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THE ALL PARTY PARLIAMENTARY
GROUP ON SUSTAINABLE PLASTICS

Opportunities and Barriers for Chemical Recycling of Plastics in the UK

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The state of the UK's chemical recycling ecosystem

Chemical recycling offers a promising route to advancing the UK's circular economy strategy, reducing reliance on virgin materials and ensuring a supply of high-quality recycled content. Scaling up chemical recycling could help address several gaps in existing recycling systems, particularly by enabling the treatment of complex waste streams such as PVC and mixed plastics. Importantly, chemical recycling is intended for feedstocks that cannot be reduced, substituted, or mechanically recycled, ensuring it complements rather than displaces other strategies.

It has several potential advantages over mechanical recycling, including higher-quality outputs, greater tolerance for contaminated or mixed feedstocks, and increased versatility. Its ability to handle multi-material packaging and plastics contaminated with food residues, two major barriers to mechanical recycling, is particularly significant. In addition, it can enable more recycling cycles and reduce the need for virgin material inputs.

European plastic producers are planning to invest up to [€8 billion](#) in chemical recycling capacity by 2030. However, there are significant barriers to the UK's readiness to scale up capacity, including uncertainty around economic viability, availability of end markets, and conflict with other policies and regulations.

To unlock the potential of chemical recycling within the UK's circular economy, changes are required across policy, investment, and innovation. The following actions are recommended.

- Clear, consistent policy signals aligned with international frameworks to support investor confidence.
- Implement the fuel-exempt mass balance approach to ensure access to high-quality domestic feedstock by reducing exports and improving local waste collection and sorting systems.
- Targeted tax incentives and innovation funding mechanisms to accelerate technological development.
- Support for scaling technologies and infrastructure, including exploring transition pathways for end-of-life energy-from-waste facilities.
- Stronger collaboration between local authorities, industry, and innovators, alongside the development of strategic innovation clusters.

Chemical recycling in context

The UK places approximately 2 million tonnes of plastic packaging on the market each year. Of this, only around 1 million tonnes are collected for recycling. Half of the collected material is processed domestically, while the remainder is exported. Although materials such as PET and HDPE can be recycled efficiently, there is a significant gap in both collection and recycling of films and flexible plastics. Currently, only 16% of local authorities collect these types of plastic, and they are not suitable for conventional mechanical recycling.

This challenge is set to intensify. From 2027, the introduction of [Simpler Recycling](#) is expected to bring an additional 120,000 tonnes of material into the waste stream, including multilayer packaging, films, and flexibles. By 31 March 2027, 100% of local authorities will need to begin collecting films from residential properties. This is happening amid other changes to the UK's waste management policies. The Emissions Trading Scheme (ETS) is being reformed to include emissions from Energy from Waste (EfW) and incineration plants, while the [Plastic Packaging Tax](#) (PPT) rate increases every year, currently at £228.82/tonne on plastic packaging components with less than 30% recycled plastic.

To stop multilayer packaging, films, and flexibles from being exported overseas in massive numbers, there is a need to improve our ability to manage this waste stream within the UK. Unlike mechanical processes, chemical recycling breaks down polymeric

waste into its chemical building blocks, producing recyclates with properties equivalent to virgin plastic. By converting these materials into valuable feedstocks, chemical recycling complements mechanical recycling by expanding the overall range of recyclable plastics.

In addition, chemically recycled outputs enable the production of a wider range of recycled plastics, including those suitable for direct food contact, which is currently not feasible with mechanically recycled polyolefins in the UK due to contamination risks. This facilitates the development of a circular economy model in high-specification sectors such as medical and food packaging, where recycled content must meet stringent safety standards.

Barriers

While several chemical recycling facilities are currently under development in the UK, and some European markets have demonstrated the success of more advanced infrastructure, the overall ecosystem remains both costly and insufficient to handle the volumes of plastic waste expected under the Emissions Trading Scheme, Simpler Recycling, and the Plastic Packaging Tax, as well as EU regulations such as the Packaging and Packaging Waste Regulation, which impact UK businesses exporting to the EU.

Cost and resources

The financial requirements for developing chemical recycling infrastructure are significant. A typical project requires capital

expenditure in the range of £15-40 million. Once the investment is provided, a facility can generate 50-60 skilled permanent jobs, alongside several hundred roles during the construction phase, but the initial investment is a major barrier.

Until investors see an increase in high-quality feedstock for chemical recycling, they will perceive chemical recycling infrastructure as a risky investment, yet the lack of infrastructure dissuades local authorities from collecting materials. Although collection systems can be implemented and encouraged through policy, the lack of established end markets creates a risk of increased disposal costs; in many cases, it remains cheaper for producers to pay the PPT fee and continue to use virgin plastic. Even in Europe, where the infrastructure is more advanced than in the UK, recycling polyolefins is [twice as expensive](#) as producing virgin polyolefins.

Energy costs present an additional challenge. Chemical recycling processes require high temperatures, and although some energy can be recovered through process gases that are used to supply some or all of the plant's electricity needs, electricity costs throughout the value chain remain a major barrier to economic viability, and fossil fuel-intensive operations limit the circularity of the process.

Falling recycling capacity

Despite growing demand for recycled materials, the UK's recycling capacity is currently declining due to high costs and market uncertainty – over [200,000 tonnes](#) of

capacity has been lost since 2024. Simpler Recycling will reduce the landfill or incineration of kerbside-collected materials, but there is simply not enough capacity to process them through the existing recycling system. Flexible plastics collected at kerbside are expected to reach 150,000-200,000 tonnes, yet there are very few mechanical recycling facilities in the UK capable of processing this material, and most chemical conversion plants are still in the pilot stage. Current operational reprocessing capacity only accounts for [23%](#) of what would be required to recycle all the plastic packaging on the market.

Without intervention to rapidly scale up recycling infrastructure, this capacity gap risks increasing reliance on exporting waste (and could contribute to a rise in waste crime) and is not conducive to developing the necessary end markets for the products of chemical recycling.

Local authority barriers

The financial implications are particularly complex for local authorities. Increased collection imposes immediate costs, before they achieve any financial benefits. The [FlexCollect trial](#) helped local authorities understand their options and demonstrated the ability to collect and sort flexible plastics, but the lack of existing end markets means they will struggle to sell that material once collected and will need to pay the cost of its disposal if it cannot be recycled. Additionally, many councils are locked into long-term [private finance initiative](#) (PFI) contracts,

which limit flexibility in changing waste collection systems.

Increased ETS exposure

The impact of changes to the Emissions Trading Scheme is also becoming more apparent. Waste sent to EfW plants by local authorities will soon fall under the ETS; once councils begin to collect flexible plastics under Simpler Recycling, they will be forced to send them to EfW and pay ETS costs due to the lack of chemical recycling infrastructure. Landfilling or incineration is not an option, leaving councils with a difficult decision to make regarding the waste they have invested significant funds into collecting and sorting.

Chemical recycling is also included in the ETS due to its production of chemical outputs. However, it is important to note that chemical recycling diverts waste away from incineration and landfill, and its carbon performance should therefore be assessed against incineration rather than other recycling methods. It is estimated that for every tonne of plastic diverted from incineration, approximately 2.4 tonnes of CO₂ emissions are avoided; this should be taken into account in the application of the ETS.

Policy uncertainty

Recent global disruptions have exposed structural vulnerabilities in plastic and recycling supply chains. While fluctuations in oil prices have at times narrowed the cost differential between virgin and recycled plastics, the economy is still volatile. In this context, policy uncertainty and regulatory

complexity reinforce a market perception that virgin plastics are the lower-cost and lower-risk option. The lack of end markets for flexible plastics continues to limit investment across the value chain and restrict the commercial case for chemical recycling.

Policy uncertainty remains the single greatest barrier to investment. Compared with the UK, European markets currently offer a more stable and supportive regulatory environment, providing clearer long-term signals to investors. One example of regulatory inconsistency is food-grade applications; in the UK, mechanically recycled content in polyolefin food packaging is restricted, while EU regulations are more permissive. Although there are some indications that the UK may move towards alignment with EU frameworks, there is no guarantee. Ultimately, policies that reduce the cost of recycled plastics and make them competitive with virgin materials are essential to scaling the market.

Opportunities for reform

Chemical recycling is likely to remain a small but strategically important source of hydrocarbons within the UK's broader waste and resource system, but there are a number of opportunities to scale it up. The UK is well positioned to secure a first-mover advantage through its higher education and research sectors, with significant opportunities to develop products and commercialise emerging technologies.

EU policy alignment

Chemical recycling has the ability to deliver mandated recycled content, an increasingly important policy lever for driving circularity in plastics. As well as Extended Producer Responsibility (EPR), the EU has introduced a mandatory requirement of 10% recycled content in certain applications under the Packaging and Packaging Waste Regulation (PPWR). In comparison, the UK's 30% threshold under the PPT is effectively optional, allowing businesses to opt to pay the tax instead; only businesses exporting into the EU have mandated recycled content. Implementing some reforms to the PPT and matching the requirements of the PPWR and Europe's EPR schemes would not only simplify the regulatory environment but also incentivise chemical recycling by creating a clear end market for its products.

Strengthening domestic supply chains

Currently, [40-50%](#) of packaging materials used in the UK are imported, often with limited scrutiny of their recycled content claims. With investment in domestic infrastructure, a significant proportion of the demand for recycled content could be met within the UK, strengthening supply chain resilience and reducing reliance on international markets.

The UK's reliance on international supply chains for plastic materials presents both economic and environmental risks, particularly amid drastic fluctuations in trade policy and oil prices. Chemical recycling offers an opportunity to capture plastic waste domestically and support a circular economy within the UK.

Ring-fencing PPT funds

The Plastic Packaging Tax generates approximately £260 million annually for the Treasury. Allocating a portion of this revenue toward recycling infrastructure and innovation could be transformative, enabling the scale-up of both mechanical and chemical recycling systems.

Repurposing existing infrastructure

With many EfW plants approaching the end of their operational life, there is a strategic opportunity to rethink waste infrastructure, particularly when changes to the ETS are making EfW a more costly option. Rather than replacing these facilities on a like-for-like basis, sites could be repurposed or transitioned toward chemical recycling.

Mass balance

A mass balance approach is a major policy lever to enable the growth of chemical recycling. This is a chain-of-custody model that allows recycled and virgin feedstocks to be blended while ensuring that the proportion of recycled content is accurately accounted for across outputs. To increase recycling rates, mass balance can also exclude fuel from the calculations of recycled content, meaning that material processed into fuel or lost during the process cannot contribute to the recycled content targets. A [fuel exemption](#) like the one adopted by the EU ensures recycled content is kept in plastics.

Given the current limited capacity of chemical recycling, it is not yet feasible to produce materials entirely from recycled feedstock. Mass balance provides a scalable solution,

and industry bodies have identified it as the only viable mechanism to scale chemical recycling and maximise the volume of plastic that can be recycled. HMRC has agreed to integrate this approach into the PPT as of [2027](#).

Although chemically recycled plastics are already recognised under the PPT,

businesses have struggled to benefit due to challenges in tracking recycled inputs. A mass balance approach will address this issue, providing traceability and enabling companies to claim recycled content where materials are physically mixed during production; a fuel-exempt version of mass balance can further incentivise plastic recycling.

Action areas and recommendations

The chemical recycling sector offers several critical opportunities for circularity, efficiency, and innovation.

- Addressing the large volume of plastic packaging not currently recycled in the UK, particularly films and flexible plastics, which will increase significantly in the coming years
- Effectively processing multilayer packaging, contaminated plastics, and mixed materials that are major barriers in current systems, providing a viable alternative to incineration or exportation
- Creating high-quality recyclates equivalent to virgin plastic, which are suitable for food-grade, medical, and other high-standard uses
- Helping industry respond to rising costs and policy changes
- Supporting a more closed-loop system by turning difficult waste streams into valuable feedstocks for new plastic production

However, scaling the technology in the UK remains constrained by a combination of barriers. Stronger and more consistent policy support is required to unlock investment and ensure long-term project viability. The following action areas are recommended:

Policy alignment

- Provide clear and consistent policy direction, including signals from the Circular Economy Taskforce and alignment with international regulatory frameworks
- Strengthen economic incentives, building on the signals established by the PPT, to improve the commercial viability of recycled plastics
- Speed up the implementation of the mass balance approach to enable chemical recycling to contribute to recycled content targets
- Ensure access to reliable, high-quality domestic feedstock by reducing exports and improving waste collection and sorting systems at the local authority level

Funding

- Expand access to grant funding and blended finance, recognising that relatively small amounts of early-stage capital can unlock significant private investment
- Introduce targeted tax incentives and innovation support mechanisms, including competitions and challenge funding, to drive technological advancement
- Provide transitional support for local authorities, including funding, planning assistance, fast-tracking of approvals, and sharing of best practice to overcome PFI-related constraints

Innovation

- Explore repurposing or transition pathways for EfW facilities approaching end-of-life
- Support the decarbonisation of chemical recycling processes through efficiency improvements and integration with low-carbon energy sources, which will help lower energy costs
- Facilitate collaboration between local authorities, technology providers, and innovators; enable access to strategic sites and clusters, building on existing industrial hubs such as the [Circular Economy and Recycling Innovation Centre](#) in Teesside
- Establish a national plastics recycling or innovation hub to coordinate infrastructure development and accelerate deployment

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