USAID
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Managing Electronic Waste in USAID Activities

INTRODUCTION

The United States Agency for International Development (USAID) developed this reference guide to provide USAID activity managers and implementing partners (IPs) with an overview of e-waste and a guide on how to manage e-waste at the activity level in developing countries.

E-waste is waste from Electrical and Electronic Equipment (EEE) that has been discarded without the intent of reuse. There are a large variety of product types that are considered EEE. Figure 1 categorizes these products at at a high level into six groups based on their waste management characteristics. Please note that this categorization aligns with The E-waste Statistics Guidelines on Classification Reporting and Indicators and directives in place by European member states (Forti, et al. 2020).

Please note that as of 2020, batteries were not covered by e-waste management structures; however, this reference guide provides best practices and mitigation measures to limit impacts of battery waste (Forti, et al. 2020).

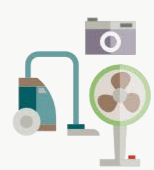
FIGURE 1. TYPES OF ELECTRONIC WASTE

Temperature Exchange Equipment
More commonly referred to as cooling and freezing equipment. Typical equipment includes refrigerators, freezers, air conditioners, and heat pumps.

Screens and Monitors
Typical equipment includes televisions, monitors, laptops, notebooks, and tablets.

Lamps
Typical equipment includes fluorescent lamps, high intensity discharge lamps, and LED lamps.

Large Equipment
Typical equipment includes washing machines, clothes dryers, dishwashing machines, electric stoves, large printing machines, copying equipment, and photovoltaic panels.



Small Equipment
Typical equipment includes vacuum cleaners, microwaves, ventilation equipment, toasters, electric kettles, electric shavers, scales, calculators, radio sets, video cameras, electrical and electronic toys, small electrical and electronic tools, small medical devices, small monitoring, and control instruments.

Small IT and Telecommunication Equipment
Typical equipment includes mobile phones, Global Positioning System (GPS) devices, pocket calculators, routers, personal computers, printers, and telephones.

Source: Forti, et al. 2020

E-WASTE IN THE DEVELOPING WORLD

E-waste is a global problem but is increasingly becoming a concern in developing countries with the growing consumption of electronics and the creation of informal markets for secondary materials. This poses both a challenge and an opportunity for USAID to help facilitate proper e-waste management in countries where it operates.

59.1 million US tons of e-waste were generated in 2019, equivalent to 16.1 lb. of e-waste per person. This figure marks a 21 percent increase in e-waste generation over the previous five years (Forti, et al. 2020). At the rate of increase in 2019, the amount of e-waste generated annually is anticipated to grow to more than 132 million US tons by 2050 (PACE 2019).

While most e-waste is generated in Asia (see Table 1 below), the Americas, Europe, and Oceania generate e-waste at a much higher rate per capita than Asia and Africa (Forti, et al. 2020). However, per capita consumption of technology and consequently e-waste is projected to increase in developing countries with the growing distribution of electronics and other technologies. For instance, by 2030, the developing world is projected to discard twice the number of personal computers as the developed world – roughly 600 million (Sthiannopkao and Wong 2013).

The shipment of large quantities of old or non-functioning equipment from developed countries to developing countries for refurbishing, recycling, or disposal is adding to this challenge. There is insufficient data on the volume of used electronics sent to developing countries because equipment can be transported under numerous codes and labels such as “second-hand goods,” “for charities,” and “for personal use” (UNEP 2011a, UNEP 2011b).

E-WASTE SPOTLIGHT
SOLAR PHOTOVOLTAIC PANELS

One equipment type of particular interest to USAID and its implementing partners is solar photovoltaic panels. These panels are utilized as energy solutions to help meet development objectives, and with their low environmental impact and long lifespan (approximately 30 years), they are a cost-effective option for reducing energy demand from other sources. However, as these panels become more prevalent, special attention needs to be paid to their proper end-of-life management because they contain hazardous components including lead and cadmium (IRENA 2016). The processes outlined throughout this guidance document can be applied to the end-of-life management of solar photovoltaic panels.

While the import of electrical or electronic products is in part due to high demand for imported, inexpensive second-hand goods, secondary materials also have high economic value (UNEP 2011b). E-waste contains a variety of valuable materials including bulky metals such as iron and aluminum and precious metals such as gold, silver, copper, platinum, and palladium. According to data from the United Nations University, the estimated value of raw materials in e-waste in 2019 was approximately US $57 billion dollars (see Table 2) (Forti, et al. 2020).

Due to the economic incentives, informal markets are often formed for the sale of raw materials recovered from e-waste. For instance, in Nigeria and Ghana, electronics are stripped for their valuable parts, plastic is smoldered off cables, and circuit boards are soaked in acid baths to leach out precious metals, generating income and jobs through informal markets (Sthiannopkao and Wong 2013). These markets lack regulation, and the economic incentives encourage improper disposal of e-waste and increase risks to the environment and human health.

The increasing consumption of electronics and growth of secondary markets places a burden on developing countries to ensure responsible handling and disassembly of e-waste, but many of these countries lack the necessary regulations and policies for the management of e-waste. There are also considerable personnel and financial constraints such as lack of individual capacity and insufficient funds to support effective enforcement mechanisms. These factors inhibit export controls and enforcement of regulations for used and end-of-life electronic equipment being exported to developing countries (UNEP 2011a).

TABLE 1. E-WASTE GENERATED BY REGION IN 2019

WASTE GENERATED	REGION					
	AFRICA	AMERICAS	ASIA	EUROPE	OCEANIA	GLOBAL
Total waste generated (million US tons)	3.2	14.4	27.4	13.2	0.8	59.1
Per capita waste generated (lb.)	12.3	29.3	5.5	35.5	35.5	16.1

Source: Forti, et al. 2020

TABLE 2. POTENTIAL GLOBAL VALUE OF RAW MATERIALS IN E-WASTE IN 2016

MATERIAL	MASS (thousand US tons)	VALUE (million USD)
Iron	22,560	$24,645
Aluminum	3,358	$6,062
Copper	1,993	$10,960
Antimony	84	$644
Cobalt	14	$1,036
Silver	1.8	$940
Gold	0.2	$9,481
Indium	0.2	$17
Bismuth	0.1	$1.3
Palladium	0.1	$3,532
Germanium	0.01	$0.4
Osmium	0.01	$108
Rhodium	0.01	$320
Iridium	0.001	$5
Platinum	0.002	$71
Ruthenium	0.0003	$3

Source: Forti, et al. 2020

IMPACTS OF E-WASTE

There are numerous environmental and human health impacts related to the improper processing and disposal of e-waste, categories of which contain over 1,000 hazardous elements and compounds such as lead, mercury, arsenic, beryllium, cadmium, polychlorinated biphenyls (PCBs), all of which pose considerable environmental and human health risks (UNEP 2019, WHO 2021).

Exposure to these hazardous chemicals can cause significant adverse health impacts, particularly for expectant mothers and children. E-waste exposure can cause expectant mothers to have premature births and stillbirth, low weight and size babies, and can impact the child born for the rest of its life. Lower neonatal behavioral neurological assessment scores, behavioral and temperamental difficulties, increased rates of attention deficit/hyperactivity disorder (ADHD), and reduced cognitive scores in children are linked to exposure to lead from e-waste.

Additionally, children exposed to e-waste may experience respiratory impacts, damage to DNA, reduced thyroid function, and increased risk of chronic diseases later in life (WHO 2021). E-waste associated health risks may result from direct or indirect contact with these hazardous elements and compounds. Individuals directly involved in the dismantling or disposal of e-waste have the greatest risk of exposure. Based on the method of disposal, such as burning or incineration, workers are at risk of inhaling toxins when they are released into the air. In addition, smoldering or dismantling electronic devices for the valuable materials inside or burning cables to extract copper exposes workers to a range of hazardous substances and by-products (WHO 2021, UNEP 2019, Treblin 2013).

Indirect impacts from inappropriate disposal of e-waste result when harmful materials are released into the air, soil, and water. These materials are highly persistent in the environment, and many are toxic even at very low concentrations, so once they are released, they may settle onto land or water and leach into the soil and/or groundwater. Similarly, if e-waste is disposed of in poorly designed/managed landfills, these materials can leach directly into groundwater. This can impact freshwater sources and contaminate crops, threatening ecosystem health, agricultural viability, and biodiversity (USEPA 2022).

BEST PRACTICES, POLICIES, AND REGULATORY FRAMEWORKS FOR REDUCING E-WASTE

Best practices, policies, and regulatory frameworks associated with reducing the total volume of e-waste and mitigating its potential adverse impacts are critical. The broad strategy of reduce, reuse, and recycle is the best practice for e-waste. Disposal should be employed only when all other options have been exhausted. Following this strategy, best practices for e-waste fall into two categories: avoidance and management. The following best practices are readily adaptable for use over the course of USAID programming from design to implementation and are essential considerations for USAID activity managers or IPs to be aware of and incorporate, as relevant, on programs that may generate, interact with, or actively address electronics consumption, or e-waste.

AVOIDING E-WASTE

This first category of best practices seeks to reduce e-waste production. This section outlines ways in which USAID activity managers and IPs can limit e-waste generation through purchasing, maintenance, and repair.

Purchasing

Agencies and organizations can reduce e-waste by purchasing environmentally sustainable equipment such as products that are manufactured to be less toxic and easier to recycle at the end of their useful life (USEPA 2023a). Additionally, purchasing used, refurbished, or repurposed equipment, as appropriate, can help avoid waste by removing products from the waste stream (Bhutta, Omar and Yang 2011). There are a variety of standards, tools, and resources available to guide USAID and its IPs to implement green procurement requirements and purchase low-impact electronic equipment including:

- The Sustainable Acquisitions and Materials Management (SAMM) interagency workgroup (Durbin 2015).
- The Green Procurement Compilation (GPC) (GSA n.d.).

There are not universally accepted guidelines or requirements for purchasing equipment, and individual organizations typically establish their own policies that delineate that procurers must adhere to a specific set of regulations including certified buyers or other guidance.

Maintenance and Repair

Extending the life of products through maintenance and repair can also help reduce e-waste by eliminating frequent disposal and purchase of new products. These actions reduce the volume of equipment entering the waste stream and, in some cases, provide local capacity building opportunities. For instance, during program implementation, USAID trainings on maintenance and repair of equipment could increase local capacity and jobs, while decreasing waste (Ahmed 2016).

MANAGING E-WASTE

When e-waste cannot be avoided, its proper management is essential to mitigating potential risk to the environment and human health and wellbeing. The following management strategies require dedicated financial and human resources that may be a significant barrier for developing countries that lack the necessary capacity, resources, and infrastructure. This is an important consideration for USAID and IPs when considering program design and implementation that may require e-waste management.

This section outlines various methods for management of e-waste including:

- Extended Producer Responsibility (EPR)
- Take-back Programs
- Recycling
- Disposal
- Relevant Policy, Guidance, and Regulations

Extended Producer Responsibility (EPR)

EPR programs are one avenue for managing e-waste. EPR focuses on increasing manufacturer and importer responsibility for the environmental impact of product lifecycles, including product disposal and waste (OECD n.d.). EPR places the financial and logistical burden of collection and recycling onto the producer or procurer. For instance, proposed EPR schemes in Nigeria and Kenya require that manufacturers and importers develop procedures and obtain government approvals for e-waste management. In Ghana, manufacturers and importers pay eco-fees to government and industry that are used for managing e-waste. EPR is an effective method to encourage greater ownership of management processes and encourages responsible recycling or disposal. However, these EPR schemes face considerable challenges including mistrust by the informal sector, lack of recycling infrastructure, difficulty defining producers and manufacturers, and poor financial support (Forti, et al. 2020).

Take-back Programs

Take-back programs are a growing component of effective electronics management. They vary significantly by organization, but like EPR, are predicated on the logistical and financial responsibility resting with the producer or retailer/procurer. These programs may utilize an array of implementation methods but broadly involve the return of end-of-life electronics to retailers or manufacturers. Retailers and manufacturers may place limits on the types of products they will recycle, or how many products an individual may recycle. Some take-back programs may charge a fee, while others may offer discounts on replacement products. Primary take-back program models include:

1. Mail-in for products such as small IT e-waste
2. Haul-away or pick-up for products
3. Consumer transport to a retailer or recycling location.

E-WASTE SPOTLIGHT
BATTERY TAKEBACK PROGRAMS

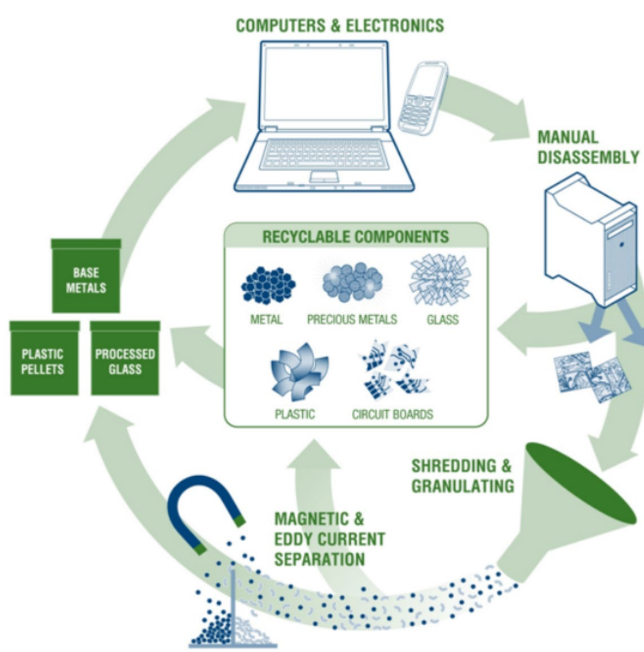
With the spread of battery-powered portable electronics, proper waste management of batteries is important. While most single-use batteries are considered non-hazardous and can be thrown away as normal waste, rechargeable batteries (e.g., lead-acid, nickel-cadmium, lithium-ion) contain hazardous materials and should always be recycled (Paynter 2018). The type of battery heavily dictates how it is recycled or disposed (https://www.epa.gov/recycle/used-household-batteries#single). Extended producer responsibility and take-back programs have been effective measures for addressing battery waste management in the U.S. and across Europe (Call2Recycle 2023, Duracell n.d., European Commission 2022, Paynter 2018).

Funding is an important consideration for take-back programs, as domestic financing may not be available in some developing countries. Another essential component of take-back programs is the management of the electronics after they have been collected. If electronics are returned to facilities in developing countries, recycling infrastructure and the resources to recycle effectively may be limited. If there is no plan in place for the materials after collection, the electronics that were "taken back" could be left unmanaged and unrecycled. These on the ground realities are important considerations when designing e-waste management methods.

Recycling

The recycling system for e-waste consists of several disassembly and separation processes, illustrated in Figure 2. Recycling programs for electronics include collection, transport to a recycling facility, and the actual recycling process (USEPA 2023b). While various collection methods may exist, the actual recycling is more difficult to accomplish. Recycling can be cost prohibitive because countries may lack the internal financing to launch programs and/or the infrastructure to implement them effectively.

FIGURE 2. RECYCLING PROCESS FOR E-WASTE



Source: Uddin, Arifa and Asmatulu 2021

Recycling initiatives with external funding are evolving in several developing countries. For instance, in January 2019, the Nigerian government, the Global Environment Facility, and UN Environment announced a $15 million initiative to launch an e-waste recycling industry in Nigeria, and efforts are underway to scale Nigeria's experience to other countries in the region (UNEP 2019). Egypt, Ghana, and Kenya also all have mandates to recycle electronics via take-back programs, however without the proper financing, they will be largely unable to meet their own mandates. USAID also launched the Lighting and Energy Access Program (LEAP) in 2019 (CLASP 2020). Winners of that challenge may serve as resources for addressing recycling of solar e-waste.

In response to many developing countries lacking the infrastructure, resources, regulatory framework, and enforcement capacity for environmentally sound management of e-waste, several global initiatives and programs were designed to address the challenges of e-waste, particularly in developing countries (UNEP 2011a). These include:

- Sustainable Electronics Recycling International (SERI) R2 Standard: A voluntary, market-based mechanism to create incentives for recycling facilities to implement environmental, health, and safety procedures (Seri 2020).
- e-Stewards Initiative: Aims to define and promote best practices for electronics reuse and recycling worldwide and certifies recyclers (e-Stewards 2023a, e-Stewards 2023b).

Recycling can be an effective e-waste management method when the appropriate infrastructure, funding, resources, and capacity are available.

E-WASTE SPOTLIGHT

EU Policy

The *Waste Electrical and Electronic Equipment (WEEE)* is a regional EU directive passed in 2002. It requires member states to set e-waste collection, recycling, and recovery targets. The WEEE directive also provides for the creation of collection arrangements through which consumers could return their e-waste to manufacturers and distributors free of charge. This set of guidelines serves as an illustrative model for the development of e-waste policies in developing countries. In the developing country context, identifying public- or private-sector financing for implementation of such policies is of concern.

European Commission

Disposal

E-waste disposal should be employed only when all other options have been exhausted. Disposal typically involves incineration or deposition in the ground (i.e., landfill or open pit), but sanitary landfills that can handle any type of e-waste are largely lacking in the developing world. However, due to the bio-contamination and bio-accumulation potential associated with heavy metals and persistent organic pollutants commonly found in e-waste, it is important that these materials are disposed of in accordance with hazardous waste management best practices. Best practices to minimize human and environmental exposure to e-waste during disposal include:

- Avoid burning, especially in open areas;
- Reduce the use of open pits and unmanaged landfills;
- Use protective equipment (e.g., face masks or respirators, protective gloves and clothing, and eye protection) during handling;
- Use engineering controls such as ventilation, filters, and vacuums; and
- Consider government policy review and capacity building as a best practice (California DPH 2012).

It is important to note that in developing countries, disposal processes typically lack sufficient infrastructure and funds (UNEP

2011a). This tends to result in the open burning or deposition of electronics in an open pit or improperly lined and managed landfill that increases environmental and human health risks. Proper landfill management or incineration requires resources, infrastructure, and capacity typically not available in developing countries. This reaffirms the importance for USAID and IPs to proactively reduce waste, implement recycling where possible, and ensure if disposal of e-waste is necessary, that it is done safely.

Relevant Policy, Guidance, and Regulations

As a federal agency, USAID and its Implementing Partners must be aware of and adhere to the U.S. General Services Administration's (GSA) federal personal property disposition guidelines and requirements, and must follow these requirements, as much as possible, when handling electronic equipment at end-of-life. Annex B: FIGURE 3 outlines the GSA process for personal property disposition. The GSA recommends:

- Following the reuse process for all federal electronic equipment with classification as new, usable and repairable.
- Adhering to the recycling process for all electronic equipment declared for abandonment and destruction designated as salvage and scrap.
- Avoiding disposal of federal electronic equipment and components in landfills or incinerators.

Host countries establish their own policies and regulations for the responsible disposal of e-waste, primarily based on international treaties.[1] Many of the approaches and considerations that apply to hazardous solid waste and health care waste, also apply to e-waste. USAID's Sector Environmental Guidelines on Solid Waste and Healthcare Waste offer relevant advice, including a description of the elements that should be included in a complete waste management program (USAID 2023).

[1] For further information on the international framework for the responsible disposal of e-waste, please see Annex A.

CONCLUSIONS AND RECOMMENDATIONS

Broadly, USAID activity managers and IPs should focus on reducing the generation of e-waste as much as possible considering the significant resource and infrastructure constraints of proper recycling or disposal in many developing countries. This includes an emphasis on sustainable purchasing, and maintenance and repair of equipment. When avoiding e-waste is not possible, it should be recycled. E-waste should only be disposed of when there are no viable alternatives due to the significant environmental and health ramifications of improper disposal. Even when the ideal option is available, selecting the next best option may be the only path forward to do your part to continue to improve management of e-wastes. Overall, consider where USAID could contribute to better policies and support technical assistance or capacity building to continue to improve the entirety of the management of the waste stream with host country institutions, regulators, and enterprises.

REFERENCES

Ahmed, Syed Faraz. 2016. *The Global Cost of Electronic Waste.* September 29. Accessed July 6, 2023. https://www.theatlantic.com/technology/archive/2016/09/the-global-cost-of-electronic-waste/502019/.

Bhutta, M. Khurrum, Adnan Omar, and Xiaozhe Yang. 2011. "Electronic Waste: A Growing Concern in Today's Environment." *Economics Research International.* doi:https://doi.org/10.1155/2011/474230.

California DPH. 2012. "California Department of Public Health." *California Department of Public Health (CDPH) Programs.* August. Accessed July 6, 2023. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/HESIS/CDPH%20Document%20Library/eWaste.pdf.

Call2Recycle. 2023. *Call2Recycle.* Accessed July 6, 2023. https://www.call2recycle.org/.

CLASP. 2020. *USAID Announces Winners of the Second Solar E-Waste Challenge.* February 24. Accessed July 5, 2023. https://www.clasp.ngo/updates/usaid-announces-winners-of-the-second-solar-e-waste-challenge/.

Duracell. n.d. *Battery Use, Care and Disposal.* Accessed July 6, 2023. https://www.duracell.com/en-us/technology/battery-care-use-and-disposal/.

Durbin, Dennis. 2015. *USAID Strategic Sustainability Performance Plan Summary.* Summary, USAID. https://2012-2017.usaid.gov/sites/default/files/documents/1868/2015AgencySustainabilityPlan.pdf.

e-Stewards. 2023a. *Find a Recycler.* Accessed July 6, 2023. https://e-stewards.org/find-a-recycler/.

e-Stewards. 2023b. *The e-Stewards Story.* Accessed July 6, 2023. https://e-stewards.org/about-us/the-e-stewards-story/.

European Commission. 2022. *Batteries.* December 9. Accessed July 6, 2023. https://environment.ec.europa.eu/topics/waste-and-recycling/batteries_en.

Forti, Vanessa, Cornelis Peter Baldé, Ruediger Kuehr, and Garam Bel. 2020. *Global E-waste Monitor: Quantities, flows and the circular economy potential.* Global E-waste Monitor, Bonn/Geneva/Rotterdam: United Nations University (UNU)/United Nations Institute for Training and Research (UNITAR) - co-hosted SCYCLE Programme, International Telecommunication Union (ITU), and International Solid Waste Association (ISWA). Accessed July 5, 2023. https://globalewaste.org/publications/.

GSA. n.d. *Green Procurement Compilation.* Accessed July 6, 2023. https://sftool.gov/greenprocurement.

GSA. 2013. "Overview of GSA Personal Property Disposal Process for Federal Electronics." June 11. Accessed July 6, 2023. https://www.epa.gov/sites/default/files/2013-08/documents/gsa_eolfact.pdf.

IRENA. 2016. *End of Life Management Solar Photovoltaic Panels.* IRENA and IEA-PVPS. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2016/IRENA_IEAPVPS_End-of-Life_Solar_PV_Panels_2016.pdf.

OECD. n.d. "Fact Sheet: Extended Producer Responsibility." Fact sheet. https://www.oecd.org/env/waste/factsheetextendedproducerresponsibility.htm.

PACE. 2019. *A New Circular Vision for Electronics Time for a Global Reboot.* Geneva: World Economic Forum. https://www3.weforum.org/docs/WEF_A_New_Circular_Vision_for_Electronics.pdf.

Paynter, Meghan. 2018. *How to Dispose of Batteries the Right Way*. February 27. Accessed July 6, 2023. https://www.cirbasolutions.com/news/dispose-old-batteries-right-way/.

Seri. 2020. *Seri is Championing Electronics Sustainability as if the World Depends on it Because it Does.* Accessed July 6, 2023. https://sustainableelectronics.org/.

Sthiannopkao, Suthipong, and Ming Hung Wong. 2013. "Handling e-waste in developed and developing countries: Initiatives, practices, and consequences." *Science of the Total Environment* 1147-1153. doi:https://doi.org/10.1016/j.scitotenv.2012.06.088.

Treblin, Johanna. 2013. *Informal Recyclng of E-waste a Serious Problem, Expert Says.* May 27. Accessed July 6, 2023. https://ourworld.unu.edu/en/informal-recycling-of-e-waste-a-serious-problem-expert-says.

Uddin, Md. Nizam, Kunza Arifa, and Eylem Asmatulu. 2021. "Methodologies of E-waste Recycling and Its Major Impact on Human Health and the Environemnt." *International Journal of Environment and Waste Management.* doi:http://dx.doi.org/10.1504/IJEWM.2021.112949.

UNEP. 2011b. *Toolkit on E-waste Insepction and Enforcement.* Accessed July 6, 2023. https://www.basel.int/Implementation/Ewaste/eWasteactivitiesinAfrica/EwasteinAfrica/Overview/ToolkitonEwasteInspectionandEnforcement/tabid/3160/Default.aspx.

UNEP. 2019. "UN Report: Time to Seize Opportunity, Tackle Challenge of E-waste." Davos. https://www.unep.org/news-and-stories/press-release/un-report-time-seize-opportunity-tackle-challenge-e-waste.

UNEP. 2011a. *Where are WEee in Africa: Findings from the Basel Convention E-Waste Africa Programme*. Secretariat of the Basel Convention. https://www.basel.int/Implementation/Ewaste/eWasteactivitiesinAfrica/EwasteinAfrica/Overview/PublicationsReports/tabid/2553/Default.aspx#.

USAID. 2023. *Sector Environmental Guidelines & Resources.* Accessed July 6, 2023. https://www.usaid.gov/environmental-procedures/sectoral-environmental-social-best-practices/sector-environmental-guidelines-resources.

USEPA. 2023a. *Basic Information about Electronics Stewardship*. April 18. Accessed July 6, 2023. https://www.epa.gov/smm-electronics/basic-information-about-electronics-stewardship#02.

USEPA. 2022. *Cleaning Up Electronic Waste (E-Waste).* November 15. Accessed July 6, 2023. https://www.epa.gov/international-cooperation/cleaning-electronic-waste-e-waste.

USEPA. 2023b. *Sustainable Management of Electronics.* April 24. Accessed July 6, 2023. https://www.epa.gov/smm-electronics.

WHO. 2021. *First WHO report on e-waste and child health calls for more effective and binding action to protect children from growing health threat.* June 15. Accessed July 6, 2023. https://www.who.int/news/item/15-06-2021-soaring-e-waste-affects-the-health-of-millions-of-children-who-warns.

ANNEX A: INTERNATIONAL FRAMEWORK FOR THE DISPOSAL OF E-WASTE

Several international treaties provide frameworks for the responsible disposal of e-waste. The Global Environment Facility provides implementation support to developing countries for most of these treaties.

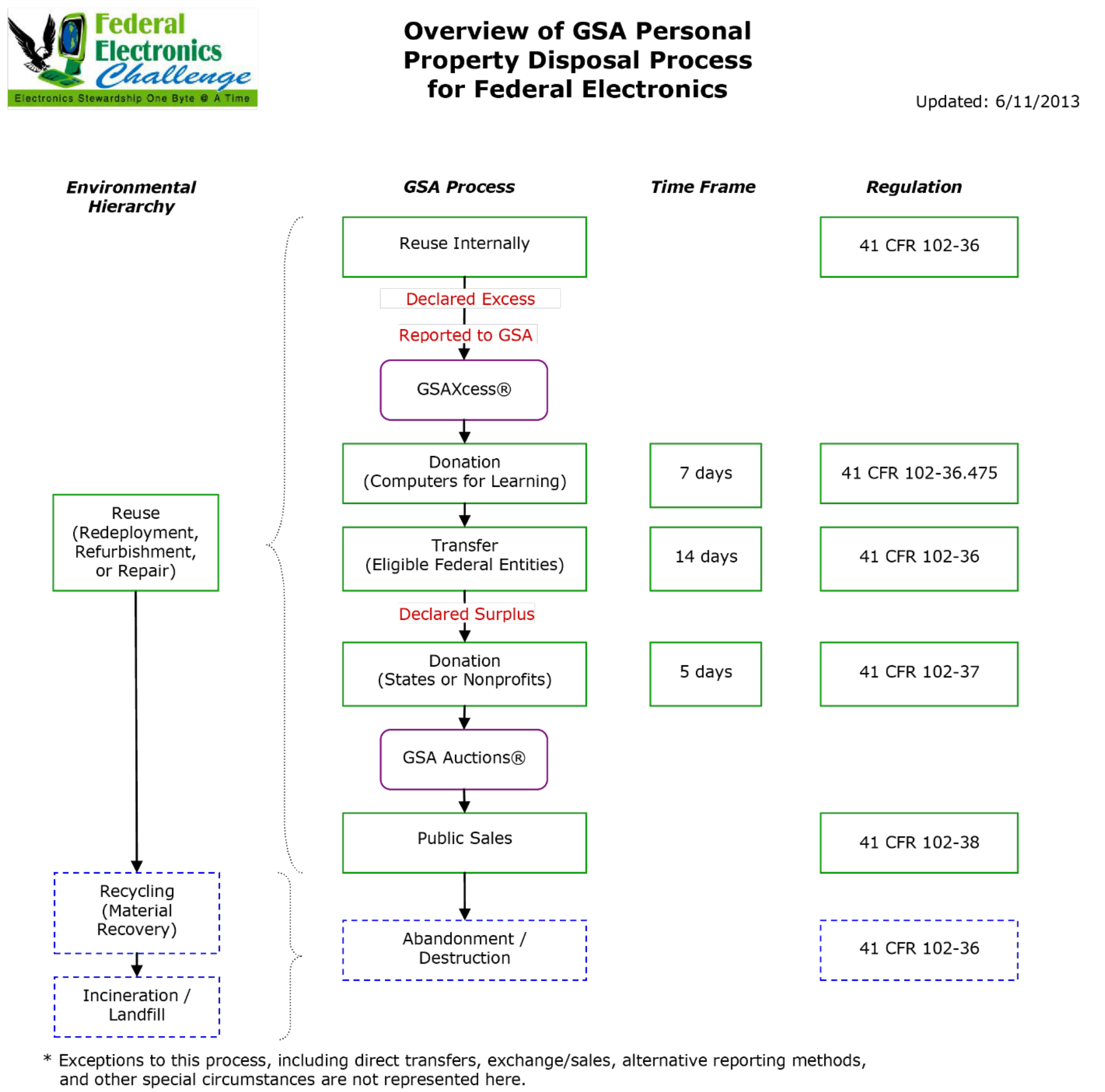
- The Basel Convention, entered into force in 1992, addresses transboundary movements of hazardous wastes and their disposal. Parties to the convention are developing technical guidelines on e-waste, and the Convention has launched several e-waste initiatives:
  - The Nairobi Declaration (2006) on the Environmentally Sound Management of Electrical and Electronic Waste provided a mandate to the Basel Convention Secretariat to implement a work plan for the environmentally sound management of e-waste. This has led to programs to manage e-waste in Africa, in Asia Pacific and in South America.
  - The Partnership for Action on Computing Equipment has produced guidelines for refurbishing, repair, material recovery, recycling, and environmentally sound management of end-of-life computing equipment.

    Similarly, the Mobile Phone Partnership Initiative developed a set of technical guidelines and an overall guidance document on the environmentally sound management of used and end-of-life mobile phones.
- The Minamata Convention on Mercury entered into force in 2017 and includes provisions relating to the entire lifecycle of mercury—including controls on air emissions, releases to land and water, and storage and waste.
- The Stockholm Convention, which entered into force in 2004, is a global treaty to protect human health and the environment from persistent organic pollutants.
- The International E-Waste Management Network, led by the Taiwan Environmental Protection Administration and USEPA, works to build global capacity for environmentally sound management of e-waste (USEPA 2022).
- The U.S. federal regulations on hazardous waste are found in Title 40 of the Code of Federal Regulations (CFR) in part 273 and apply to several types of hazardous waste; see the EPA's Universal Waste website for more details.
- The U.S. National Strategy for Electronics Stewardship includes the goal to "reduce harm from U.S. exports of electronics waste (e-waste) and improve handling of used electronics in developing countries."

ANNEX B: GSA FEDERAL ELECTRONICS DISPOSAL PROCESS

Figure 3 below outlines the U.S. General Services Administration's (GSA) process for personal property disposition. While as a U.S. federal agency, USAID and its Implementing Partners must be aware of and adhere to the U.S. General Services Administration's (GSA) federal personal property disposition guidelines and requirements as much as possible when handling electronic equipment at end-of-life, it is recognized that this process may be challenging to implement in a developing country context.

FIGURE 3. GSA FEDERAL ELECTRONICS DISPOSAL PROCESS



Source: GSA 2013