



CHEMTrust

Protecting humans and wildlife
from harmful chemicals

Policy Briefing

Circular Economy and Chemicals: *Creating a clean and sustainable circle*

Executive summary

Creation of a circular economy is an important part of creating a future-focused, sustainable economy. However, the circular economy creates some important challenges for the regulation and use of chemicals.

This briefing, part of CHEM Trust's submission to the Commission's consultation on the Circular Economy, outlines key policies and approaches that are needed. The aim has to be to create a clean circular economy, as this is the only truly sustainable approach.

It is important that the right policies are adopted in this area, otherwise the circular economy becomes a way of perpetuating the use of hazardous chemicals.

Key recommendations:



A move to non-toxic products, thus removing problems in recycling

- Regulations, regulators and industry must ensure that all chemicals of very high concern are phased out of products as soon as possible.



Faster, more precautionary, safety assessment of chemicals, assuming a circular economy. Industry should move away from problem chemicals.

- Faster identification of chemicals of very high concern, with rapid action to ensure they are substituted with safer alternatives.
- Safety assessments should assume that a circular economy is going to be in place, e.g. that 100% of sewage sludge will be used as fertiliser.
- Companies should take a forward-looking approach when producing products, avoiding chemicals likely to be restricted in the future, e.g. the ChemSec SIN list.



Better information flow on hazardous materials in products, and controls on chemicals in imported products

- The supply chain, including consumers and recyclers, should have easy access to information on identity and properties of hazardous chemicals in products.
- Imports should be subject to the same restrictions and information requirements.



Some materials should not be recycled

- Assessments should balance the value of the resource and the hazard of the chemical, with a default of no recirculation of hazardous substances.
- The EU is currently pushing to permit the recycling of products containing dangerous persistent organic pollutants. This promotion of persistent pollution is short sighted, endangering high quality recycling, health and environment.

The circular economy will only be successful in the long term if customers – including the public – are confident in the quality of recycled material. If this confidence is removed, then the market will demand virgin materials, and the attempt to create a circular economy will fail.

2. Introduction

Creation of a circular economy is clearly an important part of creating a future-focussed, sustainable economy. CHEM Trust therefore welcomes the European Union's work in this area.

A circular economy creates some important challenges for the regulation and use of chemicals. CHEM Trust believes that there are win-win solutions for these challenges, promoting both a circular economy and removing hazardous substances from our lives.

This briefing forms part of CHEM Trust's contribution to the 2015 *Public consultation on the Circular Economy* [1] and outlines some key policies and approaches that we believe are needed to address the interaction of chemicals policy and the circular economy. The aim has to be to create a clean circular economy, as this is the only truly sustainable approach.

It is important that the right policies are adopted in this area, otherwise the circular economy becomes a way of perpetuating the use of hazardous chemicals. This would not be a sustainable outcome, not least because it is likely that this would result in a loss of public and business confidence in the whole circular economy concept.

It is worth noting that the European Parliament resolution of 9 July 2015 on resource efficiency [2] clearly supports a focus on getting hazardous materials out of the circle (*our emphasis*):

31. Calls on the Commission, the Member States and the European Chemicals Agency (ECHA) to step up their efforts to substitute substances of very high concern and to restrict substances that pose unacceptable risks to human health or the environment in the context of REACH, not least as a means to fulfil the requirement of the 7th Environment Action Plan to develop non-toxic material cycles so that recycled waste can be used as a major, reliable source of raw material within the Union... stresses in accordance with the waste hierarchy that prevention takes priority over recycling and that, accordingly, recycling should not justify the perpetuation of the use of hazardous legacy substances;

32. Calls on the Commission and the Member States to step up their efforts to substitute hazardous substances in the context of Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment with a view to establishing non-toxic material cycles:

3. Circular Economy and chemicals – some problems

One of the main features of a circular economy is that products will be reused or recycled at the end of their life or if they are no longer needed.

Using the terminology of the REACH chemicals law, this will be particularly important for articles (furniture, toys etc), though it can also be relevant for waste preparations (e.g. paint) or individual substances.

Some challenges of this 'end of life' recycling from a chemicals point of view are:

- The safety assessment of the chemicals concerned may not have anticipated a high level of recycling of products (and other materials, such as sewage sludge) containing the chemicals at end of life.
- These products may contain hazardous chemicals that were legal to use when the product was manufactured, but are now restricted or banned.
- An article could contain chemicals that were not legal for use in manufacturing an article within the EU, but which could be used outside the EU and no restriction was in place on the presence of this chemical in imported articles. This could happen if, for example, the use of a chemical within the EU had been controlled by Authorisation in REACH, without a REACH Restriction also being put in place to control imports,

- It may not be clear whether the products contain restricted substances or not, due to lack of clear information about the chemicals present in product that is being discarded
- In some cases, due to how a product is used or as a result of certain waste management technologies, a complex mixture of substances may have been created – e.g. slag or ash.

Behind these problems are key issues that need to be addressed:

- There is still a lack of sufficient understanding of the toxicity of many chemicals, meaning that chemicals that should have their use restricted are actually still in use.
- The estimate of the toxicity of many chemicals changes over time, as more information becomes available – assumed “safe levels” have been revised to lower levels, e.g. in the case of lead.
- Restrictions on the use of problem chemicals may not be comprehensive enough, creating loopholes – particularly for imports to the EU.
- There is often no easy way to obtain good quality information on the chemical composition of products at the end of life – or indeed at the beginning of life in many cases.
- Some waste management collection and treatment approaches create complex mixtures, creating challenges in characterising their chemical properties.

It's worth noting that the Swedish chemicals agency KEMI has commissioned and published a detailed analysis of the issues around chemicals and waste, which is very relevant for this consultation [3].

The following sections outline recommendations to start to address these problems.

4. The need for faster and more precautionary safety assessment of chemicals.

The longer it takes to identify a problem with a chemical, the longer it will continue to be used and incorporated in products.

This is partly a result of lack of data, which still remains a problem even with REACH in place, but also the fact that science moves forward and often finds new toxicity (and often exposures) which hadn't previously been demonstrated. In reality we are always dealing with 'currently estimated toxicity' (CET) which may or may not be the same as the real toxicity of a chemical.

The European Environment Agency's "Late Lessons from Early Warnings" reports include many examples where the estimate of a chemical's toxicity has increased over time [4]. Lead and PCBs are obvious examples from the past, while endocrine disrupting chemicals (EDCs) are a current – and future - example [5].

Here are some recommendations to help address these issues.

a) Regulatory chemical assessment needs to be faster and more effective

REACH registration and evaluation processes are supposed to identify chemicals of concern, with authorisation and restriction processes preventing problematic uses and obliging substitution with safer alternatives.

However, all these processes are going too slowly, meaning that chemicals are continuing to be used in products even though they would (and eventually will) actually have their use restricted if these processes had been completed properly. In addition, we are concerned that there is insufficient consideration of the clear availability of safer alternatives, for example in the case of DEHP in PVC (see below).

All REACH process need sufficient resources and political commitment to ensure that this important job is completed rapidly.

b) Safety assessment of chemical use should assume a fully circular economy.

When estimating the safety of a chemical used in a product, all assessment processes should assume that 100% of the product will be recycled at end of life.

This should include, for example:

- Making conservative assumptions of where the material might end up (e.g. food packaging)
- An assumption that *all* sewage sludge will go on agricultural land

This may require changes in guidance for REACH Registration, Evaluation and Authorisation, amongst other improvements in procedures.

c) Safety assessment of chemicals should be more precautionary, with more consideration of emerging science and the reality of exposure to mixtures.

Given the long experience we now have of chemicals increasing in CET over time, it would make sense to consider emerging science more strongly in chemical safety assessment. Such research is too often dismissed, even after it has been confirmed by other studies (e.g. low dose effects of bisphenol A). This is particularly important as a circular economy is instigated, where chemicals may continue to circulate for some time.

In addition, the main chemicals regulatory processes still ignore the reality of our exposure to mixtures, devising an imaginary world where we are exposed to one chemical at a time. As understanding of the impacts of mixtures improves, this will end up being another example where the CET of some substances will rapidly increase, causing problems for recycling.

d) Rules on registration of recovered substances should be reviewed to ensure a high level of protection for human health and the environment

The KEMI study identifies issues with the way in which producers of recovered chemicals can be exempted from REACH registration, placing those recovering chemicals at competitive advantage to manufacturers and importers (page 35), and also potentially reducing protection for health and the environment:

“Because of the derogations from the registration obligation for recovered substances the recycler does not need to develop a separate risk assessment (chemical safety report), even in cases where the recycled material is given a different use than that recommended in previous registration and when the exposure situation may be different.”

The KEMI study also highlights important issues regarding the definition of substance in REACH, raising the question of whether a recovered substance is the same as an originally produced one, with respect to impurities for example. One conclusion is that:

“a more in-depth analysis needs to be made of how the concept of substance can be applied to recovered substances to ensure that any risks to human and health are managed in a reasonable manner”

CHEM Trust agrees that these issues need to be reviewed.

5. Industry should move away from problem chemicals in advance of regulatory action

Companies shouldn't just wait for regulatory action before moving away from chemicals of high concern, as this will increase the chance that they end up producing articles which create problems for recycling in the future. They should also work to avoid moving from one problem chemical to another. A key tool in these efforts is the ChemSec SIN list and SINilarity tool [6].

Companies should be aiming for non-hazardous products, and this will generally ensure that there aren't chemical problems in recycling these products.

6. There needs to be better information flow on hazardous materials in products, and controls on chemicals in imported products

a) Access to information on the identity of hazardous chemicals in products.

Without information on the presence of hazardous substances in products (particularly articles) it is not possible for recyclers to know what issues there may be in recycling the product

REACH already gives limited right of access to information regarding substances of very high concern in articles, however this is slow, bureaucratic and limited, involving writing to individual manufacturers.

In addition, as the KEMI report states:

“Information on substances of very high concern ought to apply to more types of substances. Difficulty in interpreting which articles are covered by the requirements is a serious problem.

The supply chain, including consumers and recyclers, should be given easy access to information on the identity of hazardous chemicals in products, going beyond current information requirements for SVHCs. This should also cover chemicals in imported articles.

b) Imported products should be subject to the same restrictions as products made in the EU

It is currently possible for a substance to be forbidden in making an article in the EU, yet be permitted in imported articles. This can lead to confusion in recycling at end of life, as well as being unsatisfactory in terms of protection of human health and the environment.

A major reason for this is that the REACH Authorisation process only considers use within the EU, not import. This problem should be solved by ensuring that a Restriction is put in place to prevent the import of articles containing the chemical in question.

c) Recyclers need a right of access to safety data sheets

The KEMI report points out an anomaly in REACH in that recyclers have no right of access to safety data sheets, even though they are required to have this information:

“Waste operators/recyclers ought to have access to safety data sheets and other information from REACH registrations, to ensure that recovered materials are safe and have uses that are non-problematic from the point of view of toxicity. Article 2(7)(d) requires recyclers to have access to such information, but under the rules they do not have the right to be notified of it. This is, in my view, the most obvious gap in the regulatory framework with regard to coordination between rules on chemicals and waste.”

7. The importance of separation in waste management

In general, the best way to produce good quality secondary raw materials is to collect materials separately. This also makes it much easier to establish whether there are any chemical hazards.

Some waste management techniques process mixed waste and then create materials that are complex mixtures – such as slags and ashes. It is often hard to establish the chemical safety of such mixtures, so it will be hard to satisfy REACH requirements if they are to be accepted as a product.

8. Dealing with products known to contain hazardous chemicals

In some cases it is well known that there is a problem with the presence of certain chemicals of high concern in end of life products. The question at this point is whether this material should be recycled or not, and what conditions should be set.

When considering allowing the recycling of materials containing hazardous substances it is vital to consider the risk of creating a scandal, with a loss of confidence in recycled products.

There are three destinations for a waste containing hazardous chemicals:

- (1) Landfill or (2) Incineration
- (3) Our homes, workplace and living environment

It is wrong to assume that recycling is always the best option when waste contains hazardous chemicals, the decision needs to be based on a balance between the value of resource vs concern re hazard.

For example, we would argue that thermal paper containing Bisphenol A (BPA) should not be recycled, as it is likely that this use of BPA will soon be banned [7], and there is little resource benefit coming from the small amount of paper involved.

Although landfill has many negative aspects, it should not be totally dismissed as a destination for some wastes – for example PVC. It may be the safest place for a material containing hazardous chemicals, and in the case of plastics, analysis shows if they aren't recycled then landfill is generally preferable to incineration for climate reasons [8]. Clearly recycling is normally the preferable option, and any landfilling should be done to the highest standards.

Some key issues regarding products containing hazardous chemicals:

a) Beware of vested interests pushing narrow agendas

Politicians and regulators need to be aware that much of the lobbying in this area is from quite narrowly-focused vested interests, trying to get an economic advantage.

- This needs to be viewed in the broader circular economy context, including an awareness of the overall ease of recycling different materials.

E.g. It has been suggested that one reason for the wish to authorise the use of DEHP in recycled PVC pellets [9] is so that these pellets can be burnt in an industrial process

- If they are not defined as waste they can then be sold at a higher price, and can be burnt with fewer pollution controls.
- This can hardly be called recycling, even if some atoms from the PVC end up in the final product.

b) The EU should not be promoting the recycling of materials containing persistent organic pollutants.

The EU is currently promoting the recycling of products containing dangerous persistent organic pollutants. This promotion of persistent pollution is short sighted, endangering high quality recycling and creating ongoing exposure to these dangerous chemicals.

For example, the EU has been pushing for the recycling of materials containing brominated flame retardants within the UNEP POPs process [10]. As the environmental NGO CIEL commented [11]:

“When countries such as China and Iran are starting to outrun the EU on environmental standards, it is time to critically assess the EU’s position and its claims to be a global leader on the protection of the environment.”

The EU should be setting a global example – not undermining international conventions on persistent organic products.

c) Labelling must be used if any hazardous materials are permitted to re-enter the economy

As CHEM Trust laid out in our joint position paper with other environmental NGOs [8], it is vital that recycled products are fully compliant with chemical legislation.

In general our view is that there shouldn't be special arrangements created to allow the continued presence of hazardous substances in products made from recycled material.

However, if exemptions or authorisations are allowed then the resulting material **must be labelled**.

But is it really worth recycling these materials?

d) Materials that contain vPvB and PBT substances should be considered as hazardous waste

The KEMI study points out that the legislation defining the list of hazardous waste, in the Waste Framework Directive, doesn't cover vPvB or PBT substances:

“No account is taken in Annex III to the Framework Directive and in the list of wastes of whether a waste has PBT or vPvB properties. The fact that a waste has such a property or is a POP thus does not mean that it has to be characterised as hazardous”

‘It is difficult to understand why Annex III of the Waste Framework Directive, which was decided upon in 2008, was not adapted to the rules in REACH, which came two years previously.’

9. Some priority products for investigation and action

In our view there has generally been insufficient research done on the chemical risks posed by recycling of different materials, and we would suggest that more research is urgently needed in this area.

Here are some examples of problem areas that we have noticed, but this list is not in any way comprehensive.

Black plastic

Black plastic, e.g. in kitchen goods, which researchers have found can be contaminated with brominated flame retardants (BFRs) [12].

Toys and other materials that children come into contact with

This is part of a broader problem of inadequate monitoring and enforcement of chemical composition of toys.

Furniture

It is clear that furniture can act as a reservoir of pollution [13], and recycling (and reuse) can spread this pollution, for example by BFRs, phthalates or perfluorinated chemicals (PFC)s.

Construction materials

Construction materials frequently contain chemicals of very high concern, yet they are also a priority for recycling and reuse.

Food contact materials

Food contact materials are important because of the direct route to human exposure via food, they are an important component of waste (particularly as food packaging); they can also be made of recycled material which may be contaminated by chemicals of concern. Relevant chemicals include phthalates, bisphenol A and perfluorocarbon coatings.

The KEMI study points out that there are controls on the use of recovered plastics in food contact materials:

“Recovered plastic may be used for food packaging, but each recovery process from which the plastic originates must obtain special approval under Regulation (EC) No 282/2008. The approval is decided by the Commission following an opinion from the European Food Safety Agency (EFSA)”

In contrast, there are no such requirements in place for paper or card food contact materials. This is, one of the ways in which the regulation of such material is deficient, lacking a harmonised EU approach, as CHEM Trust has already highlighted [14].

10. Conclusions

The only sustainable circular economy is a clean one, and a key element of this is proper controls on chemical use.

Regulators and product designers must be forward-looking, avoiding potential problem chemicals, always keeping in mind the reality that it is likely that our estimate of the toxicity of a chemical may well increase over time.

While products still contain chemicals of high concern, we must prevent them re-entering the circle.

The EU's existing regulatory structures take us some way towards a solution, but they need to be faster, more thoroughly implemented and enforced, and this briefing has also outlined areas where improvements are needed.

The risk of failure

Recycling will only be successful in the long term if customers – including the public – are confident in the quality of recycled material. If this confidence is removed, then the market will demand virgin materials, and the attempt to create a circular economy will fail.

Vested interests may claim that further use of a contaminated material will be tightly controlled, but once a material is no longer waste such claims are unlikely to be realistic. Products can end up in unexpected places – plastic pipes as children's play items in a kindergarten, for example.

There are already problems with chemicals in recycled products – for example the kitchen utensils mentioned above, or the chemicals found in food packaging made from recycled paper. The sector – and regulators – must take proper precautions, otherwise there will be many more problems in the future.

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For more on CHEM Trust's views on chemicals in the Circular Economy, see:

- Joint paper “The Circular Economy and REACH: An essential partnership”, April 2015
<http://www.chemtrust.org.uk/chem-trust-joins-with-other-ngos-to-highlight-the-importance-of-reach-to-the-circular-economy/>
- Presentation at European Commission Circular Economy event, June 2015:
<http://www.chemtrust.org.uk/wp-content/uploads/CHEMTrust-CircEcoChemicals-25thJune15.pdf>
- Longer presentation at Sustainable Standards event, June 2015:
<http://www.chemtrust.org.uk/wp-content/uploads/chemtrust-circular-economy-chemicals-24th-june-2015.pdf>
- Circular Economy related stories in our blog:
<http://www.chemtrust.org.uk/tag/circular-economy/>

References

- 1 *Public consultation on the Circular Economy*,
http://ec.europa.eu/environment/consultations/closing_the_loop_en.htm
- 2 *European Parliament resolution of 9 July 2015 on resource efficiency: moving towards a circular economy*,
<http://www.europarl.europa.eu/sides/getDoc.do?type=TA&reference=P8-TA-2015-0266&format=XML&language=EN>
- 3 *Rules on chemicals in the life-cycle of articles – a legal analysis*, KEMI, 2014,
<http://www.kemi.se/Documents/Publikationer/Trycksaker/Rapporter/Report-3-14.pdf>
- 4 *Late Lessons from Early Warnings II*, European Environment Agency, 2013
<http://www.eea.europa.eu/publications/late-lessons-2>
- 5 See the CHEM Trust FAQ on Hormone Disrupting Chemicals:
<http://www.chemtrust.org.uk/what-are-hormone-disrupting-chemicals-or-endocrine-disrupting-chemicals-edcs/>
- 6 ChemSec ‘Substitute it Now’ list and SINilarity Tools:
<http://www.chemsec.org/what-we-do/sin-list/sinilarity> <http://www.chemsec.org/what-we-do/sin-list>
- 7 *EU Chemical Agency committee agrees that Bisphenol A in receipts poses risk to workers*, June 2015:
<http://www.chemtrust.org.uk/eu-chemical-agency-committee-agrees-that-bisphenol-a-in-receipts-poses-risk-to-workers/>
- 8 *Final report of a study undertaken for the European Commission Environment Directorate General by AEA Technology to assess the climate change impacts of options for municipal solid waste (MSW) management in the EU*, 2001
http://ec.europa.eu/environment/waste/studies/climate_change.htm
- 9 *Replacing chemicals with safer alternatives – or protecting dirty industry?*, CHEM Trust, January 2015
<http://www.chemtrust.org.uk/replacing-chemicals-with-safer-alternatives-or-protecting-dirty-industry/>
- 10 *EU Promotes Recycling Toxic Chemicals into New Products Which Will Ultimately be Dumped as Waste into Developing Countries*, IPEN, May 2015
<http://ipen.org/news/eu-promotes-recycling-toxic-chemicals-new-products-which-will-ultimately-be-dumped-waste>
- 11 *Is the EU still leading?*, David Azoulay and Alexandra Caterbow, Chemical Watch Global Business Briefing, July/August 2015
<https://chemicalwatch.com/24519/is-the-eu-still-leading>
- 12 *Occurrence of brominated flame retardants in black thermo cups and selected kitchen utensils purchased on the European market*, Food Additives & Contaminants: Part A, Volume 30, Issue 11, 2013:
<http://www.tandfonline.com/doi/abs/10.1080/19440049.2013.829246#.VYp4uVWWGMU>
- 13 Stubbings, W. A., & Harrad, S. (2014). *Extent and mechanisms of brominated flame retardant emissions from waste soft furnishings and fabrics: A critical review*. *Environment International*, 71, 164-175
<http://www.sciencedirect.com/science/article/pii/S0160412014001822>
- 14 *Chemicals in Food Packaging: A can of worms?*, CHEM Trust, October 2014
<http://www.chemtrust.org.uk/chemicals-in-food-packaging-a-can-of-worms/>