Legal Considerations for a Circular Economy

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# Abstract

The legal aspects of circular economy have until recently been subject to only minimal analysis. This is partly due to the absence of specific legal frameworks; what does exist has been exhortatory and ultimately unenforceable. Moves towards imposing legal obligations are growing, and thus the need for deep and broad legal analysis becomes imperative. This chapter outlines some of the legal issues that will need to be considered in any moves towards circular economy. There is a focus on the importance of property and ownership, as well as a critical examination of the limited extent of academic work in this area. The need to reduce and remove potential contradictions between different legal regimes is highlighted.

# Introduction

Circular economy (CE) has developed in the context of environmentalism (Hu, He and Poustie 2018: 990), and against the background of scientific (and more recently, social scientific and normative) identification, analysis and critique of the (polluting) impact of linear consumption (see generally Ellen MacArthur Foundation 2013). Nevertheless, moves towards CE are likely to be highly contested. It arguably involves “nothing short of a wholesale transformation of the basis of contemporary capitalism and consumption” (Gregson et al 2015: 224), and it certainly “must be understood as a fundamental systemic change instead of a bit of twisting of the status quo to ensure its impact” (Kirchher et al 2017: 229). However, the extent to which this systemic change is actually occurring remains unclear. Explorations of how this change could take place, and indeed how such changes are actually happening, are often absent in CE debates (Hobson 2016). On this broad point, the importance of the role of ownership and property rights within law contrasts heavily with the rather glib way by which it has been analyzed in CE literature generally, as well as in the context of the (limited) literature on law and CE (Thomas 2018; Thomas 2019). Additionally, the best that can be said about the seemingly ambitious and wide-ranging CE package developed in the European Union is that it merely focuses on reintegrating waste: “The wrong signal is therefore sent to the private and public market: the focus on getting scarce materials back into the loop instead of a systemic change of production processes themselves” (Mélon 2019). Generally speaking, CE entails radically different understanding and approaches to those which have so far dominated legal discourse and the structuring of relevant legal frameworks.

CE cannot be constrained within arbitrary geo-political, and thus also jurisdictional, boundaries. On one level CE will involve (just as is the case with linear economy) a necessarily extensive level of imbrication between domestic, regional, international and supranational jurisdictional structures. At another level, the drivers towards CE are the global impacts of pollution and resource-consumption, and that the actual practices within a CE will invariably move from relatively small-scale examples to more complex commercial arrangements which will involve multiple jurisdictions. This may not be easily recognizable by the participants within CE transactions. It may also be problematic for regulators and other such governing institutions to acknowledge that the transactions concerned will involve multiple parties across different boundaries: the recent EU Directive on Waste (Directive (EU) 2018/851) presents itself as being a foundation for CE, but it does so clearly within the confines of the EU itself. This inevitably generates further tension as to the value, or even validity, of legal responses to CE that rest in one particular jurisdiction, or in one particular legal family.

This chapter thus can only offer a brief glimpse of the possible legal considerations of CE, and it certainly cannot examine in depth whether or not the identified problems may be jurisdictionally specific or whether they are common to different jurisdictions and/or legal families. In common law jurisdictions such as England and Wales, law is developed as much by judicial responses to disputes (between private parties or as between private parties and the state) as it is by legislation. Civilian legal systems such as France or Germany (and also socialist-inspired systems such as China) place much less emphasis on judicial decision making as a source of law, compared to legislative action (and to different degrees, academic works). This is a very crude comparison (for useful introductions to the comparison of law see e.g. Zweigert and Kotz ([1977] (1988)]; Reimann and Zimmerman (2006); Örücü and Nelken (2007)). The focus here is not to provide a comprehensive study, but to give a brief outline of legal issues of CE, from the general perspective of the law of England and Wales (including EU law: the Brexit issue shall necessarily be put to one side).

# Selected Legal Issues

## Meaning and enforcement of circular economy

The legal meaning and status of CE is unclear. This is to be expected, given the relative novelty of legislation in this area. The first legislative step is commonly regarded as the 2008 Circular Economy Promotion Law of the People’s Republic of China, which was considered as “an integrated state strategy rather than simply an environmental policy” (Hu, He and Poustie 2018: 991). Since then there have been a variety of domestic and international legislative actions, such as the Directive (EU) 2018/851 amending the 2008 Waste Directive to more explicitly engage with CE aims and practices. Accompanying such actions have been various governmental reports, plans, strategies and similar such official outputs which have identified CE thinking as being at least valuable, if not of central importance, to dealing with the various substantive material problems of overconsumption, waste and pollution (Defra 2018; European Commission 2019). The need for economy prevents a comprehensive detailed exposition and critique of all such examples (see generally Thomas 2019; Hu, He and Poustie 2018), but examination of the various legislative responses clearly shows up the difficult issue of enforcement. Thus with regard to the Chinese example, the lack of clarity as to the meaning of CE makes it “very difficult to establish a behaviour system that conforms to the legal norms” (Hu, He and Poustie 2018: 1007). There is clear evidence as to the multiplicity of meanings attached to CE, with the possible effect that CE will eventually become rather meaningless (Kirchher, Reike and Hekkert 2017; Murray, Skene and Haynes 2017). Certainly, there is no specific legal definition in the EU’s CE package, which seems to scupper any attempt to realistically enforce a CE. Instead of attempting to legislate for a CE at a general level though, it may be more valuable to concentrate on how circularity can be built in to commercial practices, by considering how different areas of law can be used, manipulated even, to generate, protect and enhance CE practices.

## Circular economy literature: whither law?

Whilst there is growth in the legal literature on CE, alongside tentative legislative steps, it is clear that the non-legal CE literature has so far taken only the very briefest account of the legal position. It may just be that the majority of CE writers were interested in other aspects, such as technical and scientific issues of biomimicry and resources exploitation, or in the vast array of non-legal normative and positive implications of turns towards CE. It may also simply be a reflection of the lack of legal writers in the field of CE. The relative novelty, and until relatively recently the relative obscurity, of CE itself may well have had a restrictive effect on legal analysis: we lawyers simply did not know much if anything at all about it. Certainly this author has experienced such reactions over the past few years when presenting and discussing this topic. To recast this complexity: the lack of legal analysis of CE and of legal writers within the CE literature has resulted in much CE literature presenting as if the necessary changes to shift from linear to CE practices can occur without consideration of the legal impact, or more likely, without consideration of how law may restrict or alternatively enhance such moves.

Given the limited implementation of meaningful and/or enforceable legislation (or other such doctrine, that is: law), and the relatively limited engagement with law on the part of CE proponents and literature of the same, it is perhaps unsurprising that there has until very recently been very limited academic legal interest. To illustrate, the author undertook a search (on 5 November 2019) of Westlaw, one of the leading databases for legal research. The search was for the term “circular economy”. 124 items were returned. Space precludes a detailed overview, but there was a variety of different types of sources ranging from EU directives to official publications, to short comments and notes. However, there were only six substantive articles (defined here as being a single focused piece (as opposed to an update) of greater than five pages in a journal) which had CE either as a primary focus or as a substantive element (Thomas 2019; Dawson 2019 (an eight page analysis of DEFRA 2018); Maitre-Ekern and Dalhammar 2019; Mak and Lujinovic 2019; Turunen 2017; and de Römph 2016). The other substantive articles only very briefly referred to CE (Cavoski 2019: 112 (referring once to the EU’s CE package); Moutsipai and Geiger 2019: 233 (referring once to the EU CE Action Plan); Bostoen and Devroe 2019: 412 (referring once to the shift away from ownership as part of the CE); Adekilekun, Gan, and Fuguo 2018: 46 fn 75 (referring once to the EU’s CE Action Plan); Ijaya, Abbas and Wuraola 2018: 282 (referring to the Ellen MacArthur Foundation); Adhikari, Gautam and Chaudhari 2016 (referring once to the PRC’s approach); Hillyear 2015: 146; Tromans 2010: 183 (referring once to the Chinese 2008 CE law). It is also worth very briefly noting that a similar search on HeinOnline, another extensive repository for legal work, generates 337 results. Economy prevents a detailed systematic review of this, but that search, whilst repeating much of the Westlaw results, does indicate some other substantive articles (such as Porcelli and Martinez 2018; Bradshaw 2018; Thomas 2018; Nair and Kraus 2019).

Thus, with some limited exceptions (Bonciu 2014; Dalhammer 2015; de Römph 2016; Steenmans, Marriott, and Malcolm 2016; Cassotta 2016; Turunen 2017), the first substantive legal analysis was probably Backes (2017) with a focus on the EU (and to a lesser extent, the Netherlands). The first substantive analyses of English law appear only at the end of 2018 and the start of 2019 (Thomas 2018; Thomas 2019). Whilst there is growth both in the number of pieces published which substantively engage with the issues of CE (as well as academic conferences and calls for papers), and in the range of legal areas being brought under legal academic analysis (with examples such as real property (Ploeger et al 2019) to consumer law (Mak and Lujinovic 2019); Maitre-Ekern and Dalhammar 2019), as well as specific responses to problematic issues such as plastics (de Römph 2018; Thomas forthcoming a), there are numerous areas of law which remain untouched. Thus there remains no substantive work to this author’s knowledge (again, with the further caveat that this author’s field of knowledge is both restricted in its subject matter and in its jurisdictional scope) concerning company law and CE, though there is some closely connected work on sustainability (such as Sjafjell 2018). Thus as Mélon (2019) correctly writes: “the private sector further encounters impediments to circularity in current legislation on … competition law and the general corporate law favouring and prioritising linear business practices, lacking clear guidance on circularity. These are all examples of policy incoherence, some representing a direct example of incoherence …., others an indirect example”. Another area of considerable importance with only limited examination is the field of intellectual property, where the only substantive work appears to be Thomas’s critique of the approach taken to so-called intelligent assets by the Ellen MacArthur Foundation (2016) (Thomas 2018).

The obvious problem with the limited level of academic engagement with the legal issues concerning CE is that sometimes writers may inadvertently engage with legal concepts, which in turn demonstrates the potential difficulties facing CE practices. Thomas (2018; 2019; forthcoming b) has pointed out that CE literature has tended strongly towards making considerable questionable assumptions about the nature of property and ownership. The ease with which such foundational conceptual structures (both of the specific English legal framework per se, and of the more general market-capitalist social structures at the heart of Western and modern life) are elided over or brutally overturned in CE literature raises questions about the normative or theoretical basis of law in a CE, as well as more pragmatic questions about the specific form of the doctrines attending to CE transactions. It is not uncommon to see brief references to areas of law concerning ownership, property interests and rights, commercial transactions, forms of agreement, and so on, without any explanation or analysis as to how complex legal matters can be effectively, let alone efficiently, brought within the CE aura. Even when there are works (such as Hieminga 2015; European Investment Bank 2015) on the need to address the often unique financial structures and transactional forms attending to circular economic practices, they can project insufficiently precise and thus potentially misleading representations of the role of property, title and ownership within financing (certainly under English law) (Thomas 2019; forthcoming b).

## Procurement and Ownership

Where there has been some work is in the context of public procurement. The initial steps came from the EU Parliament, which in June 2017 published a report connecting “green public procurement” and CE. This was swiftly followed by a brief document from the European Commission’s Directorate General for the Environment on best practices in circular economy and public procurement (EC 2017). At the time, Sanchez-Graells, a leading expert on public procurement, perceptively referred to this as “fluffy guidance”, at a “high level of generality” which does not provide much in the way of legal guidance (Sanchez-Graells 2017). He also noted the connection between public procurement, circular economy and general environmentalism, and he rightly questioned whether or not this was properly coordinated within the EU. For the purposes of this chapter, it is worth noting the underlying “greening” aspect here:

Circular public procurement is an approach to greening procurement which recognises the role that public authorities can play in supporting the transition towards a circular economy. Circular procurement can be defined as the process by which public authorities purchase works, goods or services that seek to contribute to closed energy and material loops within supply chains, whilst minimising, and in the best case avoiding, negative environmental impacts and waste creation across their whole life-cycle. (EC 2017)

It is suggested that this focus on the “green” aspect is part of both an attempt to greenwash the more profound implications of moving towards a CE, as well as an attempt to provide an otherwise reasonable justification for the policies themselves. Thus whilst the EU Directive on Public Procurement (Directive 2014/24/EU) “may help incorporate environmental criteria”, the conditional “may” is telling: “there is no evidence on how well these [sustainable and green public procurement] criteria actually capture the circular elements. Using several predefined environmental criteria in the procurement process does not necessarily make the outcome of the procurement more sustainable, green, or circular.” (Alhola et al 2016: 97)

Overall, public procurement and CE in general remains a rather flawed and inchoate area of law: limited illustrative examples provide the extent of the evidential basis, and loose guidance and an absence of detailed, specific legislative provision essentially prevents the generation and implementation of CE public procurement. A substantial problem with loose legal analysis of CE situations is a consistent failure to acknowledge the role of property and ownership within society, and in particular a rather glib approach to critically examining the role of property and ownership within the legal architecture of (a) currently existing systemic institutions and structures and (b) whether such roles would be the same or, more importantly, how and to what extent they would differ in the context of moves towards CE. This has been analyzed in depth by Thomas (2018; 2019; forthcoming a; forthcoming b), but it is worth adding to the critique by considering how this problem appears in the context of public procurement.

Thus, for example, it has been suggested that moves towards CE would include “leasing, hiring, and sharing of products, as opposed to direct ownership” (Alhola et al 2016: 97). This controversial statement, baldly put, is highly problematic. At one level there is some evidence of potential commercial problems with such simplistic approaches towards ownership structures. This can be seen in the context of the WEEE Forum of the International Association of Electronic Waste Producer Responsibility Organisations (a not-for-profit organization encompassing various national bodies concerning waste electronics), which at the 2019 Rome Conference of the EU Network for the Implementation and Enforcement of Environmental Law) stated that “it was noted that the leasing of products had not come out as strongly in the survey responses as designing for ease of recycling and that the project faced some challenges in convincing the sector of the merits of the leasing model, one of the facets of the circular economy it will be looking at” (WEEE 2019). This replicates earlier findings of the European Investment Bank (2015: 27-31)

Furthermore, the notion of “direct ownership” is rather jurisdictionally-loaded. Depending on whether you are coming from a common-law or continental tradition, such a phrase may make more or less sense (Thomas 2019). Secondly, there are also jurisdictionally-relevant issues with, for example, the conflation of leasing, hiring and sharing: these three concepts entail different proprietary structures, and considerable debates have arisen over the proprietary status of a lease (Swadling 1998; Watt 2003; MacFarlane 2003; McMeel 2003). Thus whether or not a hire agreement has an option or an obligation to purchase at the end of the term can have substantive commercial implications (*Helby v Matthews* [1895]), whilst at the same time proprietary consequences can clearly follow from merely possessory dealings with personal property (*The Manchester Ship Canal Company Ltd v Vauxhall Motors Ltd* [2019]). Certainly there is a fundamental logical question here: if there is a move towards leasing or hiring or sharing, then that still presupposes a party with a more powerful ownership interest, above that of the lessee, hirer, or those coming to share the asset. CE will thus entail *enhancement* of direct ownership, in the hands of a limited number of initiators (Thomas 2019: 63) of CE transactions, a position that raises substantial normative problems (Thomas 2018; forthcoming b).

If we look to some of the best practice guidance published, it becomes clear that there is a lack of examination of underlying legal structures. Thus consider the Aalborg procurement of new school furniture (European Commission 2018). Whilst it is interesting to note that participants in the exercise demonstrated pre-existing circular practices, there was also some note of reservation about what CE meant in contrast to more general environmental aspects. For our purposes it is also worth noting that there was no clear outline of legal issues: the most the example gives are references to a beguiling all-encompassing “framework agreement”. This is problematic given how a similar approach (that is, the use of a “framework agreement”) can be discerned in practical examples in England (York, North Yorkshire, East Riding Enterprise Partnership 2019). Given that there is a strong possibility in English law that some of the products covered might become part of the land (and thus not remain as goods), with complicated shifts in ownership and new proprietary relationships forming as a result (Thomas 2015), this lack of clarity makes it difficult to assess what legal risks, and what financial risks tied to the legal allocation of property rights and interests, may have arisen in this context. This issue of the land/goods divide becomes even starker when we consider the potentially viable project of concrete recycling: (European Commission 2019). Some more detail on this issue is found however in the Malmö furniture procurement project (European Commission 2019). Whilst there was reference to the bland “framework agreement”, there were some indications that this would entail some sort of buy-back obligation on the seller, as well as recognition of the potential issues concerning the power of the municipality to sell unneeded goods. Recognizing these issues is a good first step, but there clearly needs to be acknowledgement that the obligations and duties regarding ownership (or whatever proprietary or non-proprietary interests in goods are identified) need broader examination.

## Overcoming Contradictions?

Consider this definition of circular public procurement: “procurement of competitively priced products, services, or systems that lead to extended life spans, value retention, and/or remarkably improved and nonrisky cycling of biological or technical materials, making use of and supporting the circular business models and related networks” (Alhola et al 2016: 105). What exactly is a standard of “remarkably improved and nonrisky”? This appears to raise considerable questions concerning the application of precautionary principles regarding technologies: can something ever be “nonrisky”, or is that term merely a reference to a limited level of risk (to which we can further ask: what exactly is the tipping point for the relevant level of risk?). This may be a key issue in the implementation of circular economic practices, as recently recognized by the European Court of Justice (Second Chamber) in the context of a dispute over the capacity to alter the end-of-waste status of sewage sludge.

In *AS Tallinna Vesi v Keskkonnaamet* [2019], there was a need to deal with the absence of defined criteria of “end-of-waste”. This is of key importance for operating within the Waste Directive regulatory framework (Directive 2008/98/EU). The Estonian Environmental Board refused to recognize end-of-waste status for sludge that had undergone treatment with the aim of marketing the resulting product as “greening soil”. The Court held that Article 6(4) of the Directive allowed Member States to take the approach that some waste could not cease to be waste, and that that would be allowed even if it would effectively negate the achievement of the objectives of the Directive such as the recovery of waste. Furthermore, the Court held that the recovery of sewage sludge entailed certain environmental and health risks, and this meant that the discretion awarded to member states could be operational here. The Court further held ([2019] Env L R 30 [27]) that whilst the Advocate General’s observation that Member States’ abstention from adopting legislation concerning end-of-waste status was acceptable, they “must ensure that such abstention does not amount to an obstacle to the attainment of the objectives set by Directive 2008/98, such as … encouraging the recovery of waste and the use of recovered material in order to preserve natural resources and to enable the development of a circular economy.” This was the sole reference to circular economy. It suggests that the EU’s juridical approach to the policy role of circular economy is that whilst it may be a factor, it ultimately is subsidiary to the more explicit legislative provisions of the Waste Directive. The waste-holder could not demand that the relevant regulatory body determine the end-of-waste status of products such as sludge, that is, products which have risky aspects to their material nature. This illustrates a paradox: one arm of law will prevent what another arm may require. This may be another instance of the lack of coordination; it may be something more substantive in that there will need to be a radical change to the nature of environmental law, at least in the context of the Waste Directive and its use of the waste hierarchy, in order to properly account for the necessarily broader concept of CE.

# Suggested future directions

To a degree, it could be said that this radical change has begun. In 2018, the EU amended the 2008 Waste Directive (Directive (EU) 2018/851). The preamble’s reference to the need to “take additional measures … by focusing on the whole life cycle … in a way that preserves resources and closes the loop” (Directive (EU) 2018/851 (1)) suggests that new legislative measures will be required. Certainly, Preamble (17) lists a variety of measures Member States could use to ensure that material recovered from waste ceases to be waste, and appears to clearly deal with the core issue at the heart of the dispute in *AS Tallinna Vesi v Keskkonnaamet*. Furthermore, Article 1 of the Waste Directive now states that the Directive “lays down measures to protect the environment and human health by preventing or reducing the generation of waste, the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use, which are crucial for the transition to a circular economy and for guaranteeing the Union’s long-term competitiveness.” The reference to *transition* to CE is important. However, it is still hemmed in by both the notion of dealing with waste and the need to guarantee “competitiveness”. Whether this reference to competitiveness will generate a conflict between CE and other economic goals is unclear.

Moreover, there is no clarity as to the role (if any) that changes to or new forms of ownership and property structures will play in this. Preamble (29) of the 2018 Directive implies that there needs to be facilitation of business models that promote re-use, refurbishment, repurposing, and sharing of products. Such facilitation may well take the form of manipulating property interests, but the Directive avoids detailing this explicitly. Similarly, preamble (61) refers to the dissemination of best practices as to the meaning of “waste” and “discard”, accounting for CE where “a substance or object is transferred from one holder to another holder without the intention to discard”. This is clearly an issue relating to ownership and property rights, though how precisely this should be dealt with is unclear. Ultimately, the potential for use of property and ownership structures to incentivize CE practices is not explicitly mentioned in the Annex of examples of economic instruments and other measures added by the 2018 directive to the 2008 Waste Directive (Directive (EU) 2018/851 Annex, inserting Annex IVa), and it is rather difficult (though not impossible) to imply into those measures that are specifically mentioned. At best, this Directive is merely a “prelude” to a legal definition of CE (Lingl and Marcó 2019), and the beginning to a coherent and non-contradictory legal framework for CE transactions

The legal aspects of CE need to be subject to much more detailed and critical analysis. At the outset the problems of comparative legal analysis were briefly noted: this chapter must thus stand as an invitation to others to undertake such work. In addition to such issues, efforts are required to develop coherent theoretical frameworks, connecting legal doctrine with the policies and practices of CE. This should not merely be undertaken as a means of catalyzing doctrinal change to help develop, support and enhance CE practices. Rather, given the potentially problematic consequences of CE practices (see eg Thomas 2018), explication of the policy grounds allows for critical examination. This deeper understanding of CE may help with the problems of enforcement. As noted above, there is a lack of consensus over what CE actually is. However, rather than fretting over the meaning of CE, it may be more useful to consider what options for enforcement can be drawn from commercial practice.

There could be an attempt to present obligations to undertake practices that at least accord with some sort of common framework of CE. This could take the form of some sort of industry-wide code similar to examples such as that concerning mortgages (Pre-Action Protocol 2008). Alternatively, there could be some form of enforceable soft-law, encoded into transactions through essentially invariable contracting practice, such as that found in the law concerning documentary credit (International Chamber of Commerce 2006). What is worth noting is neither is specifically enforceable (for criticism of the Pre-Action Protocol see Dixon 2008). Without effective regulation, a soft-law code essentially relies on mere market-influenced enforcement, with participants dealing with marginal transactions less likely to follow. Sanchez-Graell’s perceptive identification that CE in Europe involves “weak policy intervention in the form of best practice dissemination (ie even weaker than soft law guidelines)” (Sanchez-Graells 2019) thus raises serious questions about the need for substantive regulatory engagement with CE.

# Conclusion

This brief chapter has provided an outline of legal issues likely to affect moves to a CE. It has identified a tendency towards exhortatory legislative responses, along with a tendency towards engaging with specific legal areas in the literature (such as the focus on property law, or procurement law). Analyzing law’s response as a whole, rather than the ad hoc nature of current approach, would clearly be a massive endeavor. What may therefore be more palatable is simply a call for greater volumes of work in general in the context of legal analysis of CE practices and policies. There needs to be a shift in perception among academic lawyers as to the nature of what CE involves: it needs to be understood through something more multifaceted than the current, rather myopic, (re)presentation of the issues through the ultimately flat lens of sustainability and waste (Mélon (2019)). Issues of sustainability, and issues concerning waste, are of course hugely important to circular economy (and they of course raise complex substantive issues of law by themselves). However, they are both merely part of a broader idea: an idea which necessarily will involve multiple other areas of law by virtue of the transactionalism than inheres within CE practices. In particular there will needs to be broader and deeper examinations of the doctrinal issues that will arise when CE transactions collapse, and collapse away from the start or end-points of supply chains and thus generate problems other than those concerning sustainability or waste. The minimal attention paid to property and ownership structures will be hugely problematic given the importance of such concepts to commercial transactions.

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# Further Reading

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(Brief overview of legal problems concerning EU consumer law and CE.)

Maitre-Ekern, E., Dalhammar, C. (2019) “Towards a hierarchy of consumption behaviour in the circular economy” Maastricht Journal of European and Comparative Law 26(3), 394-420. (Deep theoretical overview of implications for consumers of moves to CE.)

de Römph, T.J., Van Calster, G. (2018) “REACH in a circular economy: The obstacles for plastics recyclers and regulators” Review of European, Comparative & International Environmental Law 27(3), 267-277. (Brief, enlightening overview of the implications of transitions to CE, in light of current legal-technical standards governing a specific type of goods (plastics).)

Thomas, S. (2019) “Law and the Circular Economy” Journal of Business Law 62-83. (Outlines the possible implications for English law of CE practices. Considers the relationship between CE and the sharing economy.)

Thomas, S. (2018) “Law, Smart Technology, and Circular Economy: All Watched Over By Machines of Loving Grace?” Law, Innovation & Technology 10(2), 230-265. (Examines the value of intellectual property law as a means of moving to CE. Detailed critique of notion of “intelligent assets”. Analyses possible dangers of moves towards tracking and controlling goods. Questions the normative foundations for CE.)