



IS THE CIRCULAR ECONOMY ILLEGAL?

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About the National Interdisciplinary Circular Economy Research Programme

The UKRI National Interdisciplinary Circular Economy Research (NICER) Programme is a four-year £30 million investment sponsored by the Department for Environment, Food & Rural Affairs to move the UK towards a circular economy.

The Programme is made up of five Circular Economy Research Centres, each focused on a speciality material flow, and the co-ordinating CE-Hub (detailed below). The Programme aims to deliver research, innovation, and the evidence base to move the UK towards a resilient UK circular economy. The NICER programme is the largest and most comprehensive investment in the UK Circular Economy to date and is delivered in partnership with industrial organisations from across sectors, to ensure research outcomes contribute to the delivery of industrial implementation and government policy.

The 4 year programme launched in January 2021, initially comprising of 34 universities and over 150 industrial partners, with a key aim of growing the Circular Economy community through a significant programme of outreach and collaboration.

- The National Interdisciplinary Circular Economy Research Hub (CE-Hub), led by the University of Exeter
- The Textiles Circularity Centre (TCC), led by the Royal College of Art
- The Interdisciplinary Circular Economy Centre for Mineral-based Construction Materials (ICEC-MCM), led by UCL
- The National Interdisciplinary Centre for the Circular Chemical Economy (CircularChem), led by Loughborough University
- The Interdisciplinary Circular Economy Centre for Technology Metals (Met4Tech), led by the University of Exeter
- The Interdisciplinary Centre for Circular Metals (CircularMetal), led by Brunel University London.

Authors note

The views expressed in this discussion paper are those of the authors, intended to generate discussion and draw attention to some of the enabling requirements for CE business models under the current definition of waste in the WFD. They do not reflect or represent the official position of the regulator or government policy.

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Introduction

As interest in adopting and implementing circular economy (CE) principles grows, particularly within CE business models, there's an expanding body of evidence on what succeeds and fails in practice. Understanding the barriers and enablers to CE adoption and scaling is important for policy development, but also practical support and advice to business and industry. Many examples of CE activity involves the exchange or resale of products or resources from one owner to another. This can take a variety of forms, but examples include business to consumer trading platforms where consumers can sell a variety of items such as clothing, or schemes where an organisation collects products no longer needed and distributes to new users. Business models that involve rental, repair, repurposing, refurbishment, upcycling, or recycling all appear regularly in CE case study libraries. In each instance, the types of products and their embodied materials are defined and transformed as part of the transfer process, which raises important questions about the legal basis of the exchange and the conditions and requirements for the circulation of materials, components and products to remain within the UK legal framework for the management of waste. As a result, some CE business models and practice may inadvertently be at risk of being defined as 'illegal'. Moreover, the ways in which waste is defined may be restricting or inhibiting the adoption of desirable circulatory business activity, for fear of reclassification of such activities as 'illegal'.

In this paper, we discuss the problematic nature of various CE business models and value drivers within the current waste framework; specifically, what requirements are placed on industry actors. The main part of the paper addresses ways in which a business can ensure materials, components, and products at the end of their first life cycle can be considered as resources rather than waste.

Our intention is to promote a discussion and seek clarification around an important issue that has been reported to be a major concern for many businesses wishing to 'go circular'. We welcome feedback and further insights from business, policy and the academic research communities with the ambition to accelerate and amplify the adoption and implementation of CE business models.

Context

Over five years ago, the 2017 Chief Scientific Advisors Office's report 'From Waste to Resource Productivity' called for the development of a national strategy to deliver a wholesale shift in the treatment of resources (Defra, 2017). The landmark Defra 2018 Resources and Waste strategy building from this was deliberately titled 'Our Waste, Our Resources: A Strategy for England' to emphasise the value which could be derived through the development of a more circular and resource efficient economy (Defra 2018a). This included the reduction virgin material use and concomitant positive impacts on the environment, carbon emission, and economy. However, five years on, it is becoming increasingly clear to a wider audience including businesses with circular economy business model aspirations that current waste regulations are posing a significant barrier to circularity.

Waste policy and the legislative framework is designed to ensure that waste is managed in a safe, controlled manner that minimises negative impacts on the environment and human health. The aim of the circular economy is to keep materials in use for as long as possible and at the highest value as possible. While these two objectives can co-exist, some elements of the existing policy framework, particularly relating to the Waste Framework Directive (EU) 2018/851 (2018),¹ are

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seen as blockers to the transition to a circular economy. Regulation is often perceived (rightly or wrongly) as an obstruction to innovation but if the regulatory environment genuinely does not accommodate businesses that want to adopt new ways of working – or actively encourage it – then the transition to circularity, as advocated by the UKs flagship environmental (Defra, 2018b) and industrial strategies (BEIS, 2017; DESNZ, 2022), is unlikely to happen.

The recent Vallance review has recommended innovation on priority waste streams that cannot currently be recycled or re-used due to real or perceived regulatory barriers (HMT, 2023). Clearly there is an understanding across a range of stakeholders that things need to change in terms of how we treat waste and how it can become resource.

The Situation: The Waste Framework Directive

The Waste Framework Directive (European Parliament and Council Directive, 2018) and the *Environmental Protection Act* (1990) before it are the key legislative frameworks used to control the flow of material that is considered waste. The directive defines waste as ‘any substance or object which the holder discards or intends or is required to discard’. The former part of the definition ‘which the holder discards or intends to discard’ highlights the intent of the user as important in defining what is waste. However, what is meant by ‘discard’ and ‘is required to discard’ is an important caveat and allows the state to define what is waste.

While these regulations are complex and some would say bureaucratic, they are important as the primary objective of the WFD is to ‘protect the environment and human health by preventing or reducing the generation of waste’ with a secondary objective of reducing the ‘impacts of resource use and improving the efficiency of such use, which are crucial for the transition to a circular economy’ (European Parliament and Council Directive, 2018).

The legal definitions for waste, ‘end of life’ (EoL) and ‘end of waste’ (EoW) criteria are consequential as they have implications for how materials are used – ranging from the use of spoils and sands from domestic extraction activities to reuse enabled by local authorities.

When Does Waste Become Waste?

In its simplest form, waste entering managed routes is first discarded and then collected from a recognised

receptacle (residual waste bin, recycling bin), by a company licensed under Environmental Permitting Regulation (EPR, 2018) and transported to an EPR permitted waste facility which is licensed to conduct recovery or disposal operations as defined in EPR. Under the WFD (European Parliament and Council Directive, 2018), disposal (D1-15) covers deposition into or onto land (landfill) through to release into waterbodies, with recovery operations (R1-R13) ranging from waste as a fuel that generates energy (Energy from Waste) through to the recycling.

However, if the user does not discard or intend to discard the material as waste and it does not enter the system described above definitions can become more problematic. The Environment Agency in England considers a range of factors when they assess if a material is discarded and therefore classed as waste in line with its interest in reducing public health and environmental risks. These include burden, certainty of use, fit for purpose, a specific purpose, management environmental harm, common classification as waste, disposal or recovery, fuel or waste, an item returned for a refund, reuse (EA, 2022).

When considering the above factors these are seen in the context of the primary objective of the WFD (European Parliament and Council Directive, 2018) is to ‘protect the environment and human health by preventing or reducing the generation of waste’. Additionally, the Environment Agency is legally obliged under the Environmental Principles Policy Statement (Defra 2023) to take a precautionary approach to waste.

Specifically, the definition of ‘discarded’ includes consideration of the following concepts (EA, 2022):

- Burden: A material is discarded if it is a ‘burden’, i.e. unsuitable, unwanted or surplus to requirements.
- Certainty of use: A material is discarded if there is no certainty of use for the material.
- Fit for purpose: If a material or product cannot be used in the way it is meant to be used or does not meet relevant standards it would be considered discarded.
- Specific purpose: If the material has no specific purpose, would be considered a burden, it is likely to be discarded.
- Value: If a material has low, no or negative economic value, it would be considered a burden and is likely to be discarded
- Management: A material is considered discarded if it is transported or stored in a way that could damage it.

- Environmental harm: If a material is contaminated and poses a risk to the environment or human health it is likely to be considered as discarded.
- Common classification of waste: A material that is commonly regarded as waste is likely to, but not certain, to be waste.
- Disposal or recovery: If a material has gone through disposal or recovery operations it is likely to have been discarded.

When Waste is Not Waste

Under certain circumstances, a material or product may not be considered as waste (EA, 2022):

- Fuel or waste: In certain circumstances a material can be considered a fuel and not waste but if the calorific content of that material is less than an equivalent fuel it would be considered a waste.
- Return for a refund: Where a material or product is returned for a refund, it will not have been discarded by the holder returning it.
- Reuse: A material or product will not be considered waste if it is reused. Reuse is defined by:
 - The product being used for the same purpose for which it was designed, the previous holder intended for it to be reused, no more than minor repair is required when it is transferred from the previous holder to the new holder, the previous holder knows this repair is going to be completed, it is not managed in a way that indicates that it is waste (transportation or storage), the material has not been classified as waste prior to reuse, its use is lawful.
- A material is a by-product and not waste: The by-product test. The guidance outlines specific scenarios where the residues produced from non-waste materials used in the manufacture of new products will be considered a by-product and not waste. These include clarity that the substance or object that is produced is an integral part of the production process, certainty that there is a market for that residue, by-product or object and it requires no further processing, if further use is lawful.

The complication BOX – example 1

As well as benefits, negative implications can arise from attempts to control risk, meaning public-sector risk management needs to stand up to scrutiny (Sunstein,

2003). The arbitrary nature of 'what is waste' is captured with the example of the charity shop – a bag of clothes left outside a charity shop becomes waste by default as it is 'discarded' under the criteria of 'burden' to the holder (EA (2022)). Furthermore, under the Environmental Principles Policy Statement, the Environment Agency is legally obliged to take a precautionary approach and may consider unknown items left outside in a public place to be a potential risk to the environment or human health (Defra, 2023).

The act of leaving these products outside a charity shop is an offence under section 33 of the *Environmental Protection Act* (1990): Depositing, knowingly causing or knowingly permitting the deposit of controlled waste or extractive waste on land without, or other than in accordance with, an environmental permit. In short, the 'illegal deposit of any waste onto land that does not have a licence to accept it', i.e. fly tipping or littering. At this point it becomes the legal obligation of the Local Authority to clear the 'material' if the site is open to the air on at least one side, is under their direct control and the area is publicly accessible (Defra, 2018c). In this instance, while an individual did discard the items, they clearly did not intend for the material to become waste and, had they placed the bag inside the shop, it would not be discarded and therefore not classified as waste.

The complication BOX – example 2

An exemplar of the difficulties in the sector is encapsulated in the BBC's hit afternoon programme 'Money for Nothing' (BBC, 2023). The programme follows the presenter at a local authority HWRC (Household Waste and Recycling Facility) where they identify waste brought to the site by local residents, intercept it and send it to designers who upcycle the waste into a range of products. Episodes have followed discarded iron gates that have been fashioned into hat stands, tents that have become tote bags and toughened safety glass that has become coffee tables. These new products have then been advertised nationally and purchased by a third party. Under current legislation this practice is illegal as the requirement would be for the designers to have a licence under Environmental Permitting Regulations.

The complication BOX – example 3

Nudie jeans currently offers free repairs for ever (Nudiejeans, 2018) with the guidance to wash your jeans

and hand them into your closest Nudie Jeans Repair Spot. When considering the EA's guidance this practice is likely to be legal as it reflects repair and return to the holder. However, the repair and resale to another individual is prohibited under Reuse and so to conduct anything other than a minor repair, then transfer to a new holder, without the premises holding the relevant permit to handle waste under Environmental Permitting Regulations would be an offence. It is noteworthy that it is irrelevant if the garment had been previously classified as waste or not, it would be considered as a burden and therefore waste.

When Does Waste Stop Being Waste?

When waste has been classified as waste it needs to reach 'end of waste' status before it can be considered as a material or feedstock exempt from the regulations contained within the Waste Framework Directive and Environmental Permitting Regulations.

The EA stipulate that waste must have been through a recovery operation such as those outlined in the WFD and meet all four conditions outlined in the end of waste test (EA, 2022): 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, meets the existing legislation and standards for that material or product, d) the use of the substance or object will not lead to overall adverse environmental or human health impacts. The EA emphasise the precautionary principle and indicate, where a condition is not clearly met, 'it should be considered as not met'.

In a bid to provide clarity, a range of voluntary end of waste frameworks for specific wastes and end uses have been developed (EA, 2020). The 12 Quality protocols cover a range of waste material flows, from recycled waste gypsum from plasterboard to food waste derived digestate from anaerobic digestion. In the case of the anaerobic digestate quality protocol this allows the digestate to reach end of waste status and be spread to land as an organic fertiliser or soil conditioner (EA, 2014).

Waste Framework Directive and Circular Economy

The waste hierarchy identifies the most to least environmentally sustainable solutions when managing streams of waste. The emphasis is always toward the top of the waste hierarchy, preferencing both 'reduce' and 'reuse'.

In alignment with this preference, the Waste (Circular Economy) (Amendment) Regulations 2020 and Waste Management Plan for England (Defra, 2021) outlines the development of policies to support re-use and the circular economy. Section 10 of these documents details several measures that support preparation for re-use activities. These measures include:

- Measures to encourage the establishment and support of preparing for re-use and repair networks
- Measures to facilitate, where compatible with proper waste management, the access of preparing for re-use and repair networks to waste held by collection schemes or facilities that can be prepared for re-use but is not destined for preparing for re-use by those schemes or facilities
- The use of economic instruments
- The use of procurement criteria
- The setting of quantitative objectives

The European Parliament and Council Directive 2009/125/EC (2009) on eco-design was primarily designed to optimise the environmental performance of products while maintaining their functional qualities, i.e., use less energy but give the same performance. However, while the overarching aim of the directive was energy use specific, reference is made to design for reuse, repair, and remanufacture. Provision is made within the directive to make products modular, upgradeable, and repairable. These European provisions have now been enshrined under UK law, Schedule 7 Resource efficiency requirements, of the *Environment Act 2021* and as such there is the opportunity to legally enforce modularity to promote the circular economy.

These objectives are further supported by Recommendation 9 of the Vallance review (HMT, 2023, HMG, 2023a), and subsequent government commitment (HMG, 2023b), to explore opportunities where the government should support the Environment Agency and other organisations to examine regulatory barriers that may be block to the innovative use of waste products.

However, despite the commitment by government and allied agencies, challenges exist in delivering the circular economy. Waste regulations are designed to protect the environment and public health, but these same regulations, and the requirement for operators that handle waste to undergo permitting by the EA, represent a significant barrier to promoting circularity.

This tension needs to be overcome, allowing the development of repair networks that support reuse and the use of new economic instruments such as servitisation models.

A range of CE business models are now developing that actively involve the take-back, repair, re-use, repurposing or transformation of products that potentially fall under the WFD and the definition of waste. Examples where CE business models potentially face this risk include:

- Businesses using waste from one sector (e.g plastic waste, textile waste etc) to add to products
- Any business activity which involves additional materials or components in the repair of product
- Activities which involve transferring end of life products to another user, owner or business e.g
- Rental or leasing schemes where the returning product involves significant cleaning, repair, replacement

The solution: CE business model requirements

To overcome some of the barriers created by the legal definition of waste, a number of provisions and exceptions have been created for selected classes of 'waste'. More recent developments include the development of material or product passports.

Solutions

1) Quality Protocols. Reaching End of Waste Status

As described above a range of Quality Protocols (EA, 2020) exist that aim is to give a clear indication on when a waste reaches end of waste status and can be used as a feedstock and is therefore no longer subject to waste controls.

However, only 12 QPs exist and they apply to a small number of well-defined waste materials for a narrow group of use cases. They are: recycling waste gypsum plasterboard into new gypsum based products such as plasterboard, biodiesel from waste cooking oil, fuel oil from waste lubricating oils, aggregates from waste steel slag, pulverised fuel ash (PFA) and furnace bottom ash (FBA) for use in grout applications, production of cullet from waste glass, rubber from source segregated tyres, biomethane from landfill or anaerobic digestion, organic fertiliser or soil conditioner from food waste derived digestate, poultry litter ash as a feedstock for fertiliser,

compost from green waste, non-packaging plastics (EA, 2012). While there is clearly a need to regulate waste to protect environmental and public health the development of a QP for each material and use case in the Circular Economy may be challenging.

2) Low Risk Waste Position: Waste Streams

A Low Risk Waste Position (LRWP) is an official position taken by the EA giving clarity that an activity can take place using a legally defined waste stream without the requirement to hold a permit under Environmental Permitting Regulations (EPR, 2018). Similar to QPs, LRWP cover very specific waste material flows, apply to specific use cases and include the overarching principles outlined in the WFD: the activity must not endanger human health or the environment, cause a risk to water, air, soil, plants or animals, cause a nuisance through noise or odours nor adversely affect the countryside or places of special interest.

Fifteen LRWP exist covering a range of waste materials including; construction, demolition and dredging waste, aggregates and soils (EA, 2020), furniture and household items (EA, 2023a), paint (EA, 2019), tyres, rubber and plastic (EA, 2023b). The LRWP on tyres, rubber and plastic (EA, 2023b) allows for the reuse waste tyres in escape ladders in water storage reservoirs, as fenders on quaysides, as planters, and in construction as foundations subject to building regulations. The position gives further exemptions on processing, allowing non EPR permitted sites to store and cut waste rubber conveyor belts for reuse and rubber encased metal wire from the manufacture of new tyres. The LRWP for escape ladders in water storage towers involves relatively light touch guidance based on the premise of low risk to the environment and public health² but does put responsibility on the holder by stating the Environment Agency will not normally take enforcement action against you provided your activity complies with the afore mentioned guidance and 'does not, and is not likely to, cause environmental pollution or harm human health' (EA, 2023a). The LRWP may be a route to quickly facilitate circularity for some low-risk waste material streams.

3) Product passports

The previous two examples Quality Protocols and Low Risk Waste Positions focus on materials and products that have become waste and exempted from waste

2. You must not: bring tyres to the site before you start to construct the water storage reservoir, use more than 1,000 tyres, store more than 500 tyres in a pile without a 6-metre fire break, store the tyres for more than 3 months before they are used.

regulations. A third avenue exists in which product passports can be applied to a material or product so it avoids becoming waste. This third category 'sustainable or circular products and materials' could be passported, directly into repair to extend life and avoid a classification of waste.

The EU Batteries Directive (European Parliament and Council Directive, 2019) is specific legislation covering all Electric Vehicle, automotive and industrial batteries that are sold onto the European market. The implications are wide ranging and include provision for a battery passport which will document a range of key information about these products. The transition from EU legislation to functioning product has been conducted by Systemiq (Systemiq, 2023) with the financial support of German Government and a range of industry stakeholders (Unicore, BSAF, Audi etc).

Systemiq set out a range of detailed proposals that cover 7 areas: labels and certificates, carbon footprint, supply chain/due diligence, materials, circularity and resource efficiency, performance and durability (Systemiq, 2023). Within this is the key concept of 'transference'. Initially a new product is assigned a passport, then when that product reaches the end of its life and is transferred to a secondary user for repair or reuse a second passport is added to the product, then finally when a product has no life a third passport is added to denote its final fate - recovery or disposal.

In normal circumstances, with the few exceptions of the owner taking a damaged product to be repaired, when a product reaches end of life it becomes waste and as discussed above only an EA licensed operator can collect, transport and dispose or recover the product. However, the addition of this second passport gives a level of risk quantification for human and environmental health. As such, this could potentially allow that product to be collected, transported and reused/repared by operators that are not licensed by the EA (given specific risks were managed). This is essentially a form of Low Risk Waste Position (EA, 2019) without the product becoming 'waste'.

As such this new 'second passported' material flow would reflect a third category - 'sustainable or circular' in which data could be collected to ensure safety and highlight feedstock for circularity.

This has at least four benefits:

1. Passported products or materials will contain information on materials, hazardous materials, and previous use, which will enable regulatory authorities such as the Environment agency to make an effective risk assessment on the risk to environment and public health.
2. Passported products will contain quantitative information on the volumes of materials contained within the product so effective metrics can be established on how much natural resource is spared and carbon saved.
3. It will support policy direction and initiatives such as Ecodesign allowing repair shops to deliver circularity without permitting.
4. It will remove a significant volume of waste out of the statistics as these second passported products will not be recorded in waste figures – because they are not waste they are in the 'sustainable or circular' category.

Conclusions

This paper has provided clarification around the definition of waste that has been reported to be a major concern for many businesses wishing to 'go circular'. Rather than running the risk of non-compliance with the WFD, it would be advisable for any CE businesses to be aware and understand the legal definition of waste and the responsibilities placed on each actor. The key for CE business models is to a) avoid the generation of waste in the first place and b) design systems that avoid materials, components and products becoming defined as waste.

Product and material passports offer a practical route for businesses to achieve this. Digital tools and applications for tracking, tracing and recording data and information through a product life cycle, are increasingly available, which in turn would transform the collection of data and statistics on resources on waste in the economy. Such approaches are essential for building circular economy systems of the future and will become increasingly visible over the next 5–10 years. As this paper has shown, there are major developments in this area and *successful* CE business will embrace these digital data technologies and solutions.

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