



EU4Environment Green Economy in Eastern Partner Countries





Towards the Circular Economy in Ukraine



















OVERVIEW

Ukraine's electronics & information and communications technology depends on a globalized network of production and distribution. Its value added is not only in material hardware, but in the rapid innovation of software and 'use-ware'.

Overall, electronics & information and communications technology in Ukraine includes a huge range of products, markets and infrastructures: from household electronics (TVs, phones, etc), to commercial and industrial systems, with countless components and peripherals (batteries, leads, drives, etc).

Which are the opportunities **?**

While many products reduce in size, their complexity increases, along with their built-in obsolescence. Many devices are still unregistered or illegal imports and more difficult to regulate. Critical raw materials are key to electronics & ICT production, with growing shortages on world markets, and Ukraine could benefit by growing domestic production.

On the demand side, consumers struggle to keep up with latest models, and packaging multiplies up: devices come with many cables, power packs etc, and many product types are difficult to recycle or recover for high value materials.

The volume of WEEE ('waste electrical electronic equipment' or e-waste) in Ukraine is estimated at 300-350 thousand tons per year. The WEEE management system includes some formal channels with licensing for hazardous waste. There are parallel systems where informal collectors operate, with private take-back schemes and collection initiatives, with the remaining WEEE dumped or put into general waste.

CIRCULARITY PATHWAYS

These pathways show a broad combination of actions from all stakeholders, starting from now and looking towards a 'future horizon' of 15-25 years.



'Technology for life' pathway

For the electronics and ICT supply chain, both international and national, it is important to combine trade and import regulation, with market development for re-use and recycling. The hyper-rapid product innovation cycle can over time be steered towards the common circular economy menu: extended product life, producer responsibility, take-back policies, leasing models, reverse logistics, design for repair and dis-assembly. The full digitalization of the wider economy is also involved, where in the near future, almost all businesses will be SMAC (smart, mobile, AI, cloud-based), and then large hard-wired installations may be obsolete 'waste'. So as and when Ukraine sets up new centralized infrastructures such as server farms, intensive of energy and water, these need to be integrated to the 'electronics and ICT circularity' program.



'Device literacy' pathway

On the consumer and demand side the agenda is about behaviour change in households businesses. and social innovation and local enterprise. Α coordinated programme of public infrastructure would include hubs for reverse logistics, local repair / re-purpose shops, social re-use / sharing schemes, and skills training for recycling and recovery.

This also involves a re-think of the local repair shop economy, with high value skills training, coordinated distribution of components and ancillaries, infrastructure for disassembly and recycling, and product quality standards schemes.







'Industry 5.0' pathway

This pathway has high aspirations: full digitalization and transformation to a future 'smart-wise' economy and society, as seen for example in the Baltic states. The '5.0' refers to the EU 'Industry 5.0' programme, which aims to integrate a fully digital industrial economy with social and ecological transformations. The '5.0' starts with government and public services, extends to all branches of economic activity, and then engages with social and ecological enterprises. The 'electronics and ICT circularity' then takes an essential role in the transition towards 100% re-use and recycling. Government takes the lead role in full digitalization, with strategic programmes for procurement and innovation based on 'circular economy' principles.



When to start? 3 horizons for electronics and ICT

The pathways above then fit into the longer view, with the 3-horizon perspective:



Summary of three horizons

ELECTRONICS and ICT	Horizon 1: 1-5 years	Horizon 2: 5-10 years	Horizon 3: 10-25 years
Business	Support micro-start-ups for circular design, re-use, repair	Set up national industrial strategy and tech transfer	EU and global trade alignment for circularity and critical materials
Governance	Set up EPR and EPL regulations and incentives	Public procurement for circular devices and systems	Set up Digitalize-Industry 5.0 - public and private partnership programme
Social	Promote awareness and skills for circularity systems	Industry skills programme and logistics for re-use and repair	Plan for 'Smart cities and communities' with embedded circularity
Technology	Support design innovation for disassembly, repair	Mobilize national CE-digitalization hubs & platforms	Strategic innovation for full economic digitalization
Industry	Build capacity in tech and skills for industrial CE	Promote advanced materials and component manufact	Develop industrial symbiosis for material inter-change
Infrastructure	Set up infrastructure for e-waste recycling	Advanced infrastructure for critical materials security	Develop logistics platforms for circular materials

CIRCULARITY IN ACTION

Here are some examples from forward looking enterprises: from advanced recycling, to 'product as service' rental and repair, to industrial cluster building.



Recycling electronic waste by separating metals

... with mechanical processing of radio parts and cables, and the use of an electrostatic corona separator. This can work with scrap metals such as copper, nickel or bronze, and various combinations of metals and plastic. With this separation technology there is a ready stream of metals from households and firms, suitable for further production of electronic components.



Apple equipment repair and refurbishment

This provides repair, refurbish and sales services for Apple equipment. Remanufacturing and refurbishing used iPhones and iPads allows for re-use at discount prices, rather than recovery or disposal. Since 2016 more than 50,000 devices have been refurbished and 927 tonnes of waste avoided. An example of a refurbished device here is the Apple iPhone13 Pro.





Rental of photocopying and printing equipment

This shows the 'product as service' and 'extended producer responsibility' models, with the combination of selling, leasing, maintenance and repair of office equipment. Even in fully digital firms printing or copying may be needed, with short / long-term rental for printers, scanners, copiers and multifunction devices.



Recycling of mercury-containing equipment

This state-owned enterprise operates on a zero waste closed-loop basis, with recycling services provided free for the public and paid for companies. The service includes mercury-containing equipment, such as batteries, compact fluorescent lamps, or medical thermometers. Since 2016, 2.5 million fluorescent lamps and 35,000 mercury thermometers were recycled, preventing risk of mercury contamination of soil and water.



Circular phones with a 'Product as as Service (PaaS)' business model

Commown is a French cooperative that offers Fairphones and computers to private users on a monthly subscription, with the PaaS model designed by Circle Economy. The Fairphone products are industry standard, ethically sourced and designed for repairability.



At the forefront of electronics recycling in Europe

Ecotrel, the WEEE recycling association for Luxembourg, has launched a "circularity and solidarity cluster" of business and social enterprises. These take back WEEE for re-use, disassembly or recycling, and also to manage the data still stored in the devices.



BUSINESS AND FINANCE

For business and finance, new models can emerge for electronics supply chain transparency, product passports, and business and finance models to promote product re-use, repair and re-engineering. A fundamental issue is how far Ukraine should or could set up national production systems, to overcome its import dependency.

POLICY GOVERNANCE

For policy-governance: the ministries of economic development and digitalization can collaborate for joint coordination of standards, compatibility, regulation, with forward finance for EPR and service models. The national agenda for full digitalization needs to include circular principles from the beginning, motivated by the national development agenda.

CIVIC SOCIETY

For civic society, there is an urgent need to promote social practices and infrastructures for product repair, re-engineering, and sharing. For design - technology - innovation systems, there is a shift in the electronics and ICT industries towards standardized product design for reuse and re-engineering. There is also a focus on the energy sources for central servers, and the life cycle impact of material inputs.

ENVIRONMENTAL MANAGEMENT IN INDUSTRY

For environmental management in industry, there is a need for coordination of the Ukraine minerals sector with EU 'critical raw materials' policies and support systems.

URBAN INFRASTRUCTURE

For urban infrastructure, new systems for reverse logistics are needed for product and component re-use, re-engineering, recycling, with urban and regional hubs and exchange platforms.





WHAT IS A CIRCULAR ECONOMY?

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UNIDO defines circular economy as an industrial economy that routes materials, parts and products back into use several times and creates more value and less waste. It is an alternative, in which value is maintained for as long as possible, products are designed to last, and the generation of waste is minimized.

This booklet is one of six publications dedicated to 'Key Product Value Chains' reviewed in the Exploratory Foresight Study: constructions, food products, electronics & ICT, textiles, plastics and packaging, and waste management.

Case studies are based on the National Circular Economy Case Studies and are available at: http://www.recpc.org/recp-case-studies-en/

Examples from other countries are from the https://circulareconomy.europa.eu/platform/en/good-practices

For more information about the UNIDO Green Recovery Programme for Ukraine please visit: https://www.unido.org/green-recovery-vision-ukraine

Exploratory Strategic Foresight for Circular Economy in Ukraine: Final report | <u>https://shorturl.at/tsy63</u> Circular Economy for Industrial Development in Ukraine: Baseline Study | <u>https://shorturl.at/DHscb</u> UNIDO Online Training on Circular Economy in Ukraine | <u>https://shorturl.at/qfv4S</u>

> More about Circular Economy in Ukraine is available at the **RECP Centre** page at <u>http://www.recpc.org/circular-economy/</u>

EU4Environment Action (2019-2024) helps the EU's Eastern Partnership countries preserve their natural capital and increase people's environmental well-being by supporting environment-related action, demonstrating and unlocking opportunities for greener growth, and setting mechanisms to better manage environmental risks and impacts.

For more details, visit: <u>www.eu4environment.org</u>

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