

UK Government Biomass Strategy Analysis for BBIA Members

Dear BBIA members,

Here follows a brief analysis of the UK Government’s [Biomass Strategy](#)¹ published in August 2023.

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1. Take home message:

The strategy is focused upon the use of biomass primarily for energy production. The possibility of using biomass for non-energy purposes, for example for biochemicals and materials, receives only a brief mention towards the end of the strategy – concluding that more work is required in this area before any policy recommendations can be made in the longer-term, stating *“Emerging bioeconomy products and markets beyond energy will continue to be reviewed.”*

There is a lack of understanding within the UK Government as to the difference between decarbonisation and defossilisation. The strategy talks about how biomass *“should be prioritised for the hardest-to-decarbonise sectors first”*, yet then focuses on the bioenergy sector, which can be decarbonised. There is an opportunity to help communicate that biomass use should focus on sectors that cannot be decarbonised, but can be defossilised, e.g., biochemicals and bioplastics.

2. Key points to note:

- 2.1 The 204-page strategy outlines the government’s key priorities on biomass, which include: sustainability, Air quality, Net zero, The circular economy & resource efficiency.
- 2.2 The strategy considers how biomass should be prioritised across a variety of applications to best support the transition to net zero. Biomass applications ranging from transport fuels and hydrogen to domestic and industrial heating are recognised as important, but in the medium to long term the focus is on integration of bioenergy with carbon capture and storage (BECCS).
- 2.3 The government is clear that only sustainable biomass has a place in the UK economy, and its use should be prioritised for the hardest-to-decarbonise sectors first (ironically since biochemicals and materials are not considered as priorities)
- 2.4 Biomass energy will remain important, even as we get closer to net zero targets in 2050, because it can provide dispatchable, baseload power to a renewable electricity grid subject to weather-related fluctuations. Biomass heating in off-grid rural properties will still be able to use sustainably sourced biomass – though the government has high hopes for heat pumps.
- 2.5 Biomass is often viewed in conflict with food production. It is good to see that the government recognises food and biomass are not zero-sum games, and that using food and feeds for biomass offers flexibility to farmers in selling their surplus or lower-quality crops and residues. The strategy proposes that an additional 17,000ha of energy crops will be planted by the end of 2038 in an ambitious scenario, or 9,000ha in a more restricted scenario. However, the strategy does not explain how it will nationally balance bioenergy, food production, and nature – that will come in the Land Use Framework to be published later this year.
- 2.6 Biomass energy is not carbon neutral, even if it is renewable. To counter this issue, the government aims to build new bioenergy power plants with integrated Bioenergy Carbon Capture Storage (BECCS), which involves capturing some of the carbon released and either using it as an industrial feedstock (such as for carbonated beverages) or storing it underground in former fossil fuel reservoirs. After 2035, the government aims to *“transition away from unabated emission uses of biomass where possible to...BECCS”*. Nevertheless, BECCS may remain a prohibitively expensive technology, so the strategy explicitly states that it will not ban unabated bioenergy post-2035.

¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1178897/biomass-strategy-2023.pdf

3. Other points of interest

i) A strengthened sustainability strategy

The biggest new commitment in the Biomass Strategy is that government will develop a single, tightened sustainability framework which will be standardised across all biomass certification schemes. To achieve this framework, government has announced intention to:

- “Require biomass users to ensure 100% of woody biomass feedstocks used in their operations to be proven sustainable” – up from 70% at present
- “Implement a common GHG [greenhouse gas] emissions calculation methodology for biomass supply chains”, and review soil carbon calculators
- Establish how to assess Indirect Land Use Change within the framework
- Include safeguards for biodiversity, ecosystem services, labour rights, and community welfare.

ii) Anaerobic digestion (AD)

The strategy emphasises the benefits of AD: “increasing the proportion of biomethane in the grid is a practical, established, and cost-effective way of reducing carbon emissions associated with gas usage for heating”.

Its modelling suggests that the amount of biomethane from AD needs to increase five to eightfold to reach net zero. With the Green Gas Support Scheme ending in 2025/26, the strategy, however, does not announce any new policies or funding for AD, beyond a tool to assess the whole-lifecycle GHG emissions from biomethane.

iii) Bioenergy Carbon Capture Storage (BECCS)

The strategy states that capturing carbon dioxide from burnt biomass and biomethane through BECCS allows bioenergy to become carbon negative – i.e., it removes more carbon from the atmosphere than it emits. However, BECCS remains largely unproven at scale.

Globally, there are only 30 commercial CCS facilities operating of any type. Investment in BECCS is important, and the government’s principles in the strategy for sustainable BECCS are strongly emphasised. However, many experts urge caution in relying too heavily on BECCS in policy, as deferring emissions reductions to a technology unproven at scale can encourage complacency. In some cases, this deferral can become a form of greenwashing.

iv) Bio-based chemicals and materials

The biomass strategy highlights the role of biomass across this sector and its key position in future materials, new products, high-value-added manufacturing and emerging technologies. However, there remain challenges surrounding the production of chemicals and materials from biomass. Some of the main challenges are common to new technologies, such as a lack of cost-competitiveness with existing fossil-based chemicals and the large capital investment required to scale up these new technologies enough to meet market demand. As stated in the Biomass Strategy, much more work is needed to understand the role of biomass in the materials and chemicals manufacturing sectors. There is currently no national policy on sustainable materials and little clarity on the future for bio-based chemicals, and government needs to take action so that the UK can achieve a net-zero-compatible materials economy.

The UK is the home of significant and long-standing academic excellence in bio-based chemicals, meaning there is the potential for us to be a leader in this space, but other areas of the world are already implementing policies to drive this sector forwards and the UK is rapidly losing this competitive advantage.

There is a failure to understand what is happening globally, especially in the USA, with their publication in March 2023 of their ‘Bold Goals for U.S. Biotechnology and Biomanufacturing’² strategy, with ambitious goals for their chemicals and materials sector:

Theme 2: Chemicals and Materials

Goal 2.1: Develop Low-Carbon-Intensity Chemicals and Materials – In 5 years, produce >20 commercially viable bioproducts with >70% reduced lifecycle GHG emissions over current production practices.

Goal 2.2: Spur a Circular Economy for Materials – In 20 years, demonstrate and deploy cost-effective and sustainable routes to convert bio-based feedstocks into recyclable-by-design polymers that can displace >90% of today’s plastics and other commercial polymers at scale.

² Bold Goals for U.S. Biotechnology and Biomanufacturing: Harnessing Research and Development to Further Societal Goals (whitehouse.gov)

The UK biomass strategy introduction concludes:

“Other uses of biomass – there is an increased interest globally and in the UK in the concept of the bioeconomy. The bioeconomy includes both energy uses and non-energy uses of biomass, such as wood-based products (e.g., timber, wood panels, etc), biochar, and bio-chemicals and biomaterials (bioplastics). Government will work with international and industry partners to better understand how the bio-based chemicals and materials sectors can form part of the long-term priority use of biomass.”

On Page 182 the Government elaborates by recognising the potential of biomass:

“to be used in non-energy sectors for the production of high value renewable chemicals and materials and in construction applications.....An important enabling technology for this is industrial biotechnology (IB).....While these non-energy uses of biomass present real economic and job opportunities, there is significant uncertainty on the potential demand these end uses generate for biomass, the size of these markets, and the GHG emissions reductions some of these uses will offer in the future.”

So, to understand more, the Government has commissioned research.

“Further work is needed to understand the applications and conditions necessary for the bio-based chemicals and materials sectors to form part of the long-term priority use of biomass. As a first step, government commissioned a project to understand the economic and climate benefits to the UK of an increased use of bio-based chemicals”.

This study is being carried out by NNFCC, FREY (Dr Jen Vanderhoven), Perspective Economics and UCL. A summary of the study can be seen in appendix A. For more information, please contact Jen Directly (jen.vanderhoven@BBIA.org.uk).

In addition, Innovate UK currently has a study out for tender ‘UKRI-3212 IUK Sustainable Hydrocarbons for the UK Chemicals Industry’, which aims to develop a Sustainable Hydrocarbons Vision for the UK Chemicals Industry, which sets out how the UK can position itself, in the context of a Net Zero future, to be internationally competitive and meet the growing demand for sustainable chemical products. More details can be seen in Appendix B.

How can the BBIA respond to the Biomass Strategy:

- It is important that BBIA and its members engage with the Department for Energy Security and Net Zero to provide evidence to support the ongoing study *‘economic and climate benefits to the UK of an increased use of bio-based chemicals’*.
- Once commissioned, BBIA members should seek to engage with the IUK study ‘Sustainable Hydrocarbons for the UK Chemicals Industry.’
- There is an opportunity to help communicate that biomass use should focus on sectors that cannot be decarbonised, but can be defossilised, e.g., biochemicals and bioplastics.

ACTION: BBIA to publish a response to the biomass strategy online

APPENDIX A: Economic and climate benefits to the UK of an increased use of bio-based chemicals

In December 2022 the Department for Energy Security and Net Zero (formally BEIS) commissioned a 12-month independent study to assess the economic and climate benefits to the UK of an increased use of bio-based chemicals and materials.

NNFCC, FREY Consulting, Perspective Economics and Imperial College London were awarded the tender in January 2023, and the study commenced in February 2023.

The study aims to produce quantitative estimates of carbon and economic benefits of various biomanufacturing technologies, to highlight areas in which biomass use in the chemicals sector can best contribute to growing innovation and the economy, while also helping to meet the UK's Net Zero ambitions.

The research asks:

1. Which bio-based chemicals offer the largest potential for GHG emission savings relative to the fossil incumbents?
2. How can the UK's sustainable biomass resource be effectively and efficiently processed to bio-based chemicals?
3. What economic benefits could result from the increased production of bio-based chemicals, including the value-add compared to bioenergy applications and the opportunity for the UK to develop a competitive advantage in export markets?

Results and conclusions are expected to be published in Q1 2024.

APPENDIX B: IUK Sustainable Hydrocarbons for the UK

Innovate UK currently has a study out for tender 'UKRI-3212 IUK Sustainable Hydrocarbons for the UK', which aims to develop a Sustainable Hydrocarbons Vision for the UK Chemicals Industry, which sets out how the UK can position itself, in the context of a Net Zero future, to be internationally competitive and meet the growing demand for sustainable chemical products. The 4-month project aims to start in November 2023.

The aims and objectives of the study are:

To collate and highlight:

- o the various strategic innovation activities and projects that are already underway and championed by (for example) the Chemistry Council Innovation Committee (CCIC) and Industrial Biotechnology Leadership Forum (IBLF).
- o examples of exemplar sustainable hydrocarbon projects which are being scaled up around the world and which the UK could learn from.

To connect and convene stakeholders across the chemical sector (multinationals, SMEs, start-ups, knowledge base) to:

- o ensure effective collaboration, broad consensus and community engagement. Key stakeholder groups include members of the CCIC and IBLF, but also other organisations representing a broad section of the chemical sector and innovator community.
- o reach consensus on the transformation needed in the UK chemical industry and identify the barriers to achieve this transformation. This should be undertaken by considering different scenarios based on different technological approaches between now and 2050 and the opportunity to leverage current UK assets and strengths in existing supply chains, R&D and innovation.
- o agree on the key new building block chemicals that must be scaled to meet demand
- o agree on the key steps and actions needed to overcome these barriers and the most appropriate mechanism to deliver the required transformation (innovation, regulation, standardisation, infrastructure, research).

To articulate (using evidence and data) industry characterisation, transition challenges and opportunities, technical solution pathways, economic barriers and opportunities, and policy/regulatory implications.