A Deep Dive into WEEE

How often do you buy or replace electronics or electrical items? What do you do with the old ones? Do you have a pile to get rid of? Perhaps a collection in a drawer or cupboard that you've been meaning to deal with?

- E-waste, or waste electrical and electronic equipment (WEEE), is the planet's fastest growing waste stream. Globally, 53.6 million metric tonnes were produced in 2019, up 21% in five years. Only 17.4% was collected and recycled, with much more languishing in landfill, burnt or illegally traded. Figures vary for different regions, but every country could do much better.
- Raw materials for electricals and electronics includes some high-value metals. Some are becoming scarce on land, also with some reports of environmental destruction and human rights violations where it is mined. Demand is also growing for more obscure 'rare-earth elements' with unique properties suited to digital innovations (e.g. screen technology).
- Few are aware of the commercial interest in mineral resources of the deep-sea. For those with financial backing there is much money to made, but concern is growing about the likely impacts of deep sea mining.

Reducing our consumption and waste of electronics and electricals equipment (WEEE) will help protect the deep sea.

Electronic and electrical items are now integral to our daily lives and increasingly accessible to both rich and poor. Many are treated as 'consumables' with short life expectancies. Those small enough to fit in a domestic waste bin are even more likely to be discarded without much thought.

New and exciting products emerge constantly, making our lives easier, increasingly connected and fashionable. 'Green technologies' and 'a digital future' are key to tackling the climate change crisis: for energy capture, storage and efficiencies in energy use. We desperately need these technologies, but we must also take steps to avoid fixing one problem only to create another. We must minimise the impact of resource use and waste associated with technology.

There is a solution we can all be part of. *Resource efficiency, responsible consumption and waste management can massively reduce growing demand. This article is a gateway to information and guidance on how to enjoy electronics and electricals without it costing the earth… it's all part of achieving* ***a more circular economy****.*

What's more, circularity presents a huge opportunity for businesses that can be part of more sustainable innovations and supply chains. Recycling is just one aspect of this. The value of raw materials such as iron, copper and gold, locked-up in e-waste, is equal to at least US$57 billion globally (2019 figures), more than the GDP of most countries in the world. In Europe the potential revenue from recycled e-waste is expected to be over US$4 billion.

Companies have a role in the more sustainable design of electrical and electronic equipment. Governments have a role in expanding and enabling facilities and processes. But the actions of people – citizens – are essential to accelerate a shift to sustainability. There is no single solution, but together these can avoid unnecessary impacts. **Keep reading for advice and links to help us:**

A circular economy is not just about saving the planet… there are jobs and money to be made too.

- **Buy more ethical products, including used and refurbished**
- **Repair and restore where we can, to make it last**
- **Sell and donate what we no longer want**
- **Recycle end-of-life equipment**

First, an introduction to deep-sea mining

The deep-sea is more than just a fascinating other-worldly place. It is hugely important for the health of the planet: processing, storing and cycling nutrients and organic matter. It makes a major contribution to a sustainable future, a future that makes the planet a viable place for humans and nature to coexist in harmony. It may also be useful for acute challenges to human health, holding massive potential for the discovery of new medicines from nature.

Deep-sea mining interest is focussed on three types of opportunity:

- *Abyssal plains – polymetallic nodules, particularly ferromanganese.*
- *Seamounts – metal-rich crusts, including cobalt, platinum & molybdenum.*
- *Hydrothermal vents – sulphide deposits, including copper, lead, zinc, gold & silver.*

What will be the impacts of deep-sea mining? We're still researching what the effects may be and how much we will be able to minimise them, but impacts will include:

- **Loss and damage to special habitats and species by the direct footprint of mining**
- **Sediment plumes that are slow to settle but ultimately smother the seabed and species there, potentially including toxic elements**
- **Damage to the natural carbon cycling and storage properties of deep-sea habitats. This includes the natural breakdown and storage of methane (a potent greenhouse gas), effected by the removal and mortality of microbes in the seabed**
- **Contribution to the carbon footprint of global mining and smelting operations. The industry may be able to decarbonise some operations, but land-based operations have previously contributed 7-8% of global energy use (source: 2013 International Resource Panel report)**

Commercial scale deep-sea mining has not yet started but is on the verge of massive expansion. Most of us are wholly unaware of the link with our consumption of technology, and what we do with our waste after. But it's a problem that can be avoided, or at least minimised.

Companies aiming to mine the deep sea emphasise their environmental credentials and responsible approach. For many these ambitions may be entirely legitimate, and some corporations are actively engaged in trying to better understand the potential impacts of deep-sea mining and how to limit those impacts. The International Seabed Authority (ISA) is also working to create and implement a regulatory system to balance negative impacts while allowing economic activity that can be regarded as sustainable. Although ISA's regulatory functions are a topic of hot debate, this provides some comfort if sustainability claims can be supported by scientific research, monitored and rules enforced. However, this does not detract from a few fundamental truths:

- **The need for any sort of mining can be drastically reduced if we are more efficient in our initial use, re-use and recycling of waste materials**
- **There is substantial business opportunity (including small and medium enterprises) in the development of an efficient circular economy, making jobs and money *by* reducing our impact on the planet**
- **The majority of deep-sea mining opportunities are in international waters ('areas beyond national jurisdiction'). This makes any sort of regulatory, monitoring and enforcement systems extremely complicated to agree and implement, not to mention expensive**

A few words of caution

There a few things to be aware of and steps you can take to keep yourself happy and safe.

- If selling or donating things online, follow advice on the site you are using to avoid fraud and scams. Report anything that seems suspicious.
- Protect your personal data. If you are donating, recycling or selling a smartphone, computer or other device with personal information on it: clear data yourself or make sure the store, company or organisation you are using provide this as a service. If clearing data yourself, an internet search will usually reveal instructions specific to your device.
- Think about electrical safety – be confident that any wiring or batteries are in good condition and aren't a fire hazard.

Buying and Selling

The **second-hand market** for technology and electrical items is alive and kicking. Search Revolve to get started – this is a quality standard for second-hand stores and Scottish stores are invited to get certified. Also:

- Most major technology corporates have their own used and refurbished sales departments, including Dell, Apple and Vodafone. Others like Carphone Warehouse and Envirofone have similar services.
- Online e-commerce sites like eBay, musicMagpie, Gumtree and Pre-loved remain great places to pick up a second-hand bargain. In some instances there are fewer guarantees on electrical safety or product condition, although eBay, Compare and Recycle and musicMagpie do have a special sections for refurbished big-brand technology that come with warranties.
- CeX is another used technology specialist, which also still has a high-street presence.
- If it's photographic equipment you're after there are lots of specialist options, just search online for both high-street and online stores.
- For small electricals you can also just browse the charity shops. UK charity shops are only allowed to sell electrical items that have had their circuitry tested and declared safe.
- The Community Resources Network Scotland has a mapping tool to help you find 'Re-Use near me'.

At many of these options for buying used you can also **sell your old equipment**. If it still has some life in it, even if it needs some repair or a software refresh, try that before taking it for recycling. You can also try:

- **Trade-ins**. Again, most of the big tech companies and many other services have options for you to trade-in for a discount or just sell for a direct payment, including Vodafone, Apple, Samsung, Currys-PCWorld, Mazuma, Compare and Recycle and Argos.

Leasing electronic and electrical equipment is not as common for private individuals as for businesses and organisations, but possible

What counts as electrical and electronic equipment?

Anything with circuitry or electrical components, from kitchen appliances to toys and power-tools, and technologies such as phones, computers, televisions and gaming equipment. EEE is not just common in our homes, but also in our places of work and national infrastructure. Electric cars and solar panels are also increasingly important features of the e-waste supply chain, although managing these waste streams is less problematic than for smaller 'consumables' that are more likely to end up in landfill.

Batteries are not technically included in E-waste schemes and statistics but are an important waste stream in their own right, raising similar issues to WEEE. Remove any batteries from devices, recycling them separately.

mostly through independent businesses. Keep an eye out for this – it can help you access technology while ownership is retained by the provider; the item is therefore more likely to be re-used, refurbished or recycled once you return it.

When it comes to smartphones… **if you must have new** then consider the environmental credentials of companies like Fairphone and Shiftphones that offer modular phones for easy repair. They may seem expensive at first, but they'll probably last longer. To understand the issues and options you can also use consumer advice services like Ethical Consumer or the Good Shopping Guide.

Donate

There are also lots of options for just passing on items for free, to people who can make use of it. To get started you can use our Re-use tool to search for organisations to which you can donate. Also:

- Widespread online services like Freecycle and Freegle make your offerings available to a wide audience.
- Many local charities and social enterprises will happily take your equipment, so it's worth a web-search or just asking around. Examples that take IT equipment include EdinburghRemakery (Edinburgh) and ReMadeNetwork (Glasgow).
- People Know How accept computers, tablets and smartphones for their social projects.

Repair, Restore, Care

This may seem obvious, but first of all we just need to look after our stuff so it lasts!

- If it has a screen, give it physical protection (case; screen-protector) but also avoid display burn-in by reducing brightness and setting a screen timeout (especially for OLED displays).
- Update any software and protect it from malware.
- Avoid using tech over a sink, bath, toilet (!) or anywhere it might get wet or fall from a great height!
- Look after those lithium-ion batteries: they'll last much longer if not left plugged in overnight (charge in short-bursts).

For smartphones, if you're lucky enough to have a modular phone, like Fairphone or Shiftphone, then getting it repaired easily is what they're all about. For other smartphones check with whoever you bought it from – they may well have a repair service, especially if it is in warranty. Many other electricals (e.g. tools, white goods, small appliances) will also be repairable under warranty – **keep your receipts and warranty forms!**

Even if these aren't possible, there are other options for repair of electronics and electrical items, including:

- Online services and store-based experts like CeX offer **repairs** of phones, consoles, laptops and tablets. Web searches will show up local and national services. Local examples include ReMade in Edinburgh and Transition Stirling.
- iFixit is stuffed with guides on how to **fix all sorts of stuff for yourself** and sells parts. There is also a wealth of similar advice on YouTube and other online resources. However, there are inherent risks here, so you need to take personal responsibility for anything that goes wrong. eSpares is also a good resource for parts for electricals and electronics.
- **Repair cafes** are on the rise, providing an opportunity to learn by doing with guidance from someone who already knows what they're doing! There aren't many permanent ones in Scotland yet but look out for pop-ups. For example, see Repair Cafe Glasgow, Transition Stirling, Edinburgh Remakery and Hatton Repair Cafe.

Share, Borrow and Hire

There are lots of electrical items we only need to use occasionally, particularly tools for DIY and gardening, so there's no reason why we should all need to own one. For really specialist equipment you should go to a professional service, but for a lot of other things the local 'tool library' is becoming very popular. Try a web search to see what there is near you. Examples include:

- Crieff Tool Library
- (Glasgow) Southside Tool Library
- Glasgow Tool Library
- Edinburgh Tool Library
- Transition Stirling
- Transition Linlithgow
- Cumbernauld Tool Library

Recycle

If you're sure it's a dud then recycling is what to do.

For most electrical and electronic items, your **local council** probably has a good **recycling facility** nearby, and for bulky items you can often arrange a pick-up (there may be a small fee for pick-ups). A quick internet search will tell you all you need to know including their opening hours.

Many businesses have schemes for taking your old equipment for recycling (or refurbishment) when you buy something new or refurbished (see 'Buying and Selling' advice above). However, sometimes you have to ask. If you're lucky you might even get a discount for a trade-in. Companies delivering bulky white goods can also often take your old items away for recycling (e.g. Currys; John Lewis), although there may be a fee for pick-up.

From January 2021 large UK retailers of electronics are required to take back WEEE in-store.

- *Large items can be returned when another is bought*
- *Retailers with >400sq.metres of floor space must take 'very small' items even if there is no other purchase.*

From 2022, online retailers will also have obligations.

There are a growing number of **charities, social enterprises and independent businesses** who will take certain types of equipment, often providing local employment and training opportunities where they are needed. A web-search will often help you find local services, but here are a few examples:

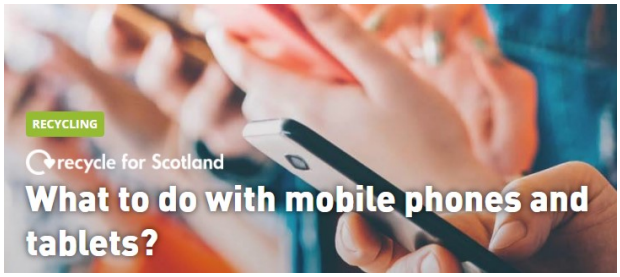
- Recycling for Good Causes
- Open To The Public - WEEE Centre (Perth)
- Domestic WEEE Recycling (Dundee)
- WEEE Scotland | Circular Glasgow

Here are some other resources to help you find locations and services for recycling:

- Our recycling locator
- Our guide on what to do with batteries
- RecOlight light bulb recycling advice

Total circularity of materials for electrical and electronic items cannot yet be achieved, so there will be a need for some new mineral extraction. But by being more efficient and less wasteful we can substantially reduce our planetary impact. ***WEEE presents us with one of the biggest opportunities for more sustainable behaviours.***

Further guidance from Zero Waste Scotland:



If you want to dive even deeper, see these:

- E-waste… a huge problem… a golden opportunity. World Economic Forum, 2019.
- A New Circular Vision for Electronics. World Economic Forum, 2019.
- An assessment of the risks and impacts of seabed mining on marine ecosystems. F&F Intl., 2020.
- Challenges to the sustainability of deep-seabed mining. (Levin *et al*., 2020. In: Nature Sustainability)
- Deep-Sea Misconceptions… of Seabed-Mining (Smith *et al.,* 2020. In: Trends in Ecology & Evolution).
- In Too Deep: What We Know and Don't Know About Deep Seabed Mining. WWF, 2021.
- The Deep-Sea Podcast 006 - Deep-sea mining special — Armatus Oceanic
- IUCN Issues Brief: Deep-sea mining.
- Mineral Choices knowledge sharing platform – designed for citizens, developed by scientists.
- The Global E-waste Monitor. Quantities, flows, and the circular economy potential.
- Minerals in Depth – the story of seabed minerals.
- DOSI webinar recording: an introduction to deep sea mining

People Ocean Planet (POP) is a behavioural change initiative, rooted in Scotland's marine science community but with an interdisciplinary approach to tackling global challenges for the ocean environment. POP aims to bridge gaps: **from knowledge to empathy and optimism**, and **from good intentions to action** across society. A foundational step is to improve public knowledge of major challenges for the ocean, the human drivers and the solutions as they relate to our day-to-day lives. www.peopleoceanplanet.com

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