



Towards the Circular Economy in **Ukraine**

WASTES





OVERVIEW

Here the key transformation of the circular economy is explored – creating **‘resources’** from **‘wastes’**. This is about all materials in all sectors, with a focus on the downstream or ‘end-fate’ part of the chain. This transformation involves rethinking business models, industrial logistics, household practices and more. Starting with the new national Law on Waste Management, pathways are presented towards full ‘industrial symbiosis’, where all wastes can be resources with value in other sectors.

Firstly, the scope of waste management includes industrial and commercial, municipal, and ‘special’ wastes such as clinical, toxic or hazardous, and radioactive ones. In more detail there are industrial products such as batteries, lighting, plastics and WEEE (waste electrical & electronic equipment), which appear in other KPVCs. The larger waste volumes from construction and demolition, and agriculture are presented separately in other booklets.

Which are the opportunities?

While the EU has set a target of 50% household waste recycling by 2030, currently Ukraine is less than 10%. There is large scale disruption to waste management infrastructure in or near the war zones, and major post-conflict contamination, pollution, general debris and wastes of all kinds.

The majority of industrial waste is sent to landfill or abandoned, with lack of investment for modernization. From UKRSTAT data for 2020, 9% of Municipal Solid Waste was recovered, 3.73% incinerated, and 87.67% was landfilled. Landfill tax is far below EU levels (0,15 EUR per tonne, versus for 107 EUR per tonne in the Netherlands). There is a lack of facilities, technologies, finances etc. for upgrading waste management, and lack of awareness in business and communities.

However, the Law of Ukraine "About waste management" is now in progress: many products are already repaired and re-used by necessity, and even in war conditions many new circular type enterprises are emerging.



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.



‘Waste not want not’ pathway

The circular economy starts with the domestic economy of households and communities, where re-use repair and recycling can grow, in kitchens, gardens, local shops and local workplaces. This calls for public education and awareness, which then enables social enterprises for re-location and re-purposing of items such as clothing, furniture, household equipment.

This pathway also starts with creating infrastructure at the local level, both physical logistics and material exchanges, and the economy of local business activity and investment. Technology will also help via data management on wastes and resources, platform marketplaces for exchange, and advanced materials. This combines with demand-driven innovation for products which are long-lasting and easily repaired or recycled.



‘Resources for life’ pathway

This pathway starts with the results of the ‘food products’ value chain. On the household and demand side, composting of kitchen and garden waste can provide valuable materials for fertilizers and conditioners before recovery for the industrial system. For retail and catering operations, food management of product quality and sell-by dates, and then sharing of surplus via food banks and similar, are the practical solutions.

On the industrial side, agricultural and forestry waste can be bio-methane, and industrial bio-waste can help to nurture agricultural production and fish farming. Technology innovation is crucial, with a rapid shift of many industrial components and products towards bio-degradable materials, which can then enter the bio-industrial system.



'Symbiosis for growth' pathway

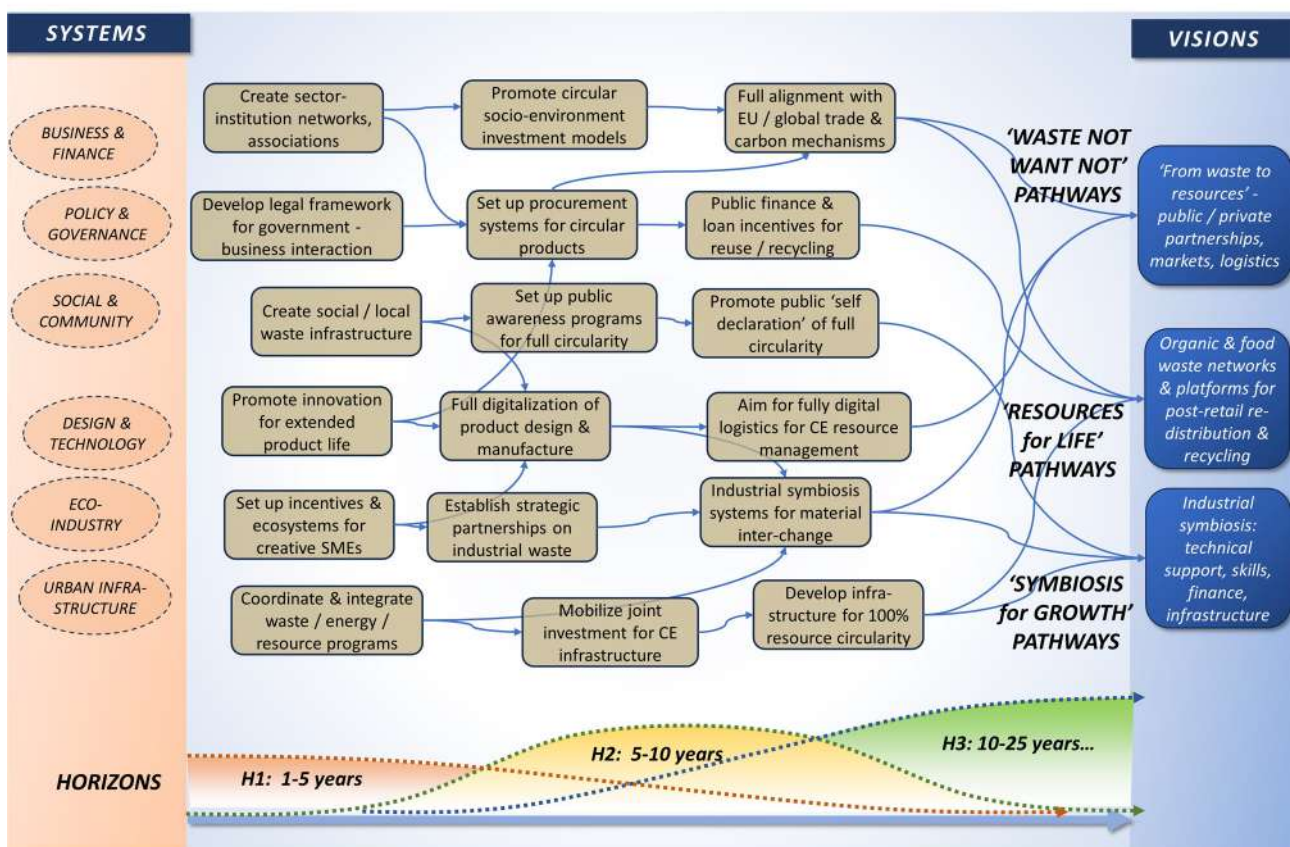
Industrial symbiosis is the guiding principle, for an extended systems and networks of circularity in resources, primary materials, components, semi-finished and final products. The ongoing modernization and digitization of the wider economy will have a key role to play in logistics for resource management, with technologies such as robotic separation, component RFID tracking, smart AI-driven logistics and energy and materials platforms.

Over time all new materials in products and packaging will be designed for easy separation, recycling and recovery.

The key to success is in practical 'valorisation' of the circular economy potential for almost all material-based firms, with business models, financial models, production lines and extended service systems. This depends on new levels of cooperation along the value chain, where the opportunities for symbiosis are created and tested at each stage of production.

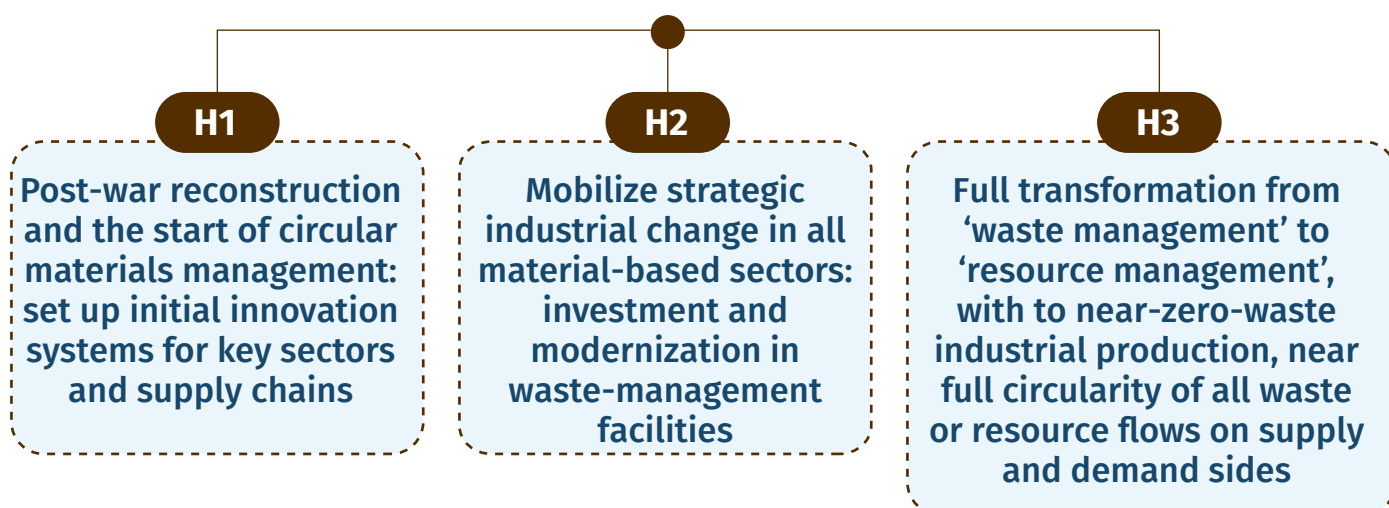
'WASTES' – PATHWAY MAPPING

Outline of pathways, from social / technical systems, to the KPVC 'visions'. (Source: JRA)





When to start?



Summary of three horizons

WASTES	Horizon 1: 1-5 years	Horizon 2: 5-10 years	Horizon 3: 10-25 years
Business	Create sector-institution wide networks, forums, associations	Promote circular socio-environment investment models	Full alignment with EU and global trade and carbon mechanisms
Governance	Develop legal framework for government - business interaction	Set up procurement systems for circular products	Public finance and loan incentives for reuse / recycling
Social	Create social and local waste infrastructure	Set up public awareness programmes for full circularity	Promote public 'self declaration' of full circularity
Technology	Promote innovation for extended product life	Full digitalization of product design and manufacture	Aim for fully digital logistics for CE resource management
Industry	Set up incentives and ecosystems for creative SMEs	Establish strategic partnerships on industrial / special wastes	Industrial symbiosis systems for material inter-change
Infrastructure	Coordinate and integrate waste / energy / resource programmes	Mobilize joint investment for CE infrastructure	Develop infrastructure for 100% resource circularity

CIRCULARITY IN ACTION

Here are some examples from forward-looking enterprises in circular economy and resource efficiency, in Ukraine and nearby: from advanced manufacturing, niche design, and industrial processes, to socio-eco enterprise and AI / IOT experiments.



Oberbeton



By-product production and waste reuse

This manufacturer of prefabricated concrete components follows European production standards, with modern equipment and operational test benches. The company applies circular principles for re-using or recovering waste material wherever possible. With by-product optimisation of slab cutting, and increased sales of cut slabs through improved marketing, waste generation is reduced by 75%, or about 1,011 m³ per year. The waste from round hollow core slab moulding is then used to make foundation blocks, with 4,843 tonnes per year recycled back into production.



Ochis



Coffee grounds into glassware production

Who knew that eyewear and sunglasses can be produced from coffee grounds (cake) and a biopolymer based on vegetable oils? First, coffee grounds are collected from coffee shops around Kyiv: the waste is dried and mixed with natural oils: the material is pressed into sheets, and frames are cut on a milling machine: the frames are then hand polished to perfection. Ochis is a creative example of turning 'ordinary waste' into a valuable material.

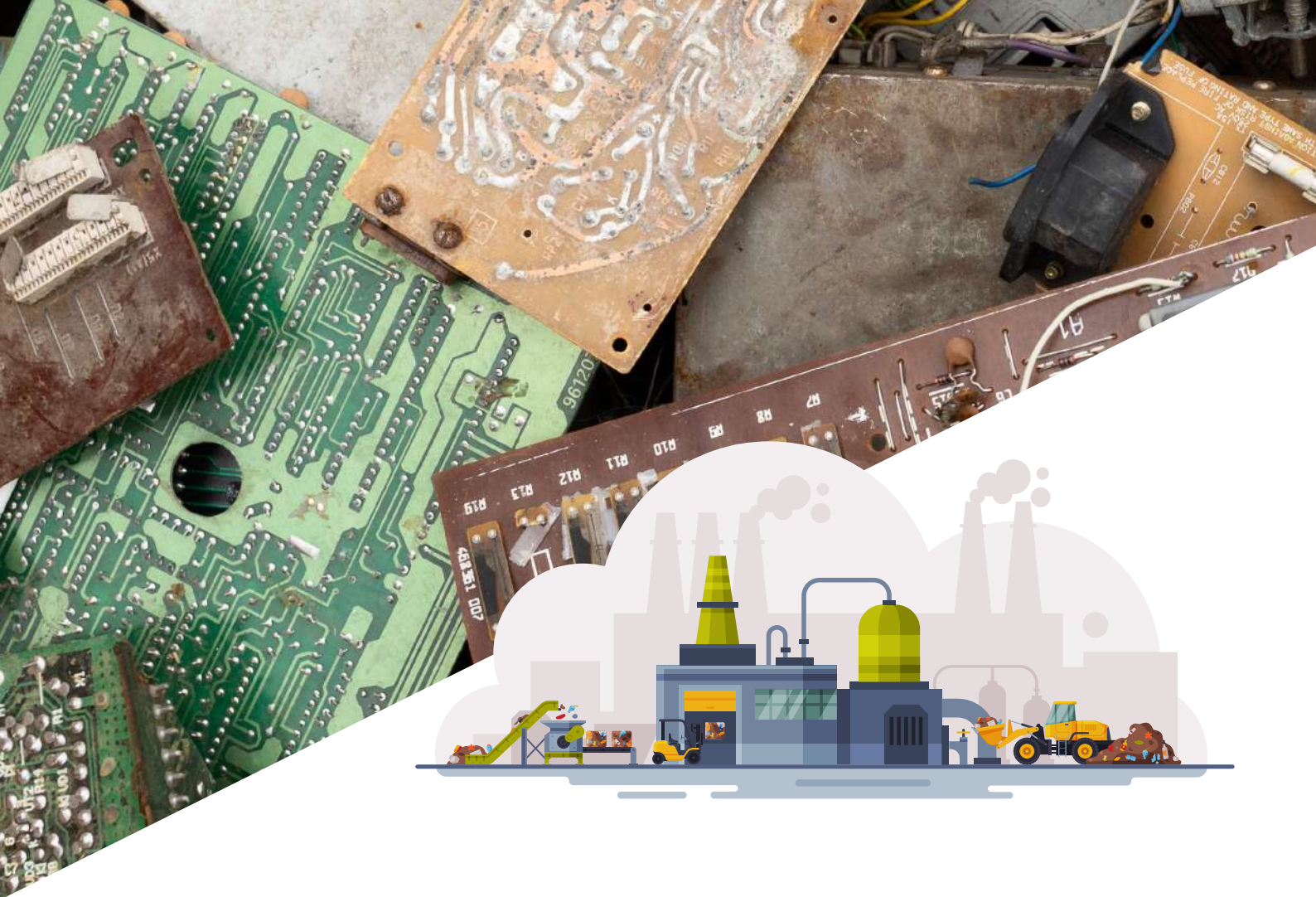


Ecointel



Collection and disposal of used fats and waste

Many lubricants for motor vehicles, special equipment, agriculture and industry are toxic or hazardous. This firm provides an essential service for management and 'regeneration' of used oils. Some used oils can be reused many times, with various options: regenerated special lubricant can be used as ordinary motor oil, or the same regenerated oil can be re-used as fuel oil.



Po-Dzielnia

The Polish Sharing Economy Centre

This is a free-shop and sharing economy centre in Poland, run by a team of volunteers and activists. They aim to show how social innovation and cultural awareness can be the key to behaviour change and the 'circular social economy'.



ConnectedBin



Artificial intelligence and Internet of Things for smart waste management

This Bulgarian company uses AI and an IOT system which reports on waste types and amounts. Once (retro)fitted with ConnectedBin's sensor devices, the waste containers get "eyes and ears" and can communicate wirelessly with the cloud-based server, to increase the efficiency of the waste collection system.



WASTES CIRCULARITY, NEXT STEPS

The examples above show the potential for business, government, technology, and civil society to work together, creating high-value resources from low-value waste.

BUSINESS AND FINANCE

For business and finance, there is growth potential for a whole new sector of ‘wastes to resource management’ – high value, hi-tech and high-skill. This depends on investment and business models for integrated supply-demand chains, and a general transformation from ‘products’ to ‘services’.

GOVERNMENT AND POLICY

For government and policy, the lead role is in coordination of public-private partnerships for integrated supply-demand chains. This depends on a policy framework of regulation, investment, procurement, EU alignment and trading standards: with a general transformation from ‘regulation’ to ‘partnership’.

CIVIC SOCIETY

For civic society, promotion of public awareness and worker skills combines with support for social and ecological enterprises. These show new models for product sharing, re-use, re-purpose, and recycling, starting with health and education services.

DESIGN, TECHNOLOGY AND INNOVATION

For design-technology-innovation systems, integrated supply chain design is now emerging, with innovation in bio-materials, synthetics and nano-materials. Full digitalization is also an opportunity for AI-IOT logistics and resource management systems.

ECO INDUSTRIAL

For eco-industrial management, there is a strategic re-thinking of industrial processes and components, from ‘resource efficiency’ to ‘resource circularity’.

URBAN INFRASTRUCTURE

For urban infrastructure, post-war reconstruction can combine with retrofit of housing and workplaces to support sharing, re-use and recycling of common materials and products.

Overall, Ukraine at this critical moment has immense potential and huge resources, for the transformation towards a more efficient, sustainable and circular resource economy.





WHAT IS A CIRCULAR ECONOMY?

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/recpc-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 | <https://shorturl.at/tsy63>
Circular Economy for Industrial Development in Ukraine: Baseline Study | <https://shorturl.at/DHscb>
UNIDO Online Training on Circular Economy in Ukraine | <https://shorturl.at/qfv4S>

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

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