Setting a truly circular recycling system

Zero Waste Europe and co-authoring organisations ECOS and Deutsche Umwelthilfe (DUH) developed this paper to define the civil society position towards chemical recycling and recovery technologies. We encourage civil society and recycling industry organisations to endorse these principles by signing this pledge.

The situation

Recently, so-called new chemical 'recycling' technologies have been promoted as environmentally friendly, with claims that they can contribute to reducing environmental and climate impacts caused by plastics. Yet, there is a significant lack of knowledge about the overall lifecycle impact of chemical recycling on the environment. There are indications that chemical recycling only works under very specific and narrow conditions; and that it consumes energy, water, and chemical resources that increase water, air, and land pollution.

If chemical recycling is to become a model widely used technology, it is crucial that it's designed and implemented in a way that mitigates environmental and climate impacts; and used as a complementary tool to reduction, reuse, and mechanical recycling - with the latter always taking priority over chemical recycling. Moreover, burning plastic waste into fuel is excluded from a recycling system (and should remain so).

Circular economy principles for plastic

To achieve a truly circular economy for plastic, we should first emphasise prevention, reduction, and reuse solutions that save energy and emissions. We should also primarily promote recycling solutions that preserve the value and the embedded energy/carbon of plastic, to the detriment of technologies which generate more emissions than they avoid. To guide decision-making processes towards this goal, we have developed the principles below.

- **Principle:** Products should be designed taking the full lifecycle into account, enabling material reduction, reuse, and mechanical recyclability. Chemical recycling or recovery[1] options are no excuse for failing to do so.

[1] Polymer to molecule conversion via chemical reactions is material recovery. Polymer to monomer and oligomer conversion via chemical reaction is chemical recycling.
ZWE, ECOS, DUH, Chemical Recycling and Recovery – Recommendation to Categorise Thermal Decomposition of Plastic Waste to Molecular Level Feedstock as Chemical Recovery, December 2021

- **In practice:** Prioritise the reduction of plastic and the development of zero waste systems based on reuse, refill, and repair practices - with new products' design considering all stages of life, from feedstock to end-of-life treatment.

- **Principle:** Following environmental impact assessments, chemical recycling and recovery technologies should be ranked below mechanical recycling in the waste hierarchy, and the concerned feedstock should be limited to degraded durable plastic waste that cannot be mechanically recycled.
- **In practice:** Rank recycling technologies based on their environmental impacts, with mechanical recycling being, therefore, the preferred option.

- **Principle:** Once mixed with virgin plastics, the outputs should contain a verifiable amount of recycled content using a controlled blending chain-of-custody model, allowing the traceability of real recycled content present in final products.
- **In practice:** Plastic products labelled as recycled, or containing a specific amount of recycled plastic, shall actually contain the indicated amount of recycled content, and consumers shall be able to verify this.

- **Principle:** To be classified as chemical recycling, technologies should be able to convert at least 80% of the carbon content of plastic waste into new products when discounting all pre-treatment and post-treatment processes until polymerisation - i.e. once the chemically recycled plastic feedstock is ready to be integrated into a new product.[2]
- **In practice:** A process keeps at least 80% of the carbon content of plastic waste until the transformation into new products in order to be qualified as a recycling technology.

- **Principle:** Living in a toxic-free environment is a right all citizens should be able to enjoy. Chemical recycling technologies shall, thus, deliver safe, non-toxic, and decontaminated products, by-products, and waste.
- **In practice:** Chemical recycling products are monitored to ensure toxic-free outputs in line with the EU legislation requirements for chemicals.

- **Principle:** Following principles of social, economic, and environmental justice, the development of chemical recycling facilities should not come at the expense of their surrounding environment and communities.
- **In practice:** When developing a chemical recycling plant, a comprehensive system should help monitor pollutants to ensure environmental and health protection.

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[2] Eunomia, Zero Waste Europe, How circular is PET?, February 2022

We call on our decision-makers at local, national, and European levels to play their part by taking ambitious measures to establish a recycling system that really supports business models of reuse and refills; and that ensure the protection of the environment and human health.

We ask you to set ambitious environmental efficiency targets and support them with the necessary measures and standards in the revised Packaging and Packaging Waste Directive; EN 15343 standard on plastic recycling traceability and recycled content; and End-of-Life Vehicle Directive to achieve climate neutrality by 2050 at the latest.

We urge you to take a precautionary approach when integrating new recycling techniques in the upcoming revision of the Waste Framework Directive, thus ensuring the development of a truly suitable and sustainable waste management system.