



CREATOR Policy Brief

An EU Joint Approach to Recycling and Eco-design: Enabling the transition to the circular economy with advanced eco innovation technologies, processes, products and services

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Main Authors

Alessia Accili, ERION; NONTOX - Project Group Leader

Malin zu Castell-Rudenhäusen, VTT; NONTOX

Muhammad Qureshi, VTT; NONTOX

Melanie Schulte, BayFor, Circular Flooring

Irma Mikonsaari, Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung; CREAToR

Els Herremans, Roeland Juchtmans, Openbare Vlaamse Afvalstoffenmaatschappij OVAM; CREAToR

Rocco Lagioia, ITRB Group; CREAToR

Esther Zondervan-van den Beuken, TNO, PLAST2bCLEANED

Roberto Vannucci, Centrocot SpA; REACT

Donatella Macchia, Centrocot SpA; REACT

Daniele Piga, Centrocot SpA; REACT

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Executive Summary

As flexible, cost-effective, strong and light materials, plastics offer a unique combination of advantages. However, plastic waste can cause harm to the environment, threatening health, food safety, marine life and animals alongside adverse chemical impacts from the build-up of organic pollutants if it is not correctly handled.

Applying ambitious circularity principles for plastics in Europe will have net positive benefits in the transition towards the circular economy, unleashing opportunities to take niche ideas into the mainstream, increasing market uptake and significantly reducing damage to the environment.

With a common focus on recycling and eco-design, five projects funded by the European Commission have joined forces to increase awareness of the benefits of implementing the principles of

circularity: NONTOX, Circular Flooring, CREAToR, PLAST2bCLEANED and REACT. Through their research, this project group is driving eco-innovation to enable recycling efficiency and closing the loop on the re-use of plastic materials in Europe.

Being part of the Plastics Circularity Multiplier Initiative is another strength of the project group, by contributing to improvements in value-chain collaboration and cross cooperation between European initiatives.

This Policy Brief, supported by the Horizon Results Booster, is an opportunity to show how these five projects are contributing to EC policy priorities in terms of reducing the environmental footprint of plastics and other waste products, thereby increasing the use of more sustainable materials.

Topic Overview

The vast amount of plastic waste and other materials is causing harm to the environment, from public health, food safety, adverse chemical effects to animal safety and well-being and irreparable damage to marine life.

Novel ways to recycle plastic products and deal more efficiently with waste is a vital step in the transition to the circular economy. With levers on multiple levels, from EU regulations and funding programmes to awareness-raising initiatives, Europe can now unleash

opportunities to take niche ideas into the mainstream, increase market uptake and reduce the environmental footprint in the broader contexts of the European Commission's (EC) Circular Economy Action Plan¹ and related priorities under the European Green Deal². Moreover, the Sustainable Product Policy³ initiative will establish a legal framework, whereby all products produced or rolled out on the EU market are in line with technical standards for sustainability.

Topic Context

Novel ways and technologies to recycle plastic products and deal more efficiently with waste is a vital step in the transition to the circular economy. To help drive the transition to the circular economy, NONTOX, Circular Flooring, CREAToR, PLAST2bCLEANED and REACT are tackling a core set of societal, technological, regulatory and industrial challenges, showing the return on investment of funding circularity principles such as recycling and eco-design.

» **Societal challenges:** Need for environmental sustainability, resource and raw material efficiency. For example, EC policy prioritises significant reductions in e-waste as one of the fastest growing waste streams through sustainable production and consumption.

» **Scientific and technological challenges:** Research and innovation need to enable advances in sorting and pre-treatment techniques and recycling technologies; proving the feasibility of an integrated pilot plant and valorisation of by-products and safe disposal of removed substances.

» **Regulatory challenges:** Need to remove legacy substances to enable plastic recycling, e.g. the EC's directives on Waste Electrical and Electronic Equipment (WEEE)⁴; End of Life Vehicles (ELV)⁵ and Construction and Demolition Waste (C&DW)⁶, and on Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) enhancing plastic recyclers' compliance and competitiveness. Other priorities include the need to enable the creation of a cost-effective circular economy for Polyvinyl Chloride (PVC) that is competitive with optimised virgin PVC, as well as reusing acrylic fibres.

To further channel the efforts towards efficient recycling technologies and deliver policy recommendations, projects of the group are members of the Plastics Circularity Multiplier Initiative⁷, contributing to improvements in value-chain collaboration and cross cooperation between European initiatives.

1 https://ec.europa.eu/environment/strategy/circular-economy-action-plan_en.

2 https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

3 https://ec.europa.eu/growth/industry/sustainability/product-policy-and-ecodesign_en.

4 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02012L0019-20180704>.

5 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32000L0053>.

6 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008L0098-20180705>.

7 <https://www.plasticscircularitymultiplier.eu/>.

NONTOX HRB Project Group: Connecting the Policy Dots



Policy Challenges

Materials that are recyclable, called “recyclates”, may have a price advantage compared with new materials but are more complex to produce, making them less economically attractive unless there is high demand for them.

It is clear, however that challenges for market uptake are accompanied by those at policy level.

» **Transitioning to a circular economy.** Fostering all forms of eco-innovation that enable the transition to a circular economy, EU policy measures will build on and enhance those undertaken in the Eco-Innovation Programme with a view to strengthening eco-innovative technologies, processes, services and products, including exploring ways to reduce the quantities of primary raw materials in production and consumption while reducing barriers for secondary raw materials.

» **Lack of incentives for plastic collection and recycling.** From a financial viewpoint, recyclates, may have a price advantage compared with new materials but are more complex to produce, making them less economically attractive. Also, the collection schemes for different plastic waste streams to date are challenging for recycling, since for example collection sites are scarce in many regions and transportation ways long,

thus increasing the overall costs for recycling. Furthermore, illegal mixing and export still takes place. Uncertainty about waste quantities available on the market creates further hurdles while stringent product requirements on the demand side prevent the extensive use of recyclates.

» **Lack of EU-wide End-of-Waste Criteria.** The EC’s Waste Framework Directive explains when waste ceases to be waste and becomes a secondary raw material, and how to distinguish between waste and by-products based on a five-step “waste hierarchy”⁸. While such criteria exist in some Member States to determine when waste material is no longer considered as waste but becomes a secondary material by default, there is no EU-wide end-of-waste criteria⁹. Thus, a product that is accepted in the Netherlands for instance, may not be allowed into another EU country, thereby hampering the EU-wide trade of such materials and products. Furthermore, waste electrical and electronic equipment weighing over 25 kg cannot be sent over borders, thus hindering scale up experiments. More specifically, notification for transport crossing EU borders can take 6-18 months or even not available at all for certain WEEE plastics streams.

8 https://ec.europa.eu/environment/topics/waste-and-recycling/waste-framework-directive_en.

9 <https://op.europa.eu/en/publication-detail/-/publication/be94cedf-5eea-4018-ac0c-bfca6c96c53e/language-en>.

Recommendations

To overcome the challenges, the five projects in the HRB Project Group suggest the following policy recommendations.

Recommendation 1 - End of Waste Policy

End-of-waste status for recovered materials enables competition with virgin materials without the burden of still counting as waste. End-of-waste status is a quality guarantee that can be given to recovered materials only if they meet a pre-defined quality requirement that also serves as a quality certificate. Information campaigns are needed

at multiple levels, including necessary awareness raising by policymakers. Different administrative requirements for shipment, transport and the issue of licenses for recyclers coupled with various categories of product-waste status is hindering a common and coherent approach in the European single market.

Recommendation 2 - Qualify Solvent-based Purification / Dissolution Recycling as “Physical Recycling” in the Taxonomy Climate Delegate Act

The EU taxonomy is a classification system for environmentally sustainable economic activities and is intended to help the EU scale up sustainable investments and achieve its Green Deal targets. The taxonomy gives companies, investors and policymakers clear definitions for economic activities considered environmentally sustainable.

It is necessary to add solvent-based purification/dissolution recycling and to classify it correctly as “physical recycling” in the Taxonomy Climate Delegated Act because it does not alter the polymeric structure. It has a higher separation selectivity than mechanical recycling and allows the reuse of polymers, thus making a significant contribution to each of the six goals.

Recommendation 3 - Information Campaign about Recyclates

It is essential to increase knowledge about the possible uses for recyclates. Increasing such knowledge is therefore a call to action for recyclers, associations and institutes within the plastics industry. Information campaigns are needed at multiple levels, including awareness-raising by policymakers.

One of the key tasks of waste management and

recycling, besides safe treatment of waste, is to contribute to EU’s self-sufficiency for raw materials. This means we need to better target recycling to focus on critical and valuable non-renewable materials. This will enable Europe to find more sustainable alternatives for high environmental impacts in mining and quarrying activities to generate primary raw materials.

Recommendation 4 - Material Specific Recycling Targets

So far, obligatory material specific recycling targets were only introduced for packaging. Although many waste streams have obligatory recycling targets, they are not material specific and focus mainly on the dominant materials of the waste stream. While the end of 2024 is the timeline for material-specific targets on construction and demolition waste under the water framework

directive, coverage of other waste streams is still needed. Obligatory material specific targets would facilitate targeted recycling and better utilisation of valuable and non-renewable materials while also contributing to EU’s self-sufficiency for valuable raw materials as it would effectively close the loop and avoid losing valuable resources.

Recommendation 5 - Closing the Loop and avoiding losing valuable Resources through efficient Collection Systems

A significant bottleneck to recycling is inefficient collection. Still, for some waste streams such as WEEE (waste electrical and electronic equipment), most of the waste generated is not collected through official collection routes but ends up in residual waste streams or illegal - mixing and -

export and does not receive proper treatment. Especially in WEEE, significant amounts are hoarded in households. These valuable materials should be contributing to the supply of raw materials, to also ensure the replacement of primary raw materials in mining and quarrying.

Recommendation 6 - Support Common Database and Larger Shipping Sample

A common database of potential substances per polymer, standardised method for screening REACH/RoHS/POP substances, standardised method to ensure representative sampling and analysis of mixed plastic wastes at European level. Trust within the value chain in recyclates as a material must be established, for example with

a guaranteed minimum quality according to standardised measurement conditions through standardisation work within relevant associations. Allow shipping of larger quantities (e.g. 1 ton) over borders to research institutes to perform scale up experiments. Currently the maximal allowed quantity is 25 kg.

Project Group

Project Group Leader: NONTOX

Contact: Alessia Accili, ERION, alessia.accili@erion.it

The project group is made up of five projects - funded by H2020, the European Union's Horizon 2020 research and innovation programme - namely NONTOX, CREAToR, CIRCULAR FLOORING, PLAST2bCLEANED and REACT, aimed at supporting the transition towards a green economy with advanced recycling and eco-design.

NONTOX: Removing hazardous substances to increase recycling rates of WEEE, ELV and CD&W plastics. Grant Agreement no 820895

CIRCULAR FLOORING: New products from waste PVC flooring and safe end-of-life treatment of plasticisers. Grant Agreement no 821366

CREAToR: Collection of raw materials, Removal of flAme reTardants and Reuse of secondary raw materials. Grant Agreement no 820477

PLAST2bCLEANED: PLASTtics to be CLEANED by sorting and separation of plastics and subsequent recycling of polymers, bromine flame retardants and antimony trioxide. Grant Agreement no 821087

REACT: REcycling of waste ACrylic Textiles. Grant Agreement no 820869



www.nontox-project.eu



www.circular-flooring.eu



www.creatorproject.eu



www.plast2bcleaned.eu



www.react-project.net

The background of the entire image is a dense, multi-colored field of small, irregular plastic fragments. The colors include various shades of blue, green, yellow, orange, red, pink, and white. The fragments appear to be broken pieces of plastic, possibly from bottles or containers, scattered across the surface.

**NONTOX
HRB
Project
Group**

CREATOR

COLLECT • PURIFY • REUSE



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