BIO-BASED AND BIODEGRADABLE INDUSTRIES ASSOCIATION

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Response from BBIA to the UK Government's Industrial Strategy Green Paper

The Opportunity for UK PLC

Industrial biotechnology offers the opportunity of responding to key challenges to the UK economy.

PEOPLE

By producing in the UK materials and products derived from biotechnologies, we will be providing secure, long term employment in the UK, reducing dependence on imported materials and products and promoting a value chain encompassing agriculture, waste management, chemistry, distribution and retailing.

PLACE

The UK is privileged to have three centuries of experience in engineering, chemistry, and a highly productive and efficient agricultural base. By enhancing biotechnologies in the UK we can revive and reinvigorate areas of the country in which the industrial base has weakened over the last decades- the Teesside, Merseyside and Clydeside industrial poles have already seen considerable investment in new industrial biotechnologies- yet so much more could be done given the right policy models.

PRODUCTIVITY AND EXPORT

The new industrial biotechnologies must compete on international markets and against well established traditional technologies for market share. The investments in new plant permit leaps and bounds in terms of productivity because only through efficiency will these industries compete, survive and grow. Currently the UK is an importer of most bio-based and biodegradable materials and chemicals. With the right policies it can become a net exporter to a rapidly growing global marketkplace.

INNOVATION

The UK has some of the best research facilities in the world and world leading Universities. Innovation is at the heart of industrial biotechnology yet when trying to bring innovation to market the UK is not particularly successful, as the Green Paper evidences. By creating the market conditions for industrial biotechnology to flourish in the UK, we will stimulate the continuing evolution of research into new materials, products and processes.

The massive opportunity is to develop the policies to build in Great Britain a multi billion pound industrial technology base competing in national and global markets by producing materials and products that can also help respond to the UK's challenges on climate change, low carbon economic growth, resource use, productivity and secure long- term employment, innovation and exports.

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Introduction

The BBIA welcomes the opportunity of being able to respond to the Green Paper on Industrial Strategy. The association represents a varied membership base, from multi-national companies to SME's, working to produce and commercialise materials made from biotechnologies utilising green chemistry and produced from biomass (non embeded geological sources, e.g. plants, algae, animals). These materials are converted into many different products, from bioplastics to insulation materials, to biopesticides and lubricants, coatings, paints, surfactants, and other chemical building blocks including for the pharma and cosmetic industries.

In evidence already given to BEIS in the Bioeconomy Consultation which closed at the end of January 2017, (our submission is attached and we ask that it is read and considered evidence in this Consultation), the development of these new industries and products fall in an area of industrial development largely unconsidered by the Government in the UK, whereas in other economies they have been given greater focus and attention.

The possibility of producing materials which have a circular rather than a linear flow on the economy is one of the drivers of industrial biotechnologies- materials produced from renewable sources that can be recovered and returned to soil or other uses rather than disposed of in a landfill. Behind these materials are years of research and design, as companies compete to bring to market new products with decreasing impacts upon the environment in terms of extraction of resources and recovery of materials. Indeed these are corner stones of the Circular Economy package being discussed now in the European Union which contains many of the elements we hope the UK will adopt into its industrial strategy (recovering food waste, improving waste management, enhancing recycling through producer responsibility, reducing polluting materials, stimulating eco-design).

Members of the BBIA are at the forefront of these new technologies and as can be seen from the Bioeconomy Consultation, have contributed extensively to BEIS with evidence of how their specific sectors can be stimulated to increase jobs, economic growth, exports and wealth in the UK.

We believe that the fragmentation of policy across Whitehall is a major obstacle to achieving growth in these new industries. Our sector involves policy making in BEIS and DEFRA whilst the DCLG and of course the Treasury are involved in any policy framework regarding GPP or waste management policies. We need an overarching vision and policy team to develop the industrial biotechnology sector and make the UK an international powerhouse before it is too late- already the growth of the sector in Germany, France, Italy, Sweden and Finland (just to cite the European countries) is far ahead of the UK and growing quickly. If we wish to attract investments to the UK and from UK finance too, policy coordination is needed as a priority.

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Industrial Biotechnology- the potential

The use of bio-based and biodegradable materials has grown over the last two decades as technologies allow and increasingly sophisticated use of biomass to produce materials. The extraction of sugars and starch from biomass to make energy is a consolidated practice but the processes which allow these base elements to be transformed into new materials and products is relatively new.

Several advantages accrue from using biomass as a basis for chemical production- not least the fact they can be sourced at home without recourse to imported, fossil fuel sources from abroad. Indeed, green chemistry has grown just as traditional oil based chemistry in Europe and the UK has declined. The UK cannot compete with chemicals produced from low cost gas at the oil well in the Middle East nor with the low cost of labour and environmental protection of the Far East.

Biomass and bio-based chemicals that can be transformed into materials in the UK offer home produced industrial solutions, investments and jobs. In this sense they respond perfectly to the need expressed in the Green Paper to ensure innovation, skills, new technologies, are developed in the UK. As an example, in 2015the Centre for Economics and Business Research (CEBR) reported that the growth of a UK domestic bio-plastics industry could create (through the value chain from agriculture to consumer) up to 32,000 new jobs. (see http://bbia.org.uk/wp-content/uploads/2015/11/BBIA-CEBR-Report.compressed.pdf)

Bio-based materials extend into the UK economy through many different permeations.

1. The cultivation of feedstocks for green chemistry gives agro-forestry new income sources whilst agricultural wastes (crop and process residues) can also become a chemical feedstock, reducing costs for disposal and treatment. Such is the case of whisky residues which can be transformed into bio-based butanol with technology offered by Celtic Renewables.
2. Biomass in the form of organic waste destined in the UK to landfill disposal is a major contributor to climate changing GHG emissions. Indeed as the Carbon Budget for 1990 to 2010 has shown, waste industry has contributed a massive 18% of the reductions throughout the UK in emissions. By better utilising this biomass, the UK can achieve more GHG emissions reductions whilst helping deliver the low carbon economy the Government envisages in its vision of an industrial strategy.
3. Bio-based and biodegradable packaging can help the waste sector reduce food and packaging waste through organic recycling. Indeed, with around 7 million tons of food waste untreated in the UK, bio-based and biodegradable packaging can help to collect this in a clean waste stream for recycling in AD and composting. Where high recycling targets or obligatory food waste collections have been put in place (Wales is the leading devolved administration for recycling levels) bio-based and biodegradable packaging can help increase food waste interception, quality and value, as WRAP has reported.

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4. Biomass is used to make lubricants. These are biodegradable so that if they spill (all engines have lubricants spills sooner or later) into the environment, they do not pollute. The use of bio-lubricants is wide spread in Germany where legislation obliges vessels navigating the river systems to use them to avoid water pollution.
5. Plant extracts are being used to make pesticides. UK producer Ecospray makes a highly successful insectide using garlic as a basis. Most of the product is exported. The logic of using plant extracts to produce biocides which do not pollute is exciting and could grow in the UK were this industry to receive the sort of support the Green Paper suggests.
   Natural fibres are being used to make insulating materials for packaging and building industries, derived from wool, plant fibres and bio-chemicals. The use of natural insulating materials has advantages in terms of human and worker health as well as providing alternative markets for materials that often would be regarded as waste (low quality wool fleeces for example). Woolcool Ltd does this, and could grow rapidly adding jobs in the UK to its business were the conditions of access to raw materials made more simple.

   All of these industries come together within the concept of bioeconomy, or industrial biotechnology used to make materials. The drivers for these industries are cleaner production than most traditional petroleum based sources and improved recyclability or biodegradability. The Ellen Macarthur Foundation has called upon Governments to embrace innovation and change the way in which we think about the plastics cycle (https://www.ellenmacarthurfoundation.org/assets/downloads/EllenMacArthurFoundation_NewPlasticsEconomy_26-1-2016.pdf) and using bio-based and biodegradable plastics is one way in which we can increase recovery of these materials whilst reducing the environmental damage their production and usage is determining.

   The Questions asked in the Green paper

In the following text we reply to the 28 questions the Government has asked in the Green Paper.

1. Does this document identity the right areas of focus: extending our strengths; closing the gaps; and making the UK one of the most competitive places to start or grow a business?

   We welcome the focus on a low carbon economy, innovation and clean technologies. The barriers to entry to market for many of these however, are very high and the Government needs to focus on how new technologies and innovation can be consolidated through market mechanisms.

2. Are the ten pillars suggested the right ones to tackle low productivity and unbalanced growth? If not, which areas are missing?

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To achieve higher productivity and balanced growth across the UK geographically, the Government can look at what the UK has traditionally been excellent at- chemistry, energy production, innovative research, engineering- and build on these pillars. By stimulating low carbon energy growth, raising the bar and objectives in terms of waste management, promoting innovation in materials production through Green Chemistry, the Government can create secure, long term employment in industries with export potential as well as domestic growth.

The principles of the circular economy should be overarching the 10 pillars. In some circles, the circular ecnomy is viewed as restrictive and anti-growth whereas the opposite is true. It is not just about packaging recycling, it is a fundamental shift to drive new economies whereby local productivity becomes enhanced due to the inherent benefits of the proximity principle. The circular economy essentially is the interconnecting of two circles, a technically driven circle and a biologically driven circle, the latter is better known as the bioeconomy.

3. Are the right central government and local institutions in place to deliver an effective industrial strategy? If not, how should they be reformed? Are the types of measures to strengthen local institutions set out here and below the right ones?

   As mentioned above, there is the question of coordination of policies. The Government recognise this and the Green Paper is a response which we welcome. To take one example- the waste industry which is a £10bn industry in the UK. Policies on waste regard DEFRA (waste policies), BEIS (energy and infrastructure), DCLG (local government planning and budgets), whilst the Treasury has a key role in budgetary questions. Policy development is extremely complicated and cumbersome in such an environment.

4. Are there important lessons we can learn from the industrial policies of other countries which are not reflected in these ten pillars?

   For the bioeconomy we have learnt that to transform innovation and research from the laboratory to industrial investments, we require markets. Market development based upon subsidies one strategy used, for example, to grow rewnewable energy production and has led to the rapid technological developments which today make renewables competitive with traditional fossil fuels. For bioeconomy such a strategy is unnecessary. Rather, as other countries have shown (Germany, France, Italy, USA) the development of markets has been made by relatively minor interventions e.g. raising the environmental quality of standards. So by banning non – compostable plastic bags (allowing compostable, bio-based bags) Italy has created a large industry making these, at zero cost to their Treasury. France has gone along a similar route, whilst in the USA the bio-based prefered purchasing programme of the Government, is a Green Public Procurement programme giving markets to bio-based materials. In

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Germany the obligatory use of biolubricants on waterways has stimulated the production of these materials, again at zero cost to their Treasury.

The Government can learn from these examples and decide to stimulate the growth of UK based manufacturing of green chemicals and other bio-based products by giving market certainty to producers- not subsidies.

One area such market certainty is relatively easy to achieve is that regarding biolubricants; whilst a larger impact could be had through the obligation of food waste collections from households across the UK and raising the standards on contamination levels to avoid plastic pollution in the food waste stream.

5. What should be the priority areas for science, research and innovation investment?

   For industries in the bioeconomy sector there is need for constant research into new materials and cleaner production. A sector deal on food waste treatment which focusses upon cleaner treatment technologies could be a driver to greater effeciencies, lower costs, investments and exports of these tecnologies. However, we are also convinced that innovation is driven where there is market competition and the creation of markets for these new materials is the priority now. This is why we will not reply to the questions below.

6. Which challenge areas should the Industrial Challenge Strategy Fund focus on to drive maximum economic impact?

7. What else can the UK do to create an environment that supports the commercialisation of ideas?

8. How can we best support the next generation of research leaders and entrepreneurs?

9. How can we best support research and innovation strengths in local areas?

10. What more can we do to improve basic skills? How can we make a success of the new transition year? Should we change the way that those resitting basic qualifications study, to focus more on basic skills excellence?

11. Do you agree with the different elements of the vision for the new technical education system set out here? Are there further lessons from other countries' systems?

12. How can we make the application process for further education colleges and apprenticeships clearer and simpler, drawing lessons from the higher education sector?

13. What skills shortages do we have or expect to have, in particular sectors or local areas, and how can we link the skills needs of industry to skills provision by educational institutions in local areas?

14. How can we enable and encourage people to retrain and upskill throughout their working lives, particularly in places where industries are changing or declining? Are there particular sectors where this could be appropriate?

15. Are there further actions we could take to support private investment in infrastructure?

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In terms of bioeconomy industries we feel that the waste industry requires greater infrastructural investments to improve the treatment of waste in the UK itself. Currently the Uk exports waste, money and energy to Europe (over 3 million tons in 2016) when plants treating the same wastes can be built in the UK.
Food waste collections would drive forward the development of the needed infrastructure to treat this stream in AD and composting.

16. How can local infrastructure needs be incorporated within national UK infrastructure policy most effectively?
17. What further actions can we take to improve the performance of infrastructure towards international benchmarks? How can government work with industry to ensure we have the skills and supply chain needed to deliver strategic infrastructure in the UK?
18. What are the most important causes of lower rates of fixed capital investment in the UK compared to other countries, and how can they be addressed?
19. What are the most important factors which constrain quoted companies and fund managers from making longer term investment decisions, and how can we best address these factors?
20. Given public sector investment already accounts for a large share of equity deals in some regions, how can we best catalyse uptake of equity capital outside the South East?
21. How can we drive the adoption of new funding opportunities like crowdfunding across the country?
22. What are the barriers faced by those businesses that have the potential to scale-up and achieve greater growth, and how can we address these barriers? Where are the outstanding examples of business networks for fast growing firms which we could learn from or spread?
23. Are there further steps that the Government can take to support innovation through public procurement?
24. What further steps can be taken to use public procurement to drive the industrial strategy in areas where government is the main client, such as healthcare and defence? Do we have the right institutions and policies in place in these sectors to exploit government's purchasing power to drive economic growth?

The introduction of a GPP for specific sectors which included requirements for the transition from fossil fuel sourced / non-biodegradable products to bio-based / biodegradable products would help drive further collaboration and further research. For example, this might include theshift from a particular persistent herbicide to one which is biodegradable but is currently just at lab scale.

Another example would be a scoping exercise to determine "easy win" products consumed widely across the public sector but where procurement is disjointed and thus

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identify the market opportunities where economies of scale would help drive investment in bio-based and biodegradable alternatives.

Current GPP pays scant regard to the three pillars of sustainability (economic, environment, social) or the proximity principle.

As we have said above, GPP can be a phenomenal driver for bioeconomy materials entering new markets. Were the Government, for example, to oblige its departments to use compostable and bio-based materials such as coffee cups and disposable table ware in staff canteens and cafés, this would stimulate the production of such materials. Currently Vegware of Edinburgh provide such products to the market and were the Government to stimulate this use through the simple GPP mechanism, companies such as Vegware would compete and develop their markets across the UK. The same goes for pesticides used on Government land, or lubricants on internal waterways. The mandating of higher environmental standards will stimulate innovation, investment, jobs and exports.

25. What can the Government do to improve our support for firms wanting to start exporting? What can the Government do to improve support for firms in increasing their exports?

26. What can we learn from other countries to improve our support for inward investment and how we measure its success? Should we put more emphasis on measuring the impact of Foreign Direct Investment (FDI) on growth?

27. What are the most important steps the Government should take to limit energy costs over the long-term?

28. How can we move towards a position in which energy is supplied by competitive markets without the requirement for on-going subsidy?