Turning Waste into Resource

May 2025

Position Paper on the EU's Waste Regulation

According to the European Environmental Agency, most European Union (EU) Member States are on course to miss their 2025 municipal and waste recycling targets. Greenhouse gas (GHG) emissions from waste have fallen over the past 30 years, yet they still represent 3% of all EU emissions (as much as the aviation or maritime sector). If the future of post-consumer waste is reduction, re-use and recycling, we must consider reject waste treatment beyond landfill and incineration.

Mechanical recycling, while indispensable, has significant limitations. Contaminated and already-recycled waste faces significant hurdles to be processed into new products. Mechanical recycling centres reject ~10% of the waste they receive, which pills up in landfills or is sent to incineration.

Advanced chemical recycling technologies, such as gasification, are complementary and available solutions that provide the opportunity for **upcycling** through valorization, i.e. turning low-grade waste into high value products that can, in turn, be mechanically recycled after use.

Policymakers should develop a comprehensive vision of waste treatment in a post-landfill/incineration world, where waste is never wasted. Enerkem seeks to provide its vision of waste treatment in the European Union, and how policymakers can shape the future of recycling.

About Enerkem

Founded in 2000, Enerkem develops and commercializes its advanced chemical recycling technology that enables the production of sustainable fuels including advanced biofuels, renewable fuels of non-biological origin (RFNBO) and recycled carbon fuels from waste (e.g. municipal solid waste).

Our scalable solution is engineered to handle large feedstock quantities (200,000 to 800,000 tonnes of waste) and yield significant volumes of products to decarbonize hard-to-abate sectors.

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Enerkem's Vision on Waste

Waste generation grows in lockstep with GDP and product consumption. Municipal solid waste generation is forecasted to grow from 2.3 billion tonnes in 2023 to 3.8 billion tonnes by 2050. The United National Environment Program predicts that without significant actions, the cost of waste treatment could surge globally from USD 252 billion in 2023 to USD 640 billion in 2050.

Recycling generally designates mechanical recycling, which is the processing of waste into secondary raw materials or products without significantly changing the material's chemical structure.

However, waste is anything but homogenous. A mixed bag of cardboard, plastics, foil and food waste creates conditions for contamination of waste, which renders it impossible to process through mechanical recycling. Furthermore, previously recycled materials or mixed plastics often cannot reach the necessary level of purity to be used as feedstock for new products.

For recycling to be the terminal stage for all waste, we must ensure that all types of waste can be turned into new products. Where mechanical recycling comes up short, chemical recycling processes can turn waste into new building blocks for value-added products, such as chemicals, tires, lubricants or fuels. Chemical recycling also generates virgin-quality plastics that can, in turn, be mechanically recycled.

Large-scale gasification of waste has reached the highest technology readiness level (TRL-9) and is already being deployed. As such, it plays an integral part of a future without landfill and incineration, where all types of waste become resources.

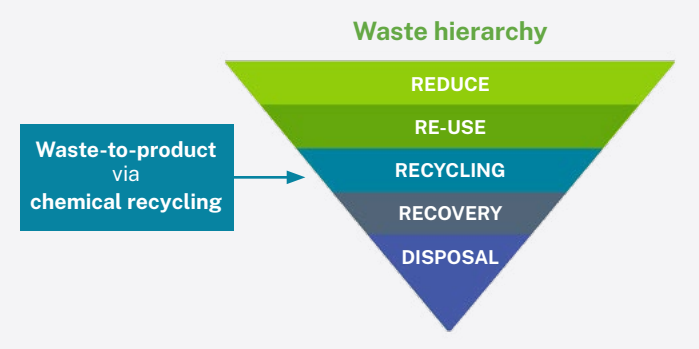
The sustainable methanol produced through Enerkem's technology can be integrated into marine engines with minimal modifications, making them a readily available and viable solution.

*Based on a 15,300 twenty-foot equivalent unit containership

Specific Policy Asks Related to Waste Regulation

Modification of the recycling definition in the Waste Framework Directive

Waste policies should be consistent with a long-term vision of waste treatment. When waste cannot be prevented, or avoided, the priority must be to ensure its conversion into a useful product. **The Waste Framework Directive should recognize waste-to-product processes as part of the recycling category within the waste hierarchy, regardless of their final use.**



By decomposing waste to its molecular form, chemical recycling can process waste into a wide array of recycled products (chemicals, plastics, fuels, etc.). The demand for these products is highly dependent on incentives and obligations set by governments. Low-carbon fuels from recycled feedstocks have received clear and decisive support from policymakers. To drive the demand for recycled product throughout the economy, governments should adopt demand-side policies akin to those in the transport sector, such as mandatory recycling content (see next section for more details).

Policymakers should encourage all forms of recycling processes and allow them to count towards national recycling targets. Indeed, all recycled products contribute to the reduction of GHG emissions from waste and foster a circular economy.

To avoid disincentivizing investments into technologies that will become necessary in a post landfill/incineration world, **the EU should specifically distinguish advanced chemical recycling technologies from waste-to-energy processes**.

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	Waste-to-energy	Gasification
Output	Electricity Heat	Chemicals Circular plastics Sustainable Fuels Paint Tires
Material recycling rate	~0%	90%

Energy recovery is limited to electricity and heat production, while gasification can generate a wide variety of value-added products. While gasification reaches a rate of 90% material recycling, energy recovery recycles 0% of the material in waste.

Bolstering demand for recycled products to become a valuable resource

Recycled plastic and components content in the Packaging and Packaging Waste Regulation (PPWR) and the End of Life Vehicle Regulation (ELVR) are critical to stimulate market demand for recycled materials, thereby encouraging investment and innovation in the recycling sector. **Incorporating the mass balance approach to calculate chemically recycled content in plastics and chemicals within the PPWR for accounting recycled content is crucial to acknowledge the complexity of recycling processes**. This approach offers a credible method for attributing recycled content in new products, aiding in the integration of recycled materials into the supply chain and advancing circular economy objectives.

Enhancing product design is another significant lever to improve waste treatment and drive market demand toward circular products. The Ecodesign for Sustainable Products Regulation (ESPR) is a transformative initiative that significantly enhances product sustainability. Enerkem acknowledges the crucial role that sustainable product design plays, not only in environmental protection but also as a catalyst for innovation. The ESPR recycling requirements for products such as tires, textiles and furniture prompt the emergence of innovative solutions to supply sustainable products.

With the first ESPR Working Plan 2025-2030, Enerkem supports the adoption of stringent ecodesign and recycling standards, especially for products with considerable environmental impacts, as a critical step towards hastening the shift to a more sustainable future.

Recommendations

- End use of recycled products is defined by market conditions, not recycling facilities. But recycling is recycling. Therefore, Enerkem recommends **including waste-to-product in the recycling category of the waste hierarchy, regardless of the end use, and ensure that chemical recycling is accounted for in national recycling targets**.
- The price gap between fossil and sustainable product remains a critical barrier in the transition to a circular economy. To drive demand toward recycled products, Enerkem recommends **adopting stringent recycling content obligations to create long-term market demand.**
- Environmental transparency and accountability are paramount. Enerkem recommends **recognizing the mass balance approach as a necessary accounting practice in sustainable plastic production to ensure traceability along the supply chain.**

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