BIO-BASED AND BIODEGRADABLE INDUSTRIES ASSOCIATION

CLIMATE CHANGE AND THE ROLE OF BIO-BASED AND BIODEGRADABLE MATERIALS

ABOUT BBIA

BBIA's mission is to unite those working in the biodegradable and bio-based industries and to develop partnerships with those who share our vision: to put the bioeconomy agenda at the centre of the political debate on sustainability and economic growth in the UK.

To open up opportunities and standards in the emerging green economy market, BBIA works with companies and organisations involved in the production of bio-based and biodegradable chemicals and polymers for the benefit of the environment.

Biotechnology - the green industrial revolution

Paul Mines, Chief Executive Officer, Biome Technologies

The Agricultural Revolution, The Industrial Revolution and The Computing Revolution have all immeasurably changed the way that we live our lives. Each of these paradigm shifts have brought huge benefits to the human race but some unforeseen negative consequences have also manifested; climate disruption, biodiversity loss, pollution and zoonotic diseases are all pressing issues that need to be solved and fast. Biotechnology is the next green revolution that promises to solve many of humanity's current challenges.

Alongside investment into renewable energy and sustainable transport, we need to be making more advancements in sustainable materials and chemicals. We need to invest in biotechnology. Without this, we simply won't achieve net zero. Rather than man-made factories producing chemicals, materials or energy, we now have the capability to engineer enzymes, microorganisms and plants to produce renewable, plant-derived alternatives. These have the potential to replace fossil fuels, improve human health and deliver low energy processes.

What has biotechnology already achieved? By harnessing the power of enzymes, microorganisms and plants, scientists have already created artificial spider silk, bio-based and biodegradable plastics, meat substitutes, biofuels, antibiotics, antibodies and vaccines – yes, the vaccines that are having so much impact on our lives are created by biotechnology.

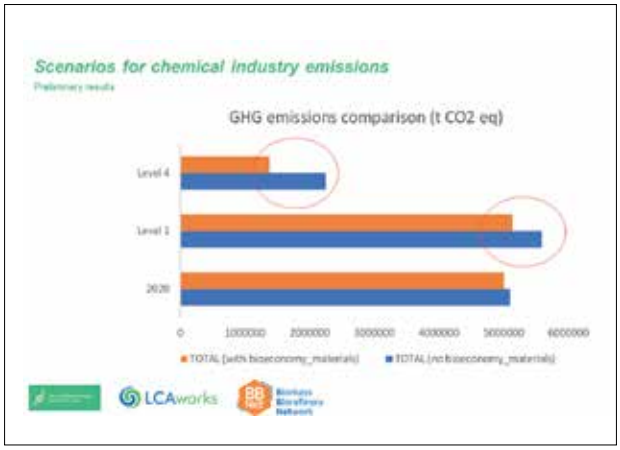
The UK is renowned for its academic excellence and has a strong research community in biotechnology. This means that with the right investment and support, the UK is well poised to take a leading role in this green revolution. In order to create a cleaner and greener Britain, biotechnology is a sector that simply can't be overlooked.

Biotechnology will move us away from a society that's dependent on oil, help create environmentally friendly materials of the future, ensure food security across the globe and revolutionise human health.

Up to now, while many have understood the importance of Biotechnology in the transition to Net Zero, there has been scant quantitative evidence at a macro level. The UK Net Zero models (illustrated by the Mackay Carbon Calculator) are dominated by energy and do not consider the role of biomass in the production of chemicals and materials.

To address this deficit in quantifying the benefits of the bioeconomy, the Industrial Biotechnology Leadership Forum has commissioned a body of work from Imperial College/LCA Works that seeks to set out the scenarios and the requirements for the future supply of sustainable bio-based products to maximise GHG abatement.

- ***Biotechnology green industrial revolution will transform our economy***
- ***Biotechnology is necessary for a transition away from oil to achieve net zero***
- ***Biotechnology is already delivering major achievements: e.g. meat substitutes, low temperature washing powders, compostable plastics, biofuels and vaccines***
- ***Biotechnology represents a significant opportunity for the UK to use its science excellence to take a world-leading economic position***



Event speaker

Bio-based plastic: Opportunity and impact

Adrian Higson, Managing Director, NNFCC

The UK plastic industry is highly innovative, adds considerable value to the materials it processes and is one of the country's most important exporters. The production of bio-based plastic from sustainable renewable resources, designed for recycling or composting, can play an important role in realising the UK's 25 Year Environment Plan, its Green Industrial Revolution, and the ambition to build-back-better post COVID19.

The UK plastic industry consumes around 3.3 million tonnes of raw materials per year. However only 1.7 million tonnes of plastics raw materials are produced domestically, and UK industry is therefore heavily reliant on imports of raw material, amounting to around 1.6 million tonnes per year [British Plastic Federation].

There is an opportunity to use domestically sourced renewable raw material to sustainably produce the materials we currently import and to develop new materials with improved function and performance.

Plastic produced from domestic biomass could target a wide range of applications from construction and automotive to packaging and textiles.

An immediate opportunity for the bio-based plastic sector is in the production of compostable plastics. This supports the roll-out of national food waste collections, reducing plastic contamination of food waste and enabling the aspiration to eliminate food waste to landfill by 2030 [UK Parliament. 2021. Environment Bill].

The impacts

With a supportive business environment 10 per cent of the UK's plastic raw material deficit could be replaced with bio-based equivalents or alternatives. This could stimulate £524 million of capital investment, support 5000 jobs in the production of primary bio-based plastic and generate an aggregate gross value add of £390 million.

Bio-based plastic contributes to net zero. Bio-based plastic sequesters atmospheric carbon dioxide and through bioenergy carbon capture and storage (BECCS) can provide negative emissions at its end-of-life. The production of bio-based plastic also supports the use of industrial biotechnology as a low carbon production technology.

Government support and investment in synthetic biology and bioscience makes the UK ideally placed to develop, scale-up and capture licensing opportunities based on biotechnology. Establishing bio-based plastic production and value chains in the UK can act as a platform to capture export opportunities in a growing international market.

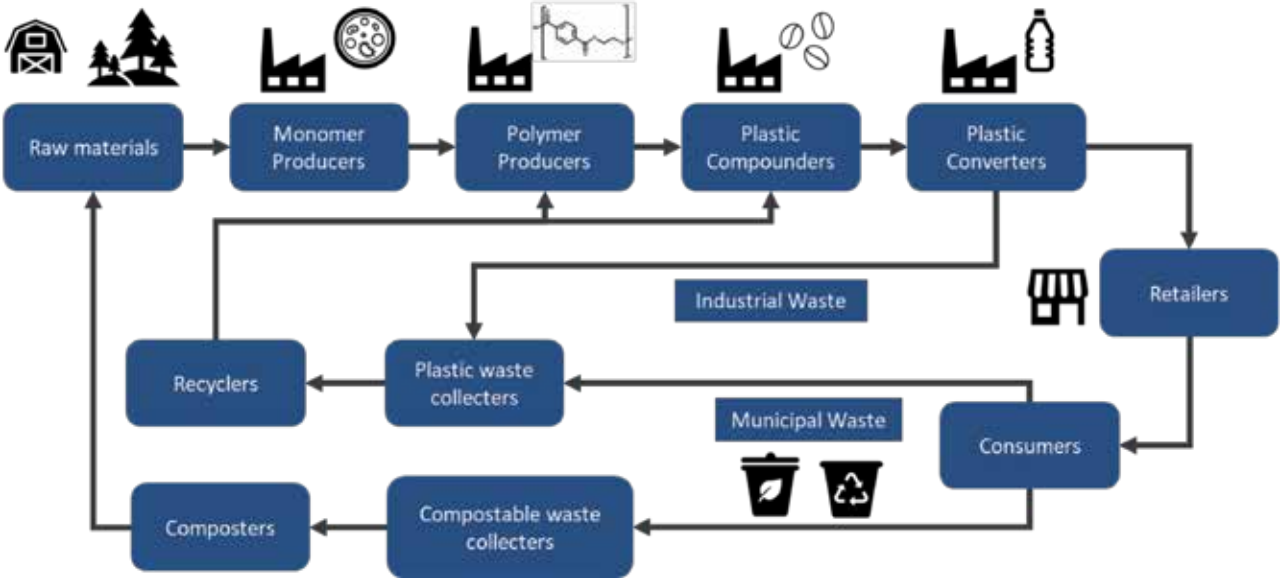
Compostable plastic in the form of bags enables the collection of food waste from households, hospitality, and the food service sector (over 2 million tonnes of which is unavoidable); it supports work towards eliminating food waste to landfill by 2030, thus avoiding climate warming emissions of methane and eliminates issues with plastic contamination of soil post-food waste treatment.

Compostable plastic provides a solution for hard to recycle food packaging items where the separation of food and plastic is difficult e.g., tea bags, coffee pods etc

Biodegradable plastic helps to address plastic pollution, the use of biodegradable plastic in products designed for specific applications in the open environment (such as mulch films and tree guards) can reduce contamination of land and sea.

Conclusion

The development and production of bio-based plastic can contribute to clean economic growth while providing solutions to important societal and environmental challenges including climate change and plastic pollution.



The circular bio-based and compostable plastic value chain

Biorefining's role in a low carbon economy

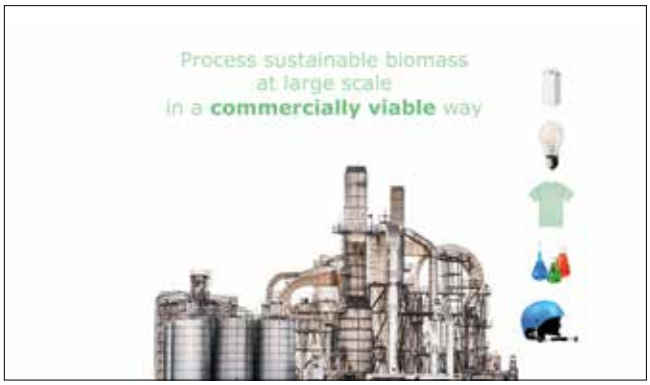
Richard Platt, Managing Consultant, E4tech

A circular bio-based economy is an important element of a low carbon economy, and is expected to increasingly contribute to GHG emission reductions and decreased dependence on fossil resources, and to economic growth over the next decades.

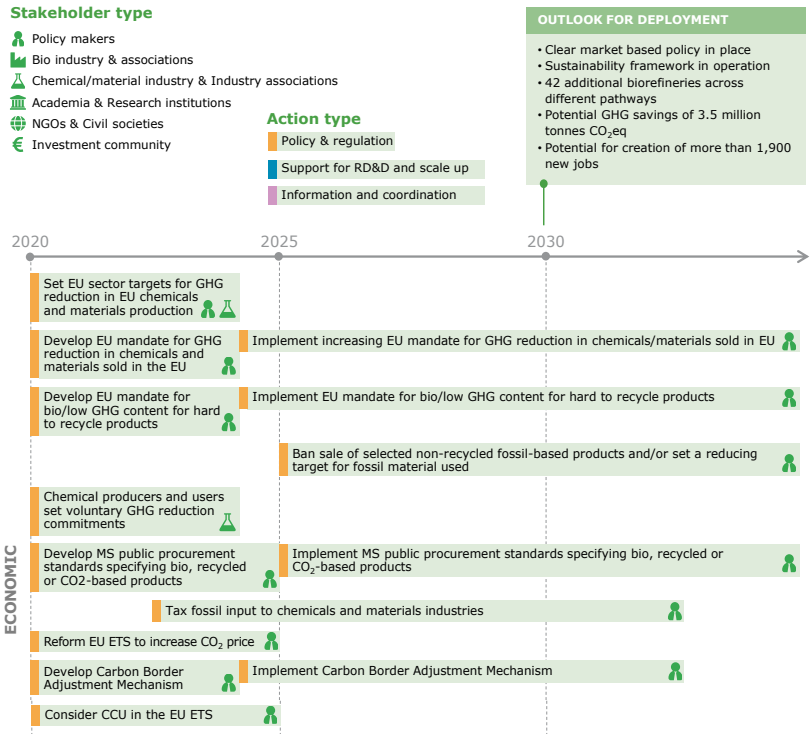
There are opportunities and challenges of utilizing biomass to produce chemicals and materials, which can contribute to these sectors reaching net-zero.

These slides and diagram give an overview of the potential of biorefining and provide an extract of an action plan for their accelerated deployment. Biorefining can be broadly defined as the processing of biomass into a portfolio of marketable bio-based products, which could include co-production of food and feed, chemicals and materials and bioenergy (power, heat/cold, fuels).

E4tech is a sustainable energy and chemicals strategy consultancy based in the U.K. and Switzerland, and is part of the ERM Group. The overview presented below is part of the EU Biorefinery Outlook to 2030 study led by E4tech and supported by the European Commission DG RTD.



EU Biorefinery Outlook to 2030: Action Plan (extract)



POLICY RECOMMENDATIONS

These are the suggestions BBIA makes to policy makers to realise the full environmental and economic potential through use of bio-based – and the treatment of biodegradable – materials and products. Management of these materials, as with others, requires a systems approach to the use of resources and to waste management.

COMPOSTABLE PACKAGING

1

Mandate that Local Authorities and collection companies allow the collection of compostable packaging with food waste, as per the applications in A Plastic Planet's Green List and as accepted in the revised Waste Framework Directive and transcribed into UK law, article 22.

2

Establish a separate financial mechanism for compostable packaging within the new EPR system so that contributions from compostable packaging companies are directed towards the collection and treatment of those materials through biowaste treatment facilities.

3

Create a working group of stakeholders to decide what rules should be introduced that reduce consumer confusion through clear marking of independently certified compostable packaging.

4

Recognise compostable packaging[1] is the right application for uses which impact collection and treatment of biowastes, as per A Plastic Planet's document The Compostable Conundrum. Compostables in the right applications cut plastic contamination of biowastes and soils, reducing biowaste treatment costs while increasing capture.

5

Mandate that food waste treatment facilities accept compostable packaging, as per A Plastic Planet's Green List of applications and compost them or, where AD system design and/or equipment is unsuitable for feeding them in, front-end remove them and send them to composting facilities approved for treating food waste.

6

Mandate that the term "biodegradable" for packaging can no longer be used, to reduce consumer confusion, avoid potentially misleading claims and support the recycling of mechanically and chemically recyclable packaging and organic recycling of compostable packaging. Use of the term "biodegradable" must be on condition the non-packaging item is independently certified compliant with an internationally or European harmonised standard that sets pass/fail criteria, where the item is intended for use in the open environment, such as fishing gear and agricultural plastics[2].

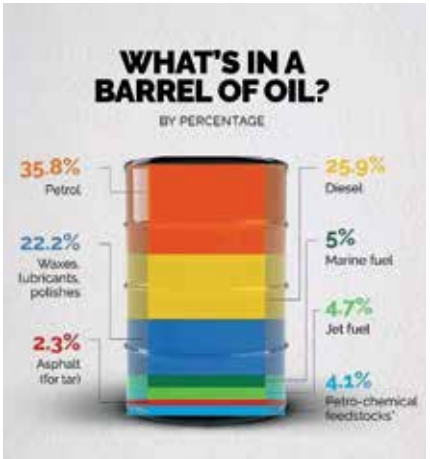
OTHER BIO-BASED AND BIODEGRADABLE MATERIALS

7

Recognise that new, innovative bio-based materials will change the way in which we produce everyday products as we search to lower GHG impacts and move away from fossil sources. We should establish a mechanism that allows Local Authorities to include these materials in collection systems for biowaste, for example some will be suitable for garden waste composting, others only for food waste composting or, where system design and/or equipment is suitable, anaerobic digestion.

8

Understand the need to ensure soil quality is a key environmental indicator and therefore materials that have benign or positive impacts upon soil health should be preferred. For example, the use of biodegradable oil lubricants or soil biodegradable tree guards, can reduce pollution to soils in forestry applications and waterways (marine engine oils)



[1] Certified by independent bodies that they conform to BS EN 13432, the British and European standard for industrially compostable packaging.

[2] BS EN 17033, the British and European standard for biodegradable plastic mulch films for use in agriculture and horticulture.

OUR MEMBERS

2-DTech (owned by Versarien PLC) is a specialist R&D company for graphene applications

BASF is a German multinational chemical company and the largest chemical producer in the world

Biome Bioplastics is a leading UK-based developer of bioplastics, with a global customer base

BIOTEC is a German-based company that produces bioplastics made from plant-based renewable resources

BioPak is a packaging manufacturer with industry-leading products that are made from plants

Eco-Craft is a compostable packaging company serving online start-ups and larger e-tailers

Fabbri Group is an Italian-based global packaging company that creates eco-friendly packing solutions

FKuR is a leading developer, producer and distributor of customised bioplastics

Floreon is an award-winning biomaterials technology company that produces high-performing, fully-compostable plastics

FUCHS is the world's largest independent lubricants manufacturer - a global group with German roots

Futamura is a leading global manufacturer of plastic and cellulosic materials

The Industrial Biotechnology Innovation Centre is an industry-led centre with world-leading research capabilities

Ingevity is a leading provider of specialty chemicals, high-performance carbon materials and engineered polymers

KCC is a sustainable food packaging specialist with a compostable alternative to CPet

Promateris is a leading European manufacturer of sustainable products and solutions for the circular economy

NatureWorks supplies biopolymers derived from 100 per cent renewable resources

NOVAMONT is the world's leading company in the sector of bioplastics and biochemicals

Oceanium develops compostable bio-packaging materials from sustainably-farmed seaweed

Parkside is a UK-based, global pioneer of industrial and home compostable packaging solutions

Pujing Chemical Industry CO., Ltd (PJCHEM) delivers industry-leading, biodegradable polymer products

Planglow is aleading supplier of catering labels, compostable packaging and food labelling software

The REA is an umbrella trade body, including sector groups for biogas and organics recycling

Solutions 4 Plastic is a technical consultancy specialising in the biopolymer industries

TÜV AUSTRIA Group is a leading independent testing, inspection and certification company

The Compost Bag Company provides compostable bags and films to LAs and companies throughout the UK

TIPA Sustainable Packaging creates viable high-performance, compostable, flexible packaging options

Vegware is the global specialist in plant-based compostable foodservice packaging

Woolcool® is natural insulated packaging for the transportation of temperature sensitive goods

Mama Bamboo, the first European Nappy company to achieve B-Corp status

Independent supplier of products for capture and containment of waste and recyclables

David Berryman (Individual) - A trained biologist who is an expert in the fruit juice sector, previously Chief Executive of David Berryman Limited
Paul Gilligan (Individual) - CEO and founder of the Magical Mushroom Company, previous food retail expertise in senior roles at Sainsburys

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