

# ELECTRONIC WASTE RECYCLING – A GLOBAL CHALLENGE

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**62 mt**

of e-waste produced in 2022

**88%**

of e-waste is not recycled properly

**18 million**

children working in the informal industrial sector

## WHAT IS THE ISSUE?

Every year millions of electronic devices are disposed of as products break or become obsolete, becoming what is known as e-waste. E-waste is the fastest growing solid waste stream in the world, with an estimated 62 million tonnes (Mt) produced in 2022, doubling since 2010<sup>1</sup>. According to a recent report by the UN, the rise of e-waste is five times faster than the e-waste recycling rates, calling for an urgent action to tackle this environmental and social hazard<sup>2</sup>. Common e-waste items include computers, mobile phones, large household appliances, and even medical devices<sup>3</sup>. Only 22% of the produced e-waste is recycled in an environmentally sound manner, with the rest being dumped, traded or recycled under poor conditions, thus releasing toxic chemicals (such as lead, dioxins and mercury) into the environment, and causing damage to both the environment and human health<sup>4</sup>. Several unsound practices that have been observed at e-waste sites include burning or heating, acid baths or acid leaking, and manual disassembly of equipment. Of those, burning or heating is considered one of the most hazardous activities due to the toxic fumes created. Once in the environment, the toxic pollutants can travel significant distances, exposing people even in remote areas to health-damaging substances.

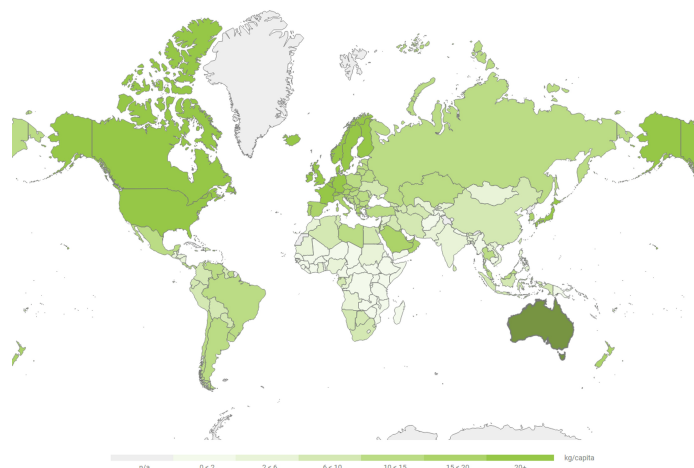


Figure 1. E-waste generated by country 2022. Source: Global E-waste Monitor.

Due to their small hands giving them an advantage in manual dismantlement of items, children are often involved in waste picking and scavenging. These activities expose children to injury and high levels of hazardous chemicals. In 2021, the World Health Organisation (WHO) estimated that as many as 18 million children were working in the informal industrial sector globally, including waste processing<sup>5</sup>.

E-waste management has both economic benefits (e.g. the recovery of metals which then re-enter industrial supply chains) and costs (e.g. waste collection, sorting, and pollution treatment). The main costs consist of \$78 billion in externalized costs to the population and the environment, stemming from lead and mercury emissions, plastic leakages and contributions to global warming, particularly in cases where hazardous substances are not properly managed<sup>6</sup>.

E-waste streams contain valuable and finite resources that can be reused if they are recycled appropriately, thus becoming an important income stream for individuals and communities in low- and middle-income (LMICs). Studies have showed that African countries, particularly West African countries, have become e-waste dumping sites for developed countries<sup>7</sup>. Despite international regulations targeting to control the transport of e-waste between countries, the transboundary movement of e-waste to LMICs continues, often illegally. The presence of hazardous materials in e-waste makes it difficult and expensive to treat safely, and unfortunately the market price for these materials is still too low to support larger-scale commercial recycling operations. Whilst legislation tackling this issue has improved, enforcement is still lagging in developing countries, which are the most burdened by e-waste exports.

## WHAT THE E-WASTE RECYCLING PROCESS IS LIKE:

### A SIX STEP RECYCLING PROCESS<sup>8</sup>

#### Step 1: Collection

- This is done through recycling bins, collection locations, take-back programs, or on-demand collection services.

#### Step 2: Transport and storage

- E-waste is transported to a recycler and stored there.

#### Step 3: Manual Sorting, Dismantling, Shredding

- Some items may be manually dismantled for components, reuse, or recovery of materials.
- E-waste is then shredded into small pieces allowing for accurate sorting of materials, a key part of the process. In the illegal practice, this is where burning takes place.

#### Step 4: Magnetic Separation

- The shredded e-waste is passed under a giant magnet, which is able to pull ferrous metals such as iron and steel from the mix of waste.

#### Step 5: Water separation

- Water is used to separate the materials, further purifying for the separation of different plastics as well as hand-sorting obvious contaminants.

#### Step 6: Recovery

- The materials, now separated, are prepared for sale and reuse.

## WHAT IS THE PROBLEM IN GHANA?

In Ghana alone, as many as 121,800 to 201,600 people depend fully or partially on informal e-waste recycling, collection or repairs for their households' economic livelihood<sup>9</sup>. The Agbogbloshie dumpsite in Ghana is the one of the largest e-waste dumpsites in Africa. There, an estimated 215,000 tonnes of second-hand consumer electronics are imported annually. It is also the home to approximately 40,000 people and has been cited as one of the most toxic threats in the world. The workers in the site work under extremely dangerous conditions where they're burning the wires to separate copper and other valuable parts without protective equipment such as gloves, eye-gear, or masks<sup>10</sup>. Many of the workers in Agbogbloshie are under the age of 45, with no formal education, and children as young as 5 years have been engaged in e-waste work.

The e-waste trade is mainly profit driven with recyclers wanting lower recycling costs, whilst at the same time consumers in Ghana are able to gain access to second-hand electronic goods in order to help bridge the 'digital divide'. E-waste is usually smuggled into Ghana as 'personal belongings', making it difficult to distinguish and separate legal players from illegal ones<sup>11</sup>.

## WHERE DOES THE RESPONSIBILITY LIE?

Whilst e-waste recycling is traditionally viewed as a positive and is encouraged, the answer to who is responsible for the poor recycling conditions currently taking place globally, is not an easy one. Once companies have sold the products to the consumer, it is no longer in the hands of the company, thereby making corporate responsibility more difficult to manage and assess. Consumers are then able to discard the products in whichever way they choose, and therefore do not always choose to recycle the items, and in some regions of the world, consumers might face physical accessibility problems to e-waste recycling. Even once choosing to recycle the items, consumers are not aware of where the product ends up, as they have no visibility of the process. Companies that do offer customers with take-back schemes would have the best control over this issue as they would choose their suppliers, and can choose suppliers with good environmental and social standards.

On the one hand, companies are encouraged to increase their proportion of recycled raw materials as a result of a sustainability push, but due to the price premium of recycled materials, companies may resort to using cheaper suppliers, who recycle e-waste using poor labour conditions. Companies tend to have partial visibility over their supply chain with regards to recycling of e-waste or purchase of recycled materials with limited public disclosure on the locations of their e-waste supplier recyclers.

### Examples of companies tackling recycling e-waste

As mentioned previously in order to tackle the issue of recyclability of e-waste, some of the world's biggest electronics producers, such as Apple, Samsung and Microsoft, have launched takeback schemes for their products. These companies however rarely provide disclosure as to how many of their consumers utilized these programs, or how many products they've recycled vs. how many new products they've sold during the year. Additionally, many of these programmes also require the customer to buy a new product in terms to be able to recycle the old item.

## HOW DO WE VIEW E-WASTE FROM AN INVESTMENT PERSPECTIVE?

Poor management of e-waste can become financially material for companies, as it forms part of product lifecycle design, operational efficiency and long term product related liabilities. Research shows that the durability of products has been changing, with the average lifetime of a washing machine, for instance, falling from ten to seven years between 2000 and 2010, indicating planned obsolescence. At the same time, consumers are becoming frustrated with short product lifespan and want more durable products<sup>12</sup>. Whilst day to day this is another area for companies to manage, sometimes an unusual catalyst can catapult the issue to share price change level materiality.

For example, the fashion world was not shocked when it came to light that Burberry burned excess products to restrict supply<sup>13</sup>, and whilst the public outrage caused the company to change their policy<sup>14</sup>, this issue surprisingly did not alter the share price. For e-waste to result in a share price drop, it took an industrial accident for Vale involving a \$7bn compensation payment for the victims to make the issue significant enough for the market to value it<sup>15</sup>. E-Waste management and incoming regulations can result in altered product design, such as the Apple charger change to USB-C<sup>16</sup>, but it appears that if the change is not significant enough, it will not necessarily impact the share price, as with the case of Apple.

More broadly, we have positively seen an increasing shift to full-lifecycle responsibility for corporates, particularly in regulation with supply chain management and end-of-life product. The EU's 2050 circular economy plan is looking to reduce pressure on natural resources whilst creating sustainable growth<sup>17</sup>. The UK government has also recently announced that it is establishing the world's first UN-based centre for circular economy research<sup>18</sup>. Whilst this may not always appear financially material currently for companies, on a look forward basis, we believe that this topic will become more important and are therefore focusing our research on it currently.

## WHAT ARE WE DOING?

We have performed an analysis of the most impacted sectors and higher risk holdings in our portfolios. Out of these holdings, we reviewed company sustainability and annual reports to identify whether corporates acknowledge the social and environmental risks of e-waste recycling and how they tackle the risks. We then engaged with the higher risk holdings to confirm whether they send e-waste to Ghana or purchase recycled e-waste from Ghana. Our first set of interactions highlighted the challenges of tracking waste streams following the sale of the product to consumers with companies have little visibility over consumer recycling of their products once the sale has occurred. Companies that do have better control over this issue, are those who operate product takeback schemes. This provides the companies with visibility over their supply chain, they are able to choose reputable recyclers and are able to conduct social and environmental audits at the recycling centres. For example, whilst we do not hold it in our funds at the time of writing<sup>19</sup>, Apple provides product take-back and recycling collection programmes in 99% of the countries they operate in<sup>20</sup>. Additionally, the company has developed a disassembly robot, named Daisy, which is capable of taking apart 23 iPhone models. Each Daisy robot can process up to 1.2 million iPhones per year, and the company operates two models<sup>21</sup>. Samsung is another example of a company which operates e-waste takeback schemes, operating these programmes in over 50 countries<sup>22</sup>.

**Overall, this is a multifaceted topic, which provides challenges to companies, consumers, governments and investors. As an active asset manager, we continue analysing our holdings to understand their product lifecycle analysis process, their sourcing practices, how they manage their supply chains and whether there is a risk for labour right violations in their supply chain (e.g. by sending recycling to illegal facilities in Ghana). We also continue engaging with companies where suitable.**

<sup>1</sup><https://api.globalewaste.org/publications/file/297/Global-E-waste-Monitor-2024.pdf>

<sup>2</sup>Global E-waste Monitor 2024, 20 Mar 2024 (footnote 1)

<sup>3</sup>[https://ewastemonitor.info/wp-content/uploads/2022/06/Global-TBM\\_webversion\\_june\\_2\\_pages.pdf](https://ewastemonitor.info/wp-content/uploads/2022/06/Global-TBM_webversion_june_2_pages.pdf)

<sup>4</sup>Global E-waste Monitor 2024, 20 Mar 2024 (footnote 1)

<sup>5</sup><https://www.who.int/news/item/15-06-2021-soaring-e-waste-affects-the-health-of-millions-of-children-who-warns>

<sup>6</sup>Global E-waste Monitor 2024, 20 Mar 2024 (footnote 1)

<sup>7</sup><https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8392572/pdf/ijerph-18-08488.pdf>

<sup>8</sup><https://www.rts.com/blog/the-complete-e-waste-recycling-process/>

<sup>9</sup><https://iris.who.int/bitstream/handle/10665/341718/9789240023901-eng.pdf?sequence=1>

<sup>10</sup><https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10815197/pdf/ijerph-21-00025.pdf>

<sup>11</sup><https://www.safeseas.net/wp-content/uploads/2021/09/Mapping-the-Illicit-Trade-of-E-waste-Final-Copy-Kanchelli-.pdf>

<sup>12</sup><https://committees.parliament.uk/publications/3675/documents/35777/default/>

<sup>13</sup><https://www.forbes.com/sites/oliviapinnock/2018/07/20/no-one-in-fashion-is-surprised-burberry-burnt-28-million-of-stock/>

<sup>14</sup><https://www.nytimes.com/2018/09/06/business/burberry-burning-unsold-stock.html>

<sup>15</sup><https://www.bbc.co.uk/news/business-55924743>

<sup>16</sup><https://www.reuters.com/technology/eu-parliament-adopts-rules-common-charger-electronic-devices-2022-10-04/>

<sup>17</sup>[https://environment.ec.europa.eu/strategy/circular-economy-action-plan\\_en](https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en)

<sup>18</sup><https://www.gov.uk/government/news/uk-to-establish-worlds-first-un-backed-centre-for-circular-economy-research>

<sup>19</sup>As of 30th April 2024

<sup>20</sup>[https://www.apple.com/environment/pdf/Apple\\_Environmental\\_Progress\\_Report\\_2023.pdf](https://www.apple.com/environment/pdf/Apple_Environmental_Progress_Report_2023.pdf)

<sup>21</sup><https://www.surfacemag.com/articles/apple-daisy-ewaste-iphone-robot>

<sup>22</sup>[https://www.samsung.com/global/sustainability/media/pdf/Samsung\\_Electronics\\_Sustainability\\_Report\\_2023\\_ENG.pdf](https://www.samsung.com/global/sustainability/media/pdf/Samsung_Electronics_Sustainability_Report_2023_ENG.pdf)

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