

UK Bioeconomy: Call for Evidence



This call for evidence closes on **29 January 2017**

Please send your responses to: ukbioeconomystrategy@beis.gov.uk

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OVERVIEW

This call for evidence seeks your input to help shape a UK bioeconomy strategy. Our aim is to produce a strategy that is appropriate to the UK's industrial structure and availability of natural resources. This strategy will engage with many different sectors across the economy and will need to take account of other objectives, such as on decarbonisation, broader sustainability and food security

The survey is a series of questions which will help us scope out the opportunities, challenges, barriers and enablers of the bioeconomy. We would your views on where there is room for growth and what needs to be done to achieve the promise of the bioeconomy.

Introduction

The UK government, working with five industry sector leadership councils, would like your input to help shape a UK bioeconomy strategy. Our aim is to produce a strategy which will foster a world leading bioeconomy in the UK, which takes into account objectives in related sectors across the economy.

What is the Bioeconomy?

The bioeconomy is the economic opportunity of using biology to help solve challenges we face in agriculture, energy, health and more, which has the potential to deliver economic, environmental and social benefits to the UK.

The bioeconomy includes all economic activity derived from bio-based products and processes. These have the potential to contribute to sustainable and resource efficient solutions to the challenges we face in food, chemicals, materials, energy production, health and environmental protection.

The bioeconomy comprises all economic activities that are either:

- (i) Feedstocks which could be biomass based(including domestic, commercial, agricultural or industrial waste) or fossil fuel based(including industrial and metropolitan wastes) which are treated by a combination of physical, chemical and biotechnological processes;
- (ii) 'bio-transformative activities – Those which add value through the inclusion of a physically or chemically transformative process that involves either as outputs or as processors, biological resources (the tissues, cells, genes or enzymes of living or formerly living things);

- (iii) 'bio-based upstream activities' – Those that add economic value as upstream suppliers of bio-transformative activities; or
- (iv) 'bio-based downstream activities' – Those which add economic value as downstream users of the outputs of bio-transformative activities.

Completing the Survey

This call for evidence is open to all who have an interest in the bioeconomy – both individuals and organisations.

The data you supply will provide us with valuable evidence to support the development of the strategy and allow us to understand the full range of issues and opportunities facing the bioeconomy.

You will find the questions in the call divided into the following headings:

- **Bioeconomy Definition**
- **Economic Growth**
- **Sustainability**
- **Investment**
- **Research and Development**
- **Sectoral Cooperation**
- **Supply Chain Cooperation**
- **Government and Policies**
- **European Issues**
- **International Issues**
- **Standards**
- **Other questions**

Apart from the questions which provide us with important details about the person completing this call for evidence, you can:

- **Answer whichever questions you want to**
- **Leave boxes blank where you have no comments**
- **Look at pages more than once**
- **Save a partial reply and go back to it later**
- **Clear answers you have previously typed in but not submitted**

What Happens Next

Responses will provide vital supporting evidence to the development of a UK bioeconomy strategy which we aim to publish in spring 2017. However, it is important to note that responses will be part of a wider initiative to develop the strategy and they will have to be assessed on this basis, as well as in relation to each other. They will also need to be assessed in relation to government priorities, such as on the industrial strategy and in the context of changing circumstances.

CONFIDENTIALITY AND DATA PROTECTION

Information provided in response to this consultation, including personal information, may be subject to publication or release to other parties or to disclosure in accordance with the access to information regimes (these are primarily the Freedom of Information Act 2000 (FOIA), the Data Protection Act 1998 (DPA) and the Environmental Information Regulations 2004). There is also a statutory Code of Practice issued under section 45 of the FOIA with which public authorities must comply and which deals, amongst other things, with obligations of confidence.

If you want information, including personal data, that you provide to be treated in confidence, please explain to us what information you would like to be treated as confidential and why you regard the information as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the department.

The Survey

Introductory Questions

1. What is your name?

James Beard

2. What is your organisation or business.

WWF-UK

3. Which best describes you? *[Tick boxes]*

- Business Representative Organisation/Trade Body
- Central Government
- Local Government
- Charity or Social Enterprise
- Trade Union or Staff Association
- Legal Representative
- Large business (over 250 staff)
- Medium Business (50-250 staff)
- Small Business (10-49 staff)
- Micro Business (up to 9 staff)
- Start up
- Academic
- Individual
- Other (please describe)

Charity or Social Enterprise

4. What is your email address?

jbeard@wwf.org.uk

5. Please describe the sector you operate in and provide any further information about your business and activities that you think might help us put your answers in context.

WWF is a leading global conservation organisation, employing over 5,000 staff in more than 100 countries and with more than five million supporters across the world. We believe that, provided biomass is responsibly used in efficient and effective applications, and taking into account the UK's ambitions to protect and improve natural capital, the bioeconomy provides significant opportunities for innovation, jobs and more environmentally sustainable growth. In particular, it can play a role in helping the UK phase out its use of fossil based fuels and feedstocks, by replacing them with responsibly sourced bio-based alternatives.

Bioeconomy Definition

6. Does our definition of the bioeconomy (see overview above) include within its scope all of the relevant bio-based products and processes? If not, please explain.

No.

In its 2015 report “A Greener Budget: Choices for a Prosperous Future”, WWF-UK offered both a descriptive and a normative definition of the bioeconomy. The descriptive definition is on p. 60:

“The bioeconomy comprises those parts of the economy that use renewable biological resources from land and sea (such as crops, forests, fish, animals and microorganisms) to produce food, materials and energy. It incorporates forestry and logging, agriculture, fishing and food manufacturing, industrial biotechnology and bioenergy. It comprises both conventional and innovative uses of biomass, from the production of food and clothing, through to cutting edge industrial biotech. It also spans the full product life cycle: from production, to use, to reuse, to recycling, to energy generation from waste – and therefore forms a key part of the circular economy (in which resources are kept in use for as long as possible, and the maximum value extracted from them while in use, and then components and materials are recovered and regenerated, reused or recycled).”

The descriptive definition proposed in this consultation lacks clarity about whether or not the bioeconomy only includes innovative technological applications of biomass or whether it also includes conventional uses of biomass, such as food and materials. WWF-UK’s definition is explicit that conventional uses should also be considered within scope of the bioeconomy, as any strategy to realise the potential benefits of developing innovative technological applications of biomass will have very direct reliances and impacts on these conventional uses as well. In our view, decisions about strategic direction for UK agriculture (especially in a post-Brexit context) are very much a core part of the bioeconomy. Government strategy for the bioeconomy therefore clearly requires close cooperation to develop shared objectives across BEIS and Defra.

Additionally, WWF-UK disagrees that fossil-based fuels and feedstocks should be considered within scope of the bioeconomy, even if they are treated with biotechnological processes. The bioeconomy should be thought of as a sub-sector of the circular economy and a means of contributing to climate change mitigation. Fossil fuels have no enduring role to play in a circular economy, as they are finite and exhaustible, nor in tackling climate change, as their use actively contributes to global warming. The bioeconomy should facilitate the phasing out of fossil-based fuels and feedstocks, and must not in any way support their continued use.

The “Greener Budget” report’s normative definition of the bioeconomy is found on p. 63 Box 13: “A Positive Vision for the Bioeconomy”. It comprises four main criteria for a sustainable bioeconomy:

- Efficiency
- Effectiveness
- Responsible sourcing
- Natural capital and ecosystem services

The consultation does not propose a normative definition, or “vision”, for the bioeconomy. WWF-UK believes these criteria should be at the heart of such a “vision” for the Government.

Further evidence

WWF-UK 2015: WWF-UK policy on bioenergy: Climate policy must address risks and opportunities across the bioeconomy. Available on request from WWF-UK.

WWF-UK 2015: A Greener Budget – Choices for a Prosperous Future. Available at:
http://assets.wwf.org.uk/downloads/a_greener_budget_2016_report_download.pdf

Economic Growth

Through the various types of bio-based activities, the bioeconomy makes a significant contribution to output and employment in the British economy. The whole bioeconomy, comprising transformative, upstream and downstream elements, generated approximately £220 billion in gross value added and supported 5.2 million jobs in 2014.

7. Within your sector or organisation, what are the prospects for economic growth that are related to the bioeconomy?

In a world where resources are becoming increasingly scarce, promoting a healthy circular economy, of which a bioeconomy is part, to boost our resource efficiency will be crucial to retain our competitiveness and continue to thrive in the global economy. Nearly a third of profit warnings issued by FTSE 350 companies in 2011 were attributed to rising resource prices. Improving the 'circularity' of the economy helps to insulate businesses against supply and price shocks, cuts waste and saves costs.

Developing a thriving UK resource recovery industry would also create new business opportunities and jobs. A study estimated that 500,000 new jobs could be created by 2030 if the UK were to make substantial progress in moving towards a circular economy. The All-Party Parliamentary Sustainable Resource Group estimated that the UK remanufacturing industry alone is already worth at least £2.4 billion, with other estimates suggesting it has the potential to increase to £5.6 billion.

Further evidence

Aldersgate Group, 2013. Business Statement: Resource security vital for growth and prosperity.

All-Party Parliamentary Sustainable Resource Group: Remanufacturing - Towards a Resource Efficient Economy 2016. Available at: <http://www.policyconnect.org.uk/apsrg/research/report-remanufacturing-towards-resource-efficient-economy-0>

8. Given your expectations, do you think there are potential issues are holding back further economic growth in the sector? For example:

- feedstock availability
- demand or ability of downstream users to adapt to the new products
- demand or ability of end users to adapt to the new products
- workforce skills
- input/output price uncertainty
- confidence in future of the sector

Yes.

At present the bioeconomy is poorly defined and not well understood by stakeholders. The Government should clarify its definition and vision for the bioeconomy to inspire confidence in the future of the sector.

WWF-UK believes that sustainability must be at the heart of this vision. If sustainability is only an afterthought to a central objective focused on too narrowly on growth, the UK may end up in a position where certain bioeconomic practices are initially promoted, only later to be discouraged because of adverse impacts on sustainability objectives.

One clear example of this is recent EU biofuels policy, which at the conception stage did not give due consideration to sustainability issues such as indirect land use change (ILUC), putting in place targets that prompted Member States to introduce incentives, only to then later introduce a cap on conventional crop-based biofuels. This process of revising policies post hoc to incorporate sustainability concerns was very arduous and burdensome for policymakers and businesses alike, paralysing investment not only into conventional crop-based biofuels, but also advanced biofuels as well.

The Government must learn the lessons from past experience and ensure that sustainability is written through its Bioeconomy Strategy from the outset, to avoid adverse impacts for both industry and the environment. This will inspire confidence in the future of the sector.

In addition, the Government must recognise that a healthy and growing bioeconomy depends on a sustainably managed natural capital asset base. Natural capital in the UK (including woodland, wetland, peatland, soil quality etc.) has been severely depleted according to evidence in the National Ecosystem Assessment and Natural Capital Committee reports, with growing economic costs. Thus investment in our natural capital is urgently required. The forthcoming 25 Year Environment Plan aims to reverse the decline in our natural capital, and identify priorities. The bioeconomy should be developed with this context in mind, and must be designed in a way that is consistent with the goals of the Plan.

Further evidence

UK National Ecosystem Assessment, 2011. Available at: <http://uknea.unep-wcmc.org/Resources/tabid/82/Default.aspx>

Natural Capital Committee 2011: The state of natural capital: protecting and improving natural capital for prosperity and wellbeing. Available at: <https://www.gov.uk/government/publications/natural-capital-committees-third-state-of-natural-capital-report>

9. Do you think that growth in a particular sector of the bioeconomy impacts growth in other sectors in a way that should affect our priorities?

Yes. Promoting the burning of biomass feedstocks for energy, when they have potential material uses, reduces the availability of feedstocks for potentially more beneficial, higher value uses.

Bioenergy has been promoted as a climate change solution in the UK through subsidy schemes such as the Renewables Obligation, Contracts for Difference, the Renewable Heat Incentive and the Renewable Transport Fuel Obligation. However, much of the bioenergy generated under these schemes has been produced by burning virgin feedstocks which could potentially have other high value applications, such as food and materials. It is important to ensure the cascading use of wood/timber - as a real means of delivering a "circular economy" based on most efficient use and recovery and re-use before a material reaches its end of life use. For wood fibres, this can be seven lives.

Whilst we cannot comment on specific growth impact, it is likely that disproportionately incentivised use of virgin wood for biomass, which could be used for other products e.g. fibreboard, could impact the viable economies of those sectors structured around the use of the same kind of wood material – and that with good recovery and re-use of woody material in construction, for example, this short circuiting of cascading use could be avoided.

Bioenergy is most likely to deliver real carbon savings when it is produced from feedstocks that have no further material use and which would be likely to rapidly decay anyway, thereby releasing the carbon contained therein back to the atmosphere. In these circumstances it makes good environmental sense to use these feedstocks for energy generation to displace fossil fuel use.

Burning materials before they reach this stage, when the likely counterfactual is that they would remain in non-gaseous form serving valuable economic functions, means releasing carbon back into the atmosphere sooner, which both accelerates global warming, and overall constitutes an inefficient use of the biomass resource, which means more extraction of biomass from natural environments is required to deliver the same unit of economic output.

At the heart of the Government's Bioeconomy Strategy should be resource efficiency and effectiveness. Resource efficiency means ensuring that maximum economic and environmental value is produced from each unit of biomass, while effective use means ensuring biomass is promoted in sectors where it is really needed due to lack of alternatives.

In practice this would mean the Bioeconomy Strategy updating or replacing the existing Bioenergy Strategy in order to:

- Ensure that only residual feedstocks with no further material use, for which the likely counterfactual is rapid decay, are promoted for bioenergy.
- Ensure that these feedstocks are responsibly produced using credible certification schemes such as the Roundtable for Sustainable Biomaterials (RSB).
- Ensure that bioenergy is only promoted in sectors where it is really needed due to lack of alternatives, such as industry and aviation, and potentially shipping and freight.

This would ensure that feedstocks suitable for developing long-life and/or multi-life material products remain available for those purposes. In a thriving and sustainable bioeconomy, **products should be designed to facilitate their reuse, their recycling, and their eventual energy recovery**. The Government's Bioeconomy Strategy should promote the development of long-life material products expressly intended for reuse, recycling and eventual energy recovery. This will increase resource efficiency and thereby reduce the need for further extraction of biomass from natural environments.

WWF's UK headquarters, the Living Planet Centre in Woking, offers a good example of this. Its construction emphasised the use of timber, all of it sustainably sourced from either recycled or FSC-certified sources. Every component in the building (both biological and non-biological) has been designed for reuse and/or recycling ("designed for deconstruction"). The building also exploits the benefits of live biomass – the three weeping fig trees on the ground floor keep our air clean and oxygen levels up. They absorb both noise and toxins, boosting air quality and employee well-being.

There is another important benefit to increasing the development of long- and multi-life bio-based products. The Paris Agreement on Climate Change commits countries to two important goals:

- Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C
- Achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century

It is increasingly clear that achieving these goals will require a significant contribution from negative emissions technologies (NETs), also known as carbon dioxide removal (CDR) techniques. This means removing CO₂ from the atmosphere (reducing atmospheric concentrations of CO₂ and hence mitigating global warming) and storing this carbon either in gaseous form in underground reservoirs (carbon capture and storage – CCS) or storing it in material form. There are currently two main CDR approaches receiving serious attention:

- **Bioenergy with CCS (BECCS):** Growing trees or crops, burning them to generate energy and storing the resultant CO₂ in underground reservoirs.
- **Afforestation and ecosystem restoration:** Enhancing the carbon storage and sequestration value of terrestrial carbon reservoirs, such as forests and peatland.

WWF-UK urges further examination of these “negative emissions options”, but cautions that these should not detract from efforts to reduce emissions through e.g. deployment of renewable energy. **“Negative emissions” are needed as well as, not instead of, deep cuts in carbon emissions.** In particular, BECCS should be further explored, but it would be extremely unwise to assume large scale contribution of BECCS due to its unproven status and sustainability constraints.

WWF-UK believes that bio-based products present a further option for increasing “negative emissions” by increasing the biogenic carbon stock in the products pool:

- **Resource efficient bio-based products:** Growing trees or crops, developing material bio-based products (displacing the use of fossil-based feedstocks) and extending the product life (thereby delaying carbon emissions) by facilitating reuse and recycling before eventual energy recovery (displacing the use of fossil-based fuels).

WWF-UK therefore considers this to be an important sector of the bioeconomy that should be further promoted, whereas support for bioenergy generation from virgin biomass feedstocks should be discouraged.

Further evidence

[Mapping Study on Cascading Use of Wood Products](#) commissioned by WWF and global packaging and paper group Mondi, looks at how regulation either hinders or promotes what is known as ‘cascading use’ of wood – prioritising value adding non-fuel uses so wood is burned for energy only after it has been used, re-used and recycled as a material first wherever possible.

For more information about WWF-UK’s Living Planet Centre, see our brochure or come and visit us for a specialist tour of the building’s environmental features:

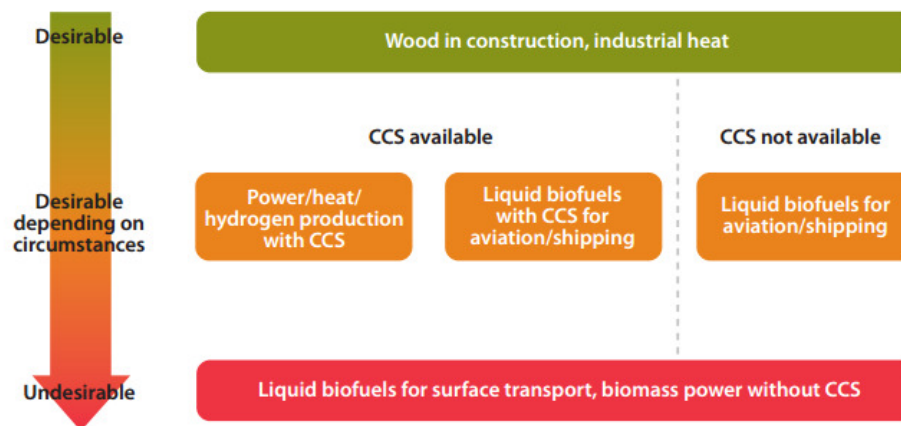
http://assets.wwf.org.uk/downloads/16_01_lpc_souvenir_brochure_online_1.pdf?_ga=1.97739609.736520801.1416495376

The nova-Institute in Germany is at the forefront of research into the bio-based economy and developing the evidence base on bio-based materials. See e.g. the eight “nova-Papers” on the bio-based economy, available at: <http://bio-based.eu/nova-papers/>

The Committee on Climate Change (CCC) discusses the need for “negative emissions” in its 2016 report “UK climate action following the Paris Agreement”. Available at: <https://www.theccc.org.uk/publication/uk-action-following-paris/>

The CCC has long advised material use of biomass in preference to direct energy use. See, for example its 2011 “Bioenergy Review” (p. 10): “the use of woody biomass in construction (rather than as an energy source) should be a high priority, given that this generates negative emissions through a very efficient form of carbon capture”. Available at: <https://www.theccc.org.uk/publication/bioenergy-review/>

Figure ES.1: Hierarchy of appropriate use of bioenergy in 2050



Source: CCC.

10. What do you think the UK’s bioeconomy goals should be in the long term i. e. 15 years or more? You could add to your reply by telling us what actions we should be taking to get there. This could include actions by government, biotechnology developers/providers, UK user sectors and consumers.

The Government should be aiming to develop a bioeconomy that, in 15 years, fully satisfies the four key criteria of our “Positive Vision for the Bioeconomy” (set out in our Greener Budget Report 2016). This means supporting the efficient and effective use of responsibly sourced biomass, without degrading the other ecosystem services afforded by natural capital:

- **Efficiency**
 - Removing **all** support for bioenergy applications that use virgin biomass feedstocks, such as wood pellets and crop-based biofuels, to discourage resource inefficiency and reduce carbon emissions.

- Increasing support for the development of long-life biomaterials, designed for reuse, recycling and eventual energy recovery, to increase resource efficiency and biogenic carbon storage in the products pool. For example, the Government could strengthen building regulations by requiring the use of a certain portion of sustainably sourced timber with reuse and recycling plans.
- Strengthening support for bioenergy applications that use biomass feedstocks that have no further use and would otherwise decay, such as waste-based anaerobic digestion, advanced conversion technologies and production of renewable hydrogen from biomass and biogas, to increase resource efficiency and support climate change mitigation.
- Removing **all** support for bioenergy applications that have a low energy conversion efficiency, such as power generation, to discourage resource inefficiency and reduce carbon emissions.
- **Effectiveness**
 - Removing **all** support for bioenergy applications in sectors that have viable low-carbon alternatives to bioenergy, such as power generation.
 - Strengthening support for sustainable bioenergy applications in sectors without viable alternatives, such as aviation and industry, and potentially freight, shipping and heat/CHP, to promote effective use of biomass.
- **Responsible sourcing**
 - Ensuring that **all** biomaterials and biofuels promoted in the bioeconomy are certified to a credible sustainability standard, such as RSB.
 - Increasing the share of bio-based material products that are both a) certified to a credible standard, such as the Forest Stewardship Council (FSC) or RSB, and b) designed to facilitate their reuse, recycling and eventual energy recovery.
- **Natural capital and ecosystem services**
 - Ensuring that biomass extraction for use in the bioeconomy (provisioning services) is fully offset by investment in natural capital to sustain the full range of ecosystem services afforded by UK woodland, peatland and farmland.
 - The forthcoming 25 Year Environment Plan should set clear goals for investment across the UK's natural capital asset base, and the Bioeconomy Strategy must be designed in a way that is consistent with the Plan and the achievement of its goals. It must take into account both the impacts the Strategy will have on natural capital, and the dependence of the Strategy on natural capital, as the ongoing availability and health of natural assets will determine the future success of the Strategy.
 - There are strong potential synergies between the two strategies. For example, the economic and social benefits of investment in increased forest cover (arising from increased carbon sequestration, recreation and air quality, as well as increased wildlife habitat) has been highlighted by the Natural Capital Committee as a potential priority investment in the 25 Year Environment Plan. The financial returns and incentives for private investment could be further enhanced by linking to incentives for sustainable timber production in the Bioeconomy Strategy - consistent with the cascading use principle - for example to promote increased uptake of timber by the domestic construction sector.

11. What do you think the UK's bioeconomy goals should be in the short term i.e. the next 5 years?

The Government should develop a Bioeconomy Strategy that, in 5 years, sets a clear plan to satisfy the four key criteria of our "Positive Vision for the Bioeconomy". This includes:

- **Efficiency**
 - Immediately removing support for **new** bioenergy projects proposing to use virgin biomass feedstocks, such as wood pellets and crop-based biofuels, to discourage resource inefficiency and reduce carbon emissions.
 - Immediately removing support for **new** bioenergy projects that would have a low energy conversion efficiency, such as power generation, to discourage resource inefficiency and reduce carbon emissions.
 - Strengthening support for bioenergy applications that use biomass feedstocks that have no further use and would otherwise decay, such as waste-based anaerobic digestion, advanced conversion technologies and production of renewable hydrogen from biomass and biogas, to increase resource efficiency and support climate change mitigation.
 - Setting a date, no later than 2030, by which **all** support for inefficient bioenergy applications will be phased out.
- **Effectiveness**
 - Immediately removing support for **new** bioenergy projects in sectors that have viable low-carbon alternatives to bioenergy, such as power generation, to discourage ineffective use of biomass.
 - Setting a date, no later than 2030, by which **all** support for bioenergy applications in sectors that have viable low-carbon alternatives, such as power generation, will be phased out, to discourage ineffective use of biomass.
 - Strengthening support for sustainable bioenergy applications in sectors without viable alternatives, such as aviation and industry, and potentially freight, shipping and heat/CHP, to promote effective use of biomass.
- **Responsible sourcing**
 - Immediately reviewing sustainability criteria for **new** bioeconomy-promoted projects to require credible certification, such as RSB.
 - Setting a date, no later than 2030, by which **all** biomaterials and biofuels promoted in the bioeconomy will be certified to a credible sustainability standard, such as RSB.
- **Natural capital and ecosystem services**
 - Feeding into the design of the 25 Year Environment Plan to ensure consistency between the government's approach to developing the bioeconomy and its ambition to reverse the decline in the UK's natural capital.
 - Incorporating information on natural capital (including in biological systems) into the annual Budget report.
 - Developing new tools and approaches for assessing the economic risks associated with depletion of natural capital (including in biological systems).
 - Implementing policies to help drive investment in priority natural capital assets (including in biological systems, such as woodland and peatland).

12. Can you tell us about any "quick wins" to increase the growth of the bioeconomy?

No response.

13. Do you think the UK is likely to miss any of these “quick wins”? If so, why is that?

No response.

14. Can you tell us about any other issues in the broader environment that are holding back economic growth in the bioeconomy?

No response.

Sustainability

As demand for bio-based resources increases, there can be concerns regarding feedstock sustainability, including the direct and indirect impacts of changes in land use, soil quality and carbon stocks. However, there are also opportunities to increase resource efficiency by using residues from agriculture, forestry, and industry.

15. How sustainable is your sector of the bioeconomy in respect of infrastructure issues? Eg roads, planning issues, telecommunications, energy and water supply.

No response.

16. How does your sector contribute to or impact on sustainability in respect of environmental issues including concerns about high energy use, water, greenhouse gas emissions, air and land pollution and destruction of animal habitats?

WWF-UK works on all of these issues, but will answer this question by referring to the potential impacts of bioeconomic activity on each of these issues and concluding with reference to the role of certification for ensuring that environmental benefits are achieved and risks mitigated.

High energy use

The contribution of bioeconomy products and activities to climate change mitigation can be assessed through lifecycle analysis (LCA). Process energy emissions must be captured in LCA to give a full picture of the benefits (or disbenefits) of bioeconomy products and activities to mitigating climate change. Bioeconomy products and activities with lower process energy emissions will tend to have a greater greenhouse gas saving on a lifecycle basis.

Water

Availability of land and freshwater are key constraints on the availability of feedstocks for bioeconomy products and activities. With a growing and developing global population, pressures on land and water will increase over the course of this century. This is why efficient use of land and water is essential. Growing crops on land solely to be turned into fuel, without any interim stages of product life, is not an efficient use of land and water.

Greenhouse gas emissions

Bioeconomy products and services can contribute to climate change mitigation by displacing fossil-based fuels and feedstocks and by increasing carbon storage (or “negative emissions”) in bio-based products. These benefits should be captured in LCA.

However, all bioenergy applications ultimately result in the release of greenhouse gases to the atmosphere. This is why it is essential that bioenergy is only credited towards climate change mitigation when the counterfactual for the unit of biomass is that it would otherwise decay in

the near term, thereby releasing the carbon contained therein back to the atmosphere anyway.

(There is another scenario in which the net effect of a bioenergy project may be carbon negative and therefore contribute to climate change mitigation, which is when demand for bioenergy incentivises the growth of energy crops on land with low carbon stock (e.g. degraded land), thereby increasing the carbon stock of that land. However, material use of these crops in the first instance would still be preferable from a climate change and resource efficiency perspective.)

Air and land pollution

Trees can boost air quality while alive by sequestering not just CO₂, but also particulate matter that is harmful to human health. Bioenergy however does not confer any inherent air quality benefit relative to fossil energy. For example, combustion of wood entails similar air quality impacts to combustion of coal. However, in general, gaseous fuels burn more cleanly than solid or liquid fuels. Gaseous biofuels can be developed by applying anaerobic digestion (AD) or advanced conversion technologies (ACT) to biomass feedstocks, including biowaste that would otherwise decay and release carbon into the atmosphere. Therefore, focusing bioenergy support on these technologies, which are better suited to dealing with residual waste than power stations and boilers, could also bring substantial air quality benefits (e.g. displacing petrol or diesel in freight).

Destruction of animal habitats

The development of bioeconomy products and services should not be established through the conversion of ecologically important ecosystems (such as natural and semi-natural forests, grasslands, wetlands and peatlands), including those that have been identified as High Conservation Value Areas (HCVAs), in order to minimize impacts on biodiversity. The destruction of ecologically important ecosystems and HCVAs can lead to a host of significant, irreversible consequences, such as the loss of critical conservation areas, increased habitat fragmentation and decreased resilience, decrease of species diversity (including species extinction in extreme examples), increased conflicts between humans and wildlife resulting in serious threats to human lives and livelihoods as well as decimation of wildlife populations, changes in soil structure and reduced fertility and increased GHG emissions (e.g. from peatlands).

It is important to note too, that with demand for material for woody biomass, there could be a risk of over stripping forests which are under management and using material e.g. thinnings, stumps, dead wood etc. for supply, with eagerness to classify such materials as waste. If not properly monitored, this can lead to apparently well managed, but otherwise sterile forest habitats which are unable to provide function for biodiversity. See next point.

The role of robust certification

While the above-listed issues are critical, they only cover a relatively limited selection of the full range of sustainability criteria that should be applied to bioeconomy products and services. In particular, it does not cover social and economic sustainability issues, such as land rights, stakeholder engagement and food security. A more comprehensive list of sustainability principles can be found in the Roundtable for Sustainable Biomaterials (RSB):

1. Legality: All applicable laws and regulations followed.

- 2. Planning, Monitoring and Continuous Improvement:** Planning, implementation, and continuous improvement through identification, mitigation and ongoing monitoring of key environmental and social risks.
- 3. Greenhouse Gas Emissions:** Climate change mitigation through significant reduction in greenhouse gas emissions compared with fossil fuels.
- 4. Human and Labor Rights:** No violation of human or labor rights and promotion of decent work and workers' wellbeing.
- 5. Rural and Social Development:** Contribution to social and economic development of local, rural and indigenous people, and communities in regions of poverty.
- 6. Local Food Security:** Ensured human right to adequate food, and improved food security.
- 7. Conservation:** Avoidance of negative impacts on biodiversity, ecosystems, and conservation values.
- 8. Soil:** Maintenance of soil health and/or practices to reverse soil degradation.
- 9. Water:** Maintenance, or enhancement, of quality and quantity of surface and ground water, and respect for water-use rights of local people.
- 10. Air:** Minimized air pollution along the supply chain.
- 11. Use of Technology, Inputs and Management of Waste:** Maximized efficiency and social and environmental performance, and minimized risk of damage to the environment and people.
- 12. Land Rights:** Respect for traditional land rights of indigenous and local communities.

RSB has also developed specific sustainability modules to certify techniques to mitigate the risks of indirect land use change (ILUC) and for use of wastes and residues. These sustainability criteria should be at the heart of the Government's Bioeconomy Strategy.

Government publications on the bioeconomy to date have indicated a preference for using waste-based feedstocks as far as possible, which WWF-UK welcomes. However, WWF-UK would caution that using waste, while a step in the right direction for sustainability, does not simply resolve all sustainability issues. Indeed, certification of wastes and residues is still required. For example, a proportion of agricultural residues should be left behind to maintain soil health and fertility (as well as soil carbon storage) rather than all being extracted for use in bioeconomy products or services.

Over time, certification should also be extended upstream, to ensure that products are being sustainably produced before they become classified as a waste for use in industrial bioeconomy applications, such as bioenergy or industrial biotechnology. This additional level of sustainability assurance should include criteria for the extent to which product design facilitates the product's reuse, recycling and eventual energy recovery.

The economic case for certification to assure the sustainability of biomass is increasingly clear at the level of both countries and businesses. Taking timber as an example, sustainable timber markets are a means to preserving existing economic activity, and by the same token, the future of current timber trade patterns is in doubt unless sustainable forestry management becomes more widespread as a means of securing supply. At the level of the company, businesses are starting to report net financial gain by addressing sustainability in their organisation, including sustainable sourcing of timber."

Further evidence

RSB 2016: RSB Principles & Criteria for the sustainable production of biomass, biofuels and biomaterials. Available at:

http://www.rsb.org/pdfs/documents_and_resources/PandCs%20Brochure.pdf

RSB 2015: RSB Low iLUC Risk Biomass Criteria and Compliance Indicators. Available at:

<http://rsb.org/pdfs/standards/RSB-STD-04-001-ver0.3RSBLowILUCCriteriaIndicators.pdf>

The Nature Conservancy 2016: Planting Healthy Air. Available at:

<https://global.nature.org/content/healthyair>

WWF-International 2012: WWF Policy on Bioenergy. Available at:

http://awsassets.panda.org/downloads/final_bioenergy_policy_external_april_2012.pdf

WWF-UK 2016: 100% Sustainable Timber Markets: The Economic and Business Case. Available at: <https://www.wwf.org.uk/updates/100-sustainable-timber-markets-economic-and-business-case>

17. How should the strategy take into account UN sustainable development goals?

These include: ending hunger and poverty, improving food security and nutrition, cleaner water and improved sanitation, affordable and clean energy, sustainable industrialization with responsible production and consumption, reducing climate change, and protecting ecosystems on land and in water?

The Bioeconomy Strategy should be part of the Government's plan for implementing the SDGs. The SDGs are universal goals that apply to all countries. In the UK there are three opportunities: a) delivering the SDGs domestically for all citizens; b) ensuring that ODA and international financial institutions support the delivery of the SDGs overseas through their programming and policies; c) ensuring policy coherence for sustainable development so that UK domestic and international policies have a positive, not negative, impact on achieving the SDGs around the world.

The 17 Sustainable Development Goals are an ambitious set of goals, they relate to the big issues of our time including: ending poverty, sustainably managing our natural resources and tackling climate change. Alongside social, environmental and governance goals the SDGs set out economic priorities and targets that all countries, including the UK, should be using to guide their investments and strategies – and to structure incentives to support and encourage those businesses who themselves are investing in sustainability, and disincentivise others.

We recommend mapping the Bioeconomy Strategy against the full suite of SDGs and Targets in order to identify both potential contributions towards SDGs and potential risks towards the achievement of SDGs. This mapping should also identify any potential impact of the UK Bioeconomy on delivery of SDGs in other countries. The policy coherence elements to the SDGs are critical and the government should be pursuing strategies that are consistent with all of the SDGs even if they focus in on delivering just some of the goals and targets.

The goals are interlinked and the Bioeconomy Strategy is of course highly relevant to a range of goals. However some goals the Strategy should be directly contributing to include:

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Goal 12. Ensure sustainable consumption and production patterns
Goal 13. Take urgent action to combat climate change and its impacts
Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

18. How sustainable is your sector of the bioeconomy with respect to workforce skills?

No response.

Investment

Investment in the UK bioeconomy has seen an increase since 2010, above the trend in the economy overall. However, the level of gross fixed capital formation in these sectors has yet to regain its 2008 peak in real terms. In this section we explore issues around obtaining finance for your organisation.

19. Has your organisation or businesses received finance from one (or more) of these sources in relation to its bioeconomy activities? Tick all that apply:

- Venture capital
- Equity crowdfunding
- Corporate venture capital
- Private equity
- IPO/public offering
- Angel Finance
- Seed Finance
- Peer-to-peer lending
- Start up Loan
- Growth finance
- Bank loan/bond
- Export or trade finance
- Asset-based finance
- Leasing & hire purchase (asset finance)
- Overdraft
- Inward Investment
- Other

No response.

20. Has your organisation or businesses had difficulty in obtaining finance from one (or more) of these sources in relation to its bioeconomy activities? Tick all that apply and please provide additional details about the issue. You may use the examples provided to show amounts, but this is entirely voluntary

- Venture capital
- Equity crowdfunding
- Corporate venture capital
- Private equity
- IPO/public offering
- Angel Finance
- Seed Finance
- Peer-to-peer lending
- Start up Loan
- Growth finance
- Bank loan/bond
- Export or trade finance

- Asset-based finance
 - Leasing & hire purchase (asset finance)
 - Overdraft
 - Inward Investment
 - Other
-
- Below £1m
 - £1m-£4.9m
 - £5m-£9.9m
 - £10m-£100m
 - Over £100m

No response.

21. More generally, does your sector, or sub-sectors within it experience difficulties in attracting investment? If so, why?

No response.

22. What sort of challenges does your sector face in terms of financial sustainability?

No response.

Research and Innovation

The United Kingdom is particularly strong in the research and development aspect of the bioeconomy, ranking second on the 2015 Global Innovation Index. We would like to build on this and create an environment where our world-class research is fully exploited by industry and society, and different sectors of the bioeconomy collaborate and tackle untapped opportunities, leading to the bioeconomy becoming ‘greater than the sum of its parts’.

23. What are the key areas for investment in research and development in your area of the bioeconomy?

One area where further research is urgently required is into the “negative emissions” potential in promoting the development of long-life bio-based products intended for reuse, recycling and eventual energy recovery. Although promoting carbon storage in wood products has been recommended by the Committee on Climate Change for several years (in its 2011 Bioenergy Review the CCC states: “the use of woody biomass in construction (rather than as an energy source) should be a high priority, given that this generates negative emissions through a very efficient form of carbon capture”), WWF-UK is not aware of any analysis that quantifies the potential scale of “negative emissions” in bio-based products at either UK or international level.

Further evidence

CCC 2016: “UK climate action following the Paris Agreement”. Available at: <https://www.theccc.org.uk/publication/uk-action-following-paris/>

CCC 2011: “Bioenergy Review”. Available at: <https://www.theccc.org.uk/publication/bioenergy-review/>

We would also urge the Government to strengthen research and development for strategically critical bioenergy technologies that can convert waste and residual biomass into low-carbon energy for difficult sectors, such as aviation and industry, and potentially shipping, freight and heat/CHP. These include anaerobic digestion, advanced conversion technologies and the production of renewable hydrogen from biomass and biogas.

24. Where do you see gaps in investment in research and development in your area of the bioeconomy?

See Q23.

25. What are the most notable types of new products or technologies that can be expected in your sector in the next few years that are related to the bioeconomy?

WWF-UK believes that the following bioeconomic products and services should be promoted:

- The development of long-life bio-based products designed to facilitate their reuse, recycling and eventual energy recovery.
- The development of sustainable liquid or gaseous biofuels (from residual biomass with no further material use) for deployment in aviation and industry, and potentially freight, shipping and heat/CHP.
- Anaerobic digestion (AD), advanced conversion technologies (ACT) and production of renewable hydrogen from biomass or biogas should be promoted in the Bioeconomy

Strategy, due to their potential for using residual biomass as feedstocks, and their potential for generating a broad range of valuable bio-based products (for AD: biogas and digestate, and for ACT: syngas, which could be used in hydrogen production, industrial heat, transport fuel, or the manufacture of chemicals). Hydrogen production should be combined with CCS to drive further “negative emissions” and climate change mitigation.

WWF-UK believes that the following bioeconomic products and services should be discouraged:

- The use of virgin biomass feedstocks in sectors with low efficiency and/or viable alternatives to biomass, such as power generation and light surface transport.

26. What are the barriers and opportunities for bioeconomy related research? Examples might include:

- Collaboration;
- Technical/scientific challenges;
- Gaps in research knowledge.
- Lack of early stage research funding
- Lack of translational research funding
- Skills

No response.

27. Are you aware of difficulties in commercialisation or translating R&D outputs into the marketplace in your area of the bioeconomy?

No response.

Sectoral Cooperation

Collaboration and integration of individual sectors brings with it substantial opportunities to create additional value. Opportunities can include use of by-products or waste and implementing best practice from other sectors.

28. What strong links does your sector have with the other sectors of the bioeconomy?

No response.

29. To what extent is your sector reliant on links to other sectors?

No response.

30. Are there potential ways in which your sector would benefit from more cooperation with other bioeconomy sectors?

No response.

31. Is there anything we could learn on sectoral cooperation from other sectors of the economy?

No response.

32. Are there any barriers to collaboration with other bioeconomy sectors? If so, what are they?

No response.

33. How can Government ensure that bio-resource is used in the best way across the different sectors, taking into account the objectives and impacts of use in these sectors?

WWF-UK considers this question to be fundamental to the development of a sustainable bioeconomy.

WWF-UK's main criteria for evaluating bioeconomic practices are efficiency, effectiveness and responsible sourcing.

Regardless of the feedstock type or end use, all bioeconomic practices promoted in the Bioeconomy Strategy should use feedstocks certified to a credible standard, such as RSB.

The Bioeconomy Strategy should only promote bioeconomic practices in sectors that lack viable non-fossil alternatives to biomass, such as materials, aviation and industry (and potentially freight, shipping and heat/CHP). It should not promote the use of biomass in power generation or cars and vans, where alternatives are available.

The Bioeconomy Strategy should also carefully balance the need to deploy biomass effectively with the need to use biomass efficiently, to ensure resource efficiency and carbon savings.

For example, use of biomass in aviation is more effective than use in heat, because aviation does not currently have any alternative sources of renewable energy, whereas heat does. However, use for heat (or CHP) is generally more efficient than use for aviation because boilers convert biomass into energy more efficiently than aircraft (especially in CHP).

Air quality impacts of the biomass in use should also be considered, which again may entail trade-offs. For example, use of biomass in aviation is a more effective use than in freight, as

dynamic charging technologies are being developed to facilitate electrification of freight. However, the negative air quality impacts of aviation biofuel in use may be greater than the air quality impacts of using biomethane in heavy goods vehicles.

While it is open to debate which uses of biomass are the *best* uses, it is beyond question that biomass has no enduring role to play in power generation and cars and vans, due to the low system efficiency and the availability of alternatives. It is also beyond question that biomass should be used to develop material products first and foremost, which should be designed to facilitate their reuse, recycling and eventual energy recovery.

It is also important to address the trade-offs between biomass production and extraction for provisioning services, such as fuel and materials, and the other ecosystem services provided by natural capital, such as carbon storage, habitats, flood prevention and recreation, and take decisions based on robust information about the relative values of these competing uses to society.

Supply Chain Cooperation

In addition to different sectors collaborating more efficiently, improving how the supply chain work together could also bring substantial benefits both to the individual organisation and the bioeconomy more broadly. Added complexity might come through geographical barriers.

34. What strong links does your business have with others in the supply chain, including links to overseas companies?

No response.

35. Are there potential ways in which your business would benefit from more cooperation with others in the supply chain?

No response.

36. Are there any barriers to collaboration with other businesses in your supply chain? If so, what are they?

No response.

Government and Policies

In this section we'd like to hear about issues where the government could remove obstructions to growth for the bioeconomy. But we would also like to hear about things that are already done, but could be done better or be more widely used. These could be things that stimulate innovation or new ways of doing things.

37. Please tell us about and programmes, policies, regulations, laws or taxes which are helping the growth of the bioeconomy?

Anaerobic digestion and advanced conversion technologies are supported through the Contracts for Difference scheme, with AD also being supported by the RHI, Feed-in Tariffs and the RTFO. This support should be both strengthened and more tightly focused to ensure environmental benefit. Firstly, only residual biomass should be promoted for use in AD and ACT, accredited to robust certification schemes such as RSB. Second, these technologies should be promoted first and foremost for their potential contributions to the development of biomaterials and fuels for aviation and industry, and potentially fuels for use in heating and shipping.

As the Contracts for Difference and Feed-in Tariff scheme support electricity generation, they are not the appropriate mechanisms for promoting efficient and effective use of biomass in AD and ACT. It might be appropriate to simply incentivise the generation of biogas and syngas, leaving maximum flexibility over the end use, and then increase reward for efficient use in target sectors, such as aviation and industry, and potentially heating and shipping.

38. Please tell us about any new programmes, policies, regulations, laws or taxes that you would like to see introduced in order to help the growth of the bioeconomy. Please describe why growth in this sector would be positive and what impacts it might have on other sectors?

In bioenergy, WWF-UK is clear that existing policies should be amended to remove support for inefficient and ineffective uses of biomass and to strengthen sustainability standards. Existing policies that support key strategic technologies such as AD and ACT should also be strengthened and more tightly focused to ensure efficient and/or effective use of biomass.

More broadly, WWF-UK believes that the “negative emissions” potential in bio-based products should be promoted. This would be facilitated by improvements to international accounting rules for land use, land use change and forestry (LULUCF), to ensure that biogenic carbon emissions are counted at the point of combustion rather than the point of harvest. This would facilitate the valorisation of “negative emissions” in bio-based products, which is currently undervalued in policy and markets. Another options for boosting “negative emissions” would be to strengthen building regulations to require the use of sustainable timber with reuse and recycling plans.

A wide range of policies and economic instruments could be considered to promote the bioeconomy, and the wider circular economy, including increasing the lower rate of landfill tax and a tax on incineration, introducing a primary resource tax and targeted product taxes, differential VAT rates, pay-as-you-throw policies, ‘feebate’ schemes, increasing access to finance for resource efficiency measures (particularly for SMEs), including targeted use of public funds to improve the investment profile of projects / reduce risk, and strengthening and broadening public procurement policies to favour bio-based products, with a preference for reused and recycled products, certified to FSC or RSB standards.

39. Please tell us about any programmes, policies, regulations, laws or taxes which are holding back growth of the bioeconomy?

WWF-UK's "Positive Vision for the Bioeconomy" is currently being undermined by a failure to support efficient and effective uses of responsibly sourced biomass, combined with the existence of incentives for the inefficient and ineffective uses of biomass, paired with relatively weak standards on responsible sourcing.

The Contracts for Difference scheme currently supports simple power generation from virgin biomass in converted coal plants, resulting in poor resource efficiency in a sector with viable alternatives to biomass.

The Renewable Heat Incentive currently supports heat generation from virgin biomass, resulting in slightly improved efficiency compared to power, as heat generation is more efficient, but still poor resource efficiency overall, as virgin biomass could first be developed into material products. Efficiency could be improved by focusing on CHP and/or heat networks.

The Renewable Transport Fuel Obligation currently promotes the use of transport fuel made from virgin biomass e.g. crops in cars and vans, which is an inefficient use of biomass, as virgin biomass could first be developed into material products, and the internal combustion engine is relatively inefficient compared to other conversion technologies e.g. CHP.

40. How could the government further assist collaboration or research cooperation between the public and private sectors?

No response.

41. How could the government further assist the growth of the bioeconomy in a way that accounts for any impacts on other objectives?

WWF-UK's "Positive Vision for the Bioeconomy" ensures the bioeconomy contributes to responsible consumption and production and climate change mitigation without adverse impacts on biodiversity and other sustainability issues. Please see previous answers for details of WWF-UK's "Positive Vision the Bioeconomy".

It is also important to address the trade-offs between biomass production and extraction for provisioning services, such as fuel and materials, and the other ecosystem services provided by natural capital, such as carbon storage, habitats, flood prevention and recreation, and take decisions based on robust information about the relative values of these competing uses to society.

We have been advocating that the new 25 Year Environment Plan includes clear goals for different aspects of natural capital, and that all government departments are held to account on the impacts of their policies on the goals, to ensure joined up government. Thus a natural capital assessment should be an integral part of the Bioeconomy Strategy design process, and impacts on natural capital should be monitored over time, in order to ensure that accountability is provided.

European Issues

Whilst the UK's relationship with the EU is in the process of changing, we would still like to learn from our European neighbours, make best use of opportunities that exist and will continue to exist and grasp the new opportunities that will exist outside the EU.

42. Can you tell us about any European Union initiatives or programmes that affect your sector of the bioeconomy? Examples might include the Circular Economy package, the Horizon2020 Programme for Research and Innovation or other areas of EU funding.

The bioeconomy should be considered as one component of the circular economy, with many principles and practices applying equally to both systems. The UK should continue to promote the circular economy, and with it a sustainable bioeconomy, during and beyond the process to exit the EU.

43. Are there European Union laws or regulations which affect your sector in a positive way? If so, what are these laws or regulations, what is their impact, and would you like them to be kept for the UK after we leave the EU?

The Circular Economy Framework, and certain elements of the 2020 and 2030 Climate and Energy Frameworks, are supportive of WWF-UK's "Positive Vision for the Bioeconomy". These include targets to reduce landfill, promotion of reuse and recycling, and support for sustainable bioenergy.

44. Are there European Union laws or regulations which affect the bioeconomy in a negative way unnecessarily? If so, what are these laws or regulations, what is their impact, and how could they be improved?

While the Renewable Energy Directive has been a positive force for deployment of clean technology such as wind and solar, it has also led to unsustainable expansion in certain forms of bioenergy that are not consistent with WWF-UK's "Positive Vision for the Bioeconomy", such as biofuels in road transport and biomass in power generation. On leaving the EU, the UK has an opportunity to both refocus its support for bioenergy to ensure that biomass is responsibly sourced and efficiently and effectively used, and also to strengthen its leadership on broader climate change and renewable energy commitments.

45. Where do you see the greatest UK bioeconomy opportunities that will arise outside of the European Union?

No response.

International Issues

We aim to make the UK the most welcoming country for those researching or investing in the bioeconomy in a sustainable way; the ‘go-to’ nation for developing, implementing, and exporting sustainable solutions. In doing this we would like to learn from other countries around the world (as well as transnational bodies such as the European Union and the Organisation for Economic Cooperation and Development) where they have put in place specific strategies or other initiatives that support the bio-based industries.

46. Are you aware of any government policies or regulations in other countries that are more or less supportive to growth in the bioeconomy? If so, please outline:

- The countries;
- The policies; and
- Their impact or why they are particularly useful or beneficial.

In 2016, WWF-International and Mondi Group commissioned the nova-Institute for Ecology and Innovation and the Institute for European Environmental Policy (IEEP) to conduct a Mapping Study on Cascading Use of Wood Products. The study compared bioeconomy-relevant policies in Finland, Germany, Poland, Spain, the UK and the US for the extent to which these policies supported, or undermined, the resource-efficient use of biomass in line with cascading use.

Further evidence:

WWF-International 2016: Cascading use of wood products. Available at:
http://wwf.panda.org/wwf_news/?263091/Cascading-use-of-wood-products-report

47. Are there any barriers to collaboration with organisations in other countries? If so, what are they?

No response.

48. How does UK policy and funding environment compare with other countries?

No response.

49. What is the degree of reliance on overseas supply chains (for example raw materials) in UK companies?

A high proportion of biomass currently used for bioenergy is imported from overseas, particularly in the power sector. There is a slightly higher proportion of home-grown feedstocks in the biofuel sector, and a much higher proportion in the heat sector.

Robust sustainability standards such as FSC and RSB are essential for ensuring that biomass produced overseas but used in the UK does not result in adverse sustainability impacts in the country of production.

For example, concerns have been raised over the carbon and broader sustainability impacts of wood pellets imported from North American forests, which are commonly used in the power sector. In the immediate term the current biomass sustainability standards should be

strengthened in line with FSC and RSB, and in the immediate term the use of virgin biomass in power generation should be phased out.

50. Please describe any trade problems you are aware of that are causing obstructions for imports or exports?

No response.

51. Are there global pressures such as changes in demand or supply that affect your sector?

Demand for land and water required to grow crops and trees is a vital issue in the 21st century. The global population is expected to grow to 9.2 billion by 2050, and Governments are rightly making concerted efforts to achieve sustainable development and food security for all global citizens. Growing food and feed, supporting ecosystems, sequestering carbon, producing fuel and fibre: these important social functions all require land and water, which is scarce and finite. If these pressures increase, for example, to grow feedstocks for novel bioeconomic practices such as bioenergy and industrial biotechnology, then that will incur trade-offs with other land uses, for example, a requirement to dramatically curb meat consumption, or the risk that protected areas will be sacrificed to provide the land grow extra feedstocks.

WWF analysis indicates that global demand for wood for timber, paper and fuel is expected to triple by 2050. Wood for energy is a major proportion of this growth, globally.

The growth of cities and urbanisation is also increasing pressure on land. Fertile farmland globally is being transformed for urban development. New farmland is needed to account for this loss. The addition of feedstocks for novel bioeconomic practices will increase the pressure to convert more land if other areas such as demand for high input foods and technology are not curbed.

It is because of these trade-offs that a comprehensive strategic approach to the bioeconomy is required, dealing not just with novel and innovative bioeconomic practices such as bioenergy and industrial biotechnology, but all uses of biomass: from food to fibre to fuel.

Further evidence

WRI 2015: Avoiding Bioenergy Competition for Food Crops and Land. Available at:
<http://www.wri.org/publication/avoiding-bioenergy-competition-food-crops-and-land>

WWF Living Forest Report Series, available at:
http://wwf.panda.org/about_our_earth/deforestation/forest_publications_news_and_reports/living_forests_report/ especially chapter 1, with analysis of global trends and models.

Standards

National and supranational standards have been proven to catalyse innovation and fuel GDP growth (<http://www.bsigroup.com/en-GB/standards/benefits-of-using-standards/research-reports/>). A number of standards have been developed, or are currently in development, that address specific aspects of the bioeconomy, e.g. bio-based energy, bio-based products, bio plastics, circularity and resource management standards.

52. How do you think standards could be used to help promote growth in the bio-economy?

Standards are very important for enabling the bioeconomy to develop in a sustainable way that promotes the efficient and effective use of responsibly sourced biomass.

WWF-UK considers that RSB is the most appropriate standard for assessing the sustainability of bioeconomy feedstocks, because:

- it has the most comprehensive coverage of sustainability issues,
- it covers both virgin and residual biomass feedstocks,
- it includes a module to address indirect impacts of developing biofuels and biomaterials,
- it has robust governance systems in line with the requirements of the ISEAL Alliance.

This is why the Government should require RSB certification for any bioeconomic practices to be promoted in the Bioeconomy Strategy. Alternatively, the FSC standards for forest and plantation management are relevant for the development of biomaterials from virgin biomass feedstocks, which is similarly robust and comprehensive.

WWF-UK also recommends the development of standards to assess how well bio-based products have been designed to facilitate their reuse, recycling and eventual energy recovery.

All and any standards related to the calculation of carbon savings/emissions reductions from the use of woody biomass as an alternative energy source should follow best methodology to account for forest carbon; that means it should not overlook this factor, and should include it in calculations of the contribution made.

53. What types of standards are best suited to support the bioeconomy?

For instance, these could be:

Standards that define the concept and explain its relevance to individual organisations, sectors or product groups; standards establishing technical criteria for bio-based products; sustainability schemes and criteria for bio-based products.

See Q 52.

Other Questions

54. Are there any relevant work studies, case studies or reports that you would like us to be aware of? Please provide a link if you can.

No response.

55. Are there any other points on the subject of the bioeconomy that you would like to make?

In conclusion, the development of a Bioeconomy Strategy could go one of two ways. If sustainability is written into the heart of the Strategy, and not simply an afterthought, it represents an opportunity to correct past mistakes and ensure that only responsibly sourced biomass is incentivised in efficient and effective applications, which will support climate change mitigation and sustainable development. If sustainability is only an afterthought, or does not feature at all, then it represents a risk of increased degradation of the natural environment on which our economy and prosperity depend.

So we welcome the recognition at the front of this consultation that “This strategy will engage with many different sectors across the economy and will need to take account of other objectives, such as on decarbonisation, broader sustainability and food security”. In order to realise the opportunities and mitigate the risks, the Government must ensure that its Bioeconomy Strategy is consistent with its wider climate change and sustainable development objectives and frameworks:

- The Bioeconomy Strategy should be seen in the context of the Government’s overarching 25 Year Environment Plan, which should incentivise investment in natural capital assets to ensure the environment can continue to support our economy.
- The Bioeconomy Strategy must be consistent with the Climate Change Act and Carbon Budgets. As discussed above, a Bioeconomy Strategy presents several opportunities for strengthening climate action e.g.
 - o Realising the potential for “negative emissions” through investment in UK forests and peatland, and the development of long-life, reusable and recyclable bio-based products
 - o Phasing out support for bioenergy technologies that are inefficient and ineffective and strengthening support for bioenergy technologies that are efficient and support decarbonisation in difficult sectors: aviation and industry, and potentially freight, shipping and heat/CHP.
- The Bioeconomy must be consistent with the Sustainable Development Goals (SDGs). It should strengthen the UK’s contribution to achieving the SDGs both at home and abroad.
- The Bioeconomy Strategy, the forthcoming Food and Farming Plan and the Government’s housing strategy should also be consistent with each other. Across all these strategies it is essential to realise that land and water are finite and precious natural resources, and difficult decisions need to be made about competing demands on these resources.
- The Government should seek the active involvement of the Committee on Climate Change and the Natural Capital Committee in developing its Bioeconomy Strategy.

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