Solvent-based Purification / Dissolution Recycling for Plastic Waste

Applied and proven since more than 20 years and with 3 Life Cycle Assessments

1996 Sony - Orange R-net for EPS Packaging recycling

Packaging EPS (contains 98% air) was collected with trucks in Tokyo, which carried a tank and **dissolved** the EPS polymer in order to reduce the transport volume. The dissolved polystyrene was then transported to the recyling plant that **purified** it to be **reused** for new EPS packaging (several 100 tons/a).

In 2001 Sony published a LCA - Life Cycle Assessment (ISO 14000) showing that this physical recycling process releases 66% less CO_2 compared to virgin EPS production.

After approx. 10 years the project was discontinued for cost reasons (*too cheap incineration?*).

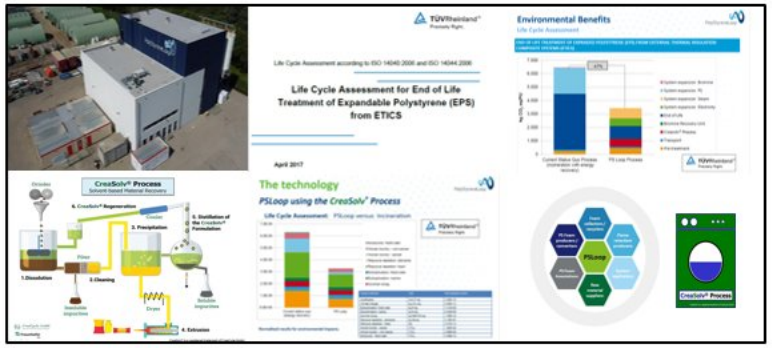
2002 Solvay Vinyls & Serge Ferrari - Vinyloop® Plant for PVC recycling

The 10.000 t/a plant in Ferrara (Italy) used *„a **physical, solvent-based technology** to recycle difficult to treat, end of life PVC waste"*. The plant was designed for PVC cables and recovered copper as by-product. Later also PVC coated PET fibers were recycled (TexyLoop®).

The updated LCA (ISO 14040/44) for the Vinyloop® Process prepared in 2013 by DEKRA (Germany) showed a *47% lower energy consumption and 40% lower CO_2 emissions, compared to virgin PVC*.

The plant was closed in 2018 because the process was not designed to separate DEHP (in 2002), a plasticizer banned in 2018.

Vinyloop® was in operation for 16 years and was until its closure an important part of ***VinylPlus***, the volontary commitment to sustainable development of the european PVC industry.



2021 PolyStyreneLoop - CreaSolv® Plant for EPS/XPS waste from construction

The 3.300t/a plant in Terneuzen (Netherlands) applies **Physical Recycling** based on a **solvent-based purification** / **dissolution recycling** to separate polystyrene from the regulated flame retardant HBCD to be **reused** for new EPS & XPS insulation boards.

The LCA (ISO 14040/44) prepared in 2017 by TÜV Rheinland (Germany) showed *47% lower CO_2 emissions compared to incineration with energy recovery*.

Inaugurated in June 2021, this plant is globally the first one to separate imbedded POPs. The isolated HBCD is collected and sent to a **bromine recovery** unit at ICL-IP.

POP polluted polymers have to be destroyed acc. to the Basel Convention. This technology is therefore the only alternative allowing the **reuse** of POP contaminated polymers.

PSLoop is a cooperation supported by more than 70 companies and associations from the whole EPS/XPS value chain.

Why was this technology removed from the new European Standard EN 17615 "Plastics – Environmental Aspects – Vocabulary" in September 2021?