

How to Reach a Safe Circular Economy?— Perspectives on Reconciling the Waste, Product and Chemicals Regulation

Joonas Alaranta* and Topi Turunen**

ABSTRACT

This article discusses the regulation of ‘substances of concern’ in the circular economy (CE) in the European Union (EU). It analyses the tensions and obstacles that the present sectoral separation of waste, product and chemicals legislation sets for the development of the CE. We argue that in a longer term perspective the aim should be to erase the border between waste and chemicals regulation and create a single regime for the regulation of materials and their flow. However, the eventual aim of such non-toxic material circulation can be achieved only via precautionary transitional measures that outweigh the costs and benefits of each material flow and set restrictions for the particular substances of concern. Regulatory actions addressing the risks posed by the substances of concern in the waste-based material flows are urgently needed. New measures are necessary to protect human health and the environment and to support the development of the markets for the secondary materials.

KEYWORDS: circular economy, chemicals, waste, recovery, substances of concern, risk

1. INTRODUCTION

Moving towards a more circular economy (CE) has been an important trend in the European Union (EU) policy initiatives over the past few years. The idea of CE was introduced in the Seventh Environmental Action Programme of the EU under the title ‘Living well, Within the Limits of Our planet’.¹ The main target of the programme was

* Legal Advisor, Registry of the Board of Appeal of the European Chemicals Agency; Post-Doctoral Researcher, University of Eastern Finland Law School, Finland. (joonas.alaranta@uef.fi)

** Researcher, Finnish Environment Institute; Post-Doctoral Researcher, University of Eastern Finland Law School, Finland. All opinions and mistakes are the authors’ own and cannot be attributed to the institutions they represent.

1 Decision 1386/2013 of the European Parliament and the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 ‘Living well, within the limits of our planet’ [2013] OJ L354/171.

to transform the EU into a CE by 2050. The CE can be defined as an industrial system in which the value of products is fully utilised by means of re-use, recycling and recovery and the value creation mechanisms are thereby decoupled from the consumption of finite resources products.² According to the definition of the Commission the CE is a new economic model ‘where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimized [...] to develop a sustainable, low carbon, resource efficient and competitive economy.’³ Thus, the concept of CE represents a new way of seeing and understanding waste, industrial production, and other aspects of life by ensuring that nothing is wasted and that natural resources are managed sustainably. High-level policy documents have praised the financial and environmental benefits which a more complete transition to a CE would deliver.⁴ At the same time, research papers focusing on the chemical risks of secondary raw materials have emerged during the last few years.⁵

The aim of the CE is to minimise the amount of generated waste and where waste is generated, to efficiently harness it back to production processes. However, while being efficient, these material flows should also refrain from causing adverse impacts to human health and the environment. Therefore, the regulatory framework on the chemical management of the material flows plays an essential role in the development of sustainable CE.

The CE objective has raised complex questions as to how to harness materials back into production processes once they have been classified as waste. The ‘commodification’ of waste is one of the key CE challenges: once waste ceases to be waste, the regulatory framework governing its use changes significantly.⁶ From industry’s perspective, the rising CE trend is a double-edged sword. The widely shared political will to enhance the CE offers new business opportunities as well as, in

2 Ellen MacArthur Foundation, ‘Growth Within: A Circular Economy Vision for a Competitive Europe’ (2015) 23, 37 <https://www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation_Growth-Within_July15.pdf> accessed 7 July 2020; Anders Wijkman and Kristian Skånberg ‘The Circular Economy and Benefits for Society: Jobs and Climate Clear Winners in an Economy Based on Renewable Energy and Resource Efficiency’ (*Club of Rome*, 2015) 5 <<https://clubofrome.org/wp-content/uploads/2020/03/The-Circular-Economy-and-Benefits-for-Society.pdf>> accessed 7 July 2020.

3 ‘Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Closing the Loop – An EU Action Plan for the Circular Economy’ COM (2015) 614 final, 2 (hereinafter ‘the CE Communication’).

4 *ibid* 1; Ellen MacArthur Foundation (n 2) 12–15; and Material Economics, *The Circular Economy – A Powerful Force for Climate Mitigation* (2018) 6 <<https://media.sitra.fi/2018/05/04145239/material-economics-circular-economy.pdf>> accessed 5 March 2020, according to which the transition to a more complete CE could cut the greenhouse gas emissions produced by the European steel, plastics, aluminium and cement industries by as much as 56%.

5 See eg Charles Bodar and others, ‘Risk Management of Hazardous Substances in a Circular Economy’ (2018) 212 *J Environ Manage* 108, 108–10, and the research papers referred to therein; and Joseph DiGangi, Jitka Strakova and Lee Bell, *POPs Recycling Contaminates Children’s Toys with Toxic Flame Retardants* (2017) <https://ipen.org/sites/default/files/documents/toxic_toy_report_2017_update_v2_1-en.pdf> accessed 5 March 2020.

6 The commodification of waste in a CE may also raise novel legal questions related to property rights. See Katrien Steenmans, Rosalind Malcolm and Jane Marriot, ‘Commodification of Waste: Legal and Theoretical Approaches to Industrial Symbiosis as Part of a Circular Economy’ (2017) University of Oslo Faculty of Law Legal Studies Research Paper No. 2017-26 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2983631> accessed 31 August 2020.

general, a favourable operational environment for industry. On the other hand, the risks posed by the accumulation of chemicals in recovery of materials may eventually give rise to new requirements, such as the tracking and elimination of hazardous substances. It is obvious that the CE does not merely involve using materials in an efficient way. It must also be ensured that the materials do not cause adverse impacts on human health and the environment.

The present EU regulation on waste, materials and the related risks has not been designed for the CE objectives as the Commission now wishes to introduce. Therefore, the pursuit of the new economy model raises a multitude of regulatory challenges that need to be addressed. The main challenges can be divided into three categories: (1) sectoral separation of waste, product and chemicals regulatory regimes; (2) tensions between the objectives of these different regimes and (3) regulatory obstacles for turning waste back into products. All of these regulatory challenges are linked to the management of 'substances of concern' in the material cycles. At a general level, 'substances of concern' can be referred to as substances that pose concern to human health or the environment due to their hazard properties. The present EU legislation does not contain a universal definition of the term 'substance of concern'.⁷ Several different definitions have been proposed by different national authorities and non-governmental organisations.⁸

In January 2018, the Commission published a Communication on options to address the interface between waste, product and chemicals legislation⁹ (the 'Interface Communication') alongside a Commission staff working document (the 'Staff Working Document').¹⁰ The Commission identifies four main obstacles that hinder the transition from waste to product and constitute barriers for the CE: (1) information on the presence of substances of concern is not readily available to those who handle waste and prepare it for recovery, (2) waste may contain substances that are no longer allowed in new products, (3) the EU's rules on end-of-waste (EoW) are not fully harmonised, making it uncertain how waste becomes a new material and product and (4) the rules used to decide which wastes and chemicals are hazardous are not well aligned and this affects the uptake of secondary raw materials.¹¹

In the Staff Working Document, the Commission suggests several options to address each of the above-mentioned obstacles. In this article we discuss: the problems

7 See, however, Regulation (EU) No 528/2012 of the European Parliament and of the Council concerning the making available on the market and use of biocidal products [2012] OJ L167/1, art 3(f), which contains a very broad definition of substance of concern. Under the regime laid down in this regulation, the substance of concern concept is applied in the simplified authorisation procedure in respect of biocidal products. Biocidal products may benefit from simplified authorisation only if they do not contain any substances of concern. In such a context the use of a broad definition is the only option.

8 See Substitution Support Portal: 'Identifying Substances of Concern' <<https://www.subsportplus.eu/identifying-substances-of-concern>> accessed 6 March 2020.

9 Commission, 'Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation' COM (2018) 32 final.

10 Commission, 'Commission Staff Working Document Accompanying the document Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation' SWD (2018) 20 final.

11 COM (2018) 32 final (n 9) 6.

that sectoral separation of the waste, product and chemicals regulatory regimes; tensions between the objectives of them; and regulatory obstacles of turning waste back to products pose to the CE and analyse the proposals of the Commission in the light of this discussion. The main objective of this article is to assess both the most viable solutions and the alternatives that do not contribute to the promotion of a sustainable CE in the desired manner but rather lead to *theory failure* where the regulation does not produce the immediate effects that were expected or intended.¹² This article also positions the identified practical problems to a wider context of shortcomings of the CE and environmental regulation.

We conclude that, whilst in a longer perspective the aim should be to erase the border between waste and chemicals regulation and create a single regime for the regulation of materials and their flow, new methods for life cycle assessment of the CE are urgently needed for the transitional period. Weighing the costs and benefits of the circulation of materials that contain substances of concern is a very complicated process that requires case-by-case approaches. However, the climate and other environmental benefits pursued by the CE should never lead to compromises as regards the protection of human health and the environment from chemical risks. The ultimate aim of achieving a non-toxic CE requires a strict policy as regards substances of concern and may in some cases also call for individual decisions that temporarily increase greenhouse gas emissions.

2. SECTORAL SEPARATION AND THE LACK OF THE CE REGULATORY SYSTEM

2.1 The Interface Between Waste and Chemicals Regulation

The regulation of waste and the regulation of products and chemicals are strictly separated in EU legislation. Wastes are regulated under Directive 2008/98/EC¹³ (hereinafter the 'Waste Framework Directive', 'WFD'). Materials that are not considered waste are regulated under horizontally applicable chemicals legislation such as Regulation (EC) No 1907/2006¹⁴ (hereinafter the 'REACH Regulation') which sets out rules for registration, evaluation, authorisation and restrictions of chemicals and Regulation (EC) No 1272/2008¹⁵ (hereinafter the 'CLP Regulation') which sets out rules for classification, labelling and packaging of substances and mixtures. Products consisting of those materials are subject to variety of sector-specific regulation. This

12 Jukka Similä, *Regulating Industrial Pollution – The Case of Finland* (University of Helsinki 2007) 56; Peter H Rossi, Howard E Freeman and Mark W Lipsey, *Evaluation: A Systematic Approach* (SAGE Publications 1999) 78.

13 Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives [2008] OJ L312/3.

14 Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC [2006] OJ L396/1.

15 Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 [2008] OJ L353/1.

regulatory setting creates a clear sectoral separation between the world of waste and the world of products and chemicals.¹⁶

This separation causes two major discrepancies that hamper the operation of a sustainable and predictable CE market: (1) the sectoral separation of legislation causes gaps in the tracking of the substances of concern in the material flow and (2) different regulatory regimes set out different standards for such chemical hazards that trigger restriction mechanisms for placing on the market and use of the recovered materials. The sectoral separation has therefore led to uncertainties as regards the safety of the secondary material cycles due to a lack of information on the presence of substances of concern in the material cycles.

2.2 Tracking of the Substances of Concern

The REACH Regulation sets out, *inter alia*, requirements for generating a standard set of information on the composition and physico-chemical, toxicological and ecotoxicological properties of all chemical substances manufactured in or imported into the EU. This generic registration requirement applies to any chemical substance unless a specific exemption applies.¹⁷ The REACH Regulation guarantees the traceability of chemical data throughout the supply chain, however, only until the substance is incorporated into a product which is classified as an ‘article’.¹⁸ The traceability of chemical data ceases even more conclusively in a situation where the material is classified as ‘waste’.¹⁹ This may hinder the recovery of waste materials because the availability of compositional data is significant for the demonstration of the environmental impacts and product quality of the waste-based materials.²⁰

The lack of traceability of substances of concern is an obvious problem from the perspective of both the functioning of the CE market and the safety of the recovered materials. The recovered materials may have severe impacts on human health and the environment if substances of concern are not detected in the material cycles and the risks that these substances pose therefore cannot be managed properly when using the secondary materials.²¹ The starting point for functioning material cycles is that the waste can be returned to production processes and commodified in a safe

16 REACH Regulation (n 14) art 2(2), and CLP Regulation (n 15) art 1(3).

17 REACH Regulation (n 14) art 3(1) defines a ‘substance’ as a chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition. Pursuant to art 5 of the REACH Regulation only registered substances can be placed on the EU market.

18 REACH Regulation (n 14) art 3(3) defines an ‘article’ as an 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.

19 The REACH Regulation (n 14) refers to the definition laid down in the EU waste legislation where ‘waste’ is a substance of object which the holder discards or intends or is required to discard.

20 SWD (2018) 20 final (n 10) 7–8.

21 The problem is well articulated in recital 38 of Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste [2018] OJ L150/109): ‘[w]hen products, materials and substances become waste, the presence of hazardous substances may render that waste unsuitable for recycling or the production of secondary raw materials of high quality. Therefore . . . it is necessary to promote measures to reduce the content of hazardous substances in materials and products, including recycled materials, and to ensure that sufficient information about the

manner. This requires either that it does not contain substances of concern or, if it does, that these substances are identified and the use of the material is regulated in a way that prevents adverse impacts. A similar logic applies to normal non-waste materials and products and is imposed via the provisions of applicable chemicals legislation such as the REACH Regulation.

Due to the variable origin, composition and possible contamination of waste, its holder may have limited information about the recovered material or object.²² At the same time, operators using virgin raw materials usually have a pretty good idea of the composition of the materials they use. The unknown composition of waste-based materials creates unclarity of the legislative framework for the use of the material. The Commission, in the CE Communication, has set the objective that all actors in the life cycle of a material, should have access to sufficient information on the chemical composition of it.²³

The Commission identifies four basic regulatory strategies that can be applied in the tracking of the substances of concern. First, the EU could set out a generic requirement for industry to track all substances of concern by a set date. Second, the new legislation could be based on sector-specific tracking requirements. Third, tracking of substances of concern could be maintained voluntarily. Fourth, substances of concern could be analysed from waste and recovered materials instead of tracking them in the material flows.²⁴

Tracking all substances of concern by a certain date would naturally offer multiple benefits for ensuring safe material cycles. However, it would also require substantive data collection and storage work and involve significant administrative costs. The other extreme would be to abandon the idea of tracking substances of concern and rely on analysing the waste and materials that are recovered to use from waste. Purely voluntary measures would hardly be sufficient to ensure the protection of human health and the environment from the risks incurred by the substances of concern in the material cycles. On the other hand, the requirement to exclude the presence of substances of concern from the recovered materials would substantially increase the costs of waste recovery and therefore practically hinder many material flows.

The practical difficulties related to the analysing of the hazardous substances from the waste streams is well illustrated by the recent Court of Justice of the European Union (CJEU) judgment in *Verlezza and others*, which concerned the burden of proof as regards the hazardous classification of wastes. The CJEU ruled that whilst the waste holder must, in general, determine the composition of waste and ascertain

presence of hazardous substances and especially substances of very high concern is communicated throughout the whole life cycle of products and materials.'

22 The problem of tracking chemicals data in respect of materials in and out the waste stage is closely connected with the fact that the supply chain system used in chemicals regulation is a tool based on a linear economy model: the manufacturers and the upstream users of the material or product provide information on its chemical composition to downstream users until the end of the product's life cycle. Only in certain situations does data go up the supply chain. After the material is discarded and becomes waste, the supply chain is over. After recovery, the waste management operator is considered to be a manufacturer of the material or product and the supply chain starts again.

23 COM (2018) 32 final (n 9) 2–4.

24 SWD (2018) 20 final (n 10) 9.

the hazardous substances ‘which may reasonably be found’ in the waste in question, no provision of EU legislation may be interpreted to mean that ‘the waste holder would be required to rebut a presumption’ that waste is hazardous. However, the CJEU pointed out that there may be cases where it is in practice impossible to determine the presence of hazardous substances or to assess the hazardous property of the waste. In those cases, the waste should, following the precautionary principle, be presumed to be hazardous.²⁵

Introducing new sector-specific tracking solutions appears to be the golden mean and a feasible mid-term solution. Adopting a sector-specific approach would be also the most cost-efficient option: the tracking could focus on those sectors in which the recovered products typically contain substances of concern.

The efficiency and effectiveness of any tracking requirement will largely depend on how the concept of ‘substances of concern’ is defined. The Commission proposes two options in the Staff Working Document. The first option would cover substances identified as ‘substances of very high concern’ (SVHC) under the REACH Regulation²⁶ and all those substances that are classified as having a chronic effect on human health or the environment under the CLP Regulation. The second option would cover substances that are subject to REACH restrictions or restricted or prohibited by sector-specific legislation.²⁷ In its resolution on implementation of the CE package, the European Parliament has supported the latter option.²⁸

It can be argued that the ‘substances of concern’ concept should be even more extensive than the Commission proposals combined—any substance classified as hazardous can pose concerns. However, the definition has to be considered in the CE context. The practical effects of the ‘substances of concern’ definition will be concretised only by the next step, namely what are the legal obligations that detecting of substances of concern trigger.

Even a wide concept of ‘substances of concern’ does not give rise to any barriers for material circulation if derogations for the use of secondary materials that contain those substances are introduced simultaneously. The conditions for such derogations should be based on careful consideration of the actual risk posed by their presence in secondary materials. This would call for case-by-case decision-making which would create an uncertain regulatory environment for market operators. On the other hand, a narrow definition of ‘substances of concern’ applied without derogations for secondary materials would lead to a more predictable regulatory environment for market operators. However, if this option was followed a lot of hazardous substances would remain unaddressed in the material circulation.

In any case, the development of a balanced CE regulatory system calls for introduction of a universal definition for substances of concern in the EU legislation. This

25 Joined Cases C-487/17 to C-489/17 *Verlezza and others* (2019) EU:C:2019:270 [45], [54] and [62].

26 SVHC substances cover substances that are carcinogenic, mutagenic or toxic for reproduction; substances that are persistent, bioaccumulative and toxic; substances that are very persistent and very bioaccumulative; and substances that give rise to an equivalent level of concern, eg endocrine disruptors.

27 SWD (2018) 20 final (n 10) 8–9.

28 See European Parliament Resolution of 13 September 2018 on implementation of the circular economy package: options to address the interface between chemical, product and waste legislation (2018/2589(RSP)) 12.

definition would serve not only the identification of the secondary materials that may pose chemical risks to human health and the environment, but would also contribute to setting a level playing field between the different regulatory regimes that steer the CE. The lack of such definition leads to situations where the same material may be considered non-hazardous under one regulatory regime and is subject to restrictions under another due to the chemical risks it may pose.

The 2018 amendment of the WFD²⁹ introduced the first significant regulatory requirement for tracking substances of concern in all kind of articles placed on the market. Article 9(1)(i) of the amended WFD requires all suppliers of articles to notify the European Chemicals Agency (ECHA) if their articles contain any SVHC more than 0.1% weight by weight. Pursuant to Article 9(2) of the WFD the data is to be gathered in a database, with the purpose of providing information on the presence of SVHC substances to waste treatment operators and consumers. This extended requirement to submit notifications about SVHCs of all imported and EU-manufactured articles to ECHA, and making the information on the presence of the SVHC substances in articles publicly available, can be seen as a fundamental change.³⁰ The control of chemical risks of all products and material cycles is shifted from rhetoric to actual obligations imposed on companies placing any articles on the EU market. At the same time, it is ECHA's first purely CE-related task and is therefore an important step away from the sectoral separation of the waste and chemicals regulation and towards single regulatory system of all materials.

However, Article 9 of the WFD is an insufficient step towards a sustainable CE for three reasons. First, the effectiveness and the practical enforceability of the measure remain questionable. Second, the notification requirement laid down in Article 9 applies only to SVHC substances, which constitute a small proportion of substances of concern. Third, the presence of substances of concern in articles in circulation in the global commodity markets, and thus in secondary material flows, is a complex issue that cannot be effectively tackled simply by introducing a binding notification requirement in respect of these substances. The improved availability of the data on SVHCs facilitates safer material cycles but as such does not set out any legal obligations for the reduction of chemical risks.

In any event, the lack of information on the presence of substances of concern in articles is a major problem that impedes the achievement of a CE faced both by market operators and by enforcement authorities. Research papers have suggested some innovative solutions that could, instead of tracking merely the substances of concern, enable even more extensive information flow in the material cycles of the CE.

In his doctoral dissertation, de Römph raised an idea of a 'product passport' and online product registration database. This product passport would serve the idea of collecting open data on a product for business-to-business, business-to-user, business-to-market surveillance authority and other stakeholder use. The system would collect information on the origin, composition and hazards of the circulated

29 Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste [2018] OJ L150/109.

30 The information on SVHC in articles will be stored in so called SCIP database <<https://echa.europa.eu/sv/scip-database>> accessed 6 March 2020.

materials and on the options for managing them. In order to gain all the possible advantages for promoting sustainable CE, the information should be freely available and should be updated whenever new evidence or practices become available. The availability of the product passport would thus not be limited solely to ‘actors of the supply chain’ as defined under the REACH Regulation.³¹

In order for the passport to promote a CE efficiently, it would have to be widely used, cost-efficient, and applied in all stages of the product’s life cycle. However, it may become complicated to trace the compositions of products in the waste stage especially if they are discarded as mixed municipal waste after consumer use. Contamination would be another troublesome aspect: the product passport would not be able to trace chemical substances that have contaminated the product after the production stage.

Modern blockchain technologies could provide solutions for the information flow on the chemical composition of circulated materials. Blockchains are instruments for recording transactions without having one central institution controlling them. Data can be permanently stored in virtual ledgers of blockchains. Steenmans and Taylor argue that in order to have a proper life cycle approach to waste, the responsibilities of waste management should be reallocated to the original product producers. Blockchain technologies could facilitate allocating waste management responsibilities for products at their production stage. The blockchain would provide a digital trail to identify the actor responsible for the treatment of the waste in unclear situations.³² However, blockchain technology is only a tool for information collection and does not provide any regulatory guidance as such. It could perhaps be used in the practical execution of the product passport scheme where huge amounts of information would have to be tracked throughout products’ life cycles.

Nonetheless, binding regulation for the tracking of substances of concern in and out of the waste stage of the life cycle is necessary to a certain extent. The innovative solutions suggested by these authors can act as practical means for implementing those regulatory requirements. Alternatively, they could be used as complementary self-regulation based measures by the industry. Introducing the blockchain technologies or product passport schemes could complement the binding legislation especially if the latter would require only sector-specific tracking of substances of concern or would be applied only to a limited group of substances of greatest concern and therefore would leave a variety of other substances of concern unaddressed.

31 Thomas de Römph, *The Legal Transition Towards a Circular Economy: EU Environmental Law Examined* (KU Leuven 2018) 210, 371–72. See also European Commission, ‘European Resource Efficiency Platform (EREP), Manifesto & Policy Recommendation’ (2014) 7 <https://ec.europa.eu/environment/resource_efficiency/documents/erep_manifesto_and_policy_recommendations_31-03-2014.pdf> accessed 6 March 2020, according to which the proposed product passport could make product information more ‘easily accessible and applicable to the supply chain, thus facilitating efficient material flows and encouraging the creation of value in the circular economy’.

32 Katrien Steenmans and Phillip Taylor, ‘A Rubbish Idea: How Blockchains Could Tackle the World’s Waste Problem’ (*The Conversation*, 9 April 2018) <<https://theconversation.com/a-rubbish-idea-how-blockchains-could-tackle-the-worlds-waste-problem-94457>> accessed 6 March 2020.

2.3 Lack of Clarity in Hazardous Waste Classification

The adoption of a universal definition of ‘substance of concern’ does not as such eliminate the problem of different rules if the sectoral separation of the legislative framework is not reconciled. This is clearly illustrated by the challenges related to hazardous waste classification. The alignment of waste classification with the CLP Regulation introduced in 2014,³³ ie applying the hazard classification of chemicals legislation to defining hazardous wastes, has given rise to several challenges at both EU and national level in terms of practical implementation.

Wastes often are complex and heterogenous materials and their properties may vary from batch to batch or change over time.³⁴ Therefore applying the classification system of chemicals to wastes can lead to situations where it is unclear whether a hazardous chemical should be considered hazardous waste after it has been discarded or whether hazardous waste should also be classified hazardous after it has ceased to be waste and is considered a product under chemicals regulation again. These uncertainties cause problems in respect of the recovery and marketing of waste-based products and can cause risks regarding the safety of waste-based materials after EoW.

The interplay between hazardous and non-hazardous waste is relevant in relation to the so-called mirror entries, ie when the European List of Waste contains two different entries for the same type of waste. The same waste may be classified either to the entry of non-hazardous or hazardous waste, depending, eg on the presence of specific hazardous substances. The CJEU has clearly ruled that hazardous waste may, in the same way as any other waste, cease to be waste.³⁵ The uncertainties related to the hazardous waste classification affect also the recovery of wastes. The classification as hazardous can make the recovery more unlikely for example because environmental protection regulation lays down more stringent requirements for the handling and treatment of hazardous waste. An installation recovering waste with hazardous waste classification may be subject to environmental impact assessment under Directive 2011/92/EU³⁶ and require an environmental permit under Directive

33 The alignment was introduced by Commission Regulation (EU) No 1357/2014 replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives [2014] OJ L365/89.

34 See Margareta Wahlström and others, ‘Hazardous Waste Classification. Amendments to the European Waste Classification Regulation – What Do They Mean and What are the Consequences’ (Nordic Council of Ministers, 2015) 90–92 <<http://norden.diva-portal.org/smash/get/diva2:927423/FULLTEXT01.pdf>> accessed 3 June 2020.

35 C-358/11 *Lapin luonnonsuojelupiiri* (2013) EU:C:2013:142 [60]. See also C-399/17 *European Commission v Czech Republic* (2019) EU:C:2019:200 [11], [78], which describes well the far-reaching consequences that the uncertainties as regards the interface between waste and non-waste may have to the market operators. The case concerned a petroleum refining residue which was exported from Czech Republic to Poland in order to be used as a raw material in cement production. The Polish authorities considered that the residue was waste and alleged the Czech exporter for illegal shipment of waste. However, the CJEU held that it had not been shown that the material in question was waste. Uncertainties related to the differences between the assessment of the hazard properties of the waste by the authorities in the country of the dispatch and in the destination country is a frequent problem for industry and waste recovery companies acting in several EU Member States.

36 Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment [2012] OJ L26/1.

2010/75/EU,³⁷ whilst such requirements would not necessarily be applicable for the handling of the similar amount of non-hazardous waste.

In many cases, the hazardous waste classification and its consequences are a justified outcome that is in line with the precautionary principle.³⁸ However, in some other cases, the hazardous waste classification may lead to a situation where a valuable and safe secondary material is unnecessarily discarded. On the other hand, the differences between CLP classification and hazardous waste classification imply an obvious problem for the efficient operation of a CE market: if a waste material classified according to a less restrictive hazardous waste classification ceases to be waste, it has to be re-classified according to the CLP Regulation. This may entail business risks for the recovery operators and thereby hinder the circulation of materials.

Currently, the hazardous waste classification mainly follows the CLP classification. However, the application of hazardous waste classification rules is inconsistent between different EU Member States, which causes uncertainty for market operators especially with regard to cross-border waste shipments.³⁹ A waste that was not classified as hazardous in the country of dispatch may be deemed hazardous in the destination country, and vice versa. This uncertainty causes industry operators considerable business and reputation risks and therefore hampers the operation of efficient secondary raw material markets. On the other hand, in some cases, the uncertainties with regard to the hazardous waste classification may be caused by the different approaches taken by industry operators themselves.⁴⁰

The introduction of CLP classifications as the basis of hazardous waste classification has in many cases led to more stringent classification of waste. This might be the reason why industry and trade associations have adopted a rather critical view towards the option of full alignment of waste and CLP classification in the public consultation process.⁴¹

The full alignment of hazardous waste classification may not be possible or even preferable when pursuing a sustainable CE. One option would be to align the hazardous waste classifications fully with the CLP but take into consideration the bioavailability of the hazardous substances in case-by-case decision-making. A waste which contains hazardous substance that, however, would not be released during the life cycle of the material, ie would not become biologically available, would not be classified as hazardous waste. On the contrary, another waste stream from which the same

37 Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) [2010] OJ L334/17.

38 As set out in art 191(2) TFEU.

39 SWD(2018) 20 final (n 10) 15.

40 See eg de Römph and van Calster's example of the different classifications of plastic waste originating from plastic containers that have contained hazardous fluids, Thomas de Römph and Geert van Calster, 'REACH in a Circular Economy: The Obstacles for Plastics Recyclers and Regulators' (2018) 27 *RECIEL* 267, 269–70.

41 Commission, 'Summary Report of the Public Consultation conducted by the European Commission based on the main issues identified in the Commission's Communication on the interface between chemical, product and waste legislation' COM (2018) 32 final, 22 according to which 80% of NGOs and 86% of academics supported the full alignment option whilst more than half of the industry and trade association representatives were against it.

hazardous substance may be released, would be classified as hazardous waste.⁴² For example, metal wastes in massive forms may be classified as non-hazardous, whilst the same metal waste in a powder form may be hazardous.⁴³ In any case, it is crucial for the operation of a safe and sustainable CE market that the application and enforcement of the hazardous waste classification rules are more consistent throughout the EU in the future.

3. TENSIONS BETWEEN THE OBJECTIVES OF THE CE

3.1 Addressing the Legacy Substances in Material Circulation

In addition to the sectoral separation of the legislative regimes, regulating the CE is also burdened with needing to balance objectives that are in tension with each other. Modern waste legislation lays down multiple targets and instruments for more efficient waste recovery. On the other hand, chemicals and product legislation regulate the risks that the materials, including recovered ones, may pose. All waste-based materials may not be feasible for material recovery as they do not comply with the quality criteria set out in the chemicals and product legislation.

Product and chemicals legislation lay down criteria regarding the quality, purity and safety of materials and some of waste-based materials have to be discarded as they do not fulfil these criteria. The tensions between the objectives of the different regulatory regimes steering the CE therefore arise when waste-based materials cannot uphold the quality criteria laid down in product and chemicals legislation. These inherent tensions between the objectives of enhanced material circulation and the safety of secondary materials would remain even if a comprehensive, single regime for the regulation of materials were introduced. For example, hazardous phthalates may remain necessary for certain uses in the plastics industry as plasticisers and the use of recycled plastics containing those phthalates must remain subject to restrictions.

Moreover, whilst new chemicals are continuously placed on the market, chemicals will be restricted or prohibited if they are found to pose significant risks to human health or the environment. Naturally when products become waste and are recovered, they may still contain these 'legacy substances'.⁴⁴ The challenge posed by such legacy substances has two parts: legacy substances may be present either in articles produced at a time which the relevant legal restriction did not yet exist or they may be present in articles produced outside the EU, in countries with less strict chemicals regulation.⁴⁵

42 SWD (2018) 20 final (n 10) 16.

43 Wahlström and others (n 34) 21.

44 COM (2018) 32 final (n 9) 4.

45 On the problems related to the regulation of the substances incorporated into imported articles under the REACH Regulation, see Martin Führ and others, 'Enhancement of the REACH Requirements for (imported) Articles: Options for Improvement of the Chemicals Regulation' (*Umweltbundesamt*, 1 April 2015) <https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/texte_41_2015_enhancement_of_the_reach_requirements_for_imported_articles_0.pdf> accessed 7 July 2020. The existence of hazardous substances in articles causes several problems for the operation of the CE. See Antonio Reihlen, 'Study For The Strategy for a Non-Toxic Environment of the 7th EAP. Sub-study B: Chemicals In Products And Non-Toxic Material Cycles' (European Commission, 2017) 25–26 <https://ec.europa.eu/environment/chemicals/non-toxic/pdf/Sub-study_b_articles_non-toxic_material_cycles_NTE_final.pdf> accessed 12 March 2020.

The tensions between the objectives of the waste, product and chemicals legislation lie at the very core of CE regulation and have to be taken into account throughout the life cycle of a material. Achieving a sustainable CE requires, to some extent, balancing the objectives of waste and chemicals regulation against each other and finding a means of reconciling them. The crucial question is whether the same chemical restriction mechanisms should be applied to waste-based and virgin raw material in exactly the same way or whether the waste-based materials should be subject to certain derogations in order to promote material circulation. The latter option is closely connected to the need to develop a form of specific cost–benefit analysis for a CE to determine the situations where the derogations would be appropriate.⁴⁶

On the other hand, a sustainable CE can only be achieved if there is a level playing field concerning legacy substances in EU-produced and imported articles. Some scholars have criticised the REACH authorisation scheme as a problematic risk management option because it is not capable of addressing SVHCs incorporated in articles that are imported into the EU market.⁴⁷ The underlying reason for exempting articles from the REACH authorisation requirement is due to WTO rules on non-discrimination in international trade.⁴⁸ However, according to Schenten and Führ, it would not be a breach of WTO rules to extend the REACH authorisation requirement to substances in articles in order to address the issue of SVHCs imported into the EU incorporated in articles as it would pursue a legitimate objective covered by the regulatory autonomy of the EU and would not be more trade-restrictive than necessary.⁴⁹ Schenten and Führ, therefore, seem to disagree with the Commission according to which applying the REACH authorisation requirement to articles containing SVHCs is legally impossible.

According to the Commission the level playing field between EU-produced and imported articles could be achieved either by the REACH restrictions or by promoting the general enforcement of the existing product and chemicals legislation at EU borders.⁵⁰ Considering that REACH authorisation has become an important tool in addressing SVHC within the EU, it is difficult to see how the level playing field can be achieved if the REACH authorisation affects only the articles produced in EU.

46 SWD (2018) 20 final (n 10) 10. As the Commission puts it, derogations should be subject to conditions, reviewed regularly, substance specific and 'based on overall costs and benefits to society according to an agreed methodology'.

47 See eg Adam DK Abelkop, John D Graham and Todd V Royer, *Persistent, Bioaccumulative, and Toxic (PBT) Chemicals: Technical Aspects, Policies, and Practices* (CRC Press 2016). On criticism of the REACH authorisation regime, see also Lucas Bergkamp and Nicolas Herbatschek, 'Regulating Chemical Substances under REACH: The Choice between Authorization and Restriction and the Case of Dipolar Aprotic Solvents' (2014) 23 *RECIEL* 221.

48 Pursuant to art 56 of the REACH Regulation the authorisation requirement concerns use and placing on the market of a substance which is subject to authorisation. The EU-imported articles containing such substances are not covered by the authorisation requirement. Article 2 of the WTO agreement on technical barriers to trade prohibits the less favourable treatment of products originating from third countries and the creating of unnecessary obstacles to international trade. This has been seen as an obstacle for extending the REACH authorisation requirement to the EU-imported articles.

49 Julian Schenten and Martin Führ, 'SVHC in Imported Articles: REACH Authorisation Requirement Justified under WTO Rules' (2016) 28 (21) *Environ Sci Eur* 1.

50 SWD (2018) 20 final (n 10) 10.

This approach will at least lead to situation where many substances are subject to REACH authorisation requirement and REACH restriction(s) in parallel.

3.2 Reconciling the Tensions Throughout the Life Cycle

The tensions between the objectives of the regulatory regimes steering the CE are connected to all phases of a material's life cycle. They cannot be comprehensively addressed through the interface between the world of waste and the world of products and chemicals. A wider scope of regulation applicable to products and materials throughout their entire life cycle will have to be taken into account. In the waste treatment stage, it is often too late to significantly alter the chemical composition of waste-based materials. The recoverability of the materials and products should be taken into account earlier in the life cycle and tensions between the objective of material circulation and the objective of product safety addressed before the recovery.

It has been estimated that more than 80% of the environmental impacts of a product are pre-determined at the design stage.⁵¹ Therefore, regulating the design of a product can have a significant role in achieving CE objectives such as non-toxic material streams. Directive 2009/125/EC⁵² (hereinafter the 'Ecodesign Directive') regulates ecodesign on a general level. More specific provisions are laid down in product-specific regulations.⁵³ These regulations lay down minimum standards for specific product types. Currently, the Ecodesign Directive and the regulations mostly focus on energy-intensive products and their energy consumption. In its CE Communication⁵⁴ and the Ecodesign Working Plan 2016–2019,⁵⁵ the Commission emphasised that there is an increasing need to improve material related aspects in the design stage of a product's life cycle.

It has also been recognised that the existing framework for ecodesign could facilitate this improvement.⁵⁶ The CE Package refers to product durability and recoverability in connection with the ecodesign framework. In particular, addressing the recoverability of the products has to also take into account the legacy substances.⁵⁷

51 See eg European Commission, 'Sustainable Product Policy' (*EU Science Hub*, 13 December 2018) <<https://ec.europa.eu/jrc/en/research-topic/sustainable-product-policy>> accessed 7 July 2020.

52 Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products [2009] OJ L285/10.

53 See eg Commission Regulation (EU) No 66/2014 of 14 January 2014 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for domestic ovens, hobs and range hoods [2014] OJ L29/33; Commission Regulation (EC) No 244/2009 of 18 March 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for non-directional household lamps [2009] OJ L76/3.

54 COM (2015) 614 final (n 3) 2–3.

55 Commission, Communication from the Commission: Ecodesign Working Plan 2016–2019, COM (2016) 773 final.

56 See eg Daniel Hinchliffe, Floris Akkerman and Michael Nitsche, 'Are Preparatory Studies Flexible Enough for the Ecodesign Directive? Regulation Challenges in Complex Product Proups' (2014) Bundesanstalt für Materialforschung und -Prüfung (BAM) Discussion Paper 12. The authors argue that these kinds of provisions could not be fitted into the ecodesign framework. See also Carl Dalhammar and others, 'Addressing Resource Efficiency Through The Ecodesign Directive: A Review Of Opportunities And Barriers' (Nordic Council of Ministers, 2014) <<http://norden.diva-portal.org/smash/get/diva2:710881/FULLTEXT01.pdf>> accessed 12 March 2020, 108–109, according to which the means of compliance between the CE ecodesign and WTO rules should be carefully thought out.

57 de Römph (n 31) 212–218.

Neither the CE Package nor the Working Plan addresses the connection between product design and chemicals. This does not, however, mean that the ecodesign framework should refrain from referring to the rules of the chemicals regime and seeking to complement them. For example, in the future, a sustainable CE could be promoted by restricting the presence of substances of concern in consumer products under the Ecodesign Directive.

The recoverability of materials promoted by using extended producer responsibility (EPR) requirements laid down in the WFD.⁵⁸ The rationale for this approach is the idea that more sustainable products will be made if the producers of these products are given operational and fiscal responsibility for waste management in respect of them.⁵⁹ This approach would also help meet the CE objectives. Extension of the scope of EPR schemes to new kinds of waste and greater regulation of substances of concern in existing EPR schemes (especially waste electrical and electronic equipment, batteries and accumulators) could offer an effective regulatory means by which to promote the traceability and management of substances of concern in waste streams. The rationale of addressing the problem through EPR is that producers of certain products usually already deal with the same kinds of materials and substances of concern that would be present in the end-of-life products that are returned to them.

This may offer synergies in the identification of chemical substances and compliance with the obligations laid down in the REACH Regulation, such as registration. If a particular chemical substance is already used in an installation, the application of the registration exemption is often more straightforward since that substance would already be registered and the operator would already have access to the data on it. However, at present, the application of EPR does not necessarily lead to more sustainable product design but merely functions as an instrument for allocating waste management costs.⁶⁰ Despite this, the main idea behind an EPR scheme can enhance the achievement of a CE and sustainable product design. However, at present, the relevant legislation does not impose sufficiently direct and ambitious CE-related obligations on manufacturers and importers. The regulation on circular product design cannot address the presence of legacy substances in products already on the market or in waste.

The basic rule is that legacy substances are not permitted in products manufactured using either virgin or waste-based raw materials. However, the current legislation contains certain derogations from this rule. For example, the concept of ‘repair

58 See also Uwe Lahl and Barbara Zeschmar-Lahl, ‘Risk Based Management of Chemicals And Products in a Circular Economy at a Global Scale (Risk Cycle), Extended Producer Responsibility and EU Legislation’ (2016) 25(3) *Environ Sci Eur*.

59 See, eg David Watson and others, ‘EPR Systems And New Business Models – Reuse and Recycling Of Textiles In The Nordic Region’ (Nordic Council of Ministers, 2015) 6, 15 <<http://norden.diva-portal.org/smash/get/diva2:720972/FULLTEXT02.pdf>> accessed 5 June 2020.

60 See eg Nathan Kunz, Luk Van Wassenhove and Kieren Mayers, ‘Stakeholder Views on Extended Producer Responsibility and the Circular Economy’ (2018) 60 (3) *Calif Manage Rev* 64; Antonia Bozic Cerar and Tina Krošelj, ‘Extended Producer Responsibility Schemes And Their Influence On Innovation In The TransDanube Region’ (Danube Transnational Programme, 2017) <http://www.interreg-danube.eu/uploads/media/approved_project_output/0001/13/6c86df84731067e51f0b71f488ecffef4b7ae842.pdf> accessed 7 July 2020.

as produced' laid down in Article 4(4) of Directive 2011/65/EU⁶¹ restricting the use of certain hazardous substances in electrical and electronic equipment (hereinafter the 'RoHS Directive') allows certain spare parts for certain specific legacy equipment (ie sold before the phase-in date) to contain substances of concern that would otherwise be limited or restricted for a limited time.⁶² This kind of regulatory scheme may make sense in circumstances where replacing the product would be expensive and cause more overall negative environmental impacts than using spare parts containing legacy substances in the repair.

The Commission has also recognised voluntary methods, like the EU Ecolabel scheme and exchange of good practices regarding value chain platforms, as one option to promote 'design for circularity'.⁶³ The suggested voluntary regulatory schemes have pros and cons. Whilst the voluntary schemes do not usually entail high administrative or execution costs, they do not provide as much legal certainty as binding legislative instruments. This can lead to schemes that are either entirely, or somewhat, ineffective.

3.3 Derogations of the REACH Obligations in Promoting the CE

The REACH Regulation offers a possibility for recovered materials to be exempt from its registration obligation.⁶⁴ This derogation aims at reducing the administrative burden and thus promote the use of waste-based materials. However, the benefit may remain insignificant, given that the recovery exemption can be applied only to substances which someone else has already registered. Recovery operators also have to acquire access to the chemical safety data from the registrants of these substances.⁶⁵

On the other hand, the recovery exemption is problematic from a chemical safety point of view as it excludes the uses of the second life cycle of the substance from the chemical safety assessment.⁶⁶ In the Staff Working Document the Commission suggests removing the recovery exemption.⁶⁷ This would place some additional burdens on users of recovered substances as they would always be required to register the substances they recover under the REACH Regulation. However, it could promote a level playing field between waste-based and virgin raw materials as well as safe chemicals management in the CE.⁶⁸

One feasible option to reconcile the objectives of the CE with a high-level protection of human health and the environment could be to introduce a general registration requirement for all recovered substances with a reduced information requirement. This would result in a level playing field between different recovered

61 Directive 2011/65/EU of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment [2011] OJ L174/88.

62 SWD (2018) 20 final (n 10) 11, fn 27.

63 *ibid* 12.

64 REACH Regulation (n 14) art 2(7)(d).

65 See Joonas Alaranta and Topi Turunen, 'Drawing a Line between European Waste and Chemicals Regulation' (2017) 26 *RECIEL* 163, 171.

66 Bodar and others (n 5) 112–13.

67 SWD (2018) 20 final (n 10) 13.

68 *ibid* 14.

materials and provide a basic data set on all the recovered substances to regulatory authorities in order to allow them to introduce different risk management measures where necessary.

These different objectives could be balanced also by introducing new exemptions from the REACH registration requirement on the basis of safety requirements laid down in product-specific legislation. If this option were chosen, specific attention should be paid to the coordination of EoW criteria and the requirements of the applicable regulatory framework post-waste in order to avoid duplication of the regulatory burden in such a way that the material has to comply with two sets of rules: one to exit the waste phase and the other to comply with product requirements.⁶⁹ Verification of compliance with the applicable product and chemicals regulation should be an essential part of the EoW assessment. In other words, REACH registration or compliance with the restriction provisions laid down in the REACH Regulation can function as methods of quality assurance in the context of the modification of waste.⁷⁰

Also, the authorisation regime laid down in the REACH Regulation can be used for derogations that promote recovery. Article 60(4) of the REACH Regulation states that an authorisation (to use SVHCs) may be granted if it is shown that the socio-economic benefits outweigh the risk to human health or the environment arising from the use of the substance and if there are no suitable alternative substances or technologies. When applying this basis for authorisation, it is possible to take into account the recovery of waste as a socio-economic benefit.⁷¹

The restriction rules laid down in the REACH Regulation offer another means of creating derogations to promote the use of waste-based materials. The REACH Regulation lays down restrictions on certain substances that are allowed in recovered materials: for example, a restriction on Cadmium (Cd) content in plastic entails a 0.01% limit for new plastics and a maximum cadmium content of 0.1% for recycled plastic.⁷² A similar restriction is planned in respect of lead.⁷³ This enables the recovery of waste materials that have higher Cd content than virgin raw materials, but distorts the playing field between waste-based and virgin raw materials. It may also reinforce the perception that waste constitutes an inferior class of raw materials than virgin raw materials. These kinds of derogations should only apply within a certain sunset period within which the substances of concern should be phased out of circulation.

69 *ibid* 14.

70 Jihyun Lee, Anders Branth Pedersen and Marianne Thomsen, 'The Influence of Resource Strategies on Childhood Phthalate Exposure – The Role of REACH in a Zero Waste Society' (2014) 73 *Environment International* 312, 320–21.

71 This theme was touched on in the General Court's judgment in T-108/17 *ClientEarth v Commission* (2019) EU:T:2019:215 (currently subject to an appeal before the CJEU). However, the General Court did not clearly rule on whether the recovery of waste can be considered as a socio-economic benefit in the socio-economic analysis under the authorisation regime laid down in the REACH Regulation.

72 The REACH Regulation, Annex XVII, entry 23.

73 See European Chemicals Agency, 'Annex XV Restriction Report – Lead Stabilisers in PVC' (ECHA, 2016) <<https://echa.europa.eu/documents/10162/f639cc6f-7403-63de-9407-135544f33d86>> accessed 7 July 2020.

The main problem with the derogations is that they do not effectively pursue the achievement of a level playing field between waste-based and virgin raw materials, but rather provide a sort of half-waste category for products as they promote the recovery of waste but do so by enabling waste-based materials to be of lower quality. Efficient circulation of materials requires that waste-based materials can substitute virgin raw materials in all uses. This objective cannot be reached if derogations allow different qualities for virgin and waste-based materials.

The risks related to substances of concern may be tightly linked to the uses that are relevant only for the recovered materials. It may be that the similar virgin materials are not used for similar uses and therefore do not pose risks to human health or the environment even if they would contain the same substances of concern. The rubber granules and mulches made from end-of-life tyres and used on football pitches, among other applications, is an example of this. A REACH restriction which is currently under consideration by the Commission would limit the concentration of eight different polycyclic aromatic hydrocarbons (PAHs) to 20 mg/kg in rubber granules and mulches, whilst in other mixtures, the limit for those PAHs would remain between 100 mg/kg and 1,000 mg/kg.⁷⁴ Whilst such secondary material-specific restrictions are justified in some circumstances, they can also lead to situations where the virgin material is allowed to contain a higher concentration of a substance of concern than similar secondary material. In the CE era, the application of such restrictions should be based on careful consideration of all the hazards and risks involved and also take into account the environmental and health benefits of recycling and the alternatives available.

4. OBSTACLES IN CROSSING THE INTERFACE

4.1 Path dependency in EU Law

The basic concepts and functions of waste legislation derive from the WFD. Although the Member States have room for discretion in the implementation of the WFD Directive, the scope of application is tightly formulated and does not really leave a lot of room for varied national implementation. The REACH Regulation, on the other hand, is directly applicable and does not require separate national implementation measures. In this way, the sectoral separation of the two legislative frameworks is tied to the very structures of the EU regulatory system these EU provisions are later implemented to the national legislations of the Member States maintaining the sectoral separation of the regulatory frameworks.

The sectoral separation of the waste and chemicals legislation on the EU level creates a path dependency where all the measures are built upon the differentiation of the regulation of the products and wastes. This puts particular emphasis on the interfaces between waste, product and chemicals regulation. As the result of differentiated regulatory framework for materials that are considered 'waste', using any waste-based substances or objects in the same way as virgin raw materials requires that the materials have ceased to be waste at some point. This is significant as operators willingly

74 See the Netherlands National Institute for Public Health and the Environment (RIVM), 'Annex XV Restriction Report – PAHs in Synthetic Turf Infill Granules and Mulches' (ECHA, 2018) <<https://echa.europa.eu/documents/10162/9777e99a-56fb-92da-7f0e-56fc848cf18>> accessed 12 March 2020.

acquire ‘recovered’ material but not ‘waste’.⁷⁵ This gives particular importance to the rules on EoW.

Pursuant to Article 6 of the WFD—the so-called EoW article—waste may cease to be waste in certain circumstances. After EoW, the WFD no longer applies and all applicable legislation governing the use of similar non-waste materials applies instead. Whilst being subject to certain exemptions, for example under the registration regime laid down in the REACH Regulation, materials that have ceased to be waste are subject to the provisions of the applicable chemicals legislation as in the case of any other chemical.

A waste may cease to be waste, if it meets the so-called EoW criteria laid down in Article 6 of the WFD:

Member States shall take appropriate measures to ensure that waste which has undergone a recycling or other recovery operation is considered to have ceased to be waste if it complies with the following conditions:

- a. the substance or object is to be 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.⁷⁶

EoW status can be regulated at the EU and national level and can be decided on a case-by-case basis. The complexity of waste streams, recovery processes and recovered materials means that drafting a comprehensive and generally applicable EoW regulation is no easy task.⁷⁷ In the Member States, and even regionally, there are different interpretations and procedural regimes governing the way in which waste can cease to be waste. As a Directive, the WFD leaves room for different national interpretations as regards the EoW and this makes currently also the scope of the application of chemicals regulation practically different in different Member States when it comes to the recovered substances. As long as it is unclear whether material is or is not waste, it remains unclear whether or not chemicals regulation should be applied.⁷⁸ This lack of clarity can have severe effects on the market for, and safety of, waste-based materials. The Interface Communication calls for action to achieve a more harmonised interpretation and implementation of EoW rules across the EU.

75 SWD (2018) 20 final (n 10) 13.

76 As amended by the Directive 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste [2018] OJ L150/109. This amendment introduced a more precise definition into the legal framework, including the alteration that ceasing to be waste no longer required that ‘the substance or object is commonly used for a specific purpose’ but that it now sufficed that the ‘substance or object is to be used for specific purposes’.

77 COM (2018) 32 final (n 9) 5.

78 SWD (2018) 20 final (n 10) 12.

The objective was to enable a well-functioning single market for waste and for recovered materials.⁷⁹

4.2 Different Alternatives to Regulate EoW

EoW plays a significant role in the utilisation of waste-based materials and the applicability of the regulation to the waste-based materials. The WFD allows EoW decision-making at three levels: generally applicable regulation at the EU level and on the national level as well as decision-making on case-by-case basis. The Interface Communication criticises the legislative framework insufficient harmonisation of the EU rules on EoW.⁸⁰

The Commission identifies two alternatives by which to address the problem of unharmonised EoW regulation: either to take measures at the EU level to bring more harmonisation in Member States' interpretation and implementation or to take measures to ensure more consistency of practices at the Member State level.⁸¹

The adoption of EU wide rules specifying the preconditions of EoW status, along with support measures, would enable Member States to check recyclers' compliance with the recovery exemption laid down in the REACH Regulation.⁸² However, given the complexity of waste streams, recovery processes and recovered materials, it may prove challenging to draft such standards for specific waste streams. Despite that, it is clear that EU wide regulation has the biggest potential to improve the market for waste-based materials. Article 28(1)⁸³ of Regulation (EC) No 1013/2006⁸⁴ (hereinafter the 'Waste Shipments Regulation') states that if the competent authorities of dispatch and of destination country cannot agree on whether something is waste or not, it shall be treated as if it were waste. Hence only EU wide EoW regulation, where rules for ceasing to be waste are applicable in all Member States, can have a definitive impact on the internal market. In turn, national EoW regulation does not automatically mean that the substance or object would have ceased to be waste in other Member States.⁸⁵

The preparation and application of a comprehensive set of waste stream specific EoW criteria at EU level would require significant additional administrative resources (either through the creation of a specific EU waste agency or through the granting of additional powers and resources to an existing EU agency such as ECHA). So far, the development of EoW criteria has been slow, the developed EoW criteria have

79 *ibid* 13.

80 COM (2018) 32 final (n 9) 5. The Interface Communication states that materials should only be considered 'waste' temporarily as they should be recovered and reintroduced into the material cycle to replace primary materials.

81 SWD (2018) 20 final (n 10) 14.

82 *ibid* 13.

83 'If the competent authorities of dispatch and of destination cannot agree on the classification as regards the distinction between waste and non-waste, the subject matter shall be treated as if it were waste.'

84 Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste [2006] OJ L190/1.

85 The connection between national and case-by-case EoW rulings and the Waste Shipments Regulation was addressed in *European Commission v Czech Republic* (n 35). The case also addressed the position of REACH registration in the EoW assessment and the CJEU concluded that an existing REACH registration can form part of the evidence that demonstrates that EoW has occurred, *ibid* [39].

been controversial and even rejected by decision-makers,⁸⁶ suffered from low use by operators⁸⁷ and potentially resulted in complex legislative texts.⁸⁸ Taking all that into account, the likelihood of EU wide EoW regulations coming into force in the near future seems rather low.⁸⁹

The 2018 amendment of the WFD took a clear stand supporting national case-by-case EoW decisions. The amended of Article 6(4) now states as follows:

where criteria have not been set at either Union or national level under [...] a Member State may decide on a case-by-case basis, or take appropriate measures to verify, that certain waste has ceased to be waste.

Article 6(4) states that ‘a Member State *may*’ (emphasis added), in the absence of the EU level or national EoW criteria, adopt case-by-case decisions. However, the Member States are now actually required to do so. The amended Article 6(4) refers to the conditions laid down in Article 6(1). Article 6(1) now lays down an obligation for the Member States ‘to take appropriate measures to ensure’ that waste which has undergone a recovery operation and which complies with the EoW criteria set out in Article 6(1) is considered to have ceased to be waste.

Nevertheless, the Member States have national discretion on how to implement the case-by-case decision-making scheme: the decision-making can either rely on ex-ante decisions or ex-post verification. Directive merely states that Member State may ‘decide’ or ‘take appropriate measures to verify’. Like national EoW regulation, case-by-case decisions are not automatically applicable in other countries due to the formulation of Article 28 of the Waste Shipment Regulation. To promote a CE, it would be useful to address the problems concerning defining waste and non-waste within transboundary shipments of waste and providing guidance for possible cooperation between the waste shipment authorities in different countries.

The procedural framework for case-by-case EoW assessment was dealt with in the cases of *Lapin luonnonsuojelupiiri* and *Tallinna Vesi*.⁹⁰ In both cases, the applicable law was the WFD prior to the 2018 amendment. In *Lapin luonnonsuojelupiiri* the CJEU ruled unambiguously that waste, even hazardous waste, can cease to be waste through a case-by-case application of EoW rules by the competent authorities of a Member State. Accordingly, neither EU level nor national EoW criteria are a prerequisite for the application of the EoW rules laid down in Article 6 of the WFD.

86 See Commission, Proposal for a council regulation on defining criteria determining when recovered paper ceases to be waste pursuant to art 6(1) of Directive 2008/98/EC on waste, COM (2013) 502 final, which was objected by the industry and then rejected by the European Parliament and the Council.

87 For example, the EoW criteria for iron, steel and aluminum scrap as set out in Council Regulation (EU) No 333/2011 of 31 March 2011 establishing criteria determining when certain types of scrap metal cease to be waste under Directive 2008/98/EC of the European Parliament and of the Council [2011] OJ L94/2.

88 For example, the Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 and repealing Regulation (EC) No 2003/2003 [2019] OJ L170/1.

89 SWD (2018) 20 final (n 10) 14.

90 C-60/18 *Tallinna Vesi* (2019) EU:C:2019:264.

The CJEU ruled that the case-by-case EoW decisions should be based on applicable case-law on the definition of waste instead of the set of criteria laid down in Article 6 of the WFD.⁹¹ In *Tallinna Vesi* the CJEU held that a Member State is not obliged to apply EoW on a case-by-case approach and that Article 6(4) does not allow a waste holder ‘to demand the recognition of EoW status by the competent authority of the Member State or by a court of that Member State’.⁹² The *Tallinna Vesi* judgment would seem to be overturned with the formulation of Articles 6(1) and 6(4) in the amended WFD. From the point of the view of CE objectives, the possibility to get any waste assessed against the EoW criteria and recognised to have ceased to be waste if it fulfils that criteria, is logical. Any other solution would create an unnecessary barrier for turning wastes to worth.

5. FROM SUPPLY CHAIN TO SUPPLY LOOP?

The CE aims at creating more efficient material loops and using waste-based materials more efficiently but the attempt made in the current regulatory framework to create a CE using linear regulatory tools has led to substantial problems. The sectoral separation of waste, product, and chemicals legislation causes gaps in the tracking of the substances of concern in the material flow and the separated regulatory regimes set out different standards for such chemical hazards that trigger restriction mechanisms for placing on the market and use of the recovered materials.

The objectives of the CE are in tension with each other. Waste legislation of a CE era should aim at increasing the recovery of materials. Product and chemicals legislation should set out restrictions in order to protect human health and the environment from the substances of concern that those recovered materials may contain. The operation of a sustainable CE market requires balancing between the objectives of obtaining comprehensive data on the chemical composition of the recovered material and maximising the use of secondary materials. Regulation that requires total identification of all chemical substances in the waste-based material might hinder their utilisation, whilst regulation not setting binding provisions on the identification of chemical substances might result in potentially hazardous recovered products affecting the acceptability of using waste-based materials. Clearly, neither of these alternatives is acceptable. The achievement of a sustainable CE requires a level playing field between waste-based and virgin raw materials in order to enable the utilisation of waste-based materials whilst taking into account their potential impacts on human health and the environment.

However, the availability of information on the presence of substances of concern in recovered materials is a necessary prerequisite for a safe CE. The traceability of the substances of concern is key to the resolution of the other obstacles to the

91 *Lapin luonnonsuojelupiiri* (n 35) [56]. However, it should be noted that the formulation of art 6 is very much based on the case-law on the definition of waste, especially C-418/97 *ARCO Chemie* (2000) EU:C:2000:318.

92 *Tallinna Vesi* (n 90) [25], [30]. Interestingly, the Advocate General’s findings depart radically from those of the CJEU. She starts by pointing out that even though it ‘would seem reasonable’ to conclude that the Member States would have no obligation to either to lay down national, waste stream-specific EoW criteria or to give individual decisions, such an approach would, however, ‘be too superficial’. See the Opinion of Advocate General Kokott in C-60/18 *Tallinna Vesi* (2018) EU:C:2018:969 [25], [26].

achievement of a sustainable CE. This issue stems to a large extent from the sectoral separation of the legal regimes: traceability of chemical data is decreased when a chemical substance is incorporated into an article and ceases even more conclusively when the material is discarded and is classified as waste. Because of the separation between the two regulatory frameworks, the legal interfaces between waste, product and chemicals regulation, especially regulation on EoW, are particularly important.

The absence of a methodology by which to reconcile the different objectives of chemicals and waste regulation is a formidable obstacle to the achievement of a sustainable CE. As the Commission states, ‘there is no agreed methodology to determine the overall costs and benefits for society of the use of recycled materials containing such substances compared to disposal, including, *inter alia*, the potential of recovering energy from the waste and the impacts of production of primary materials in case recycling is prevented’.⁹³ New methods for life cycle assessment of a CE are urgently needed. Weighing the costs and benefits of the circulation of materials that contain substances of concern can sometimes be a very complicated process.⁹⁴

As noted above, transition to a CE calls for reconciliation of waste, product and chemicals regulation. However, the reconciliation should not entail trade-offs on the environmental and safety objectives of the product and chemicals regulation. Achieving safe secondary material flows and maximum environmental benefits of the CE are not mutually exclusive. However, setting too stringent obligations concerning the acquisition of information on the composition of the secondary materials may form an obstacle to material circulation. On the other hand, pursuing climate change and other environmental benefits of the CE should never lead to compromises as regards the protection of human health and the environment from chemical risks. Achieving a non-toxic CE requires a strict policy approach to substances of concern and may in some cases also call for individual decisions that temporarily increase greenhouse gas emissions. In a longer perspective, the aim should be to erase the border between waste and chemicals regulation and create a single regime for the regulation of materials and their flow.

ACKNOWLEDGEMENTS

This work was supported by the Strategic Research Council at the Academy of Finland as part of the project CICAT2025, Circular Economy Catalysts: From Innovation to Business Ecosystems (Grant number: 320194/320206). We would like to thank Dr. Leila Suvantola (Senior Ministerial Adviser, Finnish Ministry of the Environment) for her helpful feedback during the writing process. In addition, we

93 SWD (2018) 20 final (n 10) 10.

94 See eg the General Court’s findings in *ClientEarth* (n 71). It was undisputed in the case that the use of recycled polyvinyl chloride plastic (hereinafter ‘PVC’) containing bis(2-ethylhexyl) phthalate (hereinafter ‘DEHP’) reduces the amount of neat/virgin DEHP needed in the production of PVC articles. However, the applicant argued that in the context of the decision-making concerning REACH authorisation the Commission should also have considered a wider range of options, including the use of safer plasticiser options instead of DEHP in the production of new PVC. The General Court did not examine this question in a clear manner. Furthermore, the environmental benefits of recycling (eg related to greenhouse gas emissions) were not discussed in the case. See also SWD (2018) 20 final (n 10) 2, where the presence of DEHP in PVC is discussed as an example of the waste-chemicals interface problem.

would like to express our deep gratitude to the two anonymous peer reviewers of the paper and the General Editor, Professor Liz Fisher, whose insightful commentary helped us to substantially improve the quality of this paper in the final stages of writing.