Written Evidence submitted by ReNew ELP (EB40)

Environment Bill 2019-2021

Executive Summary

1. We welcome the Environment Bill and its provisions to improve significantly the recycling of all plastics and deliver important environmental outcomes by reducing the dependency on landfill, incineration, and so reduce environmental pollution.

2. We particularly welcome the Bill as, through its ambitious target setting and range of regulatory and economic measures, it creates the need **for plastic waste processing technology** that has the capability at scale to recycle those plastic materials which cannot be mechanically recycled.

3. Our response to the Public Bill Committee is to:

- Provide information on the Cat-HTR™ chemical recycling solution that is now available, which will enable the achievement of the UK's plastic recycling targets

- Provide evidence into the Environment Bill, and the measures proposed, from a chemical recycling sector perspective

- Respond to the questions posed by the Committee members in the hearings, for which we believe we have relevant, supplementary evidence and perspectives.

We will be pleased to provide this evidence in any future oral hearings.

About ReNew ELP

4. ReNew ELP is a UK **plastic recycling company** that is building the world's first commercial scale ***chemical recycling*** plant using Catalytic Hydrothermal Reactor (Cat-HTR™) technology, at Wilton, Teesside. The technology's global licence is held by UK SME, **Mura Technologies**.

5. ReNew ELP aims to provide a game-changing, innovative process technology solution to turn waste plastic into a valued resource, create a market pull that brings plastic up in the waste hierarchy and stop the leakage of plastic to the environment that arises from poor, low value and criminal waste management practices. This enables the functioning of a circular economy for plastics, by providing a process solution at scale to address residual plastics that are not currently recycled, including multi-layer, composite flexible packaging.

6. The company website is www.renewelp.co.uk.

About the Cat-HTR™ Technology

7. The Cat-HTR™ process converts plastic back into the original chemical and oil building blocks from which it was made, ready for re-use in the production of new plastics and other products. Cat-HTR™ uses supercritical water as a solvent which breaks the polymeric structure of waste plastic feedstock into monomers and oligomers, before donating hydrogen to create new bonds and make valuable chemicals and oils for use in the petrochemical industry, including new plastic manufacture.

8. Target feedstock is mixed plastic waste (post-consumer domestic waste plastic packaging including rigid plastic packaging, pots, tubs and trays, films and flexible plastics, and mixed composite polymer waste streams). This material cannot be recycled effectively or economically through traditional mechanical recycling processes due to polymer type, low value, colouration or contamination (for example by food or soil).

9. The process can be seen here: https://vimeo.com/345023507

10. Whereas mechanical recycling processes can preferentially take clean, high-value clear and white plastics (PET, PP, PE), our Cat-HTR™ process is able to process the waste plastics that are normally consigned for low-grade recycling (for example into posts, benches etc), or if not adequately separated in material recycling processes, the fraction that is sent for ***energy recovery*** **or to** ***landfill, bringing potential for environmental leakage.***

11. The Cat-HTR™ technology can address these challenges, complementing mechanical recycling where that is the optimal choice, by being able to:

- Take mixed plastic polymer waste streams, including flexible plastic materials and process these feedstocks back into petrochemical products suitable for onward processing into virgin-grade plastics, supporting efforts of local authorities to have a viable end-market for films and flexibles and other currently non-recycled plastics

- Process plastics that are contaminated, are multi-layered/composite and coloured, that are otherwise not recycled but sent for recovery or to landfill

- Generate valuable chemical products that can be sold into the chemical manufacturing sector, closing the loop on plastic and other products, recycling into feedstocks for a circular economy.

12. As Cat-HTR™ is not a combustion process, it does not create harmful by-products such as dioxins and does not produce char as a by-product of conversion reactions, contributing to high yields.

13. The technology is, by design, scalable to meet demand and to suit local infrastructure. The first site at Wilton, in the North East of England, will run 80,000 tonnes per annum (tpa) capacity across four processing lines. The modular design enables construction at point of need, minimising transportation impacts on the environment.

14. The key differentiator for Cat-HTR™ is the ability to effectively heat and mix feedstock plastics with steam through direct heat transfer, meaning there are no limitations to scale up. We can design and install modular (20,000 tpa) lines or install larger capacity processing lines to suit specific locations. We are already looking at production plants >100,000 tpa for our future project pipeline, both here and in the EU.

15. In recognition of what the technology will deliver for waste plastic recycling, and the beneficial environmental performance of the process, Cat-HTR™ is now recognised as a **Green is Great** brand.

Response to the Provisions and Desired Outcomes of the Environment Bill

16. **Circular plastics economy and the critical role chemical recycling will need to play**
A circular plastics economy is a sustainable alternative to the traditional linear model of create-consume-dispose; keeping plastic in use for as long as possible, recovering and recycling to extract value and regenerate it into new products, establishing a create-consume-***recycle*** model. This model eliminates waste plastic leakage into the environment and reduces the requirement for fossil feedstock in plastic production. These are clear aspirations of the UK Government as indicated in the 25 Year Environment Plan, the Resources and Waste Strategy and clear aims within the UK Plastics Pact and aligned to delivering to the Pact's targets set to 2025. **We strongly support the Bill's aim to create a circular plastics economy, and the ambition of the targets as presented through the UK Plastics Pact.**

17. Achieving those UK Plastics Pact targets, however, will require investment into new technologies that ensure:

    - All plastics placed on the market can be recycled
    - 70% of plastics placed on the market **are** recycled in practice
    - Problematic plastics can be recycled, after all practical minimisation steps have been made
    - 30% recycled content in all products and packaging can be readily achieved through the provision of high-quality versatile virgin-grade plastic recyclate that can meet food grade and other requirements

18. Our technology offers a solution as part of a circular economy model for plastics, creating a step-change in the recycling system to address 'performance gaps' left by traditional mechanical recycling technologies, that otherwise directs waste plastic to incineration or landfill.

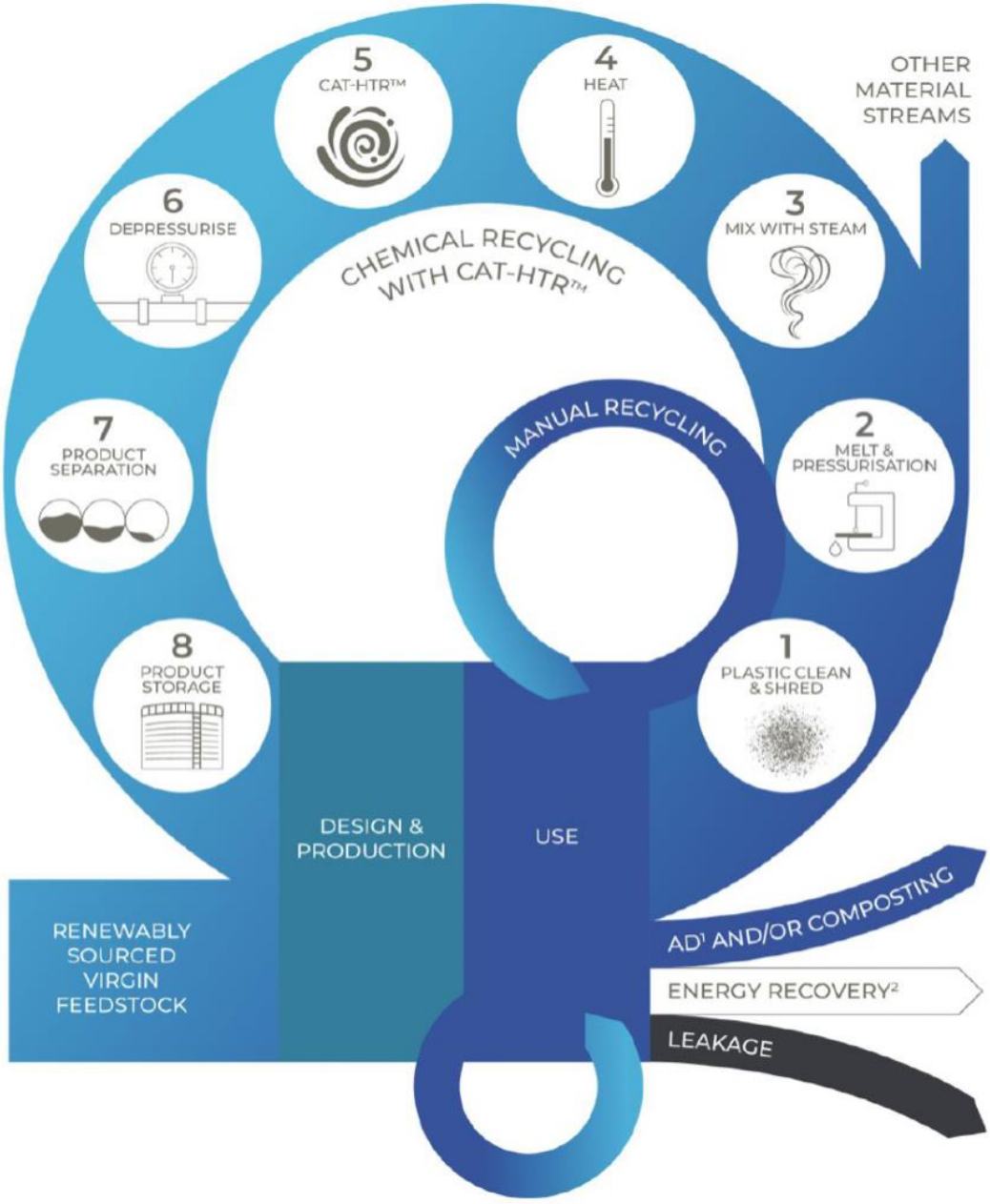

Figure 1. The circular economy model enabled by Cat-HTR™

19. In driving towards a circular economy, ***chemical*** recycling is needed because traditional ***mechanical*** recycling processes are unable to reprocess and regain value from the recycling of low-grade plastics (due to colouration, contamination, and multi-layer, flexible products). This is a significant barrier to progress from the current c45% plastic recycling rate to Government's desired 70%.

20. Recycling plastics at scale is a very complex challenge. Contamination from food or soil cannot be removed entirely, and mechanical recycling processes do not address the complexity of all packaging types, such as coloured plastics, multi-layered pouches, films and flexible plastics.

    Using mechanically recycled plastic in higher value applications is technically challenging and leads to increased process rejects and a generally lower quality of product, which is why traditional mechanical recycling processes are often referred to as 'down-cycling'.

21. It is also not a simple task to replace virgin polymer with mechanically recycled content in any plastic manufacturing operation regardless of the application - for instance blown film, injection moulding, blow moulding, and extrusion. Compared with virgin or chemically recycled polymer, mechanically recovered polymer has:

- Lower strength
- Varying processing characteristics, such as density
- Lower clarity, retaining colour of the original product
- Unknown concentrations of additives such as flame retardants, masterbatch mixtures, chalk fillers, and persistent organic pollutants (POPs).

22. There is also no great market demand for products made from low-grade plastic derived from the current mechanical recycling system, and food grade plastic cannot be produced from the vast majority of mechanically recycled plastics.

23. Traditional mechanically recycled plastics can be used in new products and blended with virgin plastics. However, the ability of plastic manufacturers to secure high-quality recyclate to meet the 30% recycled content cannot be met by supply from mechanical recycling processes. The proportion of recycled to virgin plastic in product is influenced by the end-product colour, and the quality of the recyclate – whether it is suitable for food-grade applications, or the material performs to the required standard by the manufacturer, as product quality (such as durability) can be affected. The better solution to this issue is to have polymer derived from virgin-grade chemically recycled monomer, since it would perform as well as virgin fossil-sourced polymer yet will have come from a recycled plastic feedstock.

24. The chemical recycling process creates base monomers that can be used as a chemical feedstock in the manufacture of plastics and other materials. The Cat-HTR™ process generates a range of products that directly feeds into the chemical process industry – waxes, oils and naphtha. This in turn means that chemical processors can supply recycled polymer from this feedstock, to support the aspiration of 30% recyclate in product without loss of performance. There is now considerable interest from the oil and chemical sector 'majors' in taking the chemical feedstock produced from recycled plastic for this reason. Waste partnerships and investments have been announced by companies and brands such as Neste, Total, Mars, SABIC and Mirova, into chemical recycling technologies including ReNew ELP.

Reform of the Packaging (Waste) Recovery Note System to Encompass Chemically Recycled Plastic

25. Chemical recycling takes waste plastic and processes it to create chemical products that are then available for use in chemical manufacturing. There needs to be clear recognition that chemically recycled plastic should be treated as a ***recyclate,*** and therefore attract payments for the chemical recycling processors, just as mechanical recycling does for mechanical recycling processors. Therefore, we support the review of the existing PRN system and that it should encompass the (liquid) recyclate arising from the chemical recycling process.

26. This will require an evolution of the PRN system to ensure that chemical recyclate is traceable – for example, when passing from the waste plastic processor to the off-taker, showing full blend and process traceability into chemical feedstock for products (plastics, bitumen, waxes and oils). It will also require an agreed point of measurement within the system.

27. The waste and chemical processing industries will need to be consulted on how such a system can be developed and applied, to confirm the provenance of chemical recyclate, and then downstream into chemical processing. Various approaches are already in development, using certification or chain of custody approaches, and how this is best managed through mass

balance, average volumes of equivalent uses. A Sustainable Packaging Coalition® project is looking at this challenge.

https://sustainablepackaging.org/wp-content/uploads/2019/12/RMS-One-Pager.pdf

28. We believe that this is achievable, and given the backing by many multinational chemical and plastic manufacturing companies including Dow, Eastman and Berry, it is the right time to consider how recyclate traceability and supporting PRN system can be adapted for this process of plastic recycling.

Comments on the Hearings Held in March 2020

29. We note that the waste industry representation was provided by Chris Courtois, representing Veolia. We would like to provide the Committee with a new perspective on how, as Mr Courtois observes (Combined Evidence, Page 26) that a £10Bn investment is needed in the UK to address the gaps in infrastructure.

30. **Investment in waste infrastructure:** We **AGREE** with Mr Courtois that significant investment is needed to create the right balance of waste management technologies and infrastructure to address:

    - The increasing amount of plastic packaging being placed on the domestic market for collection through the enhanced household post-consumer collection systems
    - The plastic used and disposed of by the Commercial and Industrial (C&I) and Construction and Demolition (C&D) sectors.

31. However, what was not developed in discussion at the Committee was ***what*** infrastructure is needed, nor what was to be the ***outcome*** from that infrastructure investment to support the creation and operation of a circular economy. Because of wider regulatory requirements, such as plastic for food contact, most plastics are not recycled back using mechanical means into the products equivalent to their original form. Therefore, this 'down-cycling' is a barrier towards a circular economy and investment needs to be able to address this challenge. This builds on the commentary in Section 3.1 of this response, that the majority of traditional mechanically recycled plastics do not enter high-value chains, nor support a circular economy beyond a single further product which then heads to end of life. **Above all, any investment should be increasing the quantity and quality of recycled plastics, retaining that use and driving the circular economy for plastics. We believe that chemical recycling infrastructure is needed to complement the existing mechanical recycling infrastructure, and so help achieve Government's ambitious recycling targets.**

32. **Alternatives to Plastics:** We also support the comments (Page 26) made by Mr Bellamy of the FDF that moving away from plastic to other packaging materials would potentially lead to other unintended consequences for carbon in manufacture and transport, plus other costs including costly-redesign of existing, compliant food-grade multi-layered food packaging. What we are advocating is to optimise the value chain for waste plastics and enhance processing of the plastic packaging not currently recycled through the application of chemical recycling technologies, establishing the circular plastics economy.

33. **Investment in the Waste Management:** The manufacturing industry should have the explicit aim of enhancing the circular economy for all materials, including plastics. This must include consideration of:

- Separating out higher value plastics that are readily recycled into high value food-grade products (for example, LDPE milk bottles and PET bottles)
- Sorting, cleaning and shredding of other waste plastics at a set **standard**, for example to the European E350/352 standard or an equivalent, to enhance further reprocessing downstream, coupled with:
- Investment in new technologies that can process this plastic waste into a higher value 'product', for example, including chemical recycling technologies.

34. **WE THEREFORE AGREE** with the comment made by David Bellamy (page 28) in response to the question by Alex Sobel MP where higher standards for materials in the EU ought to be followed in the UK, since this enhances recyclability and sustains material value.

35. **Working with Consumers:** We also support the need for trust in the recycling (and indeed the waste management) system. Consumers have assumed that when plastic is placed in their recycling bin that it is recycled. This is simply not the case for the majority of plastics they dispose of, and the fate of that plastic is dependent on the type of plastic, the local authority waste collection system and local facilities where the material is sorted and processed. Chemical recycling enables the widest range of plastics to be recycled into high value product, and at a comparable carbon footprint to that of mechanical recycling, diverting plastic from EfW (Energy from Waste) and landfill. The preference of EfW as a form of energy recovery (when compared to landfill), should not enable the continued burning of recyclable plastics within energy from waste facilities. **WE SUGGEST to the Committee that it should ensure that Defra's wider policy on energy from waste is consistent with the diversion of waste plastic towards recycling, and away from energy recovery.**

36. **Household Waste Collection:** We recognise that local authorities will be the greater beneficiary of future EPR funded council collections. We believe, however, that this approach could drive waste into the lowest cost recycling option regardless of traceability and ethical standards, which will go against the ambition to drive high recycling rates **and** generate higher quality recyclate within a valued circular economy.

37. What is also critically important is that the enhanced waste collection requirements proposed for Local Authorities within the Bill will increase yet further the amount of the plastics that cannot be recycled using mechanically-recycling means, leading to more plastics potentially to be sent for energy recovery in incinerators, or to be sent to landfill. Therefore, chemical

38. recycling processes will be a critical sector in the UK's waste management infrastructure to meet that growth in collected plastics.

39. **Enforcement:** Any developments to the waste management system will need to be regulated by the Environment Agency and relevant bodies in the devolved administrations. As was noted in the oral hearings by Libby Peake of the Green Alliance, however, resource cuts to the Environment Agency has led to staff reductions in waste planning, permitting, site inspections and illegal waste activity (including exports), and subsistence charges barely covers the costs of inspections. Looking ahead to 1 January 2021, the potential for cheap imports of plastic waste post EU Exit undermines the legitimate UK market. **Therefore, WE SUGGEST to the Committee that it should make clear the expectations on Defra to ensure the appropriate enforcement resources are made available to sustain the desired system**.

April 2020