



# E-WASTE

**DESCRIPTION:** The term e-waste covers “items of all types of electrical and electronic equipment and its parts that have been discarded by the owner as waste without the intention of reuse.”<sup>1</sup> In Europe, the term Waste Electrical and Electronic Equipment (WEEE) is widely used. E-waste covers any household or business item with circuitry or electrical components with a power or battery supply.

This diverse and fast growing waste stream is often categorized as hazardous waste due to the presence of toxic metals such as mercury and lead, and hazardous substances such as brominated flame retardants (BFRs) and polychlorinated biphenyls (PCBs). Under uncontrolled circumstances, dismantling electrical and electronic equipment can cause the release of harmful dioxins and furans. E-waste may also contain precious metals such as gold, copper and nickel and other rare materials of strategic value such as indium and palladium that can be recovered, as well as common plastics and glass (covered in separate fact sheets).

**GLOBAL PRODUCTION/DISPOSAL:** 41.8 million tonnes of e-waste disposed per annum globally (2014), anticipated to rise to more than 50 million tonnes per year by 2018<sup>2</sup>.

**COMMON SOURCES:** E-waste is classified in six categories: cooling and freezing equipment, screens, lamps, small equipment, large equipment, small IT<sup>3</sup>. Examples include: laptops, televisions, lighting, printers, refrigerators, air conditioning units, calculators, electric stoves, washing machines, photovoltaic panels, electric kettles.

**IMPACTS IF NOT MANAGED CORRECTLY:** The hazardous content of e-waste, if not properly managed, can cause major environmental and health problems. The United Nations University estimates 700,000 tonnes of e-waste ends up in mixed domestic and commercial waste bins annually in the European Union (8% of total EU e-waste), much of it either sent to landfill or incinerated. This proportion is expected to be significantly higher in other regions globally, where collection and reprocessing rates are lower.

Uncontrolled dismantling may also lead to hazardous emissions, notably through processes such as amalgamation where mercury is used to separate metals such as gold from other less valuable materials. Informal recycling techniques such as open burning of cables to recover copper wiring inside, exposes both adult and child workers and their households to health risks from direct contact with harmful materials such as lead, cadmium, chromium, as well as chemicals including BFRs and PCBs, via inhalation or from accumulation of chemicals in soil, water and food. Open burning also causes emissions of dangerous dioxins and furans, which pose direct and severe impacts on human health and the environment. Women and children are often left to undertake the more toxic work involving dismantling and processing, and thus are likely to be more at risk.

Landfilling or burning of e-waste leads to resource loss and can negatively impact the environment. E-waste in unmanaged dumps can lead to toxic leaching into the soil and water bodies. Long term exposure to these substances, some of which are carcinogenic, can damage the nervous system, kidneys, bones, and reproductive and endocrine systems. Incinerated e-waste may lead to emissions of greenhouse gases, mercury, and other hazardous chemicals such as dioxins and other persistent organic pollutants (POPs) that can remain in the ground and in food chains for many years, causing immune system, hormonal and reproductive system issues as well as cancer.

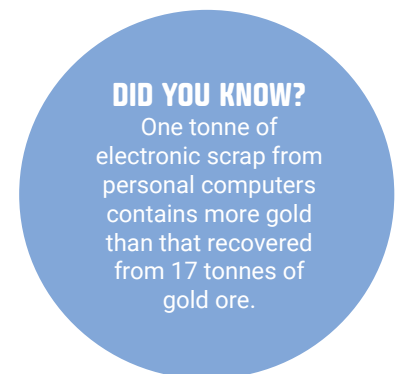
**OPTIONS FOR REDUCING:** Rethink purchasing habits for electronics: a single multi-purpose device can take the place of several single purpose units (e.g. combined copiers/printers/faxes/scanners, or a phone that combines camera/organizer/alarm clock). Share equipment across multiple users: a printer assigned to a single user may be used for just 5 minutes a month: good practice is a ratio of one printer/copier to 20 users – best practice is 1:35-plus. Select durable and long lasting equipment with no hazardous components (EU legislation requires gradual phase out of these). Extend the life of portable electronic units by: not upgrading too often, keeping it clean, buying a case to protect it in transit or if dropped, and avoiding storing equipment where it can overheat. When it's time to replace equipment, select 'green' electronic labels such as [EU Eco-label](#); [US Energy Star](#); [EPEAT](#) or [TCO Certified](#).

**OPTIONS FOR REUSING:** Preventing waste in the first place is preferable to any waste management option, including recycling. Donating used (but still operating) electronics for reuse extends their operating life and delays them entering the waste stream.


Repair and refurbish electronic equipment to the extent possible. Extensive repair, recycling and recovery guidance has been prepared under the Basel Convention, for mobile phones (under the Mobile Phone Partnership Initiative<sup>4</sup>) and for computer equipment through the *Partnership for Action on Computing Equipment (PACE)*, a multi-stakeholder public-private partnership that brings together manufacturers, recyclers, international organizations, associations, academia, environmental groups and governments to tackle environmentally sound refurbishment, repair, material recovery, recycling and disposal of used and end-of-life computing equipment<sup>5</sup>.

**OPTIONS FOR RECYCLING:** Environmentally sound recycling of used electronics can return valuable materials (e.g., gold, copper, glass, aluminium) to the supply chain, reducing raw materials used, life-cycle energy consumption and the overall disposal needs. This also prevents hazardous substances from being dispersed in the environment. When purchasing equipment, give preference to companies that have a take-back scheme (for refurbishment or recycling – see below). Within Europe, the EU WEEE Directive<sup>6</sup> provides for collection schemes where consumers return their e-waste for free. Explore options in your city for reprocessing services run by local authorities or recycling companies. Standards the recyclers should adhere to can be found in the MPPI and PACE guidance above (including both recovered and residual elements).

**OTHER OPTIONS (LAST RESORT):** International trading of e-waste (like any hazardous waste) is not permitted under the Basel Convention unless there is consent by both sending and receiving countries and appropriate permits obtained for transportation. The plastics and hazardous chemicals in e-waste should never be destroyed through open burning. If no acceptable re-processor can be found, place the equipment in a sealed container and transport to a lined and managed landfill, if local regulations allow, or identify a facility with the capacity to undertake environmentally sound, controlled and closed incineration. Dumping of e-waste is illegal and must never be practiced.



### OTHER COMMENTS:

 This symbol on a product indicates separate collection for electrical and electronic equipment. Standards for green electronics and electronic waste recycling include:

- [EPEAT](#): run by the US based Green Electronics Council
- [E-STEWARDS](#): established by the Basel Action Network - US EPA recommended
- [R2 standard](#): administered by Sustainable Electronics Recycling International - US EPA recommended

Identified private sector programmes:

- [Apple](#)
- [HP](#)
- [Microsoft](#)
- [Nokia](#)

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## ENDNOTES

- 1 Step, 2014, [One Global Definition of E-waste](#).
- 2 UNU, 2014, Global E-waste Monitor.
- 3 UNU, 2014, Global E-waste Monitor.
- 4 Basel Convention, website: <http://www.basel.int/Implementation/TechnicalAssistance/Partnerships/MPPI/MPPIGuidanceDocument/tabid/3250/Default.aspx>.
- 5 Basel Convention, PACE overview, website: <http://www.basel.int/Implementation/TechnicalAssistance/Partnerships/PACE/Overview/tabid/3243/Default.aspx>.
- 6 European Commission Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EU), website: [http://ec.europa.eu/environment/waste/weee/index\\_en.htm](http://ec.europa.eu/environment/waste/weee/index_en.htm).



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