of waste.

A joint United Nations University and Solving the E-waste Problem (StEP) initiative, called “Best of 2 Worlds” (Bo2W), aims to investigate the possible implementation of sustainable approaches to handling the environmental and social problems stemming from inadequate treatment of e-waste. The project includes a pilot phase in two regions where large-scale informal treatment of e-waste takes place: Guiyu in China, and Bangalore in India,<sup>28</sup> where gold is extracted from computer parts. The Bo2W philosophy strives to exploit the cheap and readily-available workforce in those regions for the efficient disassembly of e-waste, so that the valuable components can more easily be extracted from it, using state-of-the-art, well-equipped facilities to mitigate environmental and health hazards. The pilot has been expanded to include other materials and equipment, in order to become economically viable. This approach is based on the premise that more valuable materials can be extracted using manual disassembly.

In various studies conducted to better understand the obstacles facing proper environmental treatment of e-waste in developing countries, the main factors identified were: lack of e-waste inventories; lack of skilled workforce for enforcement; lack of relevant legislation; deficient collection and treatment infrastructure; and lack of awareness of the dangers involved in improper treatment of e-waste.<sup>29</sup> As we have seen, the informal market is known to be effective at collecting and transporting waste, as well as at the initial stages of disassembly. In China and India, the methods employed to curb the informal market through enforcing the prohibition and fining the

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27 *ibid.*

28 The Best-of-2-Worlds philosophy: Developing local dismantling and global infrastructure network for sustainable e-waste treatment in emerging economies, Wang F. et al., *Waste Management* v.32 (2012) 2134-2146.

29 E-waste: a problem or an opportunity? Review of issues, challenges and solutions in Asian countries, Heart S. and Pariatamby A., *Waste Management & Research*, 2012.

offenders has failed, mainly due to the economic value that the informal treatment yields, as well as the inability of impoverished communities to pay the fines. There were also attempts to require licenses for treating e-waste, but this approach was not very successful either, since it was aimed at actors in the informal market, whereas this market depends on the waste suppliers, for whom selling waste to the informal market is more profitable. In light of this, both China and India have found that the best way to address the problems of the informal market is to work in cooperation with the developed countries from which the waste is exported, so that they better enforce their own export laws.

### 5.3.4 Transportation and Treatment Standards

E-waste is extremely heterogeneous, on more than one level: the products come in various sizes, and they contain various materials which change constantly as technology develops. Accordingly, the environmental management of end-of-life products must be suited to the product type, size, composition, etc. Therefore, as mentioned above, one of the means to ensure environmentally proper management of e-waste is defining what constitutes proper treatment, and enforcing its implementation.

The WEEE Directive addresses this issue in principle in Article 8:

- Separation of waste flows for re-use and recycling.
- Ensuring waste collection and treatment in accordance with the best available technologies, as detailed in Annex VIII (minimum requirements for storage and treatment facilities), under the responsibility of member states.
- Establishing standards – the EU shall direct the European Standardization Organization (ESO) to establish minimal treatment standards, and member states may additionally establish their own minimal standards for e-waste treatment.

Additionally, Article 9 addresses permits, stipulating that member states must ensure that organizations treating e-waste receive a permit from the responsible authority, which must in turn comply with all requirements detailed in the directive.

Following these, other standards were created around the world which address the various stages that e-waste flow, from collection to storage and treatment, such as:

- R2 (Responsible Recycling) – an established standard used globally (but originating in the USA for e-waste recycling). Nearly 700 electronics recyclers are certified to this standard in Europe, Africa, Middle East, Asia, Australia, and North & South America. R2 Requires compliance with the Basel Convention and is widely demanded from institutional and multi-national purchasers of end-of-life electronics management.<sup>30</sup>
- e-Stewards® - An established standard for re-use and recycling of electronic equipment. Has very high standards for protection of worker health and safety and of the environment. Requires compliance with the Basel Convention. e-Stewards® is widely demanded from institutional and multi-national purchasers of end-of-life electronics management services.

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<sup>30</sup> <https://sustainableelectronics.org/recyclers>



- IEEE 1680 - a series of standards created to provide criteria for environmental performance for personal computers, imaging devices, servers, and televisions, including end-of-life criteria.<sup>31</sup> This standard is the same as EPEAT certification for “green” electronic products.<sup>32</sup>
- WEEELABEX – a standard for collection, logistics, and treatment of e-waste. This standard began as a project of the WEEE Forum in 2009 and became more widely used with the establishment of the WEEELABEX Organization, an international non-profit which strives to promote the standard’s adoption. As part of its mission, the organization trains and certifies professional auditors in order to promote the proper management of e-waste in Europe.
- EN 50625 – a European standard (stemming from the WEEE directive) which is currently in its final draft stage, based on the WEEELABEX and is destined to become its de facto replacement.

Other standards used around the world include the Canadian Verification Program, which includes recycling as well as refurbishment and re-use programs, the Australian/New Zealand Standard (AS/NZ 5377), which addresses collection, storage, transportation, and treatment of e-waste, and the British 141PAS standard that deals with re-use of e-waste and the transportation of products between countries.<sup>33</sup>

All of these standards contain general specifications. The detailed specifications for treatment facilities are usually defined in their operating permits, issued by the relevant authorities in each country.

Following is Table 1 which presents a comparison between four of the aforementioned standards according to several major criteria. The table has been compiled from data included in a 2012 report prepared for EPEAT, and provides an overview of the standards as of the writing of that report.<sup>34</sup>

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31 <http://standards.ieee.org/develop/index.html>

32 <http://www.epeat.net/about-epeat/>

33 <http://shop.bsigroup.com/>

34 Comparison of Selected End-Of-Life Electronics Processing Programs With The Requirements In The IEEE 1680 Series Of Standards For End-Of-Life Electronics Processing, prepared for EPEAT and the Green Electronics by Libby Chaplin, Arcadian Solutions, December 2012.

**Table 1: Summary of Findings in Comparison of Major Standards Made for the EPEAT Rating Program**

<b>Criterion/Requirement</b>	<b>IEEE 1680.2</b>	<b>WEEELABEX</b>	<b>e-Stewards</b>	<b>R2</b>
Accredited certification program	Yes	no	yes	Yes
IAF certification	Yes	no	yes	Yes
Legal requirements	Yes	yes	yes	Yes
Definition of covered equipment	Yes	yes	yes	Yes
Definition of materials of concern	Yes	yes	yes	Yes
Written management plan for materials of concern to protect EH&S	Yes	partial	partial	Yes
EH&S management system	Yes	yes	yes	Yes
ISO 14001	No	no	yes	No
OHSAS 18001	No	no	no	No
Prevention of prison labor	No	no	yes	No
Proof of liability & environmental insurance	No	yes	yes	Yes
EH&S controls	No	yes	yes	Yes
EH&S training	No	yes	yes	Yes
Site closure plan	No	partial	yes	Yes
Record retention & documentation	No	yes	yes	Yes
Export controls	Yes	yes	yes	Partial
Testing equipment/components going for re-use, repair, or refurbishment prior to export	Yes	yes	yes	Partial
Disallowance of incineration/waste-to-energy facilities for materials containing mercury, halogenated compounds, and beryllium	Yes	no	yes	Partial
Disallowance of non-hazardous disposal facilities for disposal of materials of concern, except as required by law	Yes	partial	partial	Partial
Tracking throughput	Yes	yes	yes	Yes
Mass balance	No	yes	yes	No
Tracking materials of concern to final disposition	Yes	yes	yes	Yes

## 6 Electrical and Electronic Waste in Israel

### 6.1 Regulation in Israel

As a country with a developed Western economy, Israel has followed the similar trends of e-waste consumption. According to the MoEP, out of a total of 5.4 million metric tons of general waste generated in Israel every year, around 130,000 metric tons are e-waste, i.e. about 2.4%.<sup>35</sup> In terms of mass, it is indeed a small percentage; however, e-waste contributes the majority of toxic waste, and increases significantly every year.<sup>36</sup>

In light of this, in 2012 the Knesset passed the Electrical and Electronic Equipment and Batteries Law (hereafter: the “E-waste Law”), which was based on the WEEE directive. Following the WEEE, the Israeli law applies the Extended Producer Responsibility (EPR) principle, charging producers and importers of e-waste with properly handling end-of-life products, in accordance with the law’s requirements.

The law’s general purpose is:

to establish measures regarding the environmental management of electrical and electronic equipment and of batteries and accumulators, in order to encourage reuse of electrical and electronic equipment, to reduce the quantity of waste created from electrical and electronic equipment and from batteries and accumulators, prevent the landfilling of such waste, and mitigate the negative environmental and health related effects of electrical and electronic equipment, of batteries and accumulators and of waste equipment and batteries.<sup>37</sup>

The law includes regulations regarding electrical and electronic equipment, as well as light bulbs and batteries.

#### 6.1.1 The Mechanism Established by the Law

The implementation of the EPR principle in the E-waste Law is meant to be accomplished through specialized recycling corporations (“Accredited Compliance Bodies,” or ACBs; often referred to as producer responsibility organizations (PROs) in the EU and North America) whose role it is to fulfill the producers’ duties on their behalf and attain the recycling targets set by the law, as detailed below:

- Producers and importers of electronic products must attain the recycling targets set by the law (25% for the year 2016, gradually rising to 50% in 2021). The recycling goals are derived from the number of products sold each year by each producer/importer. Failure to attain these targets results in severe financial sanctions.
- In order to fulfill their duties, producers must contract with an ACB and finance the

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<sup>35</sup> <http://www.sviva.gov.il/subjectsEnv/Waste/SolidWaste-Data/Pages/WasteData.aspx>

<sup>36</sup> Adam Teva V’Din, “Electronic Waste: Environmental Problems and Solutions” (2005) <http://www.adamteva.org.il/Uploads/dbsAttachedFiles/electronic.pdf> (Hebrew only)

<sup>37</sup> <http://www.sviva.gov.il/English/Legislation/Documents/Environmental%20Treatment%20of%20Electrical%20and%20Electronic%20Equipment/EnvironmentalTreatmentOfElectricalAndElectronicEquipmentLaw-2012.pdf>

latter's activities through the payment of handling fees, which are calculated based on the types and quantities of the products. The ACBs' entire purpose is to fulfill the producers' duties by contracting with various holders and collectors of e-waste and transporting it to recycling sites. Thus, for example, every municipality must establish e-waste collection system within its jurisdiction, and contract with an ACB for the purpose of funding every stage of that system, from collection to treatment. Seller of electrical or electronic equipment must allow the public to return e-waste to the point of sale when purchasing a new product. Business holding e-waste must remove it through an ACB. Table 2 below presents the duties of each party, as mandated by the E-waste Law.

**Table 2: Duties of Different Parties Mandated by the Law**

<b>Party</b>	<b>Duty and Measures to Be Taken</b>	<b>Section #</b>
Parties responsible for waste removal (usually local municipalities)	<b>Separation and collection</b> of domestic e-waste and batteries (setting up collection centers, and collecting large appliances from residents' homes)	26(a)
	<b>Providing information</b> to residents regarding e-waste recycling	26(g)
	<b>Contracting with an ACB</b>	27(1)
	<b>Taking enforcement measures</b> vis-à-vis residents	29(b)
Accredited Compliance Bodies (ACB)	Fulfill the duties of affiliated producers and importers: <ul style="list-style-type: none"> <li>• Remove waste in affiliated municipalities</li> <li>• Fund separation and collection to a reasonable extent</li> <li>• Remove waste from affiliated holders and sellers</li> <li>• Carry out sorting, re-use, and informational activities</li> </ul>	17
	<b>Contract with</b> any importer or producer who turns to it	18(a)
	<b>Report</b> to affiliated importers and producers	18(b)
	<b>Offer</b> any party responsible for waste removal to enter into contract with it	19(a)
	<b>Contract with</b> any party responsible for waste removal who turns to it	19(b)
	<b>Contract with</b> any relevant seller or holder of non-domestic waste who turns to it	20

<b>Party</b>	<b>Duty and Measures to Be Taken</b>	<b>Section #</b>
	<b>Report on</b> <ul style="list-style-type: none"> <li>• Affiliated importers and producers</li> <li>• Details regarding sale, collection, and recycling for each importer or producer</li> <li>• Details of affiliated collectors, sellers, and holders</li> <li>• Data regarding its collection and recycling activities</li> <li>• Financial balance sheet (in the annual report)</li> </ul>	21
	<b>Keep records</b> of all details included in reporting duty	22
	<b>Hold a producers and importers meeting</b>	23
	<b>Promote fair representation of people with disabilities</b> among ACB staff and in any affiliated operators	25
Producers or importers on a limited scale	<b>Annual report</b> to the MoEP (same as regular reporting duty)	12(b)
Producers and importers	<b>Contract with</b> an ACB	8(a)
	<b>Finance</b> the ACB's activities	8(b)
Producers and importers of batteries and accumulators	<b>Reach recycling targets</b> (until 2019: 15% of lead; 20% of nickel-cadmium; 12.5% of other types. Starting 2019: 30% of lead; 35% of nickel-cadmium; 25% of other types)	4
Producers and importers of electronic equipment	<b>Reach recycling targets</b> (30% in 2017, after deducting waste transferred for re-use)	3
Producers and importers of electronic equipment and batteries	<b>Report</b> to the MoEP on: <ul style="list-style-type: none"> <li>• Number and types of items sold</li> <li>• Weight of collected waste</li> <li>• Weight of waste recycled/exported</li> <li>• Instructions for environmental treatment</li> </ul>	5
	<b>Keep records</b> of details included in the reporting duty	6
	<b>Prepare and publish instructions</b> for environmental treatment of electronic equipment and batteries	7
Producers and importers exempted from contracting with an ACB	Fulfill all duties and incur all costs independently	9(c)

<b>Party</b>	<b>Duty and Measures to Be Taken</b>	<b>Section #</b>
Holders of non-domestic waste	<b>Contract with an ACB</b>	34
Operators of waste centers or treatment facilities	<b>Keep records</b> of all incoming and outgoing waste	39(b)
	<b>Report</b> to the MoEP on all incoming and outgoing waste	39(d)
Sellers of portable batteries and accumulators	<b>Install dedicated collection receptacles</b> at each point of sale	30(b)
Sellers	<b>Accept e-waste</b> at the time of sale	30(a)
	<b>Post a notice at the place of business</b> regarding: <ul style="list-style-type: none"> <li>• Deposit possibilities</li> <li>• Location of the area for deposit</li> <li>• Deposit limitations</li> </ul>	30(c)
	<b>Store e-waste</b> in accordance with the Law	31
	<b>Contract with an ACB</b>	32(a)
	<b>Transfer e-waste</b> to the ACB	32(b)
	<b>Keep records</b> of all e-waste received by and removed from the business	33
	<b>Dispose of e-waste</b> only in accordance with the Law	28
Residents	<b>Dispose of e-waste</b> only in accordance with the Law	28

### 6.1.2 The Law’s Definitions of Formal and Informal Markets

As shown hereunder, the Israeli E-waste Law establishes a *de facto* distinction between the formal and informal e-waste markets. This distinction is repeated throughout the waste processing chain, from collection to treatment. It should be emphasized that this distinction has important ramifications, on two levels: first, from the moment the Law came into force, the informal market activity became mostly illegal. Second, the formal classification of e-waste influences the way in which recycling rates are measured, as well as how producers and importers comply with the law’s requirements.

#### 6.1.2.1 The Collection and Removal System

As mentioned above, the Law defines three legitimate collection channels: sellers, local municipalities, and waste holders. This means that waste collected in any other way is unauthorized, or “informal.” In May 2016 (following the M.A.I Recycling of Electronic Waste and Batteries Corporation’s appeal to the supreme court),<sup>38</sup> the MoEP clarified that it will not recognize informal waste, even if an ACB can produce certification of some kind regarding its origins.<sup>39</sup> This

38 <http://elyon1.court.gov.il/files/15/240/033/I01/15033240.I01.pdf>

39 <http://www.sviva.gov.il/subjectsenv/waste/electronic-waste/documents/recycling-electronic-waste-30052016.pdf>

means that such informal e-waste cannot be counted towards attaining recycling targets.

Since the Law defines specific collection routes, any party (including holders and sellers) which transfers e-waste to an unauthorized party is committing a crime. Thus, for example, Subsection 43(b)(14) imposes criminal sanctions on e-waste holders who did not contract with an ACB, and transferred their waste to an unauthorized party. Criminal sanctions are also imposed on private collectors who do not operate on behalf of an ACB (junk peddlers): Clause 29(a) prohibits the collection of e-waste within the jurisdiction of a local municipality by any party not operating on behalf of an ACB.

Residents too may be held criminally responsible if they dispose their e-waste in any way other than in accordance with the collection procedures within their local municipality, or by handing it to a seller. In other words, handing e-waste to a passing junk peddler constitutes a criminal offense by both the resident and the collector.

The Law defines and regulates various kinds of sites to which e-waste may be transported. Here the Law distinguished between temporary sites, which are just a link in the collection and disposal chain, and treatment facilities. According to the Law, a “collection point” is in fact a storage tank (or several tanks) for the public’s use within a local municipality. In contrast, a “collection center” is defined as a facility whose purpose is the initial collection of e-waste.

The legal responsibility of the local municipality is to install collection points within its jurisdiction, and to operate collection centers that serve the public. Initial separation between reusable and non-reusable e-waste is meant to take place in the collection centers. However, Section 36 **prohibits** the management of e-waste (recycling, recovery, or landfilling) within collection centers. Nevertheless, the Law requires collection centers to include facilities for the prevention of environmental and health hazards (Section 35).

#### **6.1.2.2 The Management System**

The Law defines several types of sites where activities other than collection, storage, and separation of e-waste may be performed. For example, it defines “Centers for preparation for reuse” in which “activities of examination, cleaning or repair of waste electrical and electronic equipment” may take place, “enabling its reuse, without need of additional activities.” The Law also recognizes a “sorting center,” where e-waste may be sorted.

It should be emphasized that the Law prohibits e-waste *treatment* at both centers for preparation for reuse and sorting centers. Activities classified as “treatment” according to the Law are recycling, landfilling, and recovery only. The Law defines recycling as the “processing of waste equipment and batteries into products, materials or raw materials, excluding reuse, preparation for reuse and recovery.” Thus, disassembly of an electronic device and sale of its various components constitute recycling according to the Law, as does shredding and separation of raw materials. Here too the Law distinguishes between authorized and unauthorized management systems, as detailed below.

#### **6.1.2.3 The Recycling Standard Defined by the Law**

Producers and importers are required by the Law to perform “approved recycling,” that is, in order to reach recycling targets, they must transfer electronic waste only to facilities that meet the

requirements. “Approved recycling” is defined as the transfer of waste to “a recycling plant licensed under any law.” The relevant laws here are those regulating business permits, which in their current definition make no special category requirements regarding e-waste recycling. In other words, currently there is no specific category requirement for a business license for an e-waste recycling plant, nor are there horizontal conditions in the business license that are relevant to such plants. The content and scope of the conditions depends on the MoEP’s representative and may vary between plants.

The general environmental standards that a treatment facility must comply with are detailed in Section 38(a):

A person may not operate a treatment facility and may not receive or store waste equipment and batteries therein, unless the waste was stored and treated using infrastructures for the prevention of environmental and health hazards, including the infrastructures detailed below:

- (1) Scales for weighing the waste.
- (2) Impermeable surfaces.
- (3) Covering to prevent the waste equipment and batteries from getting wet.
- (4) Suitable storage means for dismantled spare parts.
- (5) Collection receptacles suitable for different components of waste equipment and batteries, including batteries or accumulators, transformers containing polychlorinated biphenyls (PCB) or polychlorinated triphenyls (PCT), hazardous waste and radioactive waste.
- (6) A separate system for drainage of effluents from the impermeable surfaces.
- (7) A facility for the treatment of effluents.

The operator of a treatment facility is also required to keep and make accessible to the MoEP a monthly inventory of e-waste entering and leaving the facility, including details about the weights, treatment methods, number of items according to various classifications and types, the facility to which it was subsequently transferred, and yet more details in case the waste is exported.

In terms of recycling standards, the Law requires the operator of a treatment facility to perform a range of “activities for the treatment of electrical and electronic equipment” (Section 38(b)). These are detailed in Annex 2, which lists activities that must be carried out regarding various components found in e-waste. These activities are designed to remove potential pollutants, but do not specifically address the manner of their treatment after removal; no regulatory document has been found which addresses this point on a national level.

The following substances, mixtures and components have to be removed from electrical and electronic equipment and treated in accordance with the provisions of any law:

- (1) Transformers containing polychloride biphenyls (PCB).
- (2) Components containing mercury (e.g. electricity switches or bulbs).
- (3) Batteries and accumulators, and after their removal they should be sorted according to type.
- (4) Printed circuit boards in mobile radio telephone devices, within their meaning in the Communications (Telecommunications and Broadcasts) Law, 5742-1982, and other devices if the area of the printed circuit board is greater than 10



- square centimeters.
- (5) Toner cartridges for printing.
  - (6) Plastic containing brominated fire retardants.
  - (7) Asbestos-containing components.
  - (8) Cathode ray tubes.
  - (9) Chlorofluorocarbons (CFC), hydrochlorofluorocarbons (HCFC), hydrofluorocarbons (HFC), hydrocarbons (HC).
  - (10) Gas discharge bulbs.
  - (11) LCD monitors with of a surface greater than 100 square centimeters and all back-lit monitors.
  - (12) External electric cables.
  - (13) Components containing refractory ceramic fibers (RCF).
  - (14) Components containing radioactive substances whose overall activity is above the exemption level set in Table II of the latest edition of the International Basic Safety Standards for Protection Against Ionizing Radiation and for the Safety of Radiation Sources – IAEA, including its annexes and comments.
  - (15) Electrolytic capacitors with a length of more than 25 millimeters and a diameter of more than 25 millimeters or with a proportionately similar volume.

These components of waste electrical and electronic equipment have to be treated in the manner specified below, in accordance with the provision of any law:

- (1) Cathode ray tubes – the fluorescent coating has to be removed.
- (2) Equipment containing gases that are ozone depleting or have a global warming potential (GWP) above 15 (e.g. gas found in foamed materials and in cooling systems) – the gas should be extracted.
- (3) Gas discharge bulbs – the mercury should be removed.

Another restriction imposed on treatment facilities is found in Section 39, which prohibits the operator to hire workers who are not Israeli residents or citizens. A similar prohibition applies to ACBs, who may not contract with parties who employ workers who are not Israeli residents or citizens (Section 14(a)(7)):

The company submitted an affidavit on its behalf according to which it shall not employ someone who is not an Israeli citizen or an Israeli resident, even if it is permissible to do so under the Foreign Workers Law, 5751-1991, and that for the performance of obligations under this law it shall contract solely with an operator or a person engaging in the collection and removal of waste who has given his undertaking to employ solely workers as stated for the fulfillment of his obligations under the contract.

This means that the Law in its current form does not allow ACBs to work with Palestinian treatment facilities, either in Area C or in Palestinian Authority territory, even if the facility meets all the required environmental standards and employs appropriate treatment technology. In the current state of affairs, transferring e-waste into Palestinian territory is not considered exportation,

since the Palestinian Authority is not defined as a sovereign state, let alone Area C facilities, which are under Israeli “belligerent occupation,” i.e., under the sovereignty of the IDF.<sup>40,41</sup> Nevertheless, even if the Palestinian Authority were a sovereign state, as of now Israel has refused to recognize it, and this political-legal conundrum goes far beyond electronic waste. In the other hand, the Basel Convention would be relevant here, as it addresses transportation of the hazardous waste out of the counties boundaries. On the other hand, the Basel Convention is relevant here as it addresses the transboundary movement of hazardous waste.

## **6.2 The Law’s Implementation in Israel, 2012-2017**

The Israeli E-waste Law was passed in July 2012. However, due to various delays, it came into force only in March 2014. Since then and up to this point, for three years, the MoEP has not published any data regarding the Law’s implementation, in violation of the Law’s explicit stipulation (in Section 69) requiring the Minister to present the Knesset with an annual report, including information about the recycling targets reached. The Law also requires the MoEP to publish this information on its website.

The Ministry’s failure to comply with the Law obviously makes it very difficult to present a detailed and informed analysis of the Law’s implementation in Israel since its enactment. Nevertheless, there are several aspects which can be assessed even without this data, as elaborated below.

According to the MoEP, every year about 130,000 metric tons of electrical and electronic waste is produced in Israel.<sup>42</sup> According to reports published on the websites of the two ACBs in Israel, in 2015 about 21,500 metric tons of e-waste were treated, out of 101,000 metric tons of equipment sold (which means that that year’s recycling targets were reached)<sup>45,46</sup>. For comparison, in 2013 about 8.1 million metric tons of electrical and electronic equipment entered the European market, and about 3.6 million metric tons of e-waste were treated (i.e., the recycling rate was almost double that of Israel).<sup>43</sup>

In 2016, the two ACBs in Israel reported reaching their recycling targets (25%), which implies that most e-waste was collected and treated in un documented manner which legality or adherence to environmental standards is questionable. It is worth noting here that even if the Law had been fully implemented, and the ACBs had achieved all recycling targets, only about 50% of the e-waste would have been recycled, the rest remaining out of the Law’s reach (non-obligated waste).

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40 Israeli Supreme Court ruling 393/82: Jam’iat Iscan Al-Ma’almoun v. Commander of the IDF Forces in the Area of Judea and Samaria

41 Administrative divisions of the Occupied Palestinian Territories as outlined in the 1995 Oslo II Accords between Israel and the Palestine Liberation Organization. Area A, according to the Accords, consists of land under full civilian and security control by the Palestinian Authority (PA) and includes major population centers such as Ramallah, Nablus, Jenin, Tulkarem, Qalqilya, Bethlehem and Jericho. Area B is under Palestinian civil control, and joint Israeli-Palestinian security control and consists mainly of rural towns and villages. Area C is under full Israeli civil and security control, and comprises approximately 73% of the West Bank. Most of the West Bank’s natural resources and open spaces are in Area C, as well as Palestinian villages and Israeli settlements. It was stipulated in the Accords that much of Area C would gradually to be transferred to Palestinian jurisdiction, though with the breakdown of the peace process, this did not happen.

42 <http://www.sviva.gov.il/subjectsEnv/Waste/Electronic-Waste/Pages/electronicwaste.aspx>

43 Eurostat, Waste statistics - electrical and electronic equipment

In the Israeli reality, the Law's implementation becomes much more complicated, since e-waste regularly flows into Area C and Palestinian Authority territory (Areas A and B) in the West Bank, mostly to three South Hebron Hills villages – Beit Awwa, Deir Samet, and Idhna. In those villages, e-waste is treated in dozens of small businesses, by disassembly and separation of valuable components such as copper, aluminum, and iron – often by burning, which creates environmental hazards such as gasses released into the air (coolants, mercury from fluorescent light bulbs, etc.), or effluents polluting the ground (oils, metals, and other harmful chemicals).<sup>44</sup> This results in polluted land areas in Palestinian Authority territory, which endangers groundwater reservoirs, as well as air and ground pollution due to the constant fires, which affects residents on both sides of the Green Line. It is worth noting here that non-environmental disassembly of e-waste also creates environmental hazards which are not immediately obvious (smell/sight), for example the emission of CFC gasses, which deplete the ozone layer, from refrigeration appliances. In such circumstances, the success of the Law's implementation efforts depends on the exceptional geo-political state of affairs, both due to the pragmatic difficulty of stopping e-waste flow across the Green Line and the difficulty of enforcing or regulating activities there, due to the different applicable legal systems (particularly in Areas A and B, which are under Palestinian Authority rule), as well as due to sensitive political and security issues.

### 6.2.1 Accredited Bodies

In January 2014, the MoEP accredited two bodies (ACBs): M.A.I Recycling of Electronic Waste and Batteries<sup>45</sup> and Ecommunity - Social Corporation for the Recycling of Electronic Waste, Ltd.<sup>46</sup>

Ecommunity's shareholders are Ecology for Protected Community, a privately- owned company which employs people with disabilities in e-waste management, and the international organization ERP, (established by a consortium of large electronics manufacturers such Electrolux, Sony, HP, and P&G in 2002), which operates similar e-waste management bodies in many European countries. The MAI corporation was established by a number of Israeli entrepreneurs, and two of them act as its managers.

Since their establishment, these two ACBs have contracted with the various stakeholders in the e-waste market in order to fulfill their duties. In accordance with the MoEP's work plan, they have contracted with producers and importers who together represent about 70% of the Israeli market.<sup>47</sup> These contracts constitute the financial basis for the e-waste collection and management activities in the formal sector. For example, members of MAI and E-community include importers and large corporations such as Electra and Tadiran (MAI), Newpan and Bezeq (Ecommunity).<sup>48,49</sup>

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44 Feasibility study report, EU funded project, Akram Amro and Hadeel Tamimi, GLSHD, 2016

45 <http://www.mai.org.il/english/>

46 <http://www.ecommunity-erp.co.il/en/>

47 <http://www.plans.gov.il/pdf2017/files/assets/basic-html/page-153.html>

48 List of manufacturers and importers which has contracts with MAI, from MAI's website (Hebrew only)

49 <http://www.ecommunity-erp.co.il/he/manufacturers-and-importers/agreement-manufacturers-importers-list>

## 6.2.2 Formal Collection Channels

### 6.2.2.1 Local Municipalities

On the local municipal level, collection efforts have been weak. Ecommunity has contracted with just 13 localities, mostly regional councils with relatively small populations (Misgav, Jezreel Valley, etc.).<sup>50</sup> MAI has contracted with a few authorities including some large cities (Tel Aviv, Ramat Gan, Shoham, Modi'in, Rishon LeZion, Hulon, Kfar Veradim, Yerucham and more).<sup>51</sup> In other words, only a small percentage of the total population residing in municipalities contracted with an accredited body.

This estimate assumes the best-case scenario, in which the local municipalities who have contracted with the ACBs do indeed provide full e-waste collection and removal services as required by the Law to all residents within their jurisdiction. The number of people who actually enjoy such services is probably lower.

As for collection methods, the larger municipalities operate collection points and centers:

- Shoham – a municipal collection center, as well as four collection points in central public locations.
- Ramat Gan – a municipal collection center in Messubim intersection, and various collection points throughout the city.
- Tel Aviv – the municipal website lists five collection points,<sup>52</sup> whereas the MAI website lists 11.

Some municipalities also operate other collection methods, such as curbside collection at regular intervals, and collection by request from residents. For example, the Misgav Regional Council<sup>53</sup> operates a mobile collection cart that accepts small and medium-sized e-waste items (toasters, computers & computer screens, printers, electric kettles, batteries, and fluorescent light bulbs). Larger items are collected by request through the municipal hotline.

### 6.2.2.2 Sellers

According to the Law, sellers must accept e-waste from customers at the time of sale, free of charge, and transfer it to an ACB or anyone working on its behalf. This also applies to home delivery, whereupon the delivering party must collect the old appliance and transfer it to approved recycling. The seller must also keep precise registration of the e-waste it receives, including product type and weight.

Since the Law came into force, the ACBs have contracted with many retailers, such as Shufersal and Traklin Electric (Ecommunity), and Mega, Rami Levy, and Sonol (MAI).

According to an Adam Teva V'Din 2015 survey (conducted by TRI), more than 80% of the

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50 <http://www.ecommunity-erp.co.il/he/local-authorities/local-authorities-agreement>

51 See MAI website.

52 <https://www.tel-aviv.gov.il/Residents/Environment/Pages/WasteSeparation.aspx>

53 <http://www.misgav.org.il/objDoc.asp?PID=455103&OID=482790>

population were unaware of their right as consumers to hand e-waste to sellers, and more than 90% were unaware of their right to hand old appliances, free of charge, when receiving new ones by delivery. Over the past two years since the survey was conducted, levels of awareness have grown. Yet, meetings held with stakeholders point that this is the most effective collection channel in Israel.

It should be mentioned that as part of the updated version of the European directive from 2012 (which came into force in 2014), the sellers' duties were expanded to include the acceptance of old products free of charge, regardless of whether the customer purchases any new products. This applies to small products only, and to businesses whose floor area exceeds 400 sq. m. Obviously, making the return of old products contingent upon the purchase of new ones is a barrier to making the public participate in the effort.

### 6.2.2.3 Holders

According to the Law, any non-domestic holders of e-waste (banks, hi-tech companies, etc.) must contract with an ACB allowing it to remove the waste free of charge. The e-waste removal from these holders is done by approved contractors who work on behalf of the ACBs. Each ACB keeps a list of approved removal contractors, who are integrated into its logistical infrastructure. The holders are required to report periodically to the ACBs regarding the e-waste even if they did not remove it.

#### **The removal procedure at MAI:<sup>54</sup>**

After contracting with the ACB, the holder requests the removal, which is coordinated with and under the responsibility of the approved contractor, but paid for by MAI. At the time of the removal the contractor provides the holder a deposit receipt on behalf of MAI, and after the actual removal and recycling emails back a recycling certificate, confirming the scrapping and transfer to approved recycling, according to the Law (and thus complete the circle).

#### **From the E-community website:<sup>55</sup>**

The holder shall be referred to the removal contractor, or contact it directly, provided that it is approved by Ecommunity. As of that moment the holder shall remain in contact with the contractor in order to coordinate the removal of the equipment as needed, and according to the terms of the agreement.

The Ecommunity approved contractor list includes 23 companies, and that of MAI – 12. Some of the removal contractors work with both bodies (Shuru, Michzur Olam, Taviv).<sup>56</sup>

#### **The scale of collection and treatment operations:**

As mentioned above, at this point there are no official and audited data regarding the amount of e-waste collected through formal channels, despite the fact that the MoEP is supposedly receiving regular detailed reports from all parties in the collection chain.

According to data published on the E-community and InfoSpot websites (An Israeli online

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<sup>54</sup> <http://www.mai.org.il/%d7%9e%d7%97%d7%96%d7%99%d7%a7%d7%99%d7%9d/> (Hebrew only)

<sup>55</sup> <http://www.ecommunity-erp.co.il/he/non-household-waste/non-household-waste> (Hebrew only)

<sup>56</sup> <http://www.ecommunity-erp.co.il/he/marketers/list-of-a-licensed-contractor> (Hebrew only)

environment news site), in 2015 Ecommunity reached that year's recycling target, 20%, and even exceeded it, i.e. above 10,000 metric tons (the target figure corresponding to the scale of operations of the importers and producers who finance Ecommunity would be 8,200 metric tons).

According to MAI's website, it too reached the 2015 recycling targets, transferring 11,500 metric tons of waste to approved recycling.

It must be emphasized that these data are not audited, and therefore cannot be relied upon to demonstrate the attainment of recycling targets. On this matter, the MoEP Director General said the following during a Knesset committee meeting:

According to reports by the accredited bodies, of which two are active today, we have reached to 2014 and 2015 targets of 15% and 20% collection rates, respectively. I will add here in parentheses that unfortunately, shamefully even, I cannot stand behind these data and say to you that I know for certain whether they are true or not.<sup>57</sup>

The Law authorizes the MoEP to reject reports which it believes fail to adhere to the Law's requirements and directives, and so we must await the official publication and decisions by the MoEP, which, as already mentioned, has itself so far failed to adhere to the Law, despite its obligation at the Knesset's Economic Affairs Committee to do so by the end of 2016.<sup>58</sup>

One of the most problematic aspects of the Law's implementation in Israel is the lack of a mechanism to manage competition.<sup>59</sup> Meetings we held with stakeholders revealed that in some cases, ACBs have no interest to contract with some local municipalities, due to the high costs relative to the waste yield. On the other hand, it was suggested that the low contracting rates of local authorities is the result of the authorities' infringement of the laws. In either case, this distorts the market and results in unfair competition which in turn undermines the Law's objectives. Therefore, for example, it is not profitable for the ACB to sign agreements with local municipalities without expanding the range of importers and sellers working with it. The removal of some waste may lead to significant losses to the ACB (an example discussed in the meetings was the collection and treatment of light bulbs), that lead to selective collection of e-waste. The MoEP Director General had this to say regarding the matter, during the same Knesset committee meeting:

There is fierce competition between the accredited bodies, without proper regulation, which leads to cherry picking, i.e., they choose to do only what is profitable and beneficial for them. I, as a business man, cannot blame them. If the denominator is not large enough, because there is no enforcement on importers and producers, then you have to focus on where the money is, because you have to survive financially, and so you focus. And then we don't have a wide enough deployment of e-waste treatment.

Furthermore, the unmanaged competition creates a race to the bottom regarding handling fees charged from importers and producers, who can threaten to switch to working with the competitor,

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<sup>57</sup> The Economic Affairs Committee session, 7.6.16

<sup>58</sup> Letter of Deputy Director for Local Authorities, Education & Community of 20.9.16

<sup>59</sup> [http://www.adamteva.org.il/\\_Uploads/dbsAttachedFiles/RIBOOY\\_GOOFIM.pdf](http://www.adamteva.org.il/_Uploads/dbsAttachedFiles/RIBOOY_GOOFIM.pdf)

which creates a situation of *de facto* reverse price fixing. This is not a case of positive streamlining that results in the lowering of consumer prices, since it involves degradation of environmental treatment practices, which goes counter to the Law's intent.

The accredited bodies argue that uncontrolled reduction of handling fees would make it difficult for them to reach the Law's mandated recycling target by 2021 (50%).

In this regard, the MoEP Director General promised to resolve the issue of competition by the end of 2016:

By the end of 2016, in the next six months, **we will regulate the activity of the accredited bodies.** We need to prevent cherry picking, we need to divide geographic areas among them, we need to set standards for how to switch local municipalities from one body to another, and how to settle the accounts regarding the money paid, among the importers, and what ended up with the municipalities. **If we do not perform the regularization, the ACBs currently operating in the market will simply cease to exist. It is my job to make sure we proceed with this regularization. This will happen in the next six months because it is a necessity, every bit as important as the size of the denominator - to make sure that it happens.** שגיאה! הסימניה אינה מוגדרת.

No regulation was put in place except for a MoEP publication (9 March 2017) banning any changes to the costs of treatment of e-waste until detailed instructions for the collecting and treating processes of electronic waste and batteries are issued.

### 6.2.3 Treatment Sites

In order to meet the Law's requirements, each of the accredited bodies works with a number of e-waste treatment facilities, as detailed in

Table 3:<sup>45,46</sup>

**Table 3: Treatment Facilities Contracted with the ACBs<sup>45,46</sup>**

<b>MAI</b>	<b>Ecommunity</b>
AllRecycling	AllRecycling
Afik Recycling	U.I.D.
Gaia	Amnir
Shuru	Shuru
Michzur Olam	Michzur Olam
Shaul Gueta	Afik RTS
Zohar SBA	Zohar SBA
Olshak Group	Olshak Group
Cohen Yakim Metals	Ecology for a Protected Community
EMS METALS	Big Power

<b>MAI</b>	<b>Ecommunity</b>
Moshe Glam and Sons	Beni Halayl
Recycom	Ziv Metals
Sheli Moshe Metals	L.H. Recycling
	Taviv
	Negev Ecology
	Nissan
	Metallex
	Oz Recycling
	Aleh Ecology Services
	Car Center / Green Center

All in all, there are about 27 approved treatment sites currently operating in Israel. As mentioned earlier, the legal requirement for treatment sites is to obtain a business permit for recycling activities, maintaining proper infrastructure, and to adhere to the requirements of the E-waste Law's Annex 2. As for permits, the MoEP has yet to define specific category requirements for e-waste recycling plants, and today they are regulated under generic categories such as "metal recycling." The definition of what constitutes e-waste recycling simply does not exist, nor do standards for its proper treatment or sector requirements in the business permits issued to plants handling e-waste. In practice, the ACBs themselves define the criteria for the recycling plants with which they work. These criteria may be based on considerations of location, cost, reliability, or environmental practices, or a combination of these.

The uncontrolled reduction of prices, and the lack of criteria, inspection, and enforcement regarding environmental waste treatment, have together pushed the market in the direction of lower environmental standards. The ACBs are ultimately for-profit organizations, who compete for contracts with importers and producers by lowering their handling fees. As long as there is no policy in place to enforce or incentivize to develop and invest in environmentally advanced treatment methods, they are forced to opt for the cheapest solutions in order to survive financially. It seems that the MoEP understands and agrees with this analysis, judging by the Director General's words at the Knesset's Economic Affairs Committee on 7.6.16:

The quality of treatment of e-waste has not been standardized, and is not enforced. We must define the standards for operating an e-waste treatment facility, and we in the Ministry are obligated to enforce and make sure that waste that is collected arrives only at those sites. Unfortunately, this is not the case at the moment. We have taken steps towards closing down unlicensed facilities, however there are still ones that are licensed but operate at lower quality levels than those set by the Ministry, and this is something we must address.

The Director General went on to say that "by the end of 2016 we will standardize the treatment



level [...] and enforce it. In other words, I state here that by the end of 2016 there will be no active facilities who do not meet our standards.” However, this unequivocal promise has not been kept.

#### 6.2.4 Inspection and Enforcement

Since the Law came into force, the MoEP has made almost no inspection and enforcement efforts whatsoever. The Law’s implementation was tasked to a few workers of the Ministry’s Packaging Waste department, and save for handling applications for new accreditations and publishing ordinances necessitated by the Law, the MoEP has not taken any meaningful steps to assist those workers, particularly regarding enforcement.

In March 2014, the Ministry published general announcements aimed at holders, sellers, and local municipalities, which included general explanations regarding their duties according to the Law, and the sanctions entailed by failing to fulfill them.<sup>60</sup> However, not much was done following this, as is evident from browsing the Ministry’s financial sanctions database: as of the writing of this paper, not a single case of financial sanctioning has been documented since the Law was passed.<sup>61</sup>

On top of the MoEP’s failure to allocate appropriate human resources to implement the Law, the position of Head of the ERP department has not been occupied since April 2016.

As mentioned above, in the Knesset’s Economic Affairs Committee discussion in June 2016 that was dedicated to the Law’s implementation, the MoEP Director General admitted to the Ministry’s failures in this regard that “[T]he Law is not properly implemented, due to lack of human resources”; “[there is] zero enforcement, or lack of enforcement to make e-waste sellers, importers, and holders enter into this agreement and this law.” שגיאה! הסימניה אינה מוגדרת.

A status update following the committee discussion was given in a letter by Guy Samet, Deputy Director for Local Authorities, Education & Community in the MoEP, in September 2016. The letter lists several steps taken by the MoEP towards the Law’s implementation, most significant of which are:

1. Publishing a Director General’s Announcement regarding “neutral waste” which clarifies that only e-waste collected through one of the formal collection channels will be counted towards reaching recycling targets.<sup>62</sup>
2. An update regarding enforcement efforts made against importers who failed to fulfill their legal duty by not contracting with any of the accredited compliance bodies.
3. Auditing and inspection of the ACB reports from 2014, 2015, and 2016.

To conclude, since the Law came into force and the ACB’s were selected, the MoEP has made no significant monitoring and/or enforcement efforts towards them.

A publication regarding the cleaning fund on Infospot reveals that 3.5 million NIS were allotted from the fund’s Judea & Samaria (West Bank) account for the purpose of installing cameras in

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60 <http://www.sviva.gov.il/subjectsEnv/Waste/Electronic-Waste/Pages/electronicwaste.aspx>

61 <http://www.sviva.gov.il/InfoServices/ReservoirInfo/FinancialSanctions/Pages/FinancialSanction.aspx>

62 Electrical and electronic waste in channels allowed by the Law, from local municipalities, electronic equipment retailers, or holders of e-waste.

border crossings, to prevent the smuggling of illegal materials.

Beyond the weak enforcement, the MoEP itself fails to adhere to the Law, which charges it with publishing an annual implementation report online. At stake here is vital information which includes the extent of electronic devices sales in Israel, the extent of waste collection, the manners of collection and treatment, etc. Due to the lack of reporting, at this point there is not enough verifiable data regarding the amounts of e-waste, producers and importers who break the Law, the level of treatment prevalent in Israel today, categories of e-waste which currently cannot be treated, etc. According to the acting head of the ERP department, a recently recruited accountant is currently busy completing the auditing of the ACB's annual reports. Two students were also hired to help with the department's workload. Nevertheless, even today the MoEP does not have reliable and comprehensive information regarding the scale of recycling operations in Israel.

Another question which has remained unanswered throughout the information gathering stages of the writing of this paper is what amount of waste *can* be treated in Israel, and in which manner, as well as which e-waste is being exported. These questions too may be answered as soon as the MoEP's report is published. A central question in this context is that of the standard of management of waste originating from large home appliances, such as refrigerators and washing machines, which apparently are not being treated satisfactorily.

### **6.2.5 Informal Waste Flows**

In the last decade, environmental legislation has focused on turning the various waste flows away from landfilling, towards more environmentally advanced solutions. In this context attention must be drawn to an important difference between e-waste and other forms of waste, which stems from the fact that the main priority in e-waste management is not the reduction of landfilling, but rather ensuring an environmental management of end-of-life products. In contrast other municipal waste is frequently collected by local municipalities, and can be separated either by residents themselves at home, or using technological means, to be transported to its final destination of landfilling or recycling. Under normal market conditions, the cheapest solution for waste management is landfilling, and that is indeed the prevalent case in Israel, where 80% of the waste ends up in a landfill. However, even before the passing of the E-waste Law, most e-waste in Israel did not find its way to landfills, but was collected rather efficiently by private commercial collectors, for a profit. In other words, the E-waste Law sought to intervene in an already active market arena, in which many actors were already operating in a well-developed secondary informal market, and to pass control of waste management to actors in the formal market. This approach was based on the premise that creating a transparent and regulated channel for e-waste from the moment of collection would also ensure a properly environmental management at the end of the process.

In itself, the Law's coming into force and the beginning of the ACBs operation did not bring about a dramatic change in the market. Today in Israel there is still much informal market activities, i.e. collection and treatment of e-waste by actors other than approved contractors who work with one of the ACBs. It should be mentioned here that some of those approved contractors were active in one way or another prior to the Law's enactment. Given the weak regulation and enforcement by the MoEP, the contractors are still guided mostly by cost-benefit considerations – that is to say, if the economic circumstances are ripe, transfer of waste from approved contractors to informal parties or to Palestinian territory cannot be discounted. In light of the potential economic value

contained in e-waste, large amounts of it are still collected illegally and are treated in non-environmental ways, such as uncontrolled disassembly, burning cables for copper recovery, etc. Sometimes, waste is collected by approved contractors but still ends up being transferred for treatment by informal parties, some across the Green Line.

An example of this was published in Israeli media,<sup>63</sup> regarding waste from electronic telephone exchange boxes belonging to Bezeq, which were found discarded in an unauthorized site in the vicinity of Shefaram, a town in the Galilee. We have received information about a bidding process set up by Bezeq for contractors, who pay Bezeq for the right to scrap old exchange boxes, even though the company, on account of it falling under the category of “non-domestic holder,” has signed an agreement with Ecommunity (pictures in Appendix 1). This is currently under investigation by the MoEP, and represents one example out of many of the informal waste flows in Israel, and of the problem that persists even with large and well-established companies such as Bezeq.

The Israeli informal market cannot be properly analyzed without understanding the flow of waste from within Israel to Area C and Palestinian Authority territory. In practice, a significant part of the waste collected in the informal routes (and sometimes in the formal ones as well) is transferred by trucks across the Green Line, to the villages of Idhna, Deir Samet, and Beit Awwa, where it is treated in uncontrolled and unregulated ways, which often include burning for cable exposure and extraction of valuable raw materials. This puts workers and residents alike in danger, due to the toxic substances emitted in the process, and the severe ground pollution. Powerful and sophisticated business actors are behind the transit of the e-waste that passes through the border crossings (to the West Bank). These often use shipping labels addressed to Jewish settlements in the West Bank and describe the waste as second-hand equipment.

Legally, the E-waste Law currently does not apply to the West Bank, however the IDF’s General Permit for the Importation of Goods (Judea & Samaria) 2005, prohibited the transportation of waste of any kind from Israel to the West Bank without a permit from the Civil Administration. Our meetings with stakeholders in the field of electric and electronic waste revealed that the informal collection industry in Israel is built like a fennel – from small collectors and diversions from the formal market to the larger yards, and eventually concentrates to a number of large dealers who have wide networks and activities on the ground that enable the smuggling of the e-waste carrying truck across the Green Line. The smuggling mechanism consists of field agents collecting information, crossings at times of low supervision (weekends, end of day or at night), connections to Palestinian contractors to disperse the waste. As mentioned earlier, at times, the vehicles carry fictitious invoices with destinations to Jewish communities.

The David Unit in the Civil Administration is responsible for enforcement at border crossings, and monitors trucks passing through them. Trucks which are stopped by the unit and prevented from crossing, are registered in a table containing the date of the incident, name of the crossing, the truck’s license plate number, and type of waste it carried. Since this table is a free-form Excel sheet, the descriptions of waste types vary. Between November 2013 and January 2017 95 trucks were stopped, of which 22 were recorded as carrying air conditioners, cables, or electronic waste. In the current state of affairs, the unit cannot easily stop and confiscate trucks carrying products

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63 <http://news.nana10.co.il/Article/?ArticleID=1229417> (Hebrew only)

declared as second-hand. Moreover, we understand that after the trucks are stopped, it is difficult to confiscate their content and therefore guarantee its transport into ACBs. In some cases, the truck might continue on route to the Palestinian territories. The Civil Administration plans to begin the implementation of the E-waste Law in the West Bank shortly.

A study funded by the EU has estimated that around 62 trucks enter the West Bank, most of which have yellow license plates (i.e., Israeli), and carrying around 70 metric tons of e-waste into the South Hebron Hills region every day. We have heard claims that the amounts are much larger (between 200 and 400 tons per day). Even though this is a rough estimate, these data add up to about 20% of the total e-waste produced in Israel yearly. Most of the e-waste crossing the Green Line ends up in sites in the South Hebron Hills region (particularly the villages of Idhna, Deir Samet, and Beit Awwa), whose population is 42,624. It is estimated that 45% of the residents of those villages make their living by treating e-waste.<sup>64</sup> After disassembly and exposure of the valuable components, most of them are sold back in Israel as industrial raw materials. Some of the electronic components are re-assembled as refurbished second-hand products in Palestinian villages.

In the aforementioned study, conducted by Dr. Akram Amro, three types of workshops were identified in the South Hebron Hills region:

1. Disassembly workshops – in which the electronic equipment is disassembled and its metal parts are transferred to other workshops or directly back into Israel.
2. Collection workshops – which trade in metals directly with Israel or through other Palestinian traders.
3. Plastic shredding workshops – in the Idhna area there are 3 such workshops, who sell the shredded plastics to Palestinian recycling plants and plastic manufacturers.

In addition to these disassembly and recycling workshops, in the South Hebron Hills there are also electronic devices refurbishment workshops. These businesses use components from used or faulty devices to produce usable products which are sold cheaply in the local market.

Among the communities who suffer from the consequences of this unregulated e-waste treatment in the South Hebron Hills region, are those of the Israeli East Lachish area (Shekef, Eliav, Neta, Amatsya, Tlamim, Shachar, and Bnei Dkalim) who have been complaining for several years about constant black smoke billowing from the Palestinian villages, and pungent smells which affect their health (pictures in Appendix2 ). The residents complain about breathing problems, migraines, and burning eyes, which they attribute to the fires.<sup>64</sup>

In meetings held with various stakeholders, it seems that in the current state of environmental enforcement, the economic benefits of informal e-waste management dwarf the deterrence by enforcement activities, and the market forces lead to the control of e-waste in Israel still remaining mostly in the hands of informal market actors.

### **6.2.5.1 Initiatives in the South Hebron Hills Region**

These environmental hazards naturally also affect the residents of the villages where the burning of waste takes place, and lately a number of NGOs and other local initiatives have organized to bring

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<sup>64</sup> <http://www.nrg.co.il/online/1/ART2/664/078.html>

about a social and environmental change.

In addition to these efforts by organizations, we have come across a business initiative to promote environmental solutions to e-waste. Currently in the final stages of being established (including applying for permits from the Palestinian Authority) is a plant for shredding and chemical separation of precious metals, set to begin operations in the Bethlehem industrial area.

Following are details regarding the two major initiatives we know of in the area:

#### **6.2.5.1.1 Sida**

One initiative, is supported by the Swedish Development Agency (Sida). This project includes, among other things, updating the inventory of burning sites, boosting the capacities for local burn detection and enforcement, and operation of subsidized grinding at this facility as an alternative for the burning of cables

Nevertheless, we do not have data about the type and amount of cables that reach the Palestinian Authority. Therefore, we cannot estimate the environmental weight such an initiative has compared to the total amount of e-waste that reach these area, as well as assess the effectiveness of the treatment of PVC-containing cables (about 80%).

#### **6.2.5.1.2 The Negev Institute for Strategies of Peace and Development and the GLSHD**

Another initiative in the South Hebron Hills region, backed by the Palestinian Green Land Society for Health Development (GLSHD) and AJEEC-NISPED, includes educational and informational efforts regarding the dangers of e-waste burning.<sup>65</sup> In the last year the activities have focused on two fronts: activities in schools, and distribution of flyers tailored to various stakeholders – mothers, workers in the e-waste industry, etc.

The GLSHD has formed working relations with relevant ministries in the Palestinian Authority, as well as with local municipalities, for the purpose of expanding the educational work in schools. So far, as mentioned above, there have been many activities in schools, including a competition among schools on the subject of e-waste recycling, with the winners awarded refurbished electronic equipment (tablet computers). In addition, the organization has been working in cooperation with AJEEC-NISPED towards the establishment of a center for environmental education on the outskirts of the village of Idhna, whose purpose is to raise awareness of issues and problems related to waste treatment, re-use, and recovery, particularly e-waste. The center is meant to become a destination for students, workers, and local municipalities' representatives who will come to learn about the issue, as well as to raise awareness of the importance of environmental waste treatment that would benefit the public.

## **7 Summary, Conclusions, and Recommendations**

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<sup>65</sup> <http://www.glshd.org/>

## 7.1 Summary

This paper examines the situation with the formal e-waste market, as defined by Israeli E-waste Law, and the informal market. These two market entities operating, each under different imperatives, represent two major dangers to the region: (1) thwarting the implementation of the E-waste Law's implementation and (2) perpetuating treatment methods which cause environmental and health hazards on both sides of the Green Line. The main challenge is that of controlling e-waste, which today mostly flows through unauthorized collection and management channels.

The phenomenon of informal e-waste markets is not unique to Israel, and exists in many countries around the world, including those characterized by high treatment rates. Often, the waste flows from developed to developing countries, where the conditions for the proliferation of a cheaper alternative market are more welcoming. In Israel, too, the informal market is dominant, taking into account the fact that the Law's implementation is still at an early stage (about three years). Illegal e-waste management is carried out in various regions around the country, and in addition, significant quantities of waste is transported across the Green Line, ending up mainly in three villages in the South Hebron Hills region where the e-waste treatment industry is relatively well-developed. The difference between the Israeli case and that of other developed countries is that in Israel there is in fact one integrated market. Whether the informal market activities take place within Israeli borders or in the West Bank, due to the geographic proximity the environmental consequences of improper treatment are felt in either case also inside of Israel. Furthermore, as mentioned in section 0 above, the status of the Palestinian Authority, the political climate, and the security situation in the region, all contribute to the significant differences in the nature of cross-border e-waste flow, relative to other countries as well as to the ability to enforce regulations, taxation and other bilateral control means.

On the legal level, the informal e-waste market in fact operates illegally, contrary to the E-waste Law. Economic concerns motivate this activity, and the parties involved are not subject to any inspection or treatment standards. For these reasons, the waste in the informal flows usually is not treated in an environmentally-conscious manner, which creates emissions and effluents into the environment that result in ground and air pollution, depletion of the ozone layer, and health hazards for workers and residents alike. On the other hand, the informal market does have its advantages, including as a source of income to impoverished communities. Thus, informal waste collection is very efficient, and in many countries, including those with well-developed formal markets, the informal sector collects a significant percentage of the e-waste. This point deserves serious consideration. Seeing as the annual recycling percentage that the ACBs are required to achieve is 50%, means that the large amounts of waste which will not be treated through formal channels will remain. In other words, the informal sector is to a large extent a necessity in the current reality.

Against this background, the question arises whether it is advisable, worthwhile, or at all possible to harness the positive aspects of the informal market, while minimizing its negative effects, and if so – how.

For example, would harnessing the informal market not encourage the exploitation of cheap labor in hazardous working conditions? Or does it in fact provide employment and economic development opportunities to impoverished communities? Additionally, considering the lower

costs involved in the informal market, can it be at all regulated without raising the treatment prices to non-viable levels? Is there a formula that can harness the informal market only to certain stages of waste management which do not harm the environment and human health, such as collection and disassembly, under proper inspection and enforcement?

## 7.2 Analysis of Potential Approaches for Addressing the Informal Market

The response to informal markets around the world ranges from prohibiting any informal activities, through tolerating informal activities alongside the formal market, and all the way to “embracing” the informal markets while holding them to the same standards as the formal market.

Following is a schematic table of three approaches:

<b>Approach 1. Strict Enforcement:</b>	<b>Approach 2. Pragmatism:</b>	<b>Approach 3. Formal Recognition:</b>
<p>Sealing the border to prevent flow of e-waste across the Green Line. The feasibility of this approach is doubtful, for technical reasons, and it also involves harming the economies of the South Hebron Hills villages who are dependent upon e-waste treatment.</p>	<p>Acknowledgment of the existence of an informal market without officially recognizing it, while attempting to minimize its negative effects on the environment.</p> <p>The main objective of this approach would be the development of the e-waste market, the promotion of unified standardization, and investment in high quality treatment facilities for approved recycling, while providing government support for specific localized environmental solutions, such as the stripper and wire-chopper machine, while focusing on eliminating environmental hazards.</p>	<p>E-waste is legally transported into the West Bank, and is counted as approved waste towards reaching the ACBs’ recycling targets. This approach necessitates legislative changes.</p> <p>Moreover, if this approach is to be permitted, the proper treatment of waste in Palestinian Authority territory must be ensured. Even before addressing the issue of inspection and enforcement of such activities in Palestinian Authority territory, the treatment of e-waste must be standardized.</p>

### Approach 1. Strict Enforcement

There have been many attempts to strictly enforce cross-border flow of e-waste in developing countries which have extensive informal markets. The goal of this approach is to shut off the routes of incoming waste flows; however, according to Davis & Garb (2015), this policy is not very successful, since waste continues to flow in alternate routes, or under the guise of second-hand equipment for refurbishment.<sup>26,29</sup> In Israel, too, it is difficult to conceive of a magic solution that would effectively prevent the flow of e-waste into the West Bank. Enforcement efforts since the

Law's enactment have been minimal. Nevertheless, in the border crossings through which waste has been flowing into Palestinian Authority territory, some enforcement efforts have been made by the Civil Administration's David Unit, which stops trucks carrying e-waste. However, substantial amounts of waste continue to flow through the crossings, by disguising it as second-hand equipment, or by declaring that its intended destination is Israeli settlements. In this context, it should be mentioned that in the West Bank there also exist legitimate recycling plants (such as "Allrecycling", in the Israeli settlement of Barkan). This fact enables the legitimate flow of e-waste into the West Bank, since there is little that can effectively be done to ensure the waste arrives at its legal destination. There is also the question of the feasibility and the resources required for achieving such strict enforcement against the informal market, in addition to the many social-economic-political and security-related complexities involved in closing the border crossings.

As for the enforcement potential within Israel, operators in the e-waste market must obtain a valid business permit and adhere to the MoEP environmental protection requirements (there are more requirements in the business permit). The regulator on its part is tasked with inspecting the ACBs, audit and enforce the operation of the treatment facilities, and is also authorized to scrutinize the activities in the border crossings between Israel and the West Bank. Presumably, the stabilization of the formal market (finding a solution to the competition between the ACBs, setting clearer standards for what constitutes approved recycling, creating incentives for investments in advanced treatment facilities, and increasing the number of importers and producers signed with the ACBs) will expand the amount of e-waste going through formal collection and management channels, at the expense of informal ones.

#### Approach 2. Pragmatism:

This approach acknowledges the market forces and the number of people whose livelihood depends on informal waste markets, without compromising safe working conditions and a healthy environment. It combines sensible enforcement against offenders who harm the environment, alongside incentives to those who follow proper environmental standards. It does not seek to regulate or recognize the informal sector, but does wish to help it minimize its negative effects on the environment and human health.

Initiatives such as the pilot project described in Davis & Garb's paper<sup>2</sup>, which takes place in the South Hebron Hills region, can be categorized as pragmatic in this sense.

The pragmatic approach requires one significant change: offering incentives and managing the market in such a way that would ensure proper environmental management of waste going through informal markets, or at least does not function as negative competition to the formal management channels.

At the same time, setting standards for sustainable e-waste treatment and effective enforcement aimed at all parties in the collection chain, will also help to define the criteria for the proper standards which this approach seeks to encourage in informal businesses.

Another condition for the success of social-environmental initiatives is that they are sustainable, i.e. based on objective tools such as economic viability and awareness (of the dangers inherent in



the non-environmental treatment). Relying on donation and philanthropic activities does not guarantee lasting results, and so this approach necessitates considering government intervention, which may include among other things direct or indirect subsidies for the purpose of mitigating hazards.

### Approach 3. Formal Recognition:

This approach effectively aims to regulate the informal market, i.e. to gradually transform it into a legal industry, which would fit into the authorized collection and treatment mechanisms. According to this approach, we need to aspire to bring the treatment standards in the informal facilities up to par with those required by the formal ones, and enable the ACBs to assimilate the existing collection routes in their regulated systems. As for the flow of e-waste into the West Bank, this reality will be legitimized, with the waste properly treated there counting towards meeting the ACBs recycling targets. The advantage of this approach is that it may minimize the economic losses to those communities who for years have been dependent on e-waste collection (and who have provided environmental benefits in the form of refurbishing and reusing electronics). As well, this approach may advance the economic development of the recycling industry overall.

It is possible that as a result of adopting this approach some of those currently involved in informal waste management would be marginalized, since it will become unprofitable for them to undergo regulation. However, it is also possible that the informal markets realign to accommodate this new reality. For example, if they focus on waste management that is more economically feasible under the new arrangement, such as collection and disassembly (which are less harmful for the environment when done properly) or reuse, repair and refurbishment (which are beneficial to the environment when done responsibly), their continued operation may be possible. It is likely, therefore, that regulation and adoption becomes a selective factor that would encourage sustainable e-waste management while somewhat incentivizing those who prefer to cross over to legal activity – a legitimate and easily operable way of making a living, once it is possible to openly work hand in hand with the ACBs.

However, this alternative faces several serious challenges. First, regulating the informal market may blunt its competitive edge (by increasing its operating costs to comply with regulations), thereby destroying its economic basis. The ability of informal actors to offer attractive prices for e-waste stems to a large extent from not being subjected to inspection and reporting duties, not paying taxes, having lower treatment standards, and from the lack of enforcement of fair employment practices. In addition, it is highly doubtful that inspection and enforcement by MoEP or other Israeli regulators can be effective against actors operating beyond the Green Line, particularly in Palestinian Authority territory. In such case, the PA may turn into the focal target for cheap treatment of waste in a way that will limit the existence and growth of a recycling market in Israel. In addition, there are also difficulties that arise from international law considerations (the Basel Convention that sets requirements for cross-border/trans-boundary waste flow). Additionally, the volatile security and political reality, which does not allow for the stability necessary for successfully implementing such arrangements, must not be discounted. There are also regulatory limitations, such as that which currently prohibits the ACBs to contract with facilities employing workers who are not residents or citizens of Israel.

### 7.3 Recommendations

Since the Israeli E-waste Law came into force, it has encountered serious obstacles, which have made its implementation very difficult. The Law's successful implementation should bring about a reduction of environmental and health hazards caused by the unregulated management of e-waste in the informal sector. However, we have seen that there are other measures that can be taken to mitigate specific hazards, such as the pollution in the South Hebron Hills region, which affects residents of both the Palestinian villages and the East Lachish area on the Israeli side. Moreover, the chosen strategy also affects e-waste management workers, who depend on the informal market for their livelihood and who also face health hazards in their work environment.

In thinking about the strategy to adopt in this matter, we must take into consideration its potential for maximizing the benefits to public interests on the one hand, and its practical feasibility in such a complex reality on the other. In theory, the formal recognition approach seems to be the best one, since it may fully achieve its goals – a sustainable treatment of e-waste – regardless of how long it might take to implement, the scale of efforts required, or the political climate that is required for it to succeed. However, taking into account the whole gamut of constraints, it appears that at this stage it is more advisable to focus on developing the Israeli market and establishing the standards for operating in it, alongside sensible enforcement and creation of tools that would encourage more environmental practices, both within Israel and the West Bank, in a manner that would minimize the hazards affecting Israelis and Palestinians alike.

In light of the above, and in accordance with the findings of this paper, here are several changes that need to be advocated:

- **The Ministry of Environmental Protection must assume responsibility for the neglected E-waste Law, and manage it with a professional workforce** - Since the Law came into force, the MoEP has kept it hands from it, rendering it almost entirely irrelevant. Indeed, over the past year the ministry took a number of steps in the field of e-waste including two letters from the Deputy re: the legal routes and pricing, beginning of in-depth examinations of the corporations and audits of reports. Yet, in our opinion and in light of the current state of events, these are small preliminary measures in the long road to enforcement of the law. The MoEP must assume the role of a leading and active regulator, one which defines the rules of the game and provides the market with assurance and stability. This would require, among other things, the permanent staffing of the position of Head of EPR department in the Ministry, a position which is supposed to be the leading regulatory professional authority in this field. This matter is of the utmost urgency. An increase in the division's resources and staffing of additional positions must be also considered down the road to facilitate effective enforcement in the illegal routes of waste transportation within Israel. It is crucial on more than one level: it is important as a statement regarding the commitment of governmental bodies, it would allow for long-term policy-making, and it would ensure stability and healthy dialogue with the many stakeholders in the e-waste market.
- **Standardization** – The adoption of a standard or several standards for all stages of e-waste management. It is imperative to define what constitutes “recycling,” followed by what constitutes “environmentally-friendly waste management,” definitions that would include minimum requirements for proper of e-waste.

The e-waste management market cannot develop any further as long as there is no way to examine e-waste management or certify treatment plants based on such standards. Establishing standards would also force the producers and importers to invest in infrastructure for advanced treatment, which would enable the environmental treatment of products which currently, in the absence of better solutions, undergo cheap and inferior treatment processes. In addition, setting such standards will make the MoEP's enforcement job easier and more efficient.

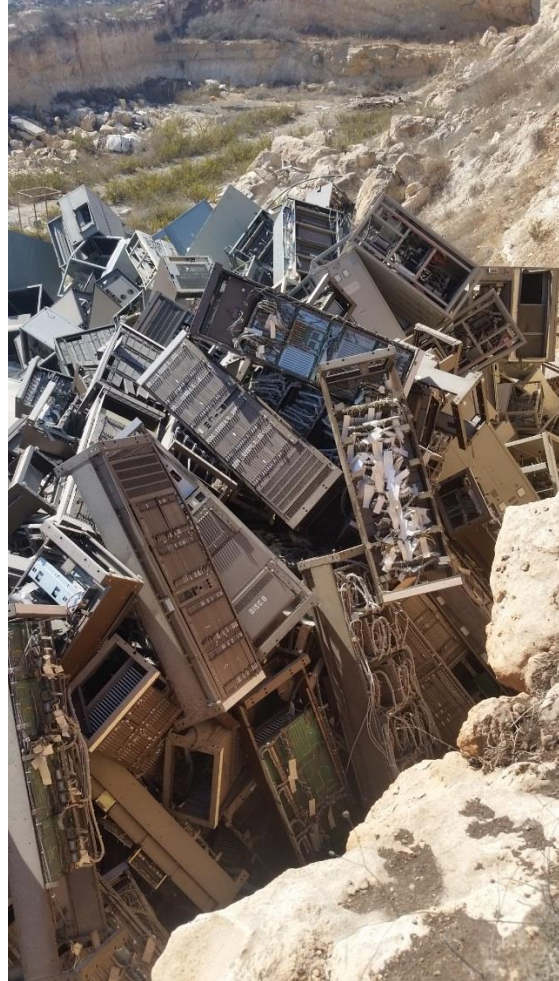
- **Defining recycling plants** – As previously mentioned, currently the ACBs have only one criterion for assessing a recycling plant, and that is the definition in its business permit. Thus, for example, even businesses which do not process e-waste at all, but whose permit defines it as handling “iron recycling,” is considered legitimate for the purposes of working with the ACBs, even though this does not guarantee the proper processing of e-waste, if at all. Defining these plants more accurately, for example by setting specific categories in business permits, would provide the ACBs with better criteria for making better choices, and also allow the MoEP to do a better job of inspection and enforcement. The regulator would, for example, be able to define specific requirements for issuing business permits for e-waste treatment, which would in turn enable the ACBs to demand businesses to meet those requirements.
- **Regulating the activities of the Accredited Compliance Bodies** – Unlike in other countries, where there are more than one officially recognized bodies (ACBs), in Israel the legal framework does not include a mechanism for managing competition, which prevents the effective implementation of the Law. This issue must be promptly addressed, in a way that would enable the proper balancing of price per-capita of waste treatment to match ACBs' income (agreements with producers, importers, and sellers) with their expenditures (agreements with municipalities), and ensuring that revenues are used for improving services and management standards. All of this must be accompanied by robust enforcement measures against producers and importers who have not yet contracted with any ACB as required by the Law, or who collect e-waste in ways unauthorized by the Law. Proper involvement of the regulator would ensure that the competition between the ACBs is based on service and environmental concerns, serving the public rather than becoming a for-profit cherry-picking competition. In this instance as well, the MoEP's notice of March 9, 2017 regarding the pricing constitutes an important step in the right direction, yet more is needed in order to regulate and manage the competition.
- **Knowledge-based policy** – As of the writing of this paper, the MoEP has yet to publish its regulatory report on the activity of the ACBs. Due to the inadequate functioning of the department, which lacks resources and did not have a permanent manager for over a year, the available data regarding the scale of operations in the market is partial or non-existent. For example, it is still the number and market share of producers, importers and sellers who are not yet signed with any of the ACBs, or what kinds of waste can be environmentally recycled in Israel and what kinds must be exported for that purpose is still unclear. It is important to ensure strict inspection of treatment facilities and ACBs alike, and to produce a data-driven understanding of the waste transport routes and management. In addition to the obvious benefits of this, these measures would enable, with proper regulatory handling and demonstrable economic viability, entrepreneurial initiative that would establish a recycling

industry for products that currently have no advanced recycling solutions within Israel, such as large home appliance (refrigerators, washing machines, etc.).

- **Coordination of the regulator's activity** – Since the informal markets exist both within Israel and in the West Bank, and especially following the environmental initiatives in the South Hebron Hills region, it is imperative that the efforts of the MoEP, which is tasked with enforcement within Israel, be properly coordinated with those of enforcement agencies in the West Bank. As detailed in this paper, the valuable materials in the e-waste that flows across the Green Line find their way back into Israel after disassembly and separation. On this issue, a unified and coordinated policy for all regulatory bodies is needed, based on an overall strategy. Further, when e-waste carrying trucks are detained, their content must be properly treated by the authorized bodies.
- **Regulation of export** – The E-waste Law authorizes the Minister of Environmental Protection to issue ordinances regulating the exportation of e-waste for the purposes of recycling and recovery, as well as to set export quotas that would count towards meeting recycling goals. Establishing export policies, alongside standards of local management, may assist greatly in developing the recycling market and stimulate investments in local technologies. Currently, the subject is entirely unregulated, and the MoEP's policy is unclear. In this context, the flow of e-waste into Palestinian Authority territory must also be addressed. This perhaps does not formally count as exportation, but in practice, advanced recycling facilities can also be built in Palestinian Authorities territory, with whom the Israeli market may find it beneficial to work, with both financially and economically. As mentioned above, Israeli law currently prohibits employing non-Israelis in recycling plants, thus effectively precluding the possibility of legitimately working with such plants in the West Bank, even when they are shown to meet all relevant environmental standards. It is our position that this regulatory restriction does not advance environmental interests, and should therefore be eliminated. The issue should be regulated in tandem with setting policies on export, taking into consideration the unique reality in the West Bank and the agreements that would have to be reached regarding inspection and enforcement, in order to reach a practical solution.

# Appendixes

*Appendix 1. Informal e-waste in Shfar'am*



*Appendix 2 . Electronic waste and waste burning sites in South Hebron<sup>66</sup>*



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<sup>66</sup> Photographed by residents of Eliav





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