Background information on

MECHANISMS OF A BENEFICIAL USE OF TARGETED INFORMATION ON SUBSTANCES OF CONCERN DURING WASTE TREATMENT

Aims and core questions of the feasibility study

In the context of its work on the chemicals-products-waste interface, the European Commission launched a feasibility study on the use of tools to manage information flows from product supply chains to the waste sector. The project started in January 2019 and will end in March 2020. The core questions the study team aims to answer are:

- At which stages of the use phase and during the waste treatment chain could an improved information flow on *Substances of Concern*[1] (SoCs) in products change waste treatment practices in a way that benefits are achieved either
  - via reduced exposures of humans or the environment to SoCs or
  - by increasing circularity of material flows (higher amounts, better quality, improved compliance etc.)?
- Which information would have to be provided and in which form, in order to support and change the actors' decision making?
- Which technological infrastructure and management of (secondary) material streams would be necessary to realise the benefit potential enabled by the information flow?

Methodology

Case studies describing the waste treatment of twelve types of products were conducted. They cover products of different complexity, different lifespans, consisting of different materials and used in different applications/sectors as well as with different legal requirements and different waste treatment chains. Hence, the "universe of articles and wastes" is represented as far as possible. Among others, it was analysed how targeted information on SoCs in these products could lead to possible benefits such as:

- Reduced consumer exposure to hazardous chemicals;
- Increased amounts of wastes entering specific recycling routes;
- Secondary materials that are less contaminated or of a better defined composition;
- Re-used products or secondary materials that are compliant with regulatory requirements.

By comparing the case studies, different mechanisms were recognised that could trigger the above benefits.

[1] In the study, the SoC are regarded as including REACH substances of very high concern (SVHCs) but also other hazardous substances which are not formally recognised as SVHCs. In addition, substances that may technically disturb waste treatment process are covered.

Each of the mechanisms would be started by an actor taking a new decision based on the provided SoC information. Each of the mechanisms requires the availability of distinct SoC information in a form suitable to the consequent (waste) process, i.e. in or on a (waste) product or material. Subsequent actors would then change their activities due to that initial decision and implement further changes to their (and the following) treatment steps.

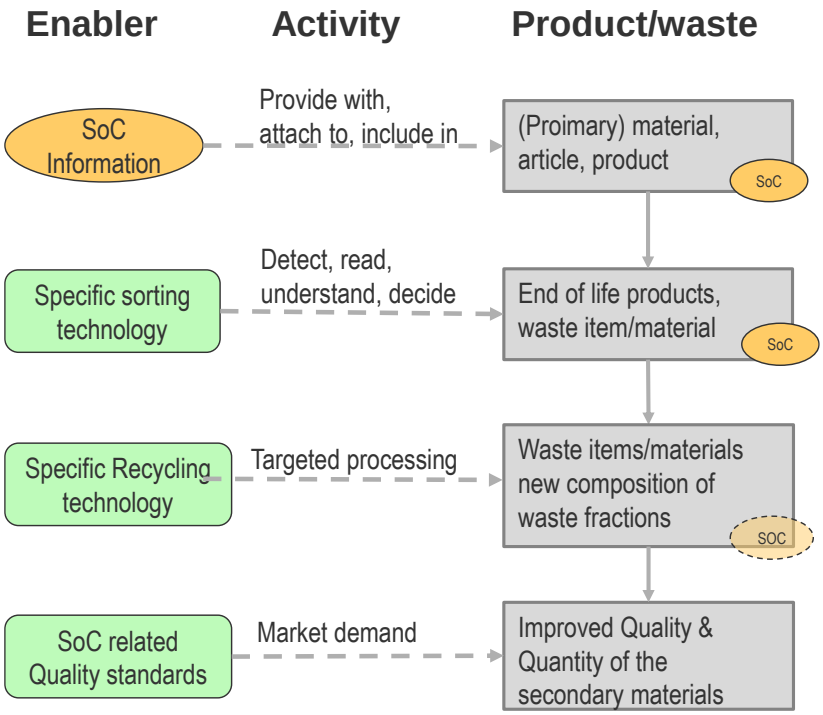

Figure 1: Generic representation of information flow mechanisms, including enablers and necessary activities

Several conditions were identified as necessary for actually changing the activities in the waste treatment chain and by that realising the benefits. These enablers are either:

- the availability of the needed information in a form which the information receiver is able to read and understand within reasonable efforts and/or;
- waste (collection) fractions that are in a condition to be sorted for/directed to specific treatment routes depending on their SoC content, among other properties;
- the technologies needed to sort, separate and specifically treat a (waste) product, article or material;
- a market request for secondary materials with clearly defined qualities (secondary material standards incl. SoC content).

Mechanism that may lead to benefits

The following figure shows a generic waste processing chain and indicates at which stages information on SoCs could have an impact on decision making and waste treatment. The chain is differentiated into the service-life stage of a product and the waste stage including the

collection, the pre-treatment and the (final) treatment of waste fractions. Depending on the type of (waste) product, the specific waste chain may or may not include a particular process.

The blue arrows in Figure 2 indicate at which stage the information-driven change within the waste treatment could start for each of the four mechanisms (A to D).

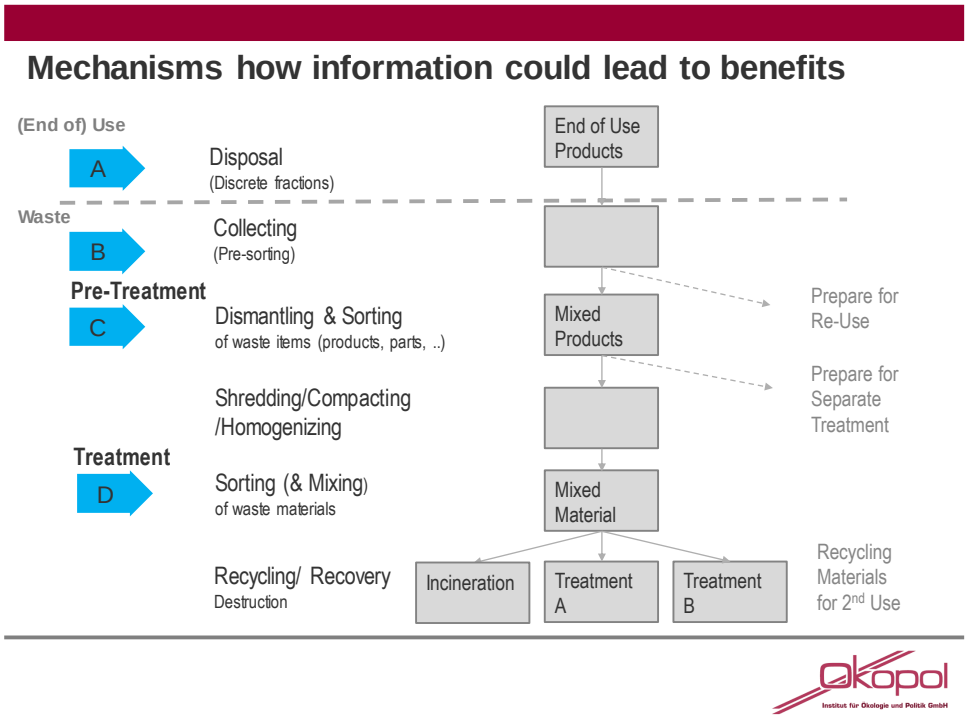

Figure 2: Overview of mechanisms how information on SoCs in products could trigger benefits for the circular economy

Mechanism A: "Empowering targeted disposal"

The actors preparing and handing over products at the end of their use to the waste collection (e.g. like renovation or demolition workers, but also regular consumers) receive targeted SoC information so that they can dispose of the old products in a way supporting further sorting and treatment of the collected waste. An example are the separate handling and then collection of insulation materials containing persistent organic pollutants directly during deconstruction. Another example are the separate handing over of electronic devices with Li-containing accumulators to waste collection and treatment so the devices do not explode during the normal treatment route of small electric and electronic equipment.

Benefits could be: safer waste processing and a more effective and a more efficient decontamination of material streams.

Cases used for exemplification: EPS/XPS insulation panels; fitted carpets

Mechanism B: "Support informed (preparation for) re-use"

Based on the availability of SoC information, e.g. on the SVHCs inventory as well as on the content of restricted substances, actors assessing the re-usability of waste products may decide whether they should be directed to preparation for re-use or to material recycling. The actors preparing for re-use would then use the information source to ensure that only compliant

products are placed back on the market. This option could eventually take advantage of the future database of articles containing SVHCs, currently being prepared by ECHA.
Benefits could be: More waste products are prepared for re-use and placed back on the market, distributors on the market are compliant and can also provide information on SVHCs in re-use products.
Cases used for exemplification: furniture; car parts

Mechanism C: "Separation of specific products/parts"
The actors dismantling complex waste items may use SoC related information to remove specific components from complex products for separate treatment, either to avoid contamination of the further treated material streams (e.g. from components including a high share of halogenated flame retardants) or to allow a more specific treatment increasing the recycling rates (e.g. for components containing precious materials).
Benefits could be: Decontamination of material streams and abstraction of SoCs from material cycles or a more efficient recovery of valuable raw materials.
Cases used for exemplification: textiles, PVC construction products

Mechanism D: "Improved material sorting":
Pre-treated (shredded) waste material streams are further sorted according to SoC information provided in the material (e.g. via tracer elements or molecules) so that specific secondary material qualities are generated as input to further recycling processes
Benefits could be: Decontamination of recycling material streams, generation of defined recycling material qualities.
Cases used for exemplification: PVC construction products

Discussions at the workshop

At the workshop, the four mechanisms will be introduced in more detail and illustrated by examples. The in-depth assessment of the presented examples will aim to answer to e.g. the following questions:

- Which specific SoC information is needed by the actors who could effectively initiate the change in waste treatment?
- How can the information best be provided to those actors, e.g. should it be attached to a (waste) product as label or included into a material as tracers?
- How could the actors best detect, read and interpret the information?
- Which technologies are needed to implement an action based on the information, e.g. abstract those waste articles from a conveyor belt that should be incinerated?
- What challenges exist, apart from the resources needed to install such technologies?
- At which scale are the potential benefits from improved waste processing and what costs would occur?