

2024



WASTE OR PRODUCT

How circularity can be supported within the chemical value chain?



INTRODUCTION

Definition of circular economy and circularity within chemical distribution

Circular Economy is a model of production and consumption that is based on sharing, leasing, reusing, repairing, and recycling existing materials and products as long as possible. It aims at extending the life cycle of products, slowing down the use of natural resources, reducing landscape and habitat disruption, and limiting biodiversity loss.

The importance of recycling is also highlighted within the raw materials realm, considering its increasing demand and limited supply. Recycling of raw materials mitigates the risks associated with supply, such as price volatility, availability and import dependency.

Industrial production processes may involve many chemical substances that are consumed in the production of numerous products. However, chemical substances may also be used as process aids during other processes, while not being consumed. Some examples are: organic solvents used as chemical synthesis media, extraction and recrystallization media, for purification, or for other purposes in Pharma industry. The food industry may also use process aids, such as biotech, electronics, metals, and other sectors.

Considering existing policy initiatives on chemical circularity within the European Union and the importance of collaboration between industry and policy makers, this brochure aims at providing insights into an area in development.



Where possible, extension of the lifetime of used process aids, can help to reduce waste and save chemical resources. Such lifetime extension of chemical resources can also result in CO₂ emission reductions.

CHEMICALS AND WASTE - SUPPORTING CIRCULARITY THROUGH POLICY AND LEGISLATION

The waste legislation in the European Union (EU) aims to protect the environment and human health by preventing and/or reducing the generation of waste, the adverse impacts of the generation and management of waste, and by reducing overall impacts of resource use and improving the efficiency of such use. Such measures are crucial for the transition to a circular economy and for guaranteeing the Union's long-term competitiveness.

EU's waste legislation has at its center REACH/CLP and Waste Framework Directive (WFD). Those are the main pillars of (1) the legislation for chemicals in the product legislation, and (2) the legislation for waste. Both aim to protect human health and the environment, but in different ways, as they have different starting points. (Note: this brochure does not encompass other product legislations, such as biocide, cosmetics, etc).

REACH, in EU product legislation, aims to protect the environment and human health considering the use of chemical substances (i.e. isolated substances; in mixtures; in articles). The regulation for chemicals takes as a starting point that chemicals enter in contact with the environment /working environment and with humans when they are produced, when they are isolated or when part of mixtures/articles while used industrially, professionally or by consumers. REACH and CLP, together with the working environment legislation, frame the requirements to ensure that chemical substances and the products they are part of can be used safely.



The borderline between chemicals in the product legislation and waste in the waste legislation requires close attention in a circular economy and when transitioning from one life cycle to the next.

REACH

The Regulation on the registration, evaluation, authorisation and restriction of chemicals (REACH) is the main EU law to protect human health and the environment from the risks that can be posed by chemicals.

In REACH Article (2)(7)(d), it is further expressed, “when a chemical substance, a chemical mixture or an article is recovered and it is the same substance(s) that enters the recovery process that comes out of it again, the obligation to register is relaxed, if the substance(s) have been registered by others and if there is access to the required information.”

In addition to the fact that there is a sharp separation between these two regulatory “pillars” (REACH and Waste Framework Directive), the above also expresses that when a chemical is not defined as waste, then it is covered by the chemical regulation.

WASTE FRAMEWORK DIRECTIVE (WFD)

Established in WFD, the foundation of the European Union waste management is the five-step “waste hierarchy”. It puts in place an order of preference for managing and disposing of waste.



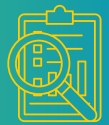
Source: https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en



It explains when waste ceases to be waste and becomes a secondary raw material, and how to distinguish between waste and by-products. The WFD defines by-products as “a substance or object, resulting from a production process, the primary aim of which is not the production of that item”. According to this, waste would have to meet the so-called End-of-Waste criteria to become product again. End-of-Waste (EoW) criteria may exist already in some cases, whereas in other situations it depends on case-by-case decisions.

According to Article 5 of the WFD, to consider a substance or object (that results from a production process which the primary aim was not such substance or object) as a by-product and not waste, the following conditions need to be met (and appropriate measures shall be taken by Member States to ensure that this is the case):

1. further use of the substance or object is certain;
2. the substance or object can be used directly without any further processing other than normal industrial practice;
3. the substance or object is produced as an integral part of a production process; and
4. further use is lawful, i.e. the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts.



For chemical substances in general, it might be difficult to find any EoW criteria from WFD. However, for chemical substances, REACH article (2)(7)(d) (on sameness) may be supportive in this perspective and it might provide a workable criteria answer. When REACH article (2)(7)(d) is fulfilled, the obligation to register a recovered chemical substance is relaxed, which would mean that the recovered substance no longer is considered waste (REACH registration obligation does not apply to waste).

Considering this, information on substance sameness might be key for the EoW criteria for chemical substances.

Sameness - Art 2(7)(d)

- Dutyholder to collect sufficient information and data to demonstrate that he has identified his recovered substance
- Knowledge of the variability of the composition; substance corresponds sufficiently ("sameness") in all its components with already registered substances.

RECOMMENDATIONS



It may be recommendable for the user of the chemical substance/ the waste producer to check any environmental permits and make contact to national authority, respectively supervisory authority. This is especially of importance in view of national implementations of WFD.

After stepping out of the waste status, the recovered chemical substances will fall under REACH and CLP (again) and will have to be provided with Safety data sheet and CLP label.

Regarding the lifetime extension of chemical resources, the work from a Danish eco-innovation project (GEAR project) reveals three important options to clarify such lifetime extension:

1. Can it be re-used directly and (safely!) without any purification or "cleaning"? Then it may be considered as direct reuse (of the molecules). It would then not be considered as waste, but a chemical in the product legislation.
2. Does it require a purification or "cleaning" process according to "normal industrial practice" before entry of a new life cycle? It may then be considered a "by-product" according to the Waste Framework Directive Article 5, when the conditions herein are met. Then it is not considered as waste, but a chemical in the product legislation.
3. If it's not possible to consider the used process aid as neither reuse nor a by-product in 1 or 2, it may be defined as waste. It would then have to obtain End of Waste status, such as through (mechanical) recycling of the molecules, to become a chemical in the product legislation.

SOURCES

European Commission on Waste Framework Directive:
https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en

European Parliament on Circular Economy:
<https://www.europarl.europa.eu/topics/en/article/20151201STO05603/circular-economy-definition-importance-and-benefits>

European Commission on REACH Regulation:
https://environment.ec.europa.eu/topics/chemicals/reach-regulation_en



This brochure aims at providing insights on the waste legislation within the EU and how the chemical value chain can make a difference in promoting and working towards chemical circularity within industry.



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