Circular Economy consultation

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Feedback on the Circular Economy consultation from the PROSPER consortium

European funded research programmes over the last decade have identified the technical capacity to produce commonly used consumer items from materials derived from biomass rather than from fossil feedstock. The production of biobased polymers that are suitable for plastics, though small, is consolidated, using crops and by-products including captured CO_2 emissions, as feedstocks through processes known as biotechnology. Biobased plastics can be used to replace many different traditional fossil-based plastics in different applications (e.g., textile, packaging, agricultural films)

Similarly biomass feedstocks have been shown to be useful for dozens of other applications, many of which can be found on the website of the CBE JU Achievements | Circular Bio-based Europe Joint Undertaking (CBE JU). We now know we have the technological capacity to use by products from (for example) potato and rapeseed production (see www.brilian.eu) to produce new materials. Algae, straw, feathers, grape and wood wastes, are just some of many examples of available feedstocks that would otherwise have been dumped or incinerated. The use of such feedstocks is a win-win for Europe- reducing waste and emissions, creating new products and industries. Unfortunately, these feedstocks are not yet fully available at large, industrial scale and TRL-9 technologies able to use those raw materials at a competitive price are lacking.

PROSPER is one of such projects and many of its consortium partners participate in similar research. During this last decade several issues common to most new biotechnological companies have emerged. They include barriers to entry to market and barriers to end-of-life solutions, some of which are physical, but most are financial. We will explore them here.

Financial Barriers

Fossil-based products are still heavily subsidised in the EU despite its pledge to eliminate subsidies by 2023 Fossil fuel subsidies in Europe | Indicators | European Environment Agency (EEA). The scale of subsidies in the EU (circa €110bn in 2023) penalises any activity competing with fossil fuels as a feedstock.

Recommendation: ensure that the 2030 target to eliminate fossil fuel subsidies is met across the whole EU

To counter the subsidised price of fossil-based polymers, a minimum price on fossil-based plastic should be applied, especially from outside the EU. Whilst the EU has a “plastic tax” introduced in 2021, it is applied in a differentiated manner, and sometimes not at all in some countries, and the income generated is not used to stimulate plastic recovery or recycling.

Recommendation: apply an import and domestic production tax (some consortium partners have suggested €1/kilo) on all virgin fossil-based polymers ring-fencing this income to support plastics recycling.

Circularity, including recycling, should be one of the drivers for EU economy as mentioned in many cases. Yet, focus is often on the sorting and sometimes initial recycling process. Yet, circularity should involve the whole value chain, from monomers via new products to recycled product. Many primary

production and final conversion steps are currently leaving the EU. If we want circular value chains we need to ensure that there is still a EU market for the recyclates.

Recommendation: select strategic value chains for the EU and make a long-term plan to operate the whole value chain and actually keep materials within EU. These value chains should then be supported with income from plastic taxes and EPR, recycled content targets with local recyclates and discounts on EPR fees (see further on).

Subsidies for the use of biomass as an energy feedstock are also significant. See Biomass These range from subsidies for the burning of biomass to those given to biogas/biomethane. Total EU subsidies for biomass to energy are difficult to calculate but are likely to be approximately €30-50 billion/annum, taking into account burning and biomethane/biogas (excluding biofuels). To our knowledge only the Netherlands has taken measures to phase out subsidies to industries using biomass for electricity. Netherlands ends all biomass subsidies for electricity with more restrictions expected - Fern.

The use of subsidies for these activities is not questioned here though there is a significant need for debate. For example, for all the support given to biomethane in the EU over decades, still today biomethane accounts for just 2% of the EU's gas needs and at production costs 2 to 3 times natural gas. The impact of subsidies is that the use of biomass for the production of materials ***at scale***, is hindered by unfair competition. There are no subsidies for renewable carbon used in materials nor even for compost, a material that is required to improve soil fertility and carbon content.

Recommendation: along with the phase out of subsidies for fossil fuels, phase out subsidies for biomass combustion by 2035 across the EU; reduce annually across the EU subsidies for biomethane production aiming for a total elimination by 2035 and reorganize the budget to support biopolymers.

The impacts of financial mechanisms are also in evidence when materials are discarded and become waste, and we see this especially with biobased and biodegradable plastics used for packaging. Such plastics, often developed by EU funded research programmes, have a 1% penetration of the plastics market in the EU. Yet their growth is not only hindered by feedstock costs (elevated by subsidies for energy), market competitivity (reduced by subsidies to fossil fuel-based plastics); lack of clear recognition (PEF methodology which do not yet consider biogenic carbon content as a CO2 emission decrease); further, the ability of bioplastic producers to enter EU markets is heavily influenced by taxation at end-of- life through EPR schemes.

Whilst Italy, a country which most consumes bioplastics, has a national EPR system for bioplastics (www.biorepack.org) most other EU countries do not recognise these materials with a balanced EPR fee to take account of collection and recycling. The EPR fee for bioplastics in Italy is €149,34 /ton in 2025 (rising to €246 in 2026) (Rimodulato il Contributo ambientale CONAI per gli imballaggi in bioplastica compostabile | Biorepack) which reflects the maturity of a system that collects and organically recycles bioplastics, a fee lower than some other packaging materials. The fee for bioplastics under the Belgian FOST PLUS EPR scheme is €4,419/tonne in 2026 (The Green Dot rates | Fost Plus) more than the sales value of the raw materials themselves, in most cases. Such a fee is an evident barrier to enter the marketplace ensuring European consumers would never have access to innovative materials.

Whilst these two EPR fees may be extremes, the incredible variability of EPR fees across the EU is an enormous barrier to market access (they can be seen at https://www.pro-e.org/). Very high fees (due to the low volumes being handled) limit access to the marketplace, adding to the burden of competing against subsidized fossil feedstock. Such fees are also a barrier to innovation and weaken the EU's ability to produce innovative industries at scale. Why is this important? The failure of circularity of plastics is evident to everyone- yet the opportunity of improving circularity through the use of bioplastics is not possible where EPR penalises these materials.

Recommendation: materials derived from renewable carbon or used in applications requiring biodegradability, should be subjected to preferential EPR taxation compared to virgin fossil-based materials. Further, an EU harmonisation of EPR schemes is urgently needed as each country has its own system, an administrative and financial burden for EU industries contrary to the concept of "single market".

EPR schemes should not just be harmonised but strengthened. Belgium's FostPlus scheme has stabilised the marketplace through fixed contracts and gate fees for plastics recyclers ensuring their survival whilst elsewhere in Europe they are closing down. Whilst the scheme is a barrier to innovative materials, it supports existing markets well.

We recommend applying the stricter FostPlus model to business waste and other sectors (textiles, automotive). Finally, EPR can incentivize local recycling now by reducing fees if recyclate comes from within a short distance— a smart, direct support for local recycling. For multilayer packaging, the fee should cover delamination; for mixed textiles, removal of elastane or PET depolymerization.

EPR fees should be linked to design for recycling/circularity and subjected to eco modulation.

Funds must flow directly to recycling (mechanical, chemical and organic), and companies must demonstrate that infrastructure exists locally.

Additionally, the Packaging and Packaging Waste Regulation (Cf. Art.8.) should explicitly recognize bio-based plastics as equivalent to recycled plastics in meeting recycled content targets set in Art. 7. This recognition would align with the principles of circularity and innovation and support the scaling of bio-based solutions across the EU.

Lastly, we emphasise the importance of harmonised (biogenic)carbon modelling and CO2 uptake for the recognition and competitiveness of bioplastics (ref PEF methodology).

Physical Barriers

What we intend here by physical barriers are the market complexities, the systems and infrastructure required to promote circularity, irrespective of financial considerations. We extend these considerations to circular economy measures in general and not just those related to biobased materials.

Many researchers have underlined the limitations of circular economy thinking to date. We will cite just a few here: Brian Baldassarre & Giulia Calabretta[1]; Hervé Corvellec, Alison F. Stowell, Nils Johansson[2]; Katrien Steenmans & Feja Lesniewska[3]. Entropy, toxicity, materials that remain in stock, incoherent accounting for recycling losses, economic considerations, all contribute to a world becoming more linear, rather than more circular See CGR 2025.

For biobased and biodegradable materials, as Italy has demonstrated, there is a need for a system to manage them. This system, which begins with separate collection and organic recycling through composting and biogas, is mature allowing such materials to enter the market, all other things being equal. Here the national waste infrastructure has developed alongside the production of biobased plastics. Such cases are rare. Perhaps only Ireland and Spain (lately) have a biowaste treatment infrastructure able to accept bioplastics.

However, bioplastics end of life is not limited to organic recycling. Depending on their chemical structure and application, they can also be compatible with mechanical recycling or chemical recycling, offering multiple end-of-life options. This versatility makes bioplastics a strategic solution for circularity, if waste management systems are adapted accordingly. As a concrete example of challenges, in Belgium, Fost-Plus EPR for bioplastics is blocking the deployment of such innovation solutions, and without enough quantity to sort, no sorting infrastructure would be able to take advantage of this potential new steam. In the same manner, without bioplastic waste stream, there is no need to recycle. It is the basic chicken-egg dilemma.

But more generally, the waste industry across the EU is incredibly fragmented- publicly or privately owned, with multinational or local council-run systems. With such a fragmentation Europe faces a very difficult task in imposing a common strategy for waste management that has circularity as its goal. Indeed, some have argued that large waste companies have the financial interest in ensuring waste is incinerated rather than recycled, privileging shareholder value over public utility.[4] This fragmentation also limits the deployment of innovative materials like bioplastics, which require tailored collection and treatment pathways depending on their recyclability. Without clear guidance and infrastructure, even recyclable bioplastics may be misdirected to incineration or landfill.

There is no single market in Europe on waste management- for example, compostable plastics are composted in Italy and other countries and are firmly rejected in compost plants in Germany and others.

[1] Why Circular Business Models Fail And What To Do About It: A Preliminary Framework And Lessons Learned From A Case In The European Union (Eu) | Circular Economy and Sustainability
[2] Critiques of the circular economy - Corvellec - 2022 - Journal of Industrial Ecology - Wiley Online Library
[3] Frontiers | Limitations of the circular economy concept in law and policy
[4] Is the waste sector deluding itself over the circular economy?

Similarly, mechanically recyclable bioplastics may be accepted in some sorting facilities but rejected in others due to lack of recognition or sorting technology. Chemical recycling, though promising, remains underdeveloped and unevenly distributed across Member States.

Perhaps it is difficult to lay down common obligations across 27 countries, but the diversity of infrastructure is again a significant barrier to market for (especially) innovative materials. Moreover, we note that the EU still exports vast amounts of waste to destinations that are unlikely to manage those wastes in an environmentally sound manner, all pointing to significant infrastructure failures in EU waste management.

Further, many waste streams are not subject to any specific financial incentive or taxation that stimulates circularity. Whilst deposit return schemes are active in some countries, there is no obligation for them to be EU-wide. This is a tremendous burden for industries selling products in the EU- DRS may be applied in one country but not its neighbour. Again the single market has failed to address these issues. Whilst obligatory national collection schemes supported by EPR are applied on (e.g. tyres or batteries), there are significant opportunities to extend those to many other categories of waste.

Finally, repairability. The Regulation 2023/1670 on product design has now come into force and is welcomed. Circularity is also obtained by using less, i.e. by making a product last longer. The right to repairability (at the manufacturer's expense) should be extended across a wide range of mechanical products. Moreover, repair shops should be subjected to an advantageous fiscal regime, excluding them from VAT which has already been paid on the original product.

Our recommendations:

In order to ensure a greater market demand for materials that can be collected, recovered and recycled, we recommend mandatory recycled and bio-based content targets. The PPWR has already laid down recycled content and reuse targets for plastics (30% and 15% -for containers- respectively by 2030) but similar targets should be laid down for other materials/streams, for example furniture and for biobased content too (e.g. textiles, packaging, vehicles, etc.).

A summary of our recommendations:

- Harmonise and simplify EPR schemes across the EU. The guidelines (C/2025/5646) published by the Commission are a good starting point but more needs to be done to harmonise costs and approaches especially to innovative materials.
- Implement EPR ecodesign-linked fee modulation, including discounts for recycled and/or biobased content
- Link EPR with the upcoming ESPR regulations and speed this process up
- Allow part of EPR funds to co-finance modernisation of sorting and recycling facilities, especially in regions lagging behind
- Support innovation funding for advanced sorting, recycling and design-for-recycling materials
- Expand EPR scope to emerging waste streams
- Establish multi-stakeholder governance boards (producers, municipalities, recyclers, NGOs, consumers) at national levels to govern the EPR systems

- Stop the export of EU wastes, compelling EU nations to treat their waste domestically (an exception for metals and paper/board)
- Some harmonisation on EoW criteria and approval in EU is needed to avoid a waste becoming a product in one country but not elsewhere
- Introduce a digital deposit money on all applications (packaging, textiles, furniture, batteries, …) to enhance collection rates.
- Introduce an EU-wide moratorium on the building of new incinerators, to encourage waste recycling. Only minimum capacity is required for hazardous waste and recycling residues.