

Module 9: The value and cost of e-waste

The piles of digital scrap we see in landfills are a symptom of unsustainable decisions made by manufacturers, consumers and government policy makers.

The post-use or “output” phase

After one or several use phases, a device is no longer usable for any purpose and we reach the end of life of the device. In this post-use phase, we refer to the device as e-waste, but it is not ready to be introduced into the waste stream. It can be “downcycled” into parts, its valuable materials separated and plastics shredded.

There are many different kinds of e-waste recycling initiatives across the world, with many actors in the recycling chain. These range from informal waste pickers, who collect digital scrap from households and landfills, to high-end smelting factories, often set up in the global North.

Different disposal processes also have different costs and impacts, and these **have been well-documented elsewhere**.^[1] The proper treatment of e-waste can be expensive. For example, while digital devices can be dismantled relatively easily, more sophisticated recycling processes may require industrial-level recycling capacity. Toxic components such as batteries and screens also need to be treated properly at landfills, and there is not always a market for the flame-retardant plastics used in digital devices.

Not all countries have the recycling capacity to recycle e-waste properly, and the best and safest recycling option needs to be used given available resources. This requires a proper assessment of capacities, and proper consideration of the environmental and social impact of the recycling process.

In general, processing ends when its cost to the processor is greater than the value of extracted resources. Locality, or processing e-waste near the source, may reduce costs in some cases. Another way may be through the aggregation of larger volumes to take advantage of more sophisticated processes to efficiently extract certain valuable materials and reduce the disposed fraction.

Because recyclers – whether for-profit businesses or non-profit organisations – cannot work at a loss, the proper recycling of e-waste needs to be funded. This can be done either by the manufacturer (through an **extended producer responsibility** programme), the person or organisation disposing of the devices, or the buyer of a digital device at the point of purchase. This

payment determines the quality and threshold of the recycling process.

While recycling e-waste can be expensive, it is important to remember that e-waste that is properly recycled can be a valuable resource to extract scarce and precious materials. In 2019, the loss of secondary resources from e-waste disposal was estimated to be valued at USD 57 billion [2]

Proper e-waste recycling can create jobs, but not recycling e-waste properly has a social and environmental cost. There is the temptation to export e-waste to less-developed countries, declaring the waste as “usable second-hand devices”, as this can be cheaper than processing it locally. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal forbids export of e-waste, but countries without e-waste legislation become easy targets for e-waste dumping. This means that many poor people across the world are negatively affected by the many hazardous materials[3] that e-waste can contain, and have to deal with a problem created by richer countries, without having the recycling capacity or know-how to do this.

Making poor people pay so we can be online

E-waste is one of the fastest-growing waste streams in the world. It is most often discarded with general waste, leading to pollution of groundwater and other natural systems, and creating serious health impacts for local communities. Yet the fate of 82.6% of the e-waste generated in 2019 was uncertain.[4] Countries in the global North continue to illegally export hazardous electronic waste[5] to countries in the global South despite treaties such as the Basel Convention. In middle- and low-income countries, informal workers, including children, sort and process e-waste for valuable minerals and resources, causing severe health effects, and polluting the air, water and land in their communities.

The impacts on people that live in or near e-waste landfills is terrifying

As highlighted by the World Health Organization: “Children live, work, and play in informal e-waste recycling sites. Adults and children can be exposed by inhaling toxic fumes and particulate matter, through skin contact with corrosive agents and chemicals, and by ingesting contaminated food and water. Children are also at risk from additional routes of exposure. Some hazardous chemicals can be passed from mothers to children during pregnancy and breast-feeding. Young children playing outside or in nature frequently put their hands, objects, and soil in their mouths, increasing the risk of exposure. Fetuses, infants, children and adolescents are particularly vulnerable to

damage from exposure to toxicants in e-waste because of their physiology, behaviour, and additional routes of exposure.”^[6]

What is being done?

Most major cities nowadays have some sort of e-waste recycling project that has been set up. Some of these might be doing a better job than others. Recycling combined with social mobilisation is exemplified by initiatives such as “Recylatron” at the Autonomous University of Nayarit in Mexico,^[7] which has developed participatory projects for e-waste collection and management, or the experimental e-waste processing plant at the National University of La Plata in Argentina.^[8] Case studies for this module include Nodo TAU’s experience of setting up an e-waste plant in Argentina, Karo Sambhav in India, and an initiative to involve the youth in e-waste recycling in the Democratic Republic of Congo.

Footnotes

[1] Ambrosi, V. M. (2018). *Successful electronic waste management initiatives*. International Telecommunication Union. <https://www.itu.int/en/ITU-D/Climate-Change/Documents/2018/Successful-electronic-waste-management-initiatives.pdf>

[2] Forti, V., Baldé, C. P., Kuehr, R., & Bel, G. (2020). *The Global E-waste Monitor 2020: Quantities, flows and the circular economy potential*. United Nations University (UNU)/United Nations Institute for Training and Research (UNITAR) – co-hosted SCYCLE Programme, International Telecommunication Union (ITU) & International Solid Waste Association (ISWA). http://ewastemonitor.info/wp-content/uploads/2020/07/GEM_2020_def_july1_low.pdf

[3] Such as lead, mercury, cadmium, etc. See: https://en.wikipedia.org/wiki/Restriction_of_Hazardous_Substances_Directive

[4] Forti, V., Baldé, C. P., Kuehr, R., & Bel, G. (2020). Op. cit.

[5] Shanmugavelan, M. (2010). Tackling e-waste. In A Finlay (Ed.), *Global Information Society Watch 2010: ICTs and environmental sustainability*. APC & Hivos. <https://www.giswatch.org/thematic-report/sustainability-e-waste/tackling-e-waste>

[6] J. Pronczuk de Garbino, J. (Ed.) (2005). *Children's health and the environment: A global perspective*. World Health Organization. <https://apps.who.int/iris/handle/10665/43162>

[7] Saldaña-Durán, C. E., & Messina-Fernández, S. R. (2020). E-waste recycling assessment at

university campus: a strategy toward sustainability. *Environment, Development and Sustainability*, 23, 2493-2502. <https://doi.org/10.1007/s10668-020-00683-4> and <https://link.springer.com/content/pdf/10.1007/s10668-020-00683-4.pdf>

[8] Poll, S. (2019). *E-waste pilot plant: Post implementation assessment report*. International Telecommunication Union.

https://www.itu.int/net4/ITU-D/CDS/PRJ/eBook/ImplementationReport/Implementation_Reviews_Argentina/docs/Implementation_f

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