SOUND MANAGEMENT OF WASTE & CHEMICALS REQUIREMENTS BY THE RECYCLING INDUSTRY

EuRIC

EuRIC AISBL – Recycling: Bridging Circular Economy & Climate Policy

OUTLINE OF THE BROCHURE

1 

Circular economy

The importance of recycling to close the loop within the value chain

2 

Recycling industry

State of the Art

3 

The presence of chemicals of concern (e.g., SVHCs)

How do they affect the recycling industry?

4 

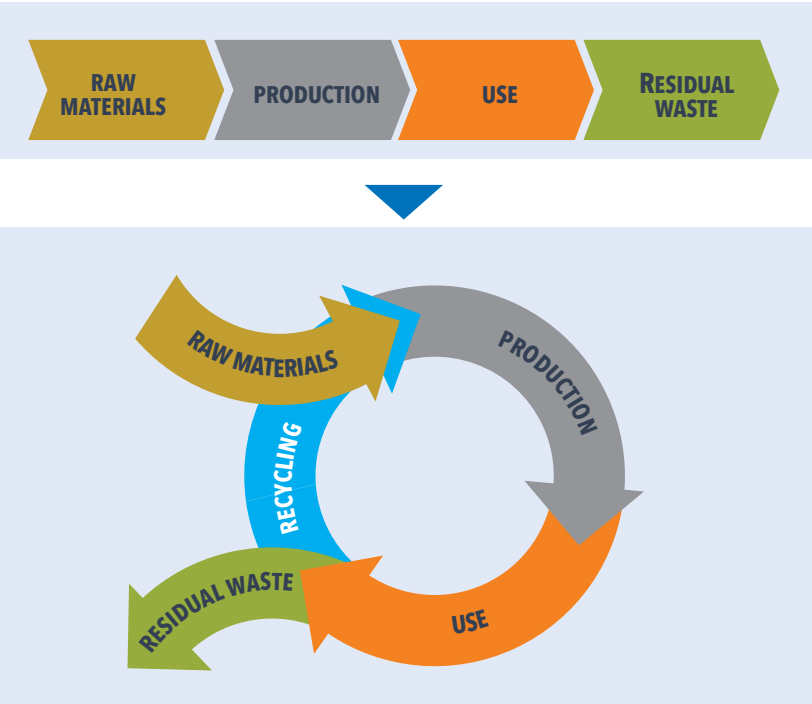
Potential solutions and future work

to address the concerns

1 Circular Economy

The importance of recycling to close the loop within the value chain

Linear economy
Traditionally, the dominant practice of business in production industries has been based on a **Linear Economy** model: using raw materials to produce a product and indirectly a waste that needs to be further disposed.



With a growing world population, the amount of raw material requirements has increased exponentially causing significant negative impact on the social and natural environment. In response, the only long term sustainable alternative is a more **Circular Economy**, where resources are handled more efficiently.

Circular economy
The **Circular Economy** model aims to create value from waste by recovering and reusing resources. In all areas, waste is generated both in production and use. Recycling can close the loop by significantly reducing the consumption of raw materials, saving both, energy and CO_2 emissions.

A Circular Economy aims for the creation of economic value, revalorizing waste and producing at a lower cost, while the economic value of materials and products increases.

A Circular Economy aims for the creation of social value, inspiring people to rethink and redesign, fostering innovation and creativity to meet societal, economical and environmental needs.

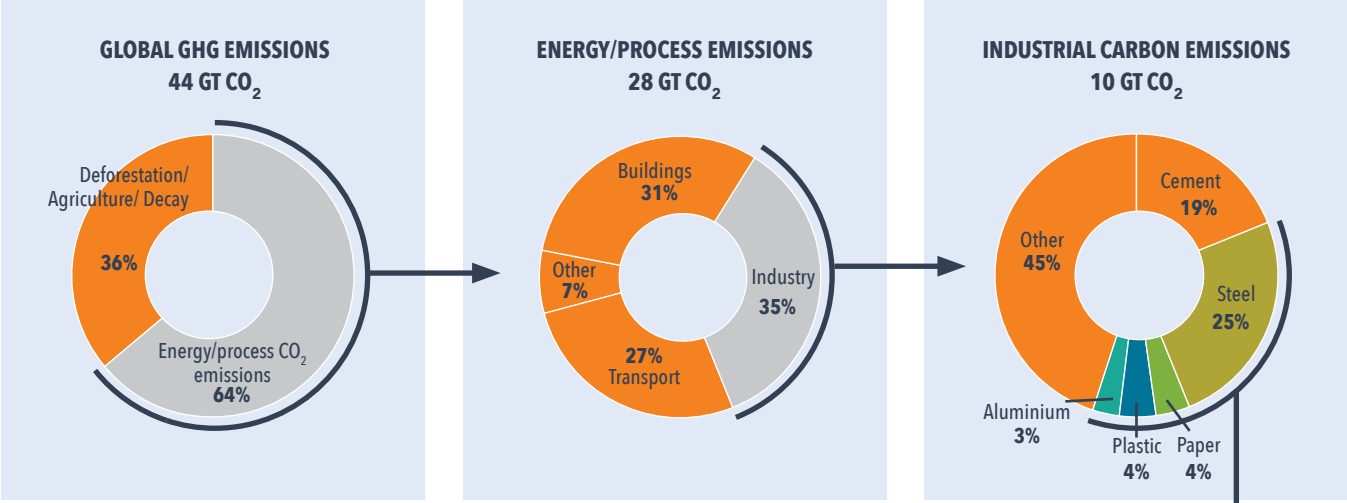
A Circular Economy aims for the creation of environmental value, by reducing raw material dependency and waste disposal, which contributes to an increase in the resilience of natural resources and the prevention of contamination.

A Circular Economy is not viable without the recycling industry

Recyclers operate at the end and at the beginning of the value chain, by recovering materials from End-of-Life (EoL) products, and reintroducing them at the beginning of the process value chain.

2 Recycling Industry
Environmental benefits

Primary production related Greenhouse Gases (GHG) emissions



Source: Allwood, J.M.; and Cullen, J.M. (2011). Sustainable materials – With both eyes open, UIT Cambridge. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.592.9544&rep=rep1&type=pdf

Recycling materials saves both CO_2 and energy compared to primary production

Table presenting avoided CO_2 emissions and energy consumption for each recycled material.

		CO_2 savings	Energy savings
Metal	Aluminum	92%	95%
	Steel	58%	72%
	Copper	65%	85%
Paper		18%	47%
Glass		87%	82%
Plastic	HDPE	89%	89%
	PET	70%	83%
Textiles		98%	99%
Tyres		88%	85%

Source:
- *Metal - BDSV (2019). The future of the steel scrap. Technical, economic, ecological and social characteristics of steel recycling. Results of the Fraunhofer Institute's UMSICHT study on the future of steel scrap – An investigation for the BSDV. Retrieved from https://www.bdsv.org/fileadmin/user_upload/030-Bro-ZuSt-Eng_WEB.pdf*
- *Metal and paper - Grimes, S.; Donaldson, J.; and Cebrian Gomez, G.(2008). Report on the Environmental Benefits of Recycling. Nominated commodities: Aluminium, Copper, Ferrous and Paper. Bureau of International Recycling (BIR). Retrieved from https://www.mgg-recycling.com/wp-content/uploads/2013/06/BIR_CO2_report.pdf*
- *Metal, glass, plastic and textiles - FEDEREC (2017). Environmental Assessment of Recycling in France according to Life Cycle Analysis Methodology. Press Conference. Retrieved from http://avnir.org/documentation/congres_avnir/2017/PPT/Recyclage_Federec_Congres_avniR_2017.pdf*
- *Tyres - Aliapur (2010). Analyse du cycle de vie pour 9 voies de valorisation des pneus usages non reutilisables. R&D Aliapur. Retrieved from https://www.aliapur.fr/fr/mediatheque.html#bibliotheque*

Recycling also helps to create local jobs and reduce the dependency over extra EU material supply…

2 Recycling Industry
State of the Art

What is mechanical recycling?

Sorting of waste, mechanical separation (shredding, crushing, etc.) followed by physical separation (density-based, infra-red, Eddy current separation, etc.), which can recover materials and remove impurities.

RECYCLING

Recycling-related technical specificities

The **input** for any recycling operation is highly variable and its composition is non-homogeneus but the **output** is highly stable in content: standards and specifications exist for recycled material quality.

- E.g., There is about 50 types of recovered paper.

Waste entering the recycling facilities can contain substances of concern but the largest part is removed during the treatment processes.

- E.g., Pb treated during smelting, or BFRs during sink-float process.

INDUSTRY

Industrial economical specificities

Recycling can only be viable if **important quantities** are treated in a short time, and in industrially efficient processes.

Primary raw materials are frequently cheaper than secondary raw materials.

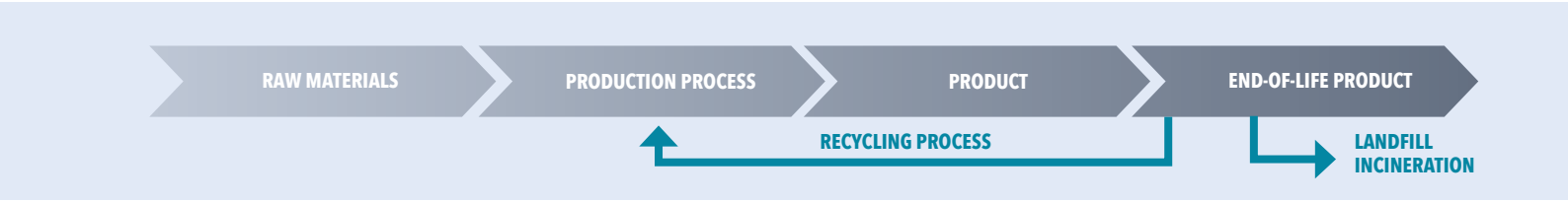
As they were obtained from waste products not designed to be recycled, recycled materials may contain unwanted materials lowering their value. Therefore, design-for-recycling plays a key role.

3 The Presence of Chemicals of Concern (e.g., SVHCs)

How do they affect the recycling industry?

The presence of substances of concern in the recycling process

One of the main challenges associated with the Circular Economy is the presence of substances of concern in products, which are being passed onto waste and have to be removed by recyclers.



Interface between chemical, product and waste legislation

Each time a new substance is regulated, recyclers need to adapt their processes to fulfil new requirements, leading to significant quantities of material likely to be lost. For example:

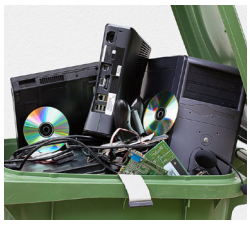
CHEMICALS →	PRODUCTS →	WASTE LEGISLATION
DecaBDE	Plastics from WEEE and ELV 	Proposal within the framework of the Basel Convention to set a "Low-POP content" concentration limit of 50 ppm for the brominated flame retardant decaBDE in plastics. Concentration in plastics used in CRTs was about 150,000 ppm, 3,000 times higher than the concentration limit.
PAH	Synthetic turfs made from EoL tyres (ELT) 	REACH restriction on granules or mulches containing more than 20 ppm of polycyclic aromatic hydrocarbons (PAH), and used as infill material in synthetic turf pitches.
DEHP	Toys and childcare articles, eating utensils 	REACH restriction on four phthalates in concentrations above or equal to 0.1% w/w (so far the concentration limit was 0.3% w/w).

Defined limits would automatically exclude recycling processes for those elements, resulting in an increased demand for landfill and incineration

How can substances of concern in recycled products be avoided if primary products contain them?

As recyclers cannot avoid the presence of the substances in the material, improving the interface between **chemical – product – waste legislation** is fundamental to promote recycling and foster a more circular economy.

Main concerns from the recycling sector regarding the interface chemical – product – waste legislation



Recyclers treat millions of different EoL products per day. While producers are aware of the substances used within their processes, **identification of individual substances by recyclers** in the input of their activities **can be challenging**.

There is a **lack of practical and easily accessible information** on regulated substances for recyclers.

Waste treated by recyclers may contain substances that are no longer allowed in new products (i.e., legacy substances).

EU rules on end-of-waste are not fully harmonised, and different Member States have different classifications for the same type of waste.

Eco-design considerations are crucial for constantly improving recycling rates. However, it is mostly focused on addressing the issue of energy efficiency, and less on the recyclability potential.

Imported articles that are not subject to authorisation requirements, may lead to a **competitive disadvantage for EU producers** and recyclers who are **subject to REACH** authorisation.

In addition, waste classification, as dangerous or not, is set on a **hazard**-based legislation and takes only partially into account the **risks** posed by a waste stream. **Waste** is, by nature, very different to **products** for which hazard based legislation is designed.

Difference between HAZARD and RISK perspective

Substances found in waste are not per se harmful for human health or the environment. For instance, arsenic and caffeine both have hazardous properties, but do not present the same level of risk.

RISK = Hazard x Exposure

HAZARD – Refers to the inherent properties of a chemical substance that make it capable of causing harm to a person or the environment.

EXPOSURE – Describes the amount of, and the frequency with which, a chemical substance comes into contact with a person or the environment.

RISK – Is the possibility of harm arising from a particular exposure to a chemical substance.

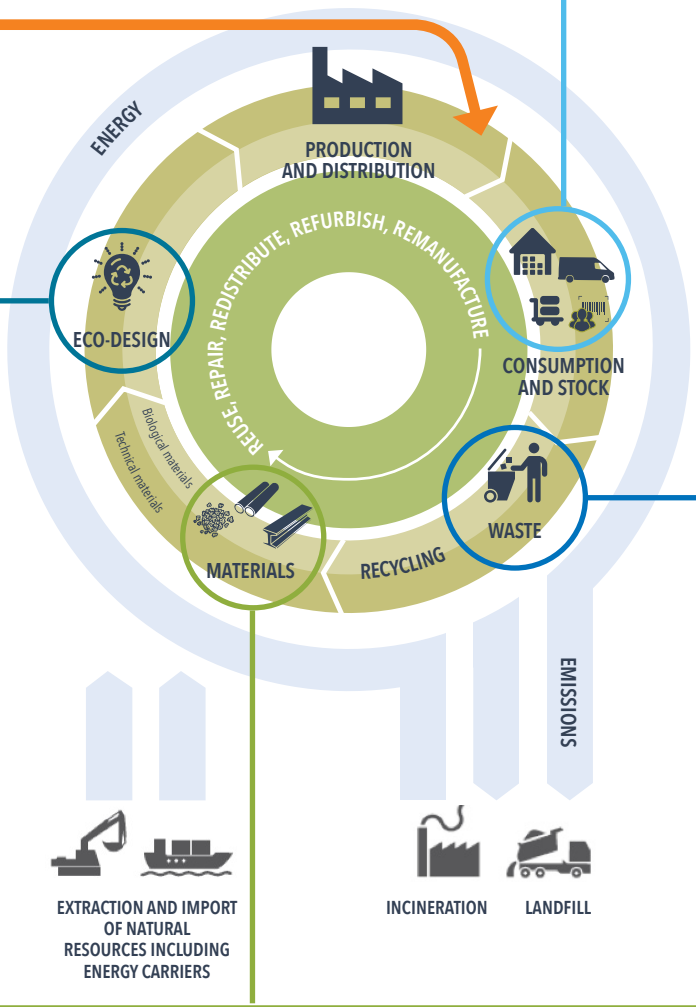
4 Potential Solutions and Future Work

to address the concerns on this topic

Enforcement of chemicals legislation at EU borders
It should simply not be allowed to import articles that are not compliant with EU rules inside EU.

Better tracking of substances of concern
Develop a regulatory framework enabling to track substances of concern in close collaboration with recyclers, in order to be practical and support their real needs.

Promote ecodesign for circularity by any means available
Avoiding whenever possible, the use of hazardous substances. In the absence of an EPR scheme or any agreement with manufacturers covering the cost of eliminating hazardous substances in waste, recyclers should not be responsible for bearing the costs of it. Improve the recyclability of products by taking into account the recycling process constraints at design stage.



Proper risk-based waste classification
Waste classification should take into account the risks posed by a waste stream, not only the hazards related to their chemical composition.

E.g., current hazard-based thresholds are unfit for waste classification if they are not complemented by broader risk assessment, taking into account exposure parameters.

Harmonized waste legislation within the EU
Same waste classification between different Member States. This could be extended to any regulation enforcement, as discrepancies in enforcement among Member States should be minimized.

Specific status for (re-) processed waste
Potentially, move out of the dichotomy between "waste" and "product" status by having an intermediate category for processed waste.

Rules for secondary materials taking into account waste intrinsic properties
Set restrictions which are stable in time, achievable and realistic. Considering the progress and limitations of every recycling and retail/manufacturing sector, having derogations for legacy substances, either:

- **General derogations:** for legacy substances in recycled materials. E.g., REACH autorisation for DEHP in PVC.
- **Time-limited derogations:** with phase out strategies to preserve a sound recycling industry while eliminating substances. E.g., time limited derogation to REACH restriction for the use of lead in PVC used as a construction article. The time limit of derogation could be based on article lifecycle.
- **Usage-limited derogations:** usage where hazardous substances are present but risk is limited. E.g., Cadmium in PVC.

Source: EEA (2017). Circular by design – Products in the Circular Economy. European Environment Agency.

EuRIC AISBL – Recycling: Bridging Circular Economy & Climate Policy
80 Boulevard Auguste Reyers, B-1030 Brussels
+32 2 706 87 24 • www.euric-aisbl.eu