

KEEPING IT CLEAN: HOW TO PROTECT THE CIRCULAR ECONOMY FROM HAZARDOUS SUBSTANCES



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The EEB provides an environmental voice for European citizens standing for environmental justice, sustainable development and participatory democracy. Our aim is to promote a healthy environment and rich biodiversity across the EU and beyond.

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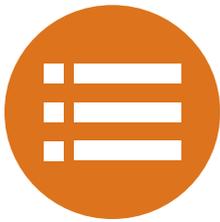
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EXECUTIVE SUMMARY

The idea of a 'circular economy' has emerged as a possible solution to the overexploitation of the natural resources of our planet. In December 2015, the EU set as a priority the transition to such a model in its EU Action Plan, and has announced that an *"analysis and policy options to address the interface between chemicals, products and waste legislation, including how to reduce the presence and improve the tracking of chemicals of concern in products"*¹ will be carried out in 2017. This report was prepared to contribute to this initiative and ensure that it aims to enhance the protection of human health and the environment in line with the Council of the European Union's recent conclusions on the sound management of chemicals.²

This report shows how the three relevant blocks of EU legislation – Chemicals, Product and Waste legislation – interact. It highlights complementarities and shortcomings with case studies on two different products – mattresses and televisions. Recommendations are then proposed to improve the current legal framework to ensure better circularity of materials, while protecting human health and the environment.

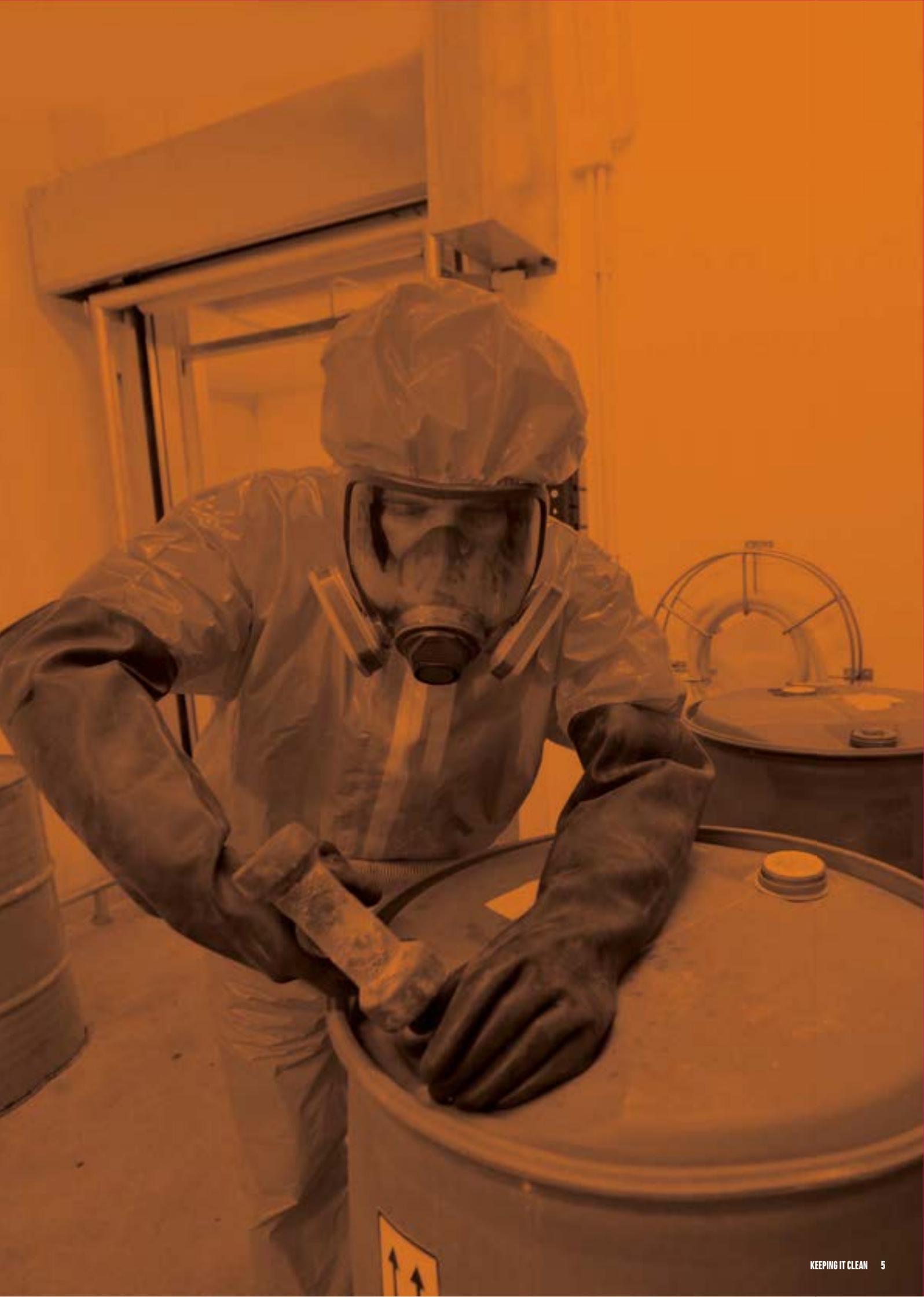
In particular, this report highlights the failure of the current legal framework to ensure that information on hazardous chemicals is properly passed along the whole material cycle and potential subsequent life cycles. This failure places economic operators in a situation where it is more costly to comply with legal requirements protecting human health and the environment when using recycled and recovered materials than when using virgin ones.

In light of these findings, this report explains that the current legal framework needs to be adapted to the challenges of a circular economy. In particular:

1. Policy makers must seek **to limit hazardous chemicals from entering the material cycle in the first place**. This is not only the best way to protect human health and the environment, but would also facilitate the future use of recovered materials for economic operators and thus the circular economy. Prioritising the full implementation of REACH and other legislation restricting the use of hazardous chemicals will be necessary to achieve this objective;
2. Policy makers must **ensure that economic operators have access to sufficient information** on the presence, location, concentration of hazardous chemicals in products and materials recovered from waste. This will reduce the burden on economic operators making products with recovered materials, and improve the protection of human health and the environment in a circular economy;
3. Policy makers must **ensure that the legal framework is not less protective of human health and the environment when products are made of recovered materials**. Notably, this means requiring appropriate decontamination of waste before it can be recovered, and avoiding restrictions of hazardous chemicals that are less protective when applied to recovered materials.



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INTRODUCTION

According to a study published by WWF in 2016, “Humanity currently needs the regenerative capacity of 1.6 Earths to provide the goods and services we use each year”.³ As a result, we must change our current linear take-consume-dispose model.⁴ The European Parliament and Council have recognised the need for a circular economy in the 7th Environment Action Programme (7th EAP).⁵ More recently, the European Commission (the **Commission**) published “an EU action plan for the Circular Economy”,⁶ advocating for a “sustainable, low carbon, resource efficient and competitive economy”.⁷

However, the concept of a circular economy “remains eclectic and lacks a scientifically endorsed definition”,⁸ and it certainly lacks a definition at EU level. However, the Commission has committed to achieve “the transition to a more circular economy, where the value of products, materials and resources is maintained in the economy for as long as possible”.⁹ This seems to point towards a spiral economy rather than a circular one.

The European Environment Agency has noted that “of particular concern in the context of a circular economy is our increasing reliance on chemicals. When closing material loops, accumulation of hazardous substances should, in principle, be prevented. A key challenge in this respect is striking the right balance between the quantities of materials to be recycled and their (non-toxic) quality”.¹⁰ In the 7th EAP, the issue of hazardous chemicals is clearly considered as a priority to ensure a high level of protection of health and the environment, and is central to turning the European Union into a resource-efficient economy.¹¹ More recently the European Parliament highlighted that “recycling should not justify the perpetuation of the use of hazardous legacy substances”.¹²

In its Action Plan for the Circular Economy, the Commission announced that it “will develop analysis and propose options on the interface between chemicals, products and waste legislation, including on how to reduce the presence and improve tracking of chemicals of concerns in products”.¹³ Nevertheless, this Action Plan puts a disproportionate emphasis on the need to “remove obstacles stemming from European legislation”¹⁴ and what it describes as an “unnecessary burden for

recyclers”.¹⁵ Framing the debate around regulatory burden is problematic for two reasons.

First, this oversimplifies the challenges. If there are anomalies in a regulation that *unnecessarily* prevents recycling, these should be addressed.¹⁶ However, the meaning of *unnecessary* must be defined explicitly and carefully. Unnecessary has to be assessed in relation to objectives. Second, insisting on legislative burden is misleading – it suggests that environmental legislation may be responsible for the fact that the economy is currently staying linear. This framing distracts attention from the true barriers to circularity, for example how “market priorities for short-term profits and dividends to shareholders make it difficult to take the long-term perspective required for investments into resource efficiency and other aspects of circularity”. In fact, without legislative intervention, moving towards a circular economy does not seem realistic.

A genuine difficulty is the constantly evolving knowledge of the properties of chemicals and their hazards. This means, in a circular economy context, that the assumption that any virgin material put on the market and considered safe at that time can still be considered safe later in their life cycle – perhaps years or even decades later – is erroneous. This makes the protection of human health and the environment particularly challenging in a circular economy. However, this challenge needs to be overcome so that EU citizens can have confidence that products placed on the market at any given time are safe in light of the most up-to-date knowledge regarding hazardous chemicals, irrespective of whether they are made of recovered materials or virgin ones. This requires the restrictions on hazardous chemicals to be brought up to speed with the most recent scientific knowledge.

This report shows how the current EU legal framework built to protect human health and the environment from the dangers of hazardous chemicals applies in a scenario where materials are re-injected into the economy after having been discarded. It presents how the three main blocks of EU legislation – Chemicals, Product and Waste legislation – interact in such a circular economy. It highlights the main complementarities between these blocks of legislation and their remaining shortcomings with two case studies. Recommendations are then proposed to improve the current legal framework so that it can better protect human health and the environment in a circular economy and make the circular economy a reality.

1

INTERACTION OF CHEMICALS, PRODUCT AND WASTE LEGISLATION

1.1

TERMINOLOGY AND SCOPE

The life cycle of a chemical can be described as follows: manufacturing, incorporation or transformation into a material, supply of the material on the market, use of the material, its disposal, and its recovery. The ‘chemical’ and the ‘material’ are given many designations under the EU legal framework – substances, mixtures, articles, products – depending on the stage of the life cycle and on the different piece(s) of legislation applicable. Three blocks of legislation are commonly identified as relevant to the circular economy – Chemicals, Product and Waste legislation – and each uses different terminology to trigger various legal obligations. Clarity on terminology is a prerequisite to understanding how these blocks of legislation apply and interact in a circular economy.

Under the Regulation on Registration Evaluation and Authorisation of Chemicals (the **REACH Regulation**),¹⁸ a chemical on its own is a ‘**substance**’ if it corresponds to the definition set out in this regulation.¹⁹ A material is designated as an ‘**article**’ if it is given “a special shape, surface or design which determines its function to a greater degree than does its chemical composition”.²⁰ A material that does not fall into the definition of an article is designated as a ‘**mixture** [of substances]’.²¹ These three definitions are also used in other pieces of legislation, e.g. the Persistent Organic Pollutants Regulation²² (the **POPs Regulation**), or the Classification, Labelling and Packaging Regulation²³ (the **CLP Regulation**). This means that, in the legal narrative created by Chemicals legislation, there are only ‘substances,’ ‘mixtures’ of substances and ‘articles’, while ‘products’ have no defined meaning or legal implications.

By contrast, pieces of EU legislation such as the General Product Safety Directive (the **GPSD**)²⁴ that do not focus on dangers caused by chemicals, and do not use the terminology of ‘articles’, ‘substances’ or ‘mixtures’, refer to ‘**products**’. Other pieces of EU legislation use the same terminology and focus on specific groups of products (e.g. toys, food packaging, energy-related products, etc.). Together with GPSD they are commonly designated as Product legislation. A material becomes a ‘**product**’ within the meaning of this legal framework when it is ‘**made available**’ in the EU market, i.e. “when supplied for distribution, consumption or use on the Union market in the course of a commercial activity, whether in return

for payment or free of charge.”²⁵ As explained in the Commission’s Blue Guide on the implementation of EU product rules, supplying a product is to make it available on the Union market, when the product is “intended for end use” on the Union market.²⁶

The Waste Framework Directive (the **WFD**)²⁷ and laws specific to certain waste streams (e.g. packaging, waste electrical and electronic equipment, batteries, vehicles) share the same terminology and focus on ‘waste’. Under this Waste legislation, waste means “any substance or object which the holder discards or intends or is required to discard”.²⁸ Waste can either be ‘**disposed of**’²⁹ (via incineration or landfill) or be fed into a new material cycle following ‘**recovery**’³⁰ operations (such as recycling). A product can also be ‘**reused**’³¹ before becoming waste, starting directly a new cycle without going through the waste phase. Another ‘re-use’ route is also envisaged in this legal narrative – a product becomes waste first and is then ‘**prepared for reuse**’.³²

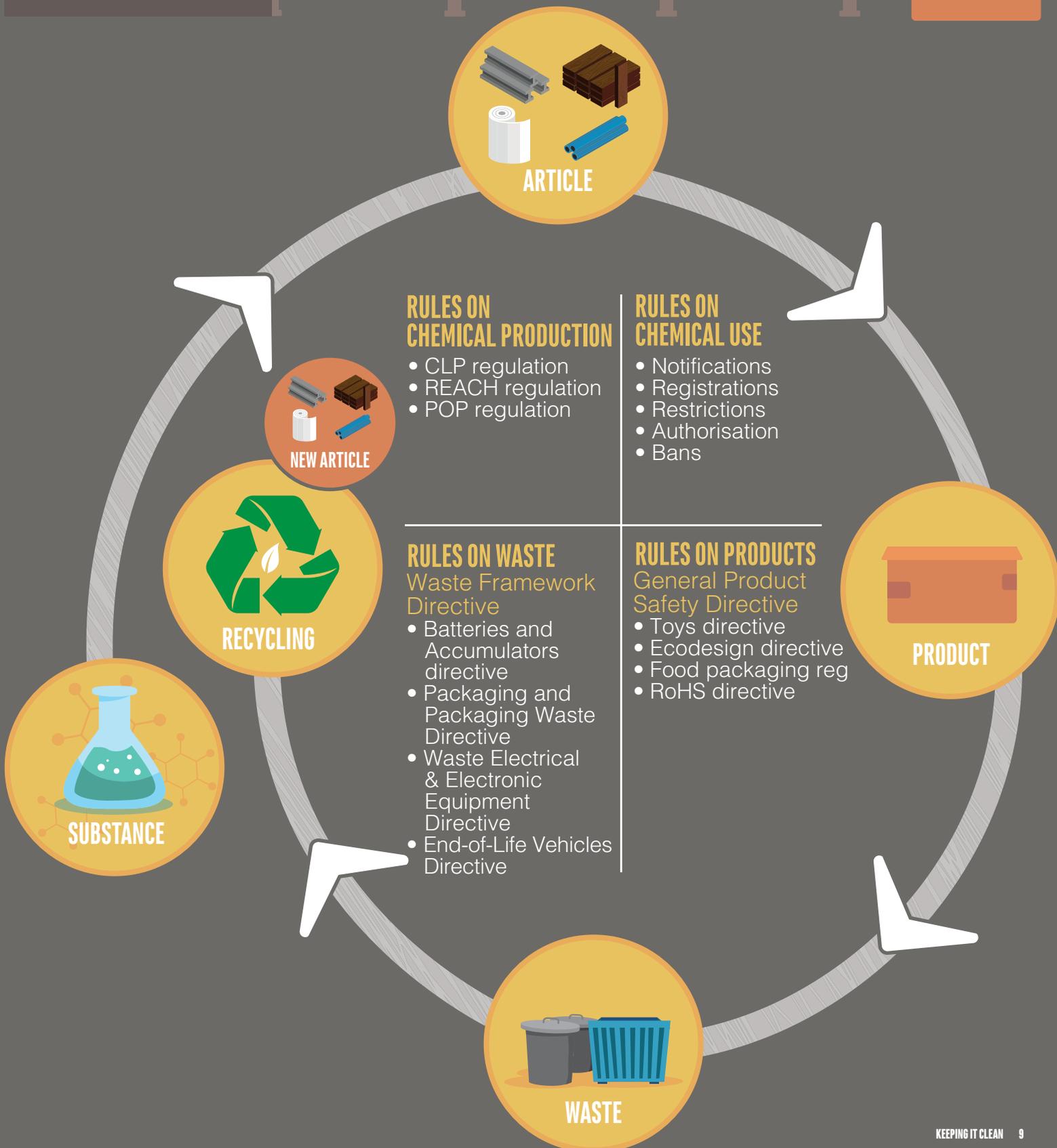
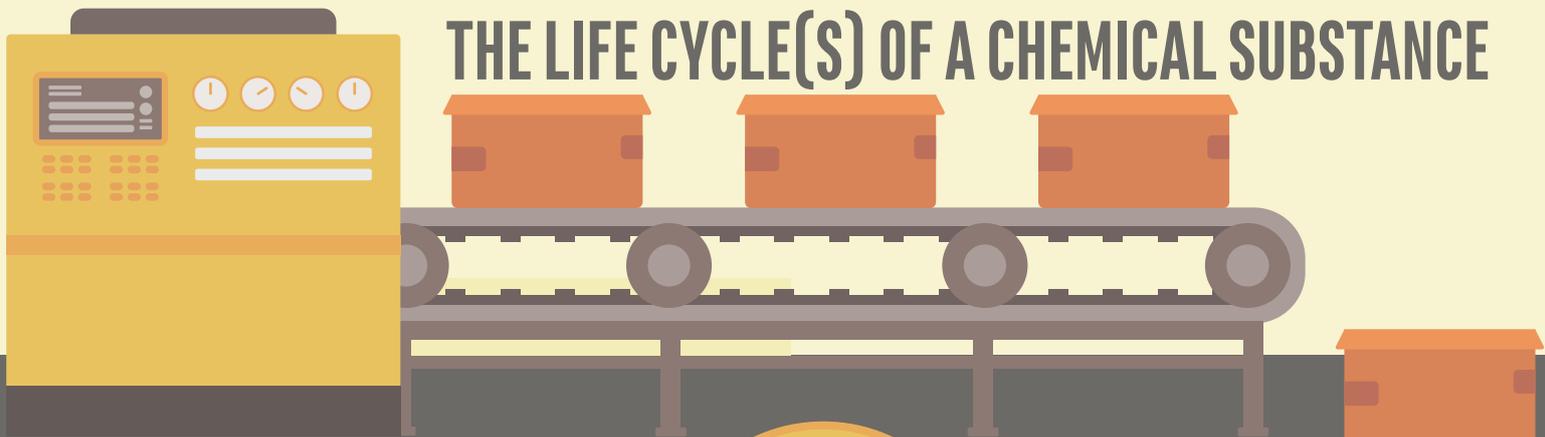
To explain how Chemicals, Product and Waste legislation interact in a circular economy, the following terminology will be used in this report:

- ‘substance,’ ‘mixture,’ and ‘article’ as defined in Chemicals legislation;
- ‘product’ as defined in the Product legislation;
- ‘waste,’ ‘recovery,’ ‘re-use,’ ‘preparation for reuse,’ and ‘disposal’ as defined in the Waste legislation.

In this legal narrative, an article can be a product, or part of a product. When discarded they become waste, and when recovered they can start a new cycle either as a substance, a mixture, or directly as an article or a product.

This report will focus on a scenario where materials that have become waste are re-injected into the economy. The scenario where products are reused before becoming waste will therefore not be covered in detail. Furthermore, it will not focus on the cases where chemicals on their own are recovered from waste, but rather on the cases where *materials* are recovered.³⁴

THE LIFE CYCLE(S) OF A CHEMICAL SUBSTANCE



1.2

CHEMICALS LEGISLATION

The CLP Regulation, the REACH Regulation and the POPs Regulation complement each other and apply irrespective of the sector of use. They constitute pillars of EU Chemicals legislation.

a) Classification, Labelling and Packaging Regulation (CLP Regulation)

All chemicals placed on the market in the EU, except substances present in medical and veterinary products, cosmetics products, some medical devices and food³⁵ have to be classified on the basis of their hazard. The United Nations Globally Harmonised System of classification and labelling (**GHS**) is the basis of this classification, which may trigger additional obligations under the CLP Regulation:

- **Notification:** if a substance is classified as ‘hazardous,’ it has to be notified to the European Chemicals Agency (**ECHA**) – unless it has already been registered or notified in application of REACH;
- **Labelling:** certain information has to appear on the label of a packaged substance depending on its classification, including standardised hazard pictograms, precautionary statements, hazard statements etc.;
- **Packaging:** hazardous substances need to be packaged in a certain way in order to protect the recipient of the substance, e.g. child resistant fastenings, or design to avoid the escape of the content.

To date, more than 4,200 substances have been classified as hazardous under harmonised classification.³⁶

The CLP Regulation does not distinguish between substances coming from virgin material or those from recovered material. The same obligations of notification, labelling and packaging apply from the moment a substance ceases to be ‘waste’ until it becomes waste again.³⁷ The main challenge when a new cycle starts is to ensure that a hazardous chemical present in recovered materials is identified as such. The way the CLP Regulation and the Waste Framework Directive (**WFD**) interact raises two issues in that regard.

First, while the CLP Regulation requires that *substances* are classified per their hazards, the WFD requires that *waste*, whatever its form, is classified as hazardous. The hazard classification under the WFD and CLP therefore do not cover the same subject matter. The classification of the waste is mainly based on its origin as defined in a list

of waste (see 1.4). This means that waste can be classified as non-hazardous if it is listed as such in the list of waste, even though it contains a substance classified as hazardous under the CLP Regulation. For example, a textile coming from domestic waste will not be classified as hazardous even though it may contain hazardous substances such as flame retardants (see, for example, Case Study 1 in relation to *HBCDD* in the ticking of a mattress). When a new life cycle starts, the economic operator that is seeking to put a recovered material on the market does not have access to any precise information on the presence or absence of hazardous chemicals in this material (unless product or waste stream specific rules apply – see Case Study 2).

Second, the ‘properties that render waste hazardous’ under the WFD only include hazards that are listed in the CLP Regulation, thereby excluding notably persistent, bioaccumulative and toxic (**PBT**) substances and very persistent and very bioaccumulative (**vPvB**) substances, endocrine disruptors and Persistent Organic Pollutants (**POPs**) (see 1.2(c)) and nanomaterials).

b) REACH

1) REACH throughout the material cycle

REACH regulates the manufacture, use and placing on the market of chemicals in the EU, excluding chemicals present in medical and veterinary products, some medical devices, and food.³⁸ Its primary objective is to ensure a high level of protection to humans and the environment. In particular it aims at ensuring hazardous chemicals are replaced with safer alternative substances or technologies.

To that end, REACH creates obligations for economic operators at different stages of the material cycle.

Registration and information

i. Rules applicable to substances on their own or in mixtures

The first obligation under REACH which lies on the manufacturer or importer of a substance – on its own or in a *mixture* – is to submit a **registration** to ECHA regarding the substance, irrespective of whether it is classified as hazardous.³⁹ Registration is only required if the volume of the substance manufactured or imported by the company reaches one tonne per year.⁴⁰ The type of information to be included will also depend on the volume.⁴¹

Additional obligations apply to the manufacturer or importer of the substance, if the substance is:

- Included in the ‘**Candidate List**’.⁴² This list, published on the ECHA website, is not static but subject to updates following proposals by Member States or the Commission. It identifies ‘Substances of Very High Concern’ (SVHCs) due to their hazard; or
- Not included in the Candidate List but classified as ‘hazardous’ within the meaning of the CLP Regulation; or
- Not included in the Candidate List but fulfilling the PBT or vPvB definition.⁴³

In these three cases, the manufacturer or importer of the substance has the obligation to provide **information to the recipient of the substance** or mixture in the supply chain. This comes in the form of a Safety Data Sheet which must enable users to take the necessary measures to ensure the protection of human health and the environment.⁴⁴

Even though REACH does not apply to waste, it requires companies that place a substance on the market to take into account the waste phase and the potential for recycling:

- When submitting a **registration dossier**, the Chemical Safety Report (only required when manufacture or import exceeds 10 tonnes) must include in the exposure assessment “*the waste management measures to reduce or avoid exposure of humans and the environment to the substance during waste disposal and/or recycling*”.⁴⁵
- Similarly, the **Safety Data Sheet**⁴⁶ provided by the manufacturer or importer of a substance (on its own or in a mixture) to the recipient of the substance in the supply chain must cover the entire life-cycle of the substance, including the waste phase.

ii. Rules applicable to articles

Any manufacturer or importer of articles must submit a **registration to ECHA** regarding the substances contained in these articles, if a substance is present in the articles in quantities exceeding one tonne per year and if the substance is “*intended to be released under normal or reasonably foreseeable conditions of use*”.⁴⁷ This obligation applies irrespective of whether a substance is classified as hazardous. However, no registration is required if the substance has already been registered for that use.⁴⁸

A manufacturer or importer of *articles* in which a substance included in the ‘Candidate List’ is present (provided the substance is present in those articles above a concentration of 0.1 percent weight by weight) has to:

- **Notify ECHA**, if the substance is present in the articles in quantities exceeding one tonne per year,⁴⁹ unless the manufacturer or importer can exclude exposure to humans or the environment during normal or reasonably foreseeable conditions of use (including disposal).
- Provide to the recipient of the article **in the supply chain** (even if not requested) “*sufficient information, available to the supplier, to allow safe use of the article including, as a minimum, the name of the substance*”.⁵⁰
- Provide to consumers, upon request, the same safety information.⁵¹

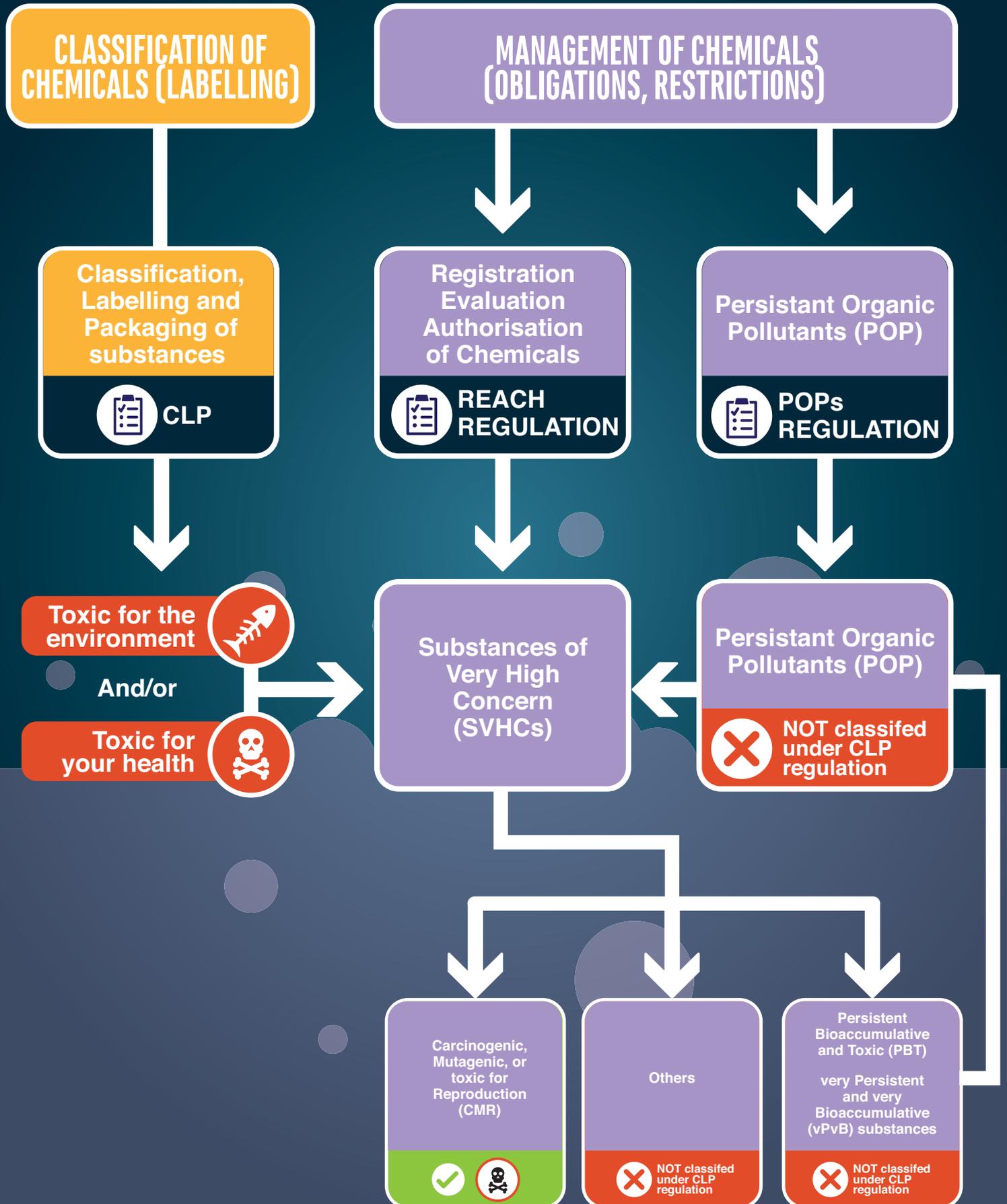
Restriction and Authorisation

In order to ensure that companies substitute hazardous chemicals with suitable alternatives, REACH provides two mechanisms:

- If a substance is listed in the ‘Authorisation List’ (Annex XIV), the manufacturer, importer and downstream user⁵² are not allowed⁵³ to use the substance or place it on the market, unless the Commission, following the opinions of ECHA committees, has granted them an authorisation for a specific use. Some authorisations are conditional upon the substance not being incorporated into certain products (e.g. toys).⁵⁴ In that regard, the authorisation process can be relevant to manufacturers of products.
- If a substance is listed in the ‘Restriction List’ (Annex XVII), it cannot be manufactured, placed on the market or used unless it complies with the conditions of the restriction. As opposed to the authorisation mechanism, companies cannot apply for authorisation to deviate from the conditions set out in the Restriction List. Restrictions often refer explicitly to specific product types in which the substance cannot be incorporated, or only incorporated within certain concentration limits.

Even though REACH does not apply to waste, when applying for authorisation to use a substance, the applicant must cover the waste phase. Similarly, restrictions are adopted based on both an assessment of the hazards and risks to human health and the environment due to exposure to a substance, which also must cover the waste stage, including disposal and/or recycling.⁵⁵

CHEMICALS LEGISLATIONS



All in all, REACH intends to protect the environment and human health during the entire material cycle, including the waste phase. But whether these obligations are actually implemented is a different question. The next issue is how REACH applies when a material is recovered from waste to be used in a new life cycle.

2) REACH when a second cycle starts (recovered material)

This report focuses on scenarios where *materials* (for example plastic materials) are recovered from waste and not on cases where *chemicals* (for example the additives in plastics) are recovered. We will therefore not develop the issues raised by the derogation to the registration obligation for recovered substances, or by the notion of impurity.⁵⁶

When a new cycle starts with recovered materials, the application of REACH raises two main issues:

1. The entry for *cadmium* in the **Restriction List** provides for a **less protective** concentration threshold for recovered materials. Indeed, the concentration limit regarding *cadmium* in virgin PVC was set ten times lower (stricter) than the concentration limit for ‘recovered’ PVC.⁵⁷ This special regime for recovered material does not sit comfortably with the objective to ensure a high level of protection of health and the environment in a circular economy. For now, *cadmium* is the only substance for which less protective concentration limits are set for recovered material under Annex XVII. However, there is a risk that this approach becomes more common in the future to facilitate recycling.
2. When a second cycle starts there is a **gap of information** regarding hazardous chemicals in recovered materials. Waste collectors or recyclers and manufacturers of products with recovered materials have no right to access relevant information on the presence of a hazardous substance in that material. Indeed, the manufacturer of a product using recovered materials – unlike a manufacturer using virgin materials – does not have the right to know whether SVHCs are present in the material recovered, nor to have access to the Safety Data Sheets prepared by the manufacturer of the *virgin* chemicals upstream. The waste collector selling waste to the recycler also does not have access to much information on the potential presence of hazardous chemicals in the waste (see 1.2(a) and 1.4(a)). This loss of information between different life cycles is a key gap in the current legislative framework (see Case Study 1).

c) Persistent Organic Pollutants Regulation (POPs Regulation)

POPs are chemicals identified as persistent in the environment, accumulating in living bodies and “transported across international boundaries far from their sources”.⁵⁸ POPs are regulated at the international level under the Stockholm Convention⁵⁹ and the Protocol to the Convention on Long-range Transboundary Air Pollution.⁶⁰ These international instruments were then transposed with an EU Regulation in 2004: the POPs Regulation. To date, only 26 substances have been listed as POPs.

The POPs Regulation applies in parallel to REACH and the CLP Regulation, and complements this framework for substances that exhibit persistent organic pollutant characteristics. The POPs Regulation creates special rules for POPs on production, placing on the market and use of these chemicals, the management of wastes and measures to reduce their unintentional release. For example, the production, placing on the market and use of substances listed in Annex I are prohibited unless an exemption is applicable,⁶¹ stock of POPs is considered waste⁶² and special waste management rules apply.⁶³

The POPs Regulation creates obligations for economic operators throughout the entire life-cycle from production to waste management. It also provides special rules for recovered materials which include POPs – operations that may lead to recovery, recycling, reclamation or re-use of the substances listed in Annex IV are prohibited unless a derogation is applicable.⁶⁴ This regulation therefore aims to prevent a second cycle starting for materials containing POPs above certain concentration limits.

However, the POPs Regulation has allowed the recovery of materials containing POPs at higher concentrations than the limits set for virgin materials. For example, the brominated flame retardant *pentabromodiphenyl ether (pentaBDE)* is only allowed in concentrations below 0.001 percent by weight when produced entirely from virgin material, but if produced “partially or fully from recycled materials or from waste prepared for re-use” the concentration limit is a significantly higher 0.1 percent.⁶⁵ According to the Commission’s Q&A,⁶⁶ this special treatment for recycled pentaBDE was “introduced to allow continuation of recycling of materials”.

It is similar to the approach under Annex XVII of REACH for cadmium, which the Commission justified as creating a more lenient regime for recycled material in order not to “endanger existing recycling schemes”.⁶⁷

1.3 PRODUCT LEGISLATION

As explained previously (see 1.1), a material becomes a 'product' within the meaning of Product legislation when it is 'made available' on the EU market, i.e. "when supplied for distribution, consumption or use on the Union market".⁶⁸ Product legislation may deal with the issue of hazardous chemicals in products when complementing the Chemicals legislation described above. While some pieces of Product legislation focus on ensuring the safety of products for consumers (GPSD, Toys Directive, Food packaging), others focus on facilitating sustainability (e.g. rules on electric and electronic equipment, product design rules). The GPSD is applicable to all categories of (non-food) consumer products (when no product specific rules exist). We will first cover this Directive and then give examples of legislation applicable to specific types of products.

a) The General Product Safety Directive (GPSD)

The GPSD provides general safety requirements for non-food consumer products and applies the same whether products are made of virgin materials or recovered materials. It does not specifically address the issue of hazardous chemicals in products. However, some provisions may still be useful:

- The GPSD requires that **only safe products** be placed on the EU market.⁶⁹ In absence of EU product specific legislation or national rules, products are deemed safe if they comply with voluntary national standards which transpose European standards.⁷⁰ Even though this mechanism is not focusing on the issue of hazardous chemicals, it can be used to limit the presence of hazardous chemicals in products.
- The GPSD also provides for an obligation for producers to **inform consumers** about the "risks inherent in a product throughout the normal or reasonably foreseeable period of its use, where such risks are not immediately obvious without adequate warnings, and to take precautions against those risks".⁷¹ This may include risks due to the presence of certain chemicals in products. However, it does not seem to have led to consistent information being given to consumers about the presence of hazardous chemicals in products.

- The GPSD proved to be useful in the past by allowing the **emergency withdrawal of products** from the market due to hazardous chemicals present in them.⁷² For example, all consumer products containing the biocide DMF (*dimethyl fumarate*) were withdrawn from the EU market following the intervention of the Commission in 2009.⁷³ This legal tool is a safety net that can be used in an emergency case to withdraw recycled products containing accidentally hazardous chemicals in concentrations exceeding safe levels from the market. However restrictions should be adopted to avoid the need for such an emergency withdrawal, and it should only be used as a last resort. The fact that DMF only was added to the Restriction List under REACH in 2012 shows the need for quicker adoption of restrictions.

This Directive could therefore be useful to complement Chemicals legislation in limiting the use of hazardous chemicals in consumer products, and ensuring safety for consumers in a circular economy. However, it currently does not address specific risks caused by hazardous chemicals to the environment, and does not ensure adequate information for consumers of the presence of hazardous chemicals in products.

b) Examples⁷⁵ of product specific legislation

The Toys Directive

The Toys Directive sets out safety requirements for toys and obligations for manufacturers, importers and distributors. The Directive sets out the general requirement that "*Toys shall be designed and manufactured in such a way that there are no risks of adverse effects on human health due to exposure to the chemical substances or mixtures of which the toys are composed or which they contain when the toys are used as [intended or in a foreseeable way, bearing in mind the behaviour of children]*".⁷⁶ In addition, the Directive sets out specific restrictions for substances, for example for substances classified as carcinogenic, mutagenic or toxic for reproduction (CMR) according to the CLP Regulation,⁷⁷ with some derogations.

The Toys Directive does not provide special rules for products that are made from recovered materials. However, in addition to REACH, which sometimes

includes toys within the scope of restrictions, this legislation provides a complementary layer of protection. Having product specific legislation for toys may allow for more rapid and targeted measures on the presence of hazardous chemicals in these products, before a decision is taken under REACH. This safety net is welcome, particularly in the context of a circular economy where recycling can create an increased risk of “accidental” exposure to certain chemicals.

The Food Packaging Regulation

The Food Packaging Regulation⁷⁸ is another example of product specific legislation dealing with the issue of hazardous chemicals and complements REACH for a group of products, i.e. materials and articles such as bottles and containers, which come or may come into contact with food.⁷⁹ The Regulation identifies groups of materials and products where specific safety measures may be adopted by the Commission. The Commission has adopted several regulations of this kind, such as a regulation on plastic which sets out a list of substances that are authorised to be ‘intentionally’ used in plastic materials in contact with food, provided certain migration limits are complied with.⁸⁰

The Food Packaging Regulation itself does not provide specific rules for recycled materials. However, the Commission has used its delegated power under this framework to set out specific rules for certain food contact materials that contain recycled materials. For example, it adopted a **regulation on recycled plastic** according to which recycled plastic (food contact) materials and articles can only lawfully be placed on the market if they contain recycled plastic obtained from a recycling process authorised in accordance with the regulation.⁸¹ This regulation encourages ‘closed loops’, i.e. that the plastic recovered comes from food contact materials. Having closed loops may be a good way to limit the risk of contamination at the recycling stage.

Restriction of hazardous chemicals in electrical and electronic equipment (RoHS)

The Directive on the Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment (**EEE**) (the **RoHS Directive**),⁸³ was adopted to facilitate the recycling of EEE. It acknowledges that “[r]estricting the use of those hazardous substances is likely to enhance the possibilities and economic profitability of recycling of waste EEE and decrease the negative impact on the health of workers in recycling plants”.⁸⁴ The Directive requires Member States to ensure that EEE placed on the market does not contain certain

chemicals, or does not exceed maximum concentration value by weight (with some exemptions).⁸⁵ The RoHS Directive thus complements restrictions under REACH by providing an additional layer of restrictions regarding EEE.

Ecodesign Directive: energy related products

The Ecodesign Directive “*contributes to sustainable development by increasing energy efficiency and the level of protection of the environment, while at the same time increasing the security of the energy supply*”.⁸⁶ It applies only to ‘energy related products’, i.e. products that have an impact on energy consumption during use. On the basis of this Directive, the Commission is entitled to adopt implementing regulations setting out mandatory product design requirements for specific products.⁸⁷ Indeed, “[i]n preparing a draft implementing measure the Commission shall consider the life cycle of the product and all its significant environmental aspects, inter alia, energy efficiency”.⁸⁸

In particular, within this framework the Commission must take into account “*possibilities for reuse, recycling and recovery of materials and/or of energy*”,⁸⁹ – particularly relevant in a circular economy – and also the “*use of substances classified as hazardous to health and/or the environment*”.⁹⁰

The Ecodesign Directive also provides that information requirements can be imposed on manufacturers, including those that relate to chemical composition. The regulation setting out ecodesign requirements for televisions thus imposes on manufacturers the obligation to include in technical documentation information relating to chemicals. The information that must be provided covers “*if the television contains mercury or lead: the content of mercury as X,X mg, and the presence of lead*”.⁹¹ Similar requirements were adopted regarding mercury in computers.⁹²

Unfortunately, to date most implementing regulations adopted do not create rules on hazardous chemicals. Therefore, there seems to be unexploited potential under the Ecodesign Directive’s legal framework to limit the use of hazardous chemicals in energy related products, in order to ensure that human health and the environment is protected in a circular economy.⁹³ Indeed, the Commission announced in its Action Plan for a circular economy that, “ ”.⁹⁴

1.4

WASTE LEGISLATION

As explained previously (see 1.1), when a product becomes waste, Product legislation and Chemicals legislation no longer apply and are replaced by the Waste legislation. In a circular economy, this phase is the end of a life cycle and potentially the beginning of a new one. That is why Waste legislation has a particularly important role to play in a circular economy. The following pieces of Waste legislation will be covered: the WFD, as the overarching piece of legislation harmonising key notions for a better management of waste at national level, and examples of legislation applicable to specific waste streams.

a) The Waste Framework Directive (WFD)

As soon as a product becomes waste, the WFD applies. The WFD harmonised the notion of waste by setting out a definition which Member States cannot depart from: “any substance or object which the holder discards or intends or is required to discard”.⁹⁵ The WFD sets objectives for Member States to achieve by 2020 on the recycling of waste materials. In adopting their own rules relating to waste, Member States must implement a priority order when approaching waste (known as the ‘waste hierarchy’): the first being prevention of waste, then preparation for re-use, recycling or, other recovery (e.g. energy recovery) and, as a last resort, disposal (through incineration and landfill). Member States also have to set up requirements for the authorisation of waste facilities and requirements for the movement of waste. These requirements are much stricter in cases where waste is classified as ‘hazardous’. i.e. waste which displays one or more of the hazardous properties listed in Annex III.⁹⁶

When looking at the risks posed by hazardous chemicals, two mechanisms of the WFD raise issues in a circular economy. The first is the rules on the classification of the waste as hazardous, including related information requirements, and the second being the rules determining when a material ceases to be waste.

1) Classification of waste as hazardous and information requirements

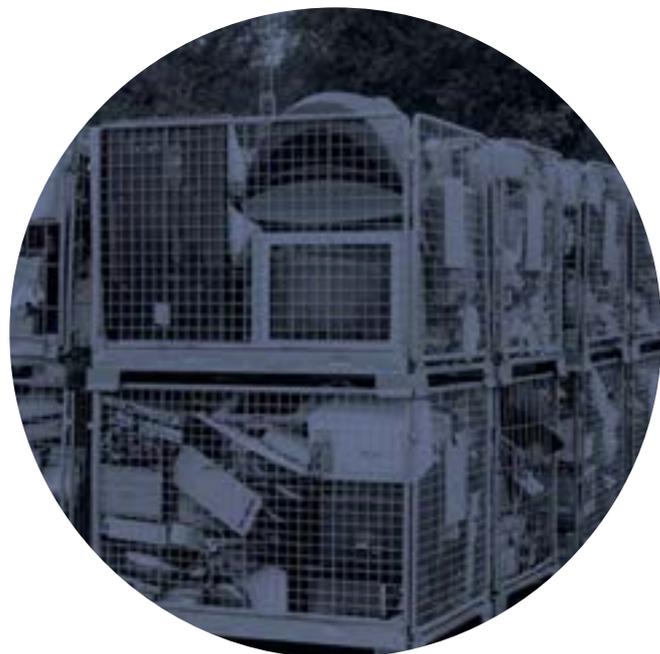
According to the WFD, waste operators are required to determine whether waste is hazardous or not, in order to manage that waste according to stricter standards if it is hazardous. The classification of waste as hazardous

plays another role in the context of a circular economy – it will provide information to recyclers as to the presence of hazardous substances in the waste they intend to re-inject into the economy. As explained previously (see 1.2), the way waste is classified as hazardous raises concerns in that context:

- The classification of the waste is not done based on its chemical composition but based mainly on its origin as defined in the list of waste. As a result some waste categories are listed as “absolute non-hazardous” in the list of waste,⁹⁷ even though they may contain a SVHC under REACH (see, for example, Case Study 1 in relation to *HBCDD* in the ticking of a mattress);
- The “properties that render waste hazardous” under the WFD only include hazards that are listed in the CLP Regulation, thereby excluding hazards identified under REACH (e.g. PBT, vPvB or endocrine disruptors).

Furthermore, this rough classification of waste as hazardous may well be the only information available to the recycler on the presence of hazardous chemicals in the waste. Indeed, depending on the source of the waste, the recycler may not even know its composition⁹⁸:

- **Post-consumer waste:** the identity of the original manufacturer is not available, and at best the recycler will be able to have some information if received explicitly from the manufacturer. Recyclers are invited to base their assessment on assumptions;



- Waste coming from **production** processes: some information on the composition of the waste should exist, for example in the Safety Data Sheets relating to substances used in the production process. That said, the recycler has no right to obtain such a Safety Data Sheet;
- **On the waste market:** the information on the origin of this waste is limited.

This lack of reliable information on the chemical composition of the waste means that when waste ceases to be waste, it may be too burdensome for economic operators willing to use the recovered material to ensure that they comply with Chemicals and Product legislation, e.g. concentration limits set in the Restriction List under REACH.

2) When waste ceases to be waste

When waste ceases to be waste, it marks the end of a life cycle of a *product/article/substance* and the beginning of a new one. From a legal perspective, it means that Waste legislation ceases to apply while the Chemicals and Product legislation apply (again).

Yet it is not straightforward to identify when a material ceases to be waste according to the WFD. Article 6(1) provides that:

“Certain specified waste shall cease to be waste [...] when it has undergone a recovery, including recycling, operation and complies with specific criteria to be developed in accordance with the following conditions:

- (a) The substance or object is commonly used for specific purposes;*
- (b) A market or demand exists for such a substance or object;*
- (c) The substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products; and*
- (d) The use of the substance or object will not lead to overall adverse environmental or human health impacts.*

The criteria shall include limit values for pollutants where necessary and shall take into account any possible adverse environmental effects of the substance or object.”

If such criteria have been adopted at EU level for a specified waste stream, and the material has undergone a ‘recovery’ operation, the waste stream ceases to be waste. This mechanism raises the following issues.

Very few ‘end-of-waste’ criteria have been adopted to date. When no end-of-waste criteria exist at EU level, Member States can decide – in individual cases – the point at which waste is no longer waste. This means potential differences of status for the same waste stream in different Member States. When no national decision has been taken, the Court of Justice of the European Union (CJEU) has stated that the conditions set out at Article 6(1) cannot in themselves make it possible directly to establish that certain waste must no longer be regarded as such.⁹⁹ Thus, the economic operator has to apply the general definition of waste,¹⁰⁰ which remains quite vague.¹⁰¹

b) Examples of waste stream specific legislation

Waste stream specific legislation set out special collection targets, producer responsibility and rules on management of waste for certain waste streams, e.g. packaging waste, electrical and electronic equipment, vehicles or batteries. These waste stream specific rules reduce the risk that hazardous chemicals present in waste will contaminate materials to be recovered, and as such reduce barriers to recovery due to the presence of those chemicals.

For example, the Directive on electrical and electronic waste (**WEEE Directive**)¹⁰² provides for separate waste collection, specific labelling indicating that EEE must not be thrown into a bin and an obligation to remove certain parts which contain hazardous chemicals before recovery. The Directive on batteries¹⁰³ also obliges manufacturers to provide more precise information to consumers on hazardous chemicals present in the product.¹⁰⁴

Case Study 2 detailed below will show how useful such waste stream specific legislation can be in a circular economy to ensure relevant information on the presence of hazardous chemicals in waste streams and appropriate treatment methods actually reaches recyclers.

2

CASE STUDIES

Two case studies are developed below, illustrating how Chemicals, Product and Waste legislation interact in a circular economy and why they may fall short of meeting the objective of ensuring a high level of protection of human health and the environment.



A MATTRESS IN A CIRCULAR ECONOMY

The first case study relates to a hypothetical mattress made of latex foam and two substances that are added to some parts of the mattress to improve their fire safety, called flame retardants:

- *DecaBDE*¹⁰⁵: a substance still currently used to treat latex **foam** (amongst other uses).¹⁰⁶
- *HBCDD*¹⁰⁷: a substance which was commonly used in bed mattress **ticking** (textile covering) until recently.

We have chosen the following hypothetical timeline:

- 2013: the substances were supplied in the EU;
- 2013: the foam and the ticking were manufactured and supplied in the EU;
- 2014: the mattress was manufactured and made available on the market;
- 2019: the mattress is discarded and collected as waste;
- 2020: the foam and ticking are recovered from waste and placed again on the market in car interiors.

We will set out below the main obligations of economic operators due to the presence of *HBCDD* and *DecaBDE* in the mattress, at each step of the lifecycle. It is assumed for the sake of the exercise that the legal framework applicable in 2019 and 2020 is the same as in 2016.

I. 2013 – Manufacture and supply of the substances

DecaBDE has not been manufactured in the EU since 1999. All uses in the EU are the result of imports.¹⁰⁹ It is assumed therefore that *DecaBDE* used in this example comes from imports, and was imported by a company called **ChemImport**.

HBCDD is both imported and manufactured in the EU.¹¹⁰ It is assumed that the *HBCDD* used in this example was manufactured in the EU by a company called **ChemCo**.

1) Obligations of ChemCo and ChemImport under CLP in 2013

DecaBDE

- **Classification**: no harmonised classification existed in 2013 for *DecaBDE*. This means that ChemImport had to self-classify this substance according to the CLP Regulation.

- **Labelling, Packaging and Notification** obligations applicable depending on the self-classification.

HBCDD

- **Classification**: a harmonised classification was adopted in 2012 for *HBCDD*. This means that, since 1 December 2013, ChemCo had to classify *HBCDD* according to the following harmonised classification:

“Suspected human reproductive toxicant”

- **Labelling**: following this harmonised classification, ChemCo had to label the packaging of *HBCDD* as follows:

Pictogramme	
Signal word	“warning”
Hazard statements	H361 H362 “Suspected of damaging fertility or the unborn child” “May cause harm to breast-fed children”

- **Packaging**: since *HBCDD* was classified as hazardous, its packaging needed to satisfy certain conditions in order to protect the recipient of the substance, e.g. to avoid the escape of the content.
- **Notification**: since *HBCDD* was classified as hazardous, ChemCo had to notify to ECHA that it was placing *HBCDD* on the market in the EU (unless it had already been registered or notified in application of REACH)

2) Obligations of ChemCo and ChemImport under REACH and the POPs Regulation in 2013

a) Registration with ECHA

DecaBDE

It is assumed that ChemImport imported into the EU 5 tonnes of *DecaBDE* in a year. This means that registration was mandatory, but that the information to be provided did not have to include a ‘Chemical Safety Report’ (only required for imports of more than 10 tonnes a year). The registration still consisted of a ‘technical dossier’,¹¹² including:

- A general description of the intended uses of the substance;
- The hazard classification and labelling under CLP: since no harmonised classification of *DecaBDE* had been adopted yet, ChemImport had to self-classify this substance and detail this in the Registration dossier.

LIFECYCLE OF A

MATTRESS



FOAM AND TICKING

INFORMATION TRANSFERRED

Manufacturer,
importer of
substances

Manufacturer,
importer, retailer
of products

INFORMATION TRANSFERRED



A new toxic
article is
re-inspected
into the market



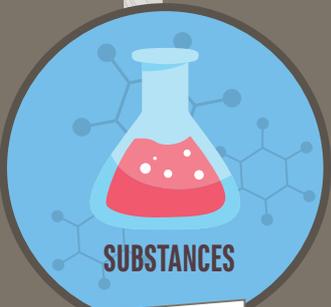
RECYCLING

2020



MATTRESS

2014



SUBSTANCES

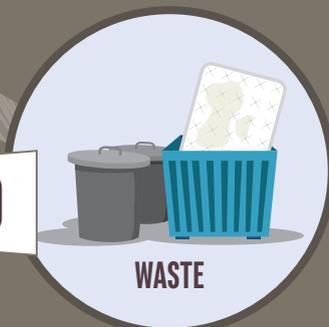
2013

waste
operators

Manufacturer,
importer, retailer
of products

INFORMATION IS MISSING

INFORMATION FLOW INTERRUPTED



WASTE

2019

- “information on waste quantities and composition of waste resulting from manufacture of the substance, the use in articles and identified uses”.¹¹³

HBCDD

ChemCo is assumed to have manufactured 20 tonnes of HBCDD in a year. Since this exceeds 10 tonnes, ChemCo had to provide to ECHA, in addition to the technical dossier, a Chemical Safety Report. This report had to cover amongst other points:

- Human hazard and environmental hazard assessment;
- Since HBCDD was classified as hazardous under harmonised CLP classification, the chemical safety assessment also had to include an exposure assessment and a risk characterisation. In the context of the exposure assessment ChemCo had to detail “the waste management measures to reduce or avoid exposure of humans and the environment to the substance during waste disposal and/or recycling”.¹¹⁴

b) Obligation of providing information due to the inclusion of the substances in the Candidate List

In 2013, both HBCDD¹¹⁵ and DecaBDE¹¹⁶ had already been included in the Candidate List. This means that ChemCo and ChemImport had to provide hazard, storage and safety information to the recipient of the substance in the supply chain, in the form of a Safety Data Sheet. This information should have enabled users to take the necessary measures to ensure the protection of human health and the environment.¹¹⁷

This Safety Data Sheet had to cover in particular disposal considerations, including waste treatment methods. Concerning HBCDD, since a Chemical Safety Report was required, the exposure scenarios set out in this report had to be annexed to the Safety Data Sheet. These exposure scenarios had to outline the waste management measures to avoid or reduce exposure of humans and the environment to the substance during waste disposal and or recycling.¹¹⁸

c) Authorisation

DecaBDE is not included in the Authorisation List.

HBCDD was included in the Authorisation List in 2011,¹¹⁹ because of this HBCDD could not be placed on the market for a use or used after 21 August 2015 unless such use had been authorised, or if an application had been filed before 21 February 2014. ChemCo manufactured HBCDD and placed it on the market in 2013. **No authorisation was thus necessary at the time.**

d) Restrictions

Neither DecaBDE nor HBCDD were subject to restriction under REACH or the POPs Regulation in 2013.

II. 2013 – Manufacture and supply of the foam and ticking

The manufacturer of the foam (ManuPartsCo) used DecaBDE to make the foam flame resistant to satisfy the technical specifications of its main customer, a manufacturer of mattresses (SweetDreamsCo). ManuPartsCo got its supply of DecaBDE from ChemImport. The manufacturer of the textile (TextileCo) also applied HBCDD on the textile to satisfy its customers’ technical specifications. It got its supply of HBCDD from ChemCo.

Both ManuPartsCo and TextileCo had the right to obtain the Safety Data Sheet from their respective suppliers. They should therefore have been aware of the hazardous properties of these substances, the detailed information on exposure controls protection and disposal/waste management considerations.

1) Obligation of ManuPartsCo under Chemicals legislation in 2013

First, ManuPartsCo needed to determine whether the foam it produced qualifies as ‘articles’ i.e. “object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition.” This determines which rules under REACH were applicable, i.e. rules on mixture of substances (e.g. provision of a Safety Data Sheet) or rules on substances in articles (e.g. more limited information in the supply chain).

According to ECHA Guidance, “[f]or the polymer sector, this means that processes including for example, but not limited to, [...], foaming, [...] mark the ‘red line’ between mixture and article”.¹²⁰ On this basis, it is assumed that the foam qualified as an article under REACH. It is also assumed that the textile produced by TextileCo fell into the definition of an article because of its special design.¹²¹

ManuPartsCo and TextileCo therefore had to fulfil the following obligations:



a) Obligations triggered by the presence of substances listed in the Candidate List in the foam/ticking:

DecaBDE was already included in the Candidate List in 2013. We assume that the concentration level of *DecaBDE* in the foam reached 0.1 percent weight by weight. Two obligations could therefore have been triggered:

- **Notification to ECHA:** if the volume of *DecaBDE* in the foam that ManuPartsCo manufactures during the year reached one tonne, unless 1) ManuPartsCo could exclude exposure to humans and the environment during normal or reasonably foreseeable condition of use including disposal or unless 2) that use of *DecaBDE* had already been registered.¹²² “Exposure to a substance in an article is possible even if the substance is not released from the article, but just on the surface of it”.¹²³ Assuming this use of *DecaBDE* was already covered in ChemImport’s registration dossier, **ManuPartsCo did not have to notify ECHA.**
- ManuPartsCo had to provide to SweetDreamsCo “sufficient information, available to [ManuPartsCo], to allow safe use of the article including, as a minimum, the name of the substance.”

The same obligations applied to TextileCo for *HBCDD* due to its presence in the ticking.

This means that, as a minimum, TextileCo and ManuPartsCo were obliged to inform SweetDreamsCo that the foam and the textile contained respectively *DecaBDE* and *HBCDD* in quantities exceeding 0.1 percent weight by weight.

b) Authorisation: in 2013, neither *HBCDD* nor *DecaBDE* were included in the Authorisation List.

c) Restriction of substances in article: no restrictions applied to *HBCDD* or *DecaBDE* in 2013, under REACH or under the POPs Regulation.

III. 2014 – Manufacture of the mattress and making it available on the market

Furniture and other foam product manufacturers typically buy foam and textile already containing flame retardants.¹²⁴ Thanks to REACH, the manufacturer of the mattress, SweetDreamsCo, was at least aware of the presence of *DecaBDE* and *HBCDD* in the articles (and that their concentration exceed 0.1 percent weight by weight). It is assumed that SweetDreamsCo sold the mattress in 2014.

1) Obligations of SweetDreamsCo under Chemicals legislation in 2014

In 2014, *DecaBDE* and *HBCDD* were still included in the Candidate List, and since the concentration level of *DecaBDE* in the foam part and *HBCDD* in the ticking respectively reached 0.1 percent weight by weight, SweetDreamsCo had to:

- **Notify ECHA** if the volume of *DecaBDE* and *HBCDD* in the mattress that SweetDreamsCo manufactured during the year reached for each substance one tonne, unless 1) SweetDreamsCo could exclude exposure to humans and the environment during normal or reasonably foreseeable condition of use including disposal, 2) the uses of these substances had already been registered.
- **Provide to consumers**, upon their request “sufficient information, available to [SweetDreamsCo], to allow safe use of the article including, as a minimum, the name of the substance.”

No other obligations under Chemicals legislation apply to SweetDreamsCo as the substances were not included in the Authorisation List in 2014, or subject to any restrictions under REACH or the POPs Regulation.

2) Obligations of SweetDreamsCo under Product legislation in 2014

At EU level, there was no product-specific legislation on mattresses in 2014. Under the GPSD, the only specific safety requirement adopted relating to mattresses, covers only mattresses for children and does not impose stringent restrictions: “*The use of chemical flame retardant substances should be kept to the minimum. If chemical flame retardant substances are used, their toxicity during use and end-of-life disposal should not endanger the health of the users, carers and the environment*”.¹²⁵

IV. 2019 – The mattress becomes ‘waste’

In 2019, it is assumed that the mattress is ‘discarded’, within the meaning of the WFD. The mattress therefore becomes waste, and the rules on waste under WFD apply. The mattress is collected by a waste collector (**WasteCo**).

First, WasteCo must determine whether the waste is hazardous. If the waste stream is included in the List of Waste,¹²⁶ WasteCo can rely on this list to determine whether the waste is hazardous. Materials coming from a mattress would fall into Chapter 20 of that list, i.e. municipal waste.

Textiles are classified under Chapter 20 as ‘absolute non-hazardous’.¹²⁷ The textile recovered from the ticking of the mattress would therefore be classified as non-hazardous, despite the fact that it contains *HBCDD* in concentrations exceeding 0.1 percent weight by weight.

Latex foam is not included in the List of Waste, so WasteCo needs to proceed to identify the composition of the foam in order to determine whether it should be classified as hazardous. However, even if WasteCo was particularly diligent and identified the presence of *DecaBDE* in the foam, this waste would still not be classified as hazardous. Indeed, *DecaBDE* is considered hazardous¹²⁸ due to its PBT and vPvB properties but these hazards are not listed in the WFD (see 1.2(a)).

Taking into account these shortcomings, the foam and the textile recovered from the ticking would not be classified as hazardous waste.

Second, WasteCo needs to manage the waste following the national rules applicable which implement the WFD. Unfortunately, WasteCo has no right to access ChemCo’s and ChemImport’s Safety Data Sheets, which would have been helpful since these Safety Data Sheets are supposed to describe waste management measures (see 1.2(b) (1)). At best, it could access information made publicly available on ECHA’s website according to Article 119(2) of REACH. However, information currently made available by ECHA remains limited.

V. 2020 – Recovery of the foam and ticking

In 2020, the parts of the mattress (foam and ticking) are bought as waste by a company specialised in the recycling of mattresses (**RecycleCo**). The recycling performed by RecycleCo does not involve recovery of the component chemicals but recovery of the mattress



Taking into account these shortcomings, the foam and the textile recovered from the ticking would not be classified as hazardous waste.

parts. For purposes of this case study, the ticking will then be transformed into automotive acoustic soundproofing textiles,¹²⁹ whilst the foam will be chipped and used ultimately in car seats.

Since there are no EU end-of-waste criteria for textile or latex foam, the general definition of waste under the WFD applies. It is assumed that the foam and textile cease to be waste when they became ‘articles’ within the meaning of REACH. RecycleCo therefore must comply with the same set of obligations as ManuPartsCo and TextileCo did when they sold the foam and textile to SweetDreamsCo to make the original mattress.

In theory, RecycleCo would have to inform the recipient of the article in the supply chain of the presence of *DecaBDE* and *HBCDD* in the articles, in concentrations exceeding 0.1 percent weight by weight.

In practice, however RecycleCo, as opposed to ManuPartsCo and TextileCo, does not have access to much information on the presence of hazardous chemicals in the articles it recovered. RecycleCo bought ‘non-hazardous’ waste so it has no reason to believe that there are any hazardous substances present in the waste. Even if RecycleCo knew the source of the waste and the identity of SweetDreamsCo, ManuPartsCo, TextileCo, ChemCo and ChemImport (which is quite unlikely in practice), RecycleCo does not have the right to obtain any information from these companies on the identity of the substances, their hazardous properties and appropriate risk management measures. Furthermore, since 2013 further restrictions on the use of *HBCDD* were adopted. As a result, and in contrast with ManuPartsCo’s obligations in 2013, RecycleCo has to comply in 2016, with:

1) Authorisation requirements under REACH

HBCDD was included in the Authorisation List in 2011,¹³⁰ as a result of which *HBCDD* was not allowed to be placed on the market for use after 21 August 2015 unless such use had been authorised, or if an application for authorisation had been made before 21 February 2014. The only applications submitted regarding *HBCDD* relate to uses in construction.¹³¹ RecycleCo is thus not in the same supply chain as the applicants and the use of *HBCDD* is not covered by these authorisations. **RecycleCo was therefore not allowed, from 21 August 2015, to use *HBCDD* in textile (in contrast with ManuPartsCo in 2013).**

2) Restrictions under the POPs Regulation

HBCDD: In 2016, the production, placing on the market and use of *HBCDD* whether on its own, in preparations or as constituents of articles, has indeed been prohibited since 22 March 2016 under the POPs Regulation¹³² (unless it is only present in concentration below 0.01 percent weight by weight). Contrary to TextileCo in 2014, RecycleCo is not allowed in 2020 to place on the market the recycled textile containing *HBCDD* in concentration higher than 0.01 percent weight by weight.

Because of these shortcomings, RecycleCo may not be in a position to ensure that it complies with its obligations under REACH and the POPs Regulation, i.e. refrain from placing on the market the textile containing *HBCDD* and inform its customers of the presence of *DecaBDE* in the foam.

VI. 2020 – Manufacture and placing on the market of the recovered foam and textile in car interiors

CarCo is a manufacturer of cars which decided to buy from RecycleCo the foam for the seats and the textile for the acoustic soundproofing system of its new environmentally friendly car.

1) Obligation of CarCo under REACH and the POPs Regulation

CarCo would have to fulfil the same obligations as RecycleCo under REACH and POP Regulations, i.e. not place on the market an article with *HBCDD*, and provide to consumers – upon their request – the information that *DecaBDE* is present in the foam.¹³³

In practice, however, due to the fact that information on hazardous chemicals has been lost during the life cycle, CarCo, as opposed to SweetDreamsCo, is likely not to have been informed of the presence of *DecaBDE* in the foam it is using to make its car seats, nor of the presence of *HBCDD* in the textile it is using for its acoustic soundproofing.

2) Obligation of CarCo under Product legislation

Under Product legislation, there are no requirements relating to the presence of flame retardants in car interiors.



AN LCD TV IN A CIRCULAR ECONOMY

We chose as a second example a hypothetical Liquid Crystal Display (**LCD**) television. LCD is the technology that gradually replaced Cathode Ray Tube (**CRT**), and has already resulted in significant quantities of waste.¹³⁴ An LCD is made of many components.¹³⁵ For the sake of simplicity this case study will focus on one of them – the fluorescent tubes providing the source of light. To make an LCD cold, cathode fluorescent lamps (**CCFLs**) were typically used as fluorescent tubes. Most CCFLs contain mercury.¹³⁶

We have chosen the following hypothetical timeline:

- 2011: the TV was imported into the EU¹³⁷ and sold to a consumer;
- 2016: the TV reaches the end of its life,¹³⁸ is discarded and the parts recovered.

We will set out below the main obligations of economic operators for each step of the lifecycle of this TV focusing on the presence of mercury in the CCFLs.

I. 2011 – The import of the TV into the EU

The manufacturer of the TV (**HighTechCo**) is not established in the EU and sells the TV to a professional retailer located in the EU (**ShoppingCo**) which then makes the TV available to consumers on the EU market. We will set out below the obligations of these two actors due to the presence of mercury in the fluorescent tubes of the TV.

1) Obligations of HighTechCo in 2011

Chemicals legislation

According to the EU harmonised classification and labelling, mercury is “fatal if inhaled, may damage the unborn child, causes damage to organs through prolonged or repeated exposure, is very toxic to aquatic life and is very toxic to aquatic life with long lasting effects”.¹³⁹

Additionally, the classification provided by companies to ECHA in REACH registrations identifies that this substance may damage fertility or the unborn child.¹⁴⁰ However, the supply of mercury to HighTechCo occurred outside the EU so the obligations (i) to classify, label and package mercury under the CLP Regulation or (ii) register the substance with ECHA, were not applicable to the company supplying HighTechCo.

Some applications of mercury (e.g. in measuring devices) are restricted under REACH (Annex XVII), however these restrictions do not cover TVs. Mercury is not included in the Candidate List or the Authorisation List. Mercury is also not identified as a POP under the POPs Regulation.

HighTechCo, the manufacturer of the TV (even if it was manufacturing the TV in the EU), would not be subject to any obligations under the EU chemicals legislative framework, despite the use of mercury to manufacture the TV.

Product legislation

The RoHS Directive applies because the TV is an EEE.

Under the RoHS Directive,¹⁴¹ HighTechCo would be considered as a ‘manufacturer’,¹⁴² and as such would have to comply with certain obligations.¹⁴³ In particular, HighTechCo must ensure that the TV has been designed and manufactured in compliance with the restrictions set in the RoHS Directive, concerning the use of mercury in the TV.¹⁴⁴ While mercury is prohibited in EEE in principle in concentration above 0.1 percent weight by weight,¹⁴⁵ certain uses have been exempted from this restriction.¹⁴⁶ One of them concerns “Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for special purposes”.¹⁴⁷ It sets specific limits of mercury per lamp in mg.

Therefore, under the RoHS Directive, HighTechCo is allowed, by way of exemption, to use mercury in the CCFL incorporated in the TV provided that the quantity of mercury does not exceed the stated limit.

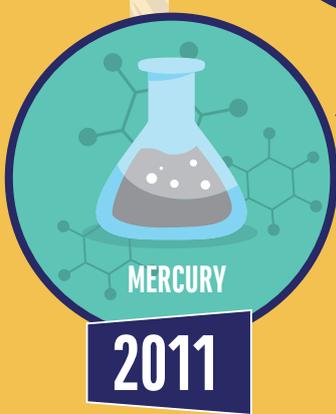
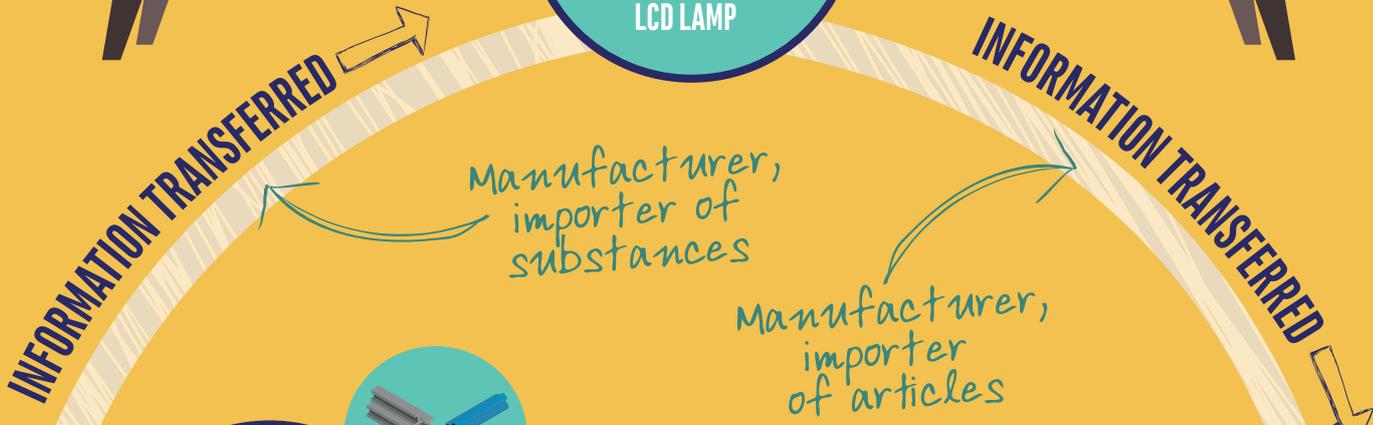
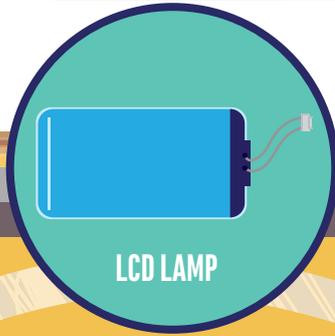
Under the Ecodesign Directive, the Commission has adopted ecodesign requirements for televisions,¹⁴⁸ two of which relate to mercury:

- If the television contains mercury or lead, the **technical documentation** must contain “the content of mercury as X,X mg, and the presence of lead”;
- The same information on the presence of mercury in the TV must be made **publicly available on free-access websites**.

Therefore, under the Ecodesign Directive, HighTechCo has to comply with these special obligations of information regarding mercury.

Under the WEEE Directive, HighTechCo is not a ‘producer’ because, in this example, it is not established in a Member State and does not sell “directly to private households or to users other than private households in a Member State”.¹⁴⁹ It is therefore not subject to obligations under the WEEE Directive.

LIFECYCLE OF A TV



2) Obligations of ShoppingCo in 2011

Under the RoHS Directive, ShoppingCo would be considered as an ‘importer’.¹⁵⁰ As such it would have to comply with certain obligations, including ensuring that HighTechCo has complied with requirements under this Directive (e.g. that the appropriate conformity assessment procedures have been carried out by HighTechCo and that the relevant information in the technical documentation has been provided).¹⁵¹

Under the Ecodesign Directive,¹⁵² ShoppingCo – as an importer¹⁵³ – has to ensure that the TV placed on the market complies with the ecodesign requirements adopted for TVs, and must keep and make available the EC declaration of conformity and the technical documentation.

Even though the TV has not yet become waste, the WEEE Directive already applies at this stage of the life cycle as it creates obligations upstream for economic operators such as ShoppingCo who put the TV on the market.

Under the WEEE Directive, ShoppingCo is a ‘producer’ as it “*is established in a Member State and places on the market of that Member State, on a professional basis, EEE from a third country*”.¹⁵⁴ As such, ShoppingCo has to comply with special obligations under the WEEE Directive. These include financing of the treatment, recovery and environmentally sound disposal of the TV¹⁵⁵ and marking the product with the symbol of a crossed bin.¹⁵⁶ The company must also provide information – free of charge – about preparation for re-use and treatment in respect of each type of new EEE placed on the market for the first time within one year after the equipment is placed on the market.¹⁵⁷



When supplying the TV, ShoppingCo has to ensure that another TV which has become waste can be returned to its shops by the consumer free of charge on a one-to-one basis.

Under the WEEE Directive, ShoppingCo is also a ‘distributor’,¹⁵⁸ and as such has to fulfil other obligations. In particular, when supplying the TV, ShoppingCo has to ensure that another TV which has become waste can be returned to its shops by the consumer free of charge on a one-to-one basis.¹⁵⁹

II. 2016 – The TV becomes ‘waste’

1) Collection

It is assumed that the consumer is aware that a TV should not be disposed of like any municipal waste (thanks to the marking of a crossed bin) and brings it back to ShoppingCo. This is a best case scenario.

2) Treatment

ShoppingCo sends the TV as waste to **RecoveryEEEECo**, a company specialised in the recycling of EEE. Being discarded, the old TV becomes waste within the meaning of the WFD. In addition to the obligations flowing from the WFD, the WEEE Directive provides for special obligations for economic operators like RecoveryEEEECo, who for example need a special permit to recycle EEE.¹⁶⁰ Regarding the presence of mercury, RecoveryEEEECo has to follow certain steps to **treat the waste**. This includes the removal of “*liquid crystal displays of a surface greater than 100 square centimetres and all those black-lighted with gas discharge lamps*”.¹⁶¹ The Directive also requires the removal of gas discharge lamps (such as CCFLs), and the removal of any mercury from them.

The WEEE Directive ensures that recyclers have access to information from producers on the location of dangerous substances within EEE. Indeed, producers must provide free information to centres that prepare for re-use, and treatment and recycling facilities, about preparation for re-use and treatment in respect of “*each type of new EEE placed on the market for the first time within a year after the equipment is placed on the market*”.¹⁶²

The CCFLs will be classified as hazardous waste¹⁶³ and managed in accordance with national rules (implementing WFD) which must ensure “*that the production, collection and transportation of hazardous waste, as well as its storage and treatment, are carried out in conditions providing protection for the environment and human health*”.¹⁶⁴ The mercury removed is either stored in strict conditions as set out in the Mercury Regulation,¹⁶⁵ or recovered to be used again. It is assumed that the mercury is recovered.

III. 2016 – Recovery of the materials from the discarded TV

Once the CCFLs are removed from the TV, RecoveryEECo is allowed to recycle the remaining materials from it. These are likely to include, for example, plastics and high value metals. Thanks to the mandatory prior removal of the CCFLs, the risk of mercury contamination of these materials is reduced.

It is assumed that the remaining materials are not contaminated with mercury (because they were removed according to the WEEE Directive), that they are recovered and re-enter the market for a new life cycle. In this best case scenario, thanks to the legal framework, and in particular the rules set out in the WEEE Directive, a circular economy that is protective of human health and the environment seems possible.

However, this positive conclusion should be nuanced:

- It is dependent on whether obligations under WEEE and RoHS Directives are properly implemented, and in particular the obligation for information on each type of new EEE placed on the market for the first time;
- Binding quality standards at EU level for the treatment of WEEE are currently being set but have not been adopted yet.¹⁶⁶ This means they may still vary from one Member State to another;
- It is unclear whether the mercury recovered would be used to make new products. If it is simply stored, and new products continue to enter the EU containing ‘new’ mercury, the mercury stored will increase, and circularity will not be achieved.





CONCLUSION ON CASE STUDIES

When no EU product or waste stream specific legislation is applicable (Case Study 1), the legal framework (i.e. the CLP Regulation, REACH, the POPs Regulation and the WFD) fails to ensure waste operators and recyclers have access to information on the presence and nature of hazardous substances in the waste, and on appropriate treatment methods. This means any economic operator in a second life cycle also does not have access to this information when using recovered materials to make new products. As a result, to ensure compliance with the most up-to-date restrictions on using hazardous chemicals, whether under REACH or the POPs Regulation, manufacturing companies would have to find other solutions – such as testing the recovered materials – which may be costly. This may make the recovered materials financially less attractive than virgin material. It also increases the risk that companies in a circular economy breach the rules restricting the use of hazardous chemicals when using recovered materials.

By contrast, when EU product or waste stream specific legislation is applicable (Case Study 2), information is more likely to reach the relevant economic operators looking to use recovered materials. Indeed, in this case study – thanks to the ecodesign rules – there is information in the supply chain on the presence and quantity of mercury in televisions. Thanks to WEEE rules, information on appropriate treatment of the discarded EEE should be made available to treatment facilities free of charge, including the location of hazardous chemicals in the equipment. In addition, the WEEE Directive requires specific treatment of the waste (e.g. removal of CCFLs).

These two case studies therefore show that, Chemicals, Product and Waste legislation are complementary, and each has a role to play to make the circular economy a reality, while protecting human health and the environment. Nonetheless, when no product or waste stream specific rules are applicable, Chemicals legislation and the WFD are not sufficient to ensure 1) the necessary information flow on hazardous chemicals in material cycles and 2) the protection of human health and the environment when recovered materials are used to make new products.

These case studies also emphasise how limiting hazardous chemicals from entering the material cycle in the first place would be the best option, as it would reduce the (unnecessary) burden for economic operators seeking to switch from virgin to recovered materials, while ensuring the protection of human health and the environment.

3

PROS AND CONS OF THE CURRENT LEGAL FRAMEWORK

To summarise, despite the structure of the EU legal framework being in three blocks – Chemicals, Product and Waste legislation – these blocks do not work in isolation but complement each other in order to protect human health and the environment.

However, at each step of the material cycle, shortcomings remain in the current legal framework:

1) Before the cycle starts:

- In practice, the objective to limit hazardous chemicals entering the material cycle has not yet been realised: under Chemicals legislation, the identification of SVHCs and inclusion of substances on the Restriction or Authorisation Lists is not keeping pace with the evolution of scientific knowledge.
- Under Chemicals and Product legislation, restrictions are to be adopted or authorisations denied on the basis of whether feasible and safer alternative substances or technologies are available. However, this notion of ‘available alternative’ is not clearly defined or applied consistently. This leads, for example, to authorisations being granted under REACH, despite feasible alternatives being available.¹⁶⁷
- There is no clear and consistent enforcement of the obligation to provide safety information on exposure in the waste or recycling phase to ECHA in the registration dossier, or to companies in the supply chain. The quality of dossiers is generally low, especially regarding exposure scenarios,¹⁶⁸ which should reflect potential multiple life cycles through closed and open material loops in a circular economy.

2) When the product is made available on the market:

- Except for TVs and computers, no information on the presence of hazardous chemicals is required to be set out in the technical documentation of a product under either Product or Chemicals legislation.
- Chemicals legislation, as currently interpreted, only requires the manufacturer of the product to inform the retailer of the presence of an SVHC in the product (this does not cover other hazardous chemicals) and its identity (and that it is present in quantities exceeding 0.1 percent weight by weight of the article in which it is contained). The current Guidance¹⁶⁹ does not require that the location of the hazardous substance be specified.
- There is no clear and consistent enforcement of the obligation under REACH to inform consumers, upon their request, about the presence of hazardous

chemicals in products. However, this existing requirement could be a useful lever to incentivise companies to switch to non-hazardous chemicals.

3) When the product becomes waste:

- Except when waste stream specific rules impose an obligation to pass on information (Case Study 2), no information regarding the presence, location or identity of hazardous substances in the waste, or regarding appropriate management or treatment methods must be made available to companies collecting, sorting and treating waste (Case Study 1).
- The requirements under Waste legislation to classify waste as hazardous are also not precise enough to ensure that hazardous substances present in the waste are identified at this stage (see 1.4(a)(1) and Case Study 2).

4) When a new cycle starts with recovered materials:

- Again, except when waste stream specific rules impose an obligation to pass on information (as in Case Study 2), no information regarding the presence, location, identity of hazardous substances in the waste or regarding appropriate management or treatment methods usually reaches recyclers (as in Case Study 1).
- The current legal framework does not prevent recovered materials from entering into a new cycle in cases where they contain substances that have only been restricted after the first cycle has started. Because recyclers do not have access to information as basic as the chemical composition of the waste, they may not be in a position to ensure compliance with the most up to date legal requirements (see, for example, comments relating to *HBCDD* in Case Study 1).



Except for TVs and computers, no information on the presence of hazardous chemicals is required to be set out in the technical documentation of a product under either Product or Chemicals legislation

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- When no waste stream specific rules (such as the WEEE Directive) apply, no rules exist to ensure that hazardous substances are removed from waste streams or that the waste is treated appropriately before the material is re-introduced into the economy.
 - The lack of clarity and harmonisation as to when, and under which conditions, waste ceases to be waste may give too much flexibility to recyclers to decide under which quality standards (e.g. concentration of hazardous chemicals) waste can be re-injected into the economy as non-waste.
 - Restrictions that are more lenient for recycled materials have been adopted (e.g. cadmium in recovered PVC under REACH, or pentaBDE under POPs Regulation), allowing materials to re-enter the economy despite containing hazardous chemicals at concentration levels exceeding what is now considered safe for virgin materials. This creates explicitly lower standards of protection of human health and the environment when recovered materials enter a new cycle.

These shortcomings might cause serious concerns both for economic operators and consumers, which would impact the success of the circular economy. These points should therefore be taken into account when the Commission implements its Action Plan for the circular economy, particularly (i) the “*analysis and policy options to address the interface between chemicals, products and waste legislation*” in 2017, and (ii) when examining “*options and actions for a more coherent policy framework of the different strands of work of EU product policy in their contribution to the circular economy*” in 2018.¹⁷⁰ This is also relevant for the EU institutions when considering and voting on the proposals made by the Commission in December 2015 on the Waste legislation.





4

POLICY RECOMMENDATIONS

4.1

LIMIT HAZARDOUS CHEMICALS ENTERING THE ECONOMY IN THE FIRST PLACE

Limiting hazardous chemicals from entering the economic cycle in the first place is not only the best way of protecting human health and the environment, but also facilitates the recovery of materials from waste and thus strengthens the circular economy.¹⁷¹ Indeed, as acknowledged in the RoHS Directive regarding electric and electronic equipment, “[r]estricting the use of those hazardous substances is likely to enhance the possibilities and economic profitability of recycling of waste EEE and decrease the negative impact on the health of workers in recycling plants”.¹⁷²

As explained above, legal tools already exist to limit hazardous chemicals from entering the material cycle in the first place. Our recommendation would therefore be to prioritise the proper and consistent implementation of the legal provisions which incentivise their substitution with non-hazardous chemicals, specifically:

- Accelerate the **identification of SHVCs and inclusion of substances in the Restriction or Authorisation Lists**. REACH needs to be implemented fully and its mechanisms need to keep up with evolving scientific knowledge on the hazardous properties of chemicals;
- Clarify and harmonise the interpretation of the **notion of ‘suitable alternative’** under REACH, the POPs Regulation, the RoHS Directive, and any other relevant piece of legislation restricting the manufacturing, marketing and use of hazardous substances. Public consultations regarding availability of safer alternatives should also be made more visible so that more actors with relevant expertise (such as product designers) can contribute. We suggest, for example, the creation of a common online platform promoting innovation where stakeholders could share their knowledge on alternatives substances and technologies and contribute to the decision-making process, whether under REACH, the POPs Regulation, RoHS Directive or any other piece of relevant legislation.
- Set as a priority the **enforcement of the obligation to inform consumers** of the presence of SVHCs in products, as well as require that the location of the

substance in the product must be identified. Beyond enforcement, public authorities could promote or finance mobile applications such as ToxFox¹⁷³ to make it easy for consumers to ask whether products they intend to purchase contain SVHCs.

- Extend the obligations of providing information, currently applicable to SHVCs, to all substances classified as hazardous (as foreseen by Article 138(8) of REACH).

Other instruments could be exploited more than they are at present to incentivise companies to switch to safer alternatives, such as:

- European standards under Product legislation prohibiting the use of certain hazardous substances, or at least not requiring their use (e.g. flame retardants);¹⁷⁴
- Economic instruments such as extended producer responsibility fees with higher costs for products containing hazardous substances that hinder safe reuse or recycling;
- Voluntary certification schemes in the supply chain, such as Ecolabels, which exclude the use of hazardous chemicals in compliant products.



4.2

ENSURE INFORMATION FLOW REGARDING HAZARDOUS SUBSTANCES IN THE ENTIRE MATERIAL LIFE CYCLES

In order to ensure they comply with the most up-to-date legal requirements protecting human health and the environment, companies using materials recovered from waste to make new products **need to have access to the following key information:**

- whether the resource they intend to use contains hazardous chemicals;
- in which part of the waste these hazardous chemicals are located;
- the concentration of these chemicals; and
- which treatment methods would be appropriate, if any.

As explained previously, the current legal framework does not ensure this information is made available to treatment facilities, recyclers or manufacturers of products using recovered materials. The legal framework therefore needs to be adapted:

1) In the long term, to ensure the ‘right to know’ in relation to the chemical composition of materials

Ensuring that these economic operators have the right to know the **chemical composition** of materials would allow them to identify not only substances already regulated as hazardous when the product was first placed on the market, but also substances that become restricted while already on the market. This way, it would be less costly for the manufacturers of products looking to use recovered materials to ensure that the products they place on the market comply with the most up-to-date standards of protection for human health and the environment.

Policymakers therefore need to set as a priority the development of an information system that would 1) gather data on the chemical composition of all materials placed on the EU market and 2) make it available to relevant economic operators looking to place on the market materials recovered from waste. Making the link between the information in the database and a material collected from waste would require technical tools to be developed (e.g. embedded markings, colour coding, smart tags, digital scans etc.).

Policymakers therefore need to set **incentives to make companies invest in the development of such technologies**. Setting **higher targets for recycling across the EU**, as

currently proposed by the Commission, could be an effective way to create such an incentive. Higher recycling targets should not, however, be used as an excuse for allowing recovered materials to be used in new products if they do not comply with the most up-to-date legal concentration limit of hazardous chemicals. Instead, higher targets should be promoted as an incentive for economic operators to make the necessary investments to ensure recovered materials are as safe for human health and the environment as virgin materials. Nevertheless, more targeted incentives may be necessary.

2) In the interim, to improve information in the material life cycle

To start with, pending the development of the necessary technologies, **the quality of information at each step of the material life cycle should be improved**. This means:

- Setting as a priority the enforcement of the obligation under REACH for manufacturers and importers of substances on their own or in mixtures to detail in their **registration** dossier and **Safety Data Sheet**, exposure scenarios covering the waste stage. More detailed information could be required such as the description of different end-of-life scenarios for recycling, preparation for reuse or disposal. Furthermore, ECHA should make available on its website more detailed information, in line with Article 119 of REACH.
- Setting as a priority the enforcement of the obligation under REACH **for manufacturers and importers of products** to inform economic operators in the supply chain of the **presence of SVHCs in articles**, as well as require that the **location** of the substance in the product is identified.



Higher recycling targets should not, however, be used as an excuse for allowing recovered materials to be used in new products if they do not comply with the most up-to-date legal concentration limit of hazardous chemicals.



- Extending under REACH the obligations of providing information, currently applicable to SHVCs, to all substances classified as hazardous (as foreseen by Article 138(8) of REACH).
- Extending to other product types and other hazardous chemicals the **ecodesign requirements** currently applicable to televisions and computers that require that manufacturers and importers of products include information on the presence of mercury in the **technical documentation**. Ecodesign requirements could be adopted as well to ensure that the products are designed in a way that facilitates the localisation and isolation of parts containing hazardous chemicals. For example, the proposal for new ecodesign requirements for electronic displays that requires a mercury content warning logo should be supported.¹⁷⁵ Markings could also be required for other categories of products and hazardous substances, e.g. a mandatory flame retardant logo.
- Adopting material or sector specific rules similar to the WEEE Directive which impose an obligation on manufacturers and importers of products to make available to recyclers and treatment facilities relevant information on the presence and location of hazardous substances in their products, as well as appropriate treatment methods. Enforcement of this existing obligation under the WEEE Directive should also be a priority.

Thanks to this improved information in the material cycle, waste operators, recyclers and finally manufacturers of products with recovered materials should receive relevant information on the presence, location and concentration of hazardous chemicals in these materials. This should reduce the burden on them to be able to comply with the most up-to-date restrictions regarding hazardous chemicals. This will therefore stimulate the circular economy while protecting human health and the environment from the risks caused by contamination through hazardous chemicals in material cycles.

4.3

ENSURE THE LEGAL FRAMEWORK IS NOT LESS PROTECTIVE FOR PRODUCTS MADE OF RECOVERED MATERIALS

If hazardous chemicals cannot be substituted by non-hazardous ones, the legal framework needs to at least ensure products containing recovered materials do not endanger human health or the environment due to the presence of hazardous chemicals. To that end we would recommend:

- To develop, as a priority, EU harmonised end-of-waste criteria for the most important waste streams in terms of volume and risk to human health and the environment. For instance, defining EU end-of-waste criteria for plastics is urgent. In addition, the criteria need to prevent hazardous chemicals from being present in recovered materials in concentrations exceeding the level allowed for virgin materials.
- As long as no binding end-of-waste criteria are available, quality standards for waste treatment and recycling processes leading to recovered materials of a similar quality to virgin materials should be developed and promoted to pull the market towards safer and cleaner material cycles.

- To adopt rules, similar to the WEEE Directive, for other specific product groups or material streams (e.g. furniture or textiles) which impose an appropriate treatment of waste containing hazardous chemicals before it can be recovered and used in new products.
- To ensure the full implementation of the WEEE Directive regarding in particular the obligations to ensure treatment of EEE waste before recovery.
- To amend restrictions which are more lenient for recovered materials (e.g. cadmium in recycled PVC under REACH, or pentaBDE under the POPs Regulation) and avoid them in the future.

This report covers cases where materials have been discarded, become waste and have been recovered to make new products. However, in a circular economy, other scenarios exist which also prevent the use of virgin materials, e.g. by re-using products or parts of products before they become waste, or extending their lifetimes through repair and refurbishment. The issues raised by the presence of hazardous chemicals in these cases would require another detailed analysis of the EU legal framework.





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- 31 WFD, Article 3(13), "any operation by which products or components that are not waste are used again for the same purpose for which they were conceived".
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- 44 REACH, Article 31.
- 45 REACH Annex I, see Guidance on information requirements and chemical safety assessment Chapter R.18: Exposure scenario building and environmental release estimation for the waste life stage.
- 46 REACH, Annex II, Part A.
- 47 REACH, Article 7(1).
- 48 REACH, Article 7(6).
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- 50 REACH, Article 33(1).
- 51 REACH, Article 33(2).
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- 89 See Ecodesign Directive, Annex I, point 1.2.
- 90 See Ecodesign Directive, Annex I, point 1.3.
- 91 Commission Regulation (EC) No 642/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for televisions, (OJ L 191, 23.7.2009, p. 42–52), Annex I.
- 92 Commission Regulation (EU) No 617/2013 of 26 June 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for computers and computer servers, (OJ L 175, 27.6.2013, p. 13–33), Annex II, Section 7.1.1(y).
- 93 Institut für Ökologie und Politik for the EEB, “Delivering resource efficient products, how can ecodesign drive a circular economy in Europe”, March 2015, available at: <http://www.eeb.org/index.cfm/library/report-delivering-resource-efficient-products/>
- 94 Commission Action Plan, p. 4.
- 95 WFD, Article 3(1); See Commission “Guidelines on the interpretation of key provisions of Directive 2008/98/EC on waste”, p. 9–11.
- 96 WFD, Articles 18–19.
- 97 As explained in Commission Draft Guidance document available at: http://ec.europa.eu/environment/waste/pdf/consult/Draftpercent20guidancepercent20document_09062015.pdf
- 98 As explained in a report from the German Environment Protection Agency “Reach and the recycling of plastics, Reference manual for an appropriate implementation of the REACH requirements for the operators of recycling plants” (Umwelt Bundes Amt, Texte 08/2012 “REACH and the recycling of plastics”, p. 23).
- 99 See Judgment of the Court of 7 March 2013 Case C-358/11, EU:C:2013:142, §55.
- 100 i.e. it must no longer be a “substance or object which the holder discards or intends or is required to discard” (WFD, Article 3(1)).
- 101 See Case C-358/11, §59.
- 102 Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) Text with EEA relevance (OJ L 197, 24.7.2012, p. 38–71). (“WEEE Directive”)
- 103 Directive 2006/66/EC of the European Parliament and the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators, (OJ L 266, 26.9.2006, p. 1) (“Directive on Batteries”).
- 104 Article 21(3), Directive on Batteries: “batteries, accumulators and button cells containing more than 0,0005 percent mercury, more than 0,002 percent cadmium or more than 0,004percent lead, shall be marked with the chemical symbol for the metal concerned: Hg, Cd or Pb”.
- 105 Name: “Bis(pentabromophenyl) ether”.
- 106 According to ECHA “Background document to the Opinion of SEAC and RAC on the Annex XV dossier proposing restrictions on Bis(pentabromophenyl) ether” (September 2015) <https://echa.europa.eu/documents/10162/13641/rac_seac_background_doc_decabde_en.pdf>
- 107 Name: “Hexabromocyclododecane”.
- 108 According to ECHA “Background document for hexabromocyclododecane and all major diastereoisomers identified (HBCDD)” (Document developed in the context of ECHA’s first Recommendation for the inclusion of substances in Annex XIV) (June 2009) <<https://echa.europa.eu/documents/10162/9b8562be-30e9-4017-981b-1976fc1b8b56>>
- 109 As described in: <https://echa.europa.eu/documents/10162/13641/rac_seac_background_doc_decabde_en.pdf>
- 110 According to ECHA “Background document for hexabromocyclododecane and all major diastereoisomers identified (HBCDD)” (Document developed in the context of ECHA’s first Recommendation for the inclusion of substances in Annex XIV) (June 2009) <<https://echa.europa.eu/documents/10162/9b8562be-30e9-4017-981b-1976fc1b8b56>>
- 111 Commission Regulation (EU) No 618/2012 of 10 July 2012 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures (OJ L 179, 11.7.2012, p. 3–10).
- 112 REACH, Annex VI.
- 113 REACH, Annex VI.
- 114 REACH, Annex I, Part 5.1.1.
- 115 ECHA Decision of 28 October 2008, ED/67/2008 including HBCDD in the Candidate List, <https://echa.europa.eu/documents/10162/471aceac-4e5e-4c53-a4b2-23159a290893>
- 116 ECHA Decision of 18 December 2012, ED/169/2012 including decaBDE in the Candidate List, <https://echa.europa.eu/documents/10162/7de8998e-c87a-4fa6-82fa-927ffbf0fe79>
- 117 REACH, Article 31.
- 118 REACH Annex I section 5, and for further details see Guidance on information requirements and chemical safety assessment Chapter R.18: Exposure scenario building and environmental release estimation for the waste life stage.
- 119 Commission Regulation (EU) No 143/2011 of 17 February 2011 amending Annex XIV to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (OJ L 44, 18.2.2011, p. 2–6).
- 120 According to ECHA Guidance on requirements of substances in articles (ECHA-15-G-10-EN). At the time of this report, the Guidance is under review.
- 121 “the design of a textile may be determined by the twist of fibres in the yarn, the weave of threads in a fabric and the treatment of the surface of the textile” (ECHA Guidance on requirements of substances in articles (ECHA-15-G-10-EN) p. 11). At the time of this report, the Guidance is under review.

- 122 REACH, Article 7(6).
- 123 According to ECHA Guidance on requirements of substances in articles (ECHA-15-G-10-EN). At the time of this report, the Guidance is under review.
- 124 U.S. Environmental Protection Agency (2015), "Flame retardants in Flexible Polyurethane Foam", 744-R-15-002 p. 20 https://www.epa.gov/sites/production/files/2015-08/documents/ffr_final.pdf
- 125 Commission Decision of 2 July 2010 on the safety requirements to be met by European standards for certain products in the sleep environment of children pursuant to Directive 2001/95/EC of the European Parliament and of the Council (2010/376/EU).
- 126 Commission Decision of 3 May 2000 on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council (OJ L 226 6.9.2000, p. 3), as amended by Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council (OJ L 370, 30.12.2014, p. 44–86).
- 127 No (*) in the List of Waste for any entry described as "Textile".
- 128 And was added to the Candidate List.
- 129 See for a real life example: <http://www.wrap.org.uk/sites/files/wrap/Collectionpercent20andpercent20takepercent20backpercent20ofpercent20mattressespercent20forpercent20recycling_0.pdf>
- 130 Commission Regulation (EU) No 143/2011 of 17 February 2011 amending Annex XIV to REACH, (OJ L 44, 18.2.2011, p. 2–6).
- 131 ECHA's website (Adopted opinions and previous consultations on applications for authorisation)
- 132 Commission Regulation (EU) 2016/293 of 1 March 2016 amending Regulation (EC) No 850/2004 of the European Parliament and of the Council on persistent organic pollutants as regards Annex I (OJ L 55, 2.3.2016, p. 4–8).
- 133 Provided that the concentration level of decaBDE in the foam part reached 0.1 percent weight by weight.
- 134 Fakhredin, Huisman, "Analyzing End of Life LCD TV WEEE Flows in Europe", (2013), available on ResearchGate.
- 135 [http://www.savap.org.pk/journals/ARInt./Vol.2\(2\)/2012\(2.2-14\).pdf](http://www.savap.org.pk/journals/ARInt./Vol.2(2)/2012(2.2-14).pdf)
- 136 http://www.air.ie/Download/Mercury_in_waste_LCD_backlights_summary_research_report.63ad9220.11115.pdf
- 137 The main manufacturers of LCD are established outside the EU: <https://www.statista.com/statistics/267095/global-market-share-of-lcd-tv-manufacturers/>
- 138 "According to manufacturers, a television has a lifespan of approximately 40,000 to 90,000 hours (continuous use). This translates to roughly between four and ten years of active use", see <<http://ccm.net/faq/10203-a-television-buying-guide-lcd-led-or-plasma#television-life-expectancy>>
- 139 CLP Regulation, Annex VI, Entry « Mercury ».
- 140 <https://echa.europa.eu/substance-information/-/substanceinfo/100.028.278>.
- 141 RoHS Directive (following the recast in 2011).
- 142 RoHS Directive, Article 3(6): "person who manufactures an EEE or who as an EEE designed or manufactured and markets it under his name or trademark".
- 143 e.g. drawing up a technical documentation and an EU Declaration of conformity, ensure that the TV can be identified (with a number), and that the identity of the manufacturer and single point of contact marked on the TV (RoHS Directive, Article 7).
- 144 RoHS Directive, Article 4(2).
- 145 RoHS Directive, Annex II; in homogenous materials.
- 146 RoHS Directive, Article 4(6).
- 147 RoHS Directive, Annex III; Entry 3.
- 148 Commission Regulation (EC) No 642/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for televisions, (OJ L 191, 23.7.2009, p. 42–52).
- 149 WEEE Directive, Article 3(f)(iv).
- 150 RoHS Directive, Article 3(9) « person established within the Union who places an EEE from a third country on the Union market ».
- 151 RoHS Directive, Article 9.
- 152 Ecodesign Directive, Article 4.
- 153 Ecodesign Directive, Article 2(8).
- 154 WEEE Directive, Article 3(f)(iii).
- 155 WEEE Directive, Article 12.
- 156 WEEE Directive, Article 14(4).
- 157 WEEE Directive, Article 15.
- 158 WEEE Directive, Article 3(g).
- 159 WEEE Directive, Article 5(b) "as long as the equipment is of equivalent type and has fulfilled the same functions as the supplied equipment".
- 160 WEEE Directive, Article 9.
- 161 WEEE Directive, Article 8 (Annex VII).
- 162 WEEE Directive, Article 15(1).
- 163 List of waste 20 01 21* "fluorescent tubes and other mercury-containing waste".
- 164 WFD, Article 17.
- 165 Regulation (EC) No 1102/2008 of the European Parliament and of the Council of 22 October 2008 on the banning of exports of metallic mercury and certain mercury compounds and mixtures and the safe storage of metallic mercury (OJ L 304, 14.11.2008, p. 75–79).
- 166 http://ec.europa.eu/environment/waste/weee/standards_en.htm
- 167 See the Commission Implementing Decision of 16 June 2016 granting an authorization for uses of DEHP under REACH (C(2016)3549 final).
- 168 See ECHA Evaluation Progress Reports available at: <https://echa.europa.eu/regulations/reach/evaluation>
- 169 ECHA published a Guidance document on requirements for substances in articles (ECHA-15-G-10-EN) which guides operators in understanding whether an object is a mixture or an article. At the time of this report, the Guidance is under review
- 170 See COM(2015) 614: Annex to the Communication from the Commission on the EU action plan for the Circular Economy.
- 171 This was highlighted by other organisations such as ChemTrust (Policy Briefing available at: <<http://www.chemtrust.org.uk/wp-content/uploads/chemtrust-circulareconomy-aug2015.pdf>>) and Oekopol and the EEB (see Report on Delivering Resource Efficient Products available at: <http://www.eeb.org/index.cfm/library/report-delivering-resource-efficient-products/>).
- 172 RoHS Directive, Recital 8.
- 173 <https://www.bund.net/themen/chemie/toxfox/>
- 174 See also for more information on the six classes of chemicals of concern here: <http://www.sixclasses.org/>
- 175 Proposal available at : http://www.eup-network.de/fileadmin/user_upload/Labeling_DRAFT_reg-V01.pdf
- Collectionpercent20andpercent20takepercent20backpercent20ofpercent20mattressespercent20forpercent20recycling_0.pdf>
- Commission Regulation (EU) No 143/2011 of 17 February 2011 amending Annex XIV to REACH, (OJ L 44, 18.2.2011, p. 2–6).
- ECHA's website (Adopted opinions and previous consultations on applications for authorisation
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The European Environmental Bureau is the largest federation of environmental citizens' organisations in Europe. It currently consists of over 150 member organisations in more than 30 countries (virtually all EU Member States plus some accession and neighbouring countries). Including a growing number of European networks, and representing some 15 million individual members and supporters. The EEB stand for environmental justice, sustainable development and participatory democracy. Our aim is to ensure the EU secures a healthy environment and rich biodiversity for all.