

MAKING THE POLYSTYRENELOOP A SUCCESS FOR THE CIRCULAR ECONOMY

For a number of years now the Polystyrene industry has been at the forefront in developing technologies to recycle polystyrene across many important applications including packaging and construction waste. Polystyrene without Substances of Very High Concern (SVHC) is currently being recycled in Europe usually by means mechanical recycling. However, to achieve circularity in material containing SVHC, a further joint effort from the whole value chain was needed.

This is the reason for PolyStyrene Loop¹ (PSLoop), a Life Programme project to demonstrate the **recycling of construction waste Expanded polystyrene (EPS) and extruded polystyrene (XPS) foams² containing the legacy Persistent Organic Pollutant (POP) HBCD (a phased out flame retardant). A very distinctive characteristic of this process is that it allows for both the recovery of the polymer and of the chemical raw material (bromine). The POP containing fraction is separated and destroyed.**

Most promising for the circular economy is that the technology and processes developed in PSLoop can be potentially used to deal with different SVHC (not just current POPs) and to handle waste from electronics (and not just construction plastics).

However, the viability of the project and indeed of most plastics recycling is affected by a range of policy, legal and economic factors. We believe the EU needs to address these also if the Circular Economy concept is to be more than just that – a concept.

WHAT CAN THE EU DO TO FACILITATE THE TRANSITION TO A CIRCULAR ECONOMY FOR POLYSTYRENE?

1. *Regulatory certainty and a realistic science based approach to policy making*

Ensure evidence-based and pragmatic approach to setting limit values in waste for POPs such as HBCD. For instance, **for HBCD the appropriate low POP Content Limit (LPCL) is 1,000 mg/kg.**

- **this value captures all flame retarded polystyrene foam wastes from demolition**, since such foams contain HBCD above 5000 mg/kg (EPS contains on average 5000-10000 mg/kg HBCD and XPS contains on average 8000-25000 mg/kg HBCD). A limit of 1000 mg/kg would therefore allow the destruction of HBCD incorporated in such flame retarded polystyrene foams via for example the PSLoop
- **The value of 1000 mg/kg is measurable with current technologies**, whereas this is not the case for other proposals (namely a 100 mg/kg limit). A low POP limit any lower than 1000 mg/kg would make the analysis of the substance in polystyrene foam waste unnecessarily challenging, time consuming and costly, due to adequate sample preparation and extraction. Specifying a POP limit level of 100 mg/kg cannot be easily enforced, controlled and reported

¹ The PolystyreneLoop demonstration plant will recycle 3000 tons/year of polystyrene using the CreaSolv© process. The investment foreseen in this demonstration plant is 8,5 million EUR (around 2,7 million EUR from LIFE grant LIFE 16 ENV/NL/000271).

² Polystyrene without Substances of Very High Concern (SVHC) (e.g. EPS and XPS packaging) is currently being recycled in Europe using other technologies (usually mechanical recycling).

The PSLoop project was designed having in mind a HBCD limit of 1000 mg/kg, as this is the value that ensures the protection of human health and of the environment and that can be enforced with current technologies. A limit of 100 mg/kg would make the project not viable.

2. Industry needs to have access to end of life material

- Minimize exports of waste outside of Europe. Avoid “exporting the problem”
- Promote the implementation of **existing recycling technologies in Europe** and support the development of additional innovative technologies in Europe (like, for example, PSLoop).
- Minimize incineration and landfill of the polystyrene in Europe

3. The Commission and the Member States have to create and facilitate a market for secondary material

- The PS material resulting from the PSLoop process will have a **quality** similar to the virgin polystyrene. However, its **price**, at least at present values will be greater than virgin. The key reason is economy of scale. This demonstration plant will only be 3,000 mtons per year versus a virgin PS production plant, being up to 200.000 mtons per year; Incentives are needed to address this such as **minimum recycled content requirements** for products or applications based on PS
- Other financial instruments such **tax deductions or preferential VAT** for customers using recycled PS could be also useful

4. Improve the investment conditions in Europe

- Setting up a recycling plant is a 5-7 years effort, and therefore ensuring the **predictability** of European legislation is paramount
- Ensure a **level playing field** across the EU and between the EU and third countries is of the utmost where both the imported materials and European materials have to meet the European requirement.
- Strengthening the **enforcement** of European legislation and controls remains key for the success of the Circular Economy

5. Facilitate an internal market for waste

- **Lack of harmonisation in the classification of waste** within Europe remains a hurdle to the Circular Economy, and additional efforts are needed in this aspect
- **Establish harmonized end of waste criteria for plastics**
- Generally, we need an “**internal market**” for waste – the entire waste framework should work towards that aim

6. Help industry to scale up

- The PSLoop is a demonstration plant project, once the technology has been demonstrated, the industry will need to **scale up operations. Access to EU financial instruments and investment funds needs to be promoted**
- **Competent Authorities in Member States** need to walk the talk on the Circular economy and support recycling operations in Europe and reusing the recyclates in products. This remains the key to the success of the industry's endeavour.
- EU innovative projects for the Circular Economy such as the PS Loop risk to disappear without the necessary support of regulation, enforcement and economic incentives. **We invite the Commission to reflect on the need of an holistic approach to scale up EU funded circular economy projects**, or at least the most promising ones

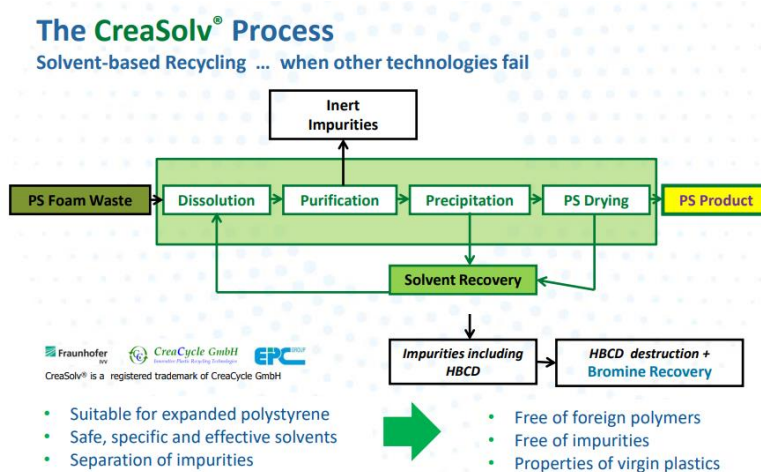
Annex

About Polystyrene

Polystyrene is one of the widest used plastics, and is manufactured in the solid form or in the form of foams. Amongst the different types of foam are **expanded polystyrene (EPS)** and **extruded polystyrene (XPS)**. Polystyrene foams are 95-98% air. Polystyrene foams are very good thermal insulators, and are used in **packaging** and as **building insulation materials**, incorporating in this case flame retardants.

The technological process applied in the PS Loop Project

The technology employed in the PS Loop project (CreaSolv®) has been developed by the Fraunhofer Institute. It relies on physical dissolution of polymers after pre-treatment. Its outputs are a polymer resin that is free from impurities (eg. the legacy POP HBCD) and other polymers. It has the same properties as virgin PS polymer.



Who are we?

PS Loop

The PolyStyreneLoop Cooperative is a non-profit organization under Dutch law. Members of the foundation are industry representatives from the whole polystyrene foam value chain: PS foam manufacturers, raw material and additives suppliers, foam converters, and recyclers. It is set up to demonstrate the feasibility of a large-scale demo plant as a closed-loop solution for the recycling of polystyrene (PS) insulation foam waste and the recovery of bromine. The planned demonstration plant in Terneuzen, Netherlands, will work with the CreaSolv® Technology. The CreaSolv® Technology is a development of Fraunhofer Institute and CreaCycle GmbH. Its EU Transparency Register number is 613370731995-56

EUMEPS

EUMEPS represents the European Manufacturers of Expanded Polystyrene, representing the Expanded Polystyrene (EPS) supply chain, from raw material suppliers to converters, as well as recyclers, and machinery companies (around 1000 EU-based companies, many of which are SMEs). Its EU Transparency Register number is 02100645398-66

BSEF

We are the international bromine organisation. Since 1997 we have been working to foster knowledge on the uses and benefits of bromine-based solutions. We strongly believe in science and innovation. Through investments in research and development BSEF members create robust bromine-based technologies meeting the needs of society. Its EU Transparency Register number is 4641 9392 1314-91

Flame Retardants Europe

Flame Retardants Europe is a newly established European trade association representing the flame retardants industry, currently in the process of becoming an international association under Belgian law. Its members are the flame retardants producers Albemarle, Lanxess Solutions and ICL. Its EU Transparency Register number is 961627032521-50