ELLEN MACARTHUR FOUNDATION

CIRCULAR ECONOMY GROWTH POTENTIAL BY SECTOR

Electronics

Introduction

The circular economy is built on three principles, driven by design: eliminate waste and pollution, circulate products and materials (at their highest value), and regenerate nature. A circular economy gives us the tools to tackle climate change and biodiversity loss together. It can scale fast across industry to create value and jobs, while increasing the resilience of supply chains and delivering massive economic growth potential.

Circular economy opportunities can be found in nearly every sector in the global economy. The plastics, fashion, and food sectors stand out as some of the most likely to be significantly impacted or even disrupted by the circular economy in the near term, driven by innovation, regulation, and evolving customer preferences. The electronics, transport, and technology sectors also have high circular economy growth potential.

Moving from a linear to a circular economy is not only about financing perfectly circular companies or turning away from extractive ones. This transformation will require all sectors to shift fast and at scale to achieve climate targets and build a resilient economy.

This document provides a qualitative assessment of circular economy growth potential across electronics.

A full sector-by-sector analysis can be found in our paper Financing the circular economy: capturing the opportunity.

Electronics

Key circular economy strategies

- Design products for repairability, disassembly and recyclability, using recycled materials
- Keep electronics in use for as long as possible through circular business models (e.g. rental or product-as-a-service) and by repairing, refurbishing, reusing, reselling, repurposing or remanufacturing components and products
- Maintain value of materials by collecting, sorting, separating, and recycling materials after a product's useful life

Drivers of circular economy growth potential

Innovation and corporate action	
Increased demand for finite resources	• Increase in urban mining/recycling efforts as the demand for rare earth metals rises in the electronics industry, with only 1% of rare earth elements currently being recycled
Innovation	• Technologies such as IoT, AI, 5G, or blockchain are enabling new business models (e.g. streaming services, subscription models) • Emerging design for repairability and reverse logistics solutions

Policies and regulation	
Increasing policies and regulation	• Increasing directives and regulation, such as new EU circular economy Action Plan, national policies and regulations (e.g. in Malawi, South Africa), right-to-repair, restrictions on hazardous substances, EPR on Waste Electrical and Electronic Equipment (WEEE) (e.g. China's Regulation on the Administration of the Recovery and Disposal of WEEE; South Korea's EPR scheme for e-waste covers 27+ products nationally)
Political priorities	• Mounting political interest in access to rare earth metals (e.g. EU critical raw materials work), reinforced by Covid-19 crisis and geopolitical tension (e.g. US-China trade)

Customer preferences and macrotrends	
Changing preferences and behaviour	• More and more customers are opting for cheaper, as-new refurbished electronics or access-over-ownership models to get access to newest products, especially in the fast-moving electronics space

Types of circular economy opportunity areas

- Circular design and innovation
- Circular business models
- Reuse, repurpose, and redistribute
- Repair, remanufacture, and refurbish
- Collect, sort, and recycle
- Regenerative and renewable practices and materials
- Enabling digital technologies

Current circular economy opportunity areas

Electronics resale platforms and refurbished electronics marketplaces

Repair, maintenance, and upgrade of devices

Disassembly and recycling technologies

Access-over-ownership business models
(e.g. rental, peer-to-peer lending or subscription pay-per-use models)

Electronics reverse logistics/infrastructure for collection and sorting

Examples: **Large corporates**

Apple
have committed to use 100% recycled or renewable resources in all products in future and use customer returns programmes and robotic disassembly to increase material recovery from used iPhones

HP
offers an IoT enabled subscription model ('printing-as-a-service'), closed loop cartridge recycling, and has partnered with Sinctronics to recover and create value out of HP end-of-use electronic equipment

Dell
designs products for reuse, repair, and recyclability, and committed to source 100% recycled or renewable materials for packaging by 2030

Samsung
offers subscription models that allow an upgrade to the latest device for a monthly fee

Cisco
has pledged 100% product return using returns programmes to repurpose, repair, refurbish, and remanufacture telecom equipment

Electrolux
is trialling subscription pay-per-use business models for hardware products in China and Sweden

Reclite
collect, transport, and recycle waste electronics in South Africa and surrounding countries

Examples: **Innovators**

Grover
offers 'pay-as-you-go' subscriptions to the latest user tech, including e-scooters

Fairphone
offers a modular mobile phone, allowing customers to replace and upgrade parts easily

Teleplan
offers lifecycle care of technology products, focusing on screening and testing, repairing and refurbishing, and recovering value from large flows of used electronics

Refind Technologies
develops systems for automatic classification and sorting of e-waste, such as batteries and phones

Back Market
is a marketplace for refurbished consumer electronics and recently raised USD 120 million from Goldman Sachs, Aglaé Ventures, and Eurazeo Growth[1]

ReUrbi
collects discarded IT equipment from businesses, then dismantles/refurbishes it and sells it under the Remakker brand, including warranty and technical assistance, at prices that are up to 50% lower than for new products

Close the Gap
refurbishes and redistributes used IT equipment for educational, medical, and social projects in developing and emerging countries

Endnotes

1 TechCrunch, 'Back Market Raises $120m for Its Refurbished Device Marketplace' (5th May 2020)

The Ellen MacArthur Foundation, an international charity, develops and promotes the circular economy in order to tackle some of the biggest challenges of our time, such as climate change, biodiversity loss, waste, and pollution.

We work with our network of private and public sector decision-makers, as well as academia, to build capacity, explore collaborative opportunities, and design and develop circular economy initiatives and solutions.

Increasingly based on renewable energy, a circular economy is driven by design to eliminate waste, circulate products and materials, and regenerate nature, to create resilience and prosperity for business, the environment, and society.

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