

Bioenergy Review (2018) - Call for Evidence

Please answer only those questions where you have particular expertise and are able to provide links to supporting evidence.

In 2011 the Committee on Climate Change (CCC) published a [Bioenergy Review](#) to provide an assessment of the potential role of bioenergy in meeting the UK's carbon budgets. The Bioenergy Review drew on the best available evidence to address questions relating to the sustainability of bioenergy, lifecycle emissions, resource availability and best-use across the economy. It highlighted the importance of bioenergy for meeting the UK's climate change targets and made recommendations for tightening the sustainability standards for bioenergy resources - recommendations that were subsequently adopted by the UK Government.

The CCC is now planning to update its work on bioenergy, culminating in a new Bioenergy Review to be published in Autumn 2018. This will consider the latest evidence to provide an updated view on the role of bioenergy in decarbonising the UK economy through to 2050. Key themes to be explored include sustainability and certification, GHG emissions accounting, developing sustainable supply, non-energy uses of bioenergy resources, and transitions to future best-uses of bioenergy resources. We will identify recommendations for further action and aim to develop indicators to allow the CCC to monitor progress over time.

Stakeholder engagement will underpin the 2018 Bioenergy Review. This Call for Evidence is the first formal step in the engagement process. It is intended to provide all stakeholders with the opportunity to input to the CCC's work and to enable the CCC to draw on the full range of up-to-date evidence relating to bioenergy production, sustainability and use.

The Call for Evidence will be followed by stakeholder workshops on specific key topics in 2018. In addition, we will be establishing an Expert Advisory Group to provide advice and support to the CCC throughout the review.

Responding to the Call for Evidence

We encourage responses that are brief and to the point (i.e. a maximum of 400 words per question, plus links to supporting evidence), answering only those questions where you have particular expertise. We may follow up for more detail where appropriate.

Please use the website form when responding, or if you prefer you can use this word form and e-mail your responses to: communications@theccc.gsi.gov.uk. Alternatively, if you would prefer to post your response to us, please send it to:

The Committee on Climate Change – 2018 Bioenergy Review Call for Evidence
7 Holbein Place
London SW1W 8NR

The deadline for responses is 5th February 2018.

Confidentiality and data protection

Responses will be published on the CCC website after the response deadline, along with a list of names or organisations that responded to the Call for Evidence.

If you want information that you provide to be treated as confidential (and not automatically published) please say so clearly in writing when you send your response to the consultation. It would be helpful if you could explain to us why you regard the information you have provided 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 by us as a confidentiality request.

All information provided in response to this consultation, including personal information, may be subject to publication or disclosure in accordance with the access to information legislation (primarily the Freedom of Information Act 2000, the Data Protection Act 1998 and the Environmental Information Regulations 2004).

Information on organisation / individual submitting response

If you are responding on behalf of an organisation please provide a brief description of your organisation and your role within this organisation.

The Confederation of Paper Industries (CPI) unifies the UK's Paper-based Industries with the purpose of promoting paper's intrinsic value as a renewable and sustainable fibre-based material, enhancing its competitiveness through seeking appropriate legislation and regulation for the industry and in spreading best practice.

CPI represents the supply chain for paper, comprising pulp, paper and board manufacturers and converters, corrugated packaging producers, makers of soft tissue papers and collectors of paper for recycling. Members range in size from large multi-national organisations with multiple sites, to single site SMEs.

CPI advocates:

- *A positive image for paper;*
- *Secure energy supplies at competitive prices;*
- *Resource efficiency within a coherent waste strategy;*
- *The benefits of packaging;*
- *A sustainable UK Paper Industry;*
- *Manufacturing as a vital part of a balanced economy;*

- *A competitive, level playing field for the UK's Paper-based Industries.*

CPI represents an industry with an aggregate annual turnover of £11.5 billion, 56,000 direct and more than 85,000 indirect employees (ONS data for SIC 17 from the Annual Business Survey).

Our interest in this topic is as a direct user of wood fibre and recycled paper and card to make into paper-based products, but also as a user of low grade wood and waste products in on site CHP.

GHG emissions and sustainability of bioenergy imports

Our 2011 Bioenergy Review concluded that UK and EU regulatory approaches should be strengthened to better reflect estimates of the full lifecycle emissions of bioenergy feedstocks, taking into account both direct and indirect land-use change impacts. Whilst changes have been made to these regulatory frameworks, both life-cycle emissions and the wider sustainability impacts of bioenergy remain highly contested issues, particularly in relation to bioenergy imports. Given the potential role for bioenergy in the UK's low-carbon transition, and the potential increase in bioenergy feedstock production in the future, it will be essential that policy is based on the latest available evidence and that bioenergy is genuinely sustainable.

The term 'sustainable' here is used to cover a wide-range of issues relating to GHG emissions, biodiversity, water use, land-use, land-rights, air-quality and other social and environmental issues.

1. What is the latest evidence on lifecycle GHG emissions of biomass and other biofuels imported into the UK? How could this change over time as a function of scaling up supply? We are particularly interested in evidence that considers the full range of relevant issues including changes to forest and land carbon stocks, direct and indirect land-use change and wider market effects.

We agree with the principle that forest carbon should be accounted for in the forestry sector rather than the energy sector. Assuming this principle is respected, then biomass for energy use should only be sourced from countries with mandatory carbon accounting for land related carbon emissions and removals. Land Use, Land Use Change and Forestry (LULUCF) accounting considers harvesting rates across countries or regions and provides assurance that harvesting rates do not exceed replacement rates. This wider approach is needed to take account of growing cycles in individual harvesting areas – sustainability can only be judged over longer time periods and an appropriate sized forest area. Any biomass sourced from non-LULUCF accounting countries should be required to prove there is no over-harvesting associated with its use.

2. Under what circumstances can imported biomass and other biofuels deliver real GHG emissions savings (considering full life-cycle emissions and indirect/wider market effects)? Conversely, what evidence is there for ruling out certain sources on the grounds of lifecycle GHG emissions or sustainability risks?
3. Currently the UK imports a significant proportion of wood pellets for biomass electricity production from North America, particularly the south-east USA.

- a) What are the wider market impacts of demand for wood pellets on forestry management practices and carbon stocks at the landscape level in North America?
- b) What evidence is there that wood pellet production displaces other uses of forestry products in North America? (e.g. panel board or lumber production)
- c) What are the most likely alternative/counterfactual uses of forestry products used for wood pellet production?
- d) How are these wider market impacts (sub-questions a-c) likely to change over time if demand for wood pellets significantly increases?

We have no comment to make on alternative uses for North American wood or the impact on forest management. However, we do highlight the potential for subsidy for energy use to unfairly distort market prices and supply chains for other non-subsidised users of forest resources.

4. Aside from GHG emissions, what evidence is there of other sustainability impacts associated with imported biomass or other biofuels? What evidence is there for how these might change as a function of scaling up supply (from the US, and internationally)?

No comment beyond noting that while biomass is potentially renewable, amounts are not unlimited.

5. Are there any benefits resulting from importing biomass or other biofuels into the UK (e.g. development benefits)? How might these vary internationally? What are the conditions required for any benefits to be realised?

Sustainability policy and certification

The sustainability framework for bioenergy in the UK has evolved significantly since 2011. Changes have included the tightening over time of lifecycle GHG emissions limits for bioenergy supported under Government incentive schemes, changes to EU rules on liquid biofuels and the development of certification schemes. Nonetheless questions remain regarding the current framework's capacity to guarantee high sustainability standards.

The term 'sustainability framework' refers here to the policies, regulations and incentives in place to promote bioenergy sustainability in the UK.

We note the requirement of the EU Timber Regulations for existing wood pellets to be legally harvested – this should be extended to include a requirement that harvesting is also sustainable.

6. What are the strengths, weaknesses and gaps of the current sustainability framework for bioenergy in the UK? How could the current sustainability framework for bioenergy in the UK be improved to address these issues?

7. Ofgem has identified a number of certification schemes that it considers appropriate for demonstrating compliance with the 'Land Criteria' under the Renewable Obligation sustainability standards. Are these certification schemes adequate? Why/why not? How could they be improved?
8. What certification schemes currently represent 'best practice'? Why?
9. Ofgem has set out approaches to calculating bioenergy GHG emissions for demonstrating compliance with the 'GHG Criteria' under the Renewable Obligation sustainability standards. Are these approaches adequate? Why/why not? How could they be improved?
10. Please highlight any further measures you feel are required to ensure bioenergy feedstocks used in the UK are sustainable and deliver significant life-cycle GHG emissions savings. Why are these measures needed?
11. Some large UK users of imported biomass use a risk-based approach to assess the sustainability risks associated with importing biomass from specific jurisdictions. What is the role for these approaches?

Supply of bioenergy feedstocks

In our 2011 Bioenergy Review we considered scenarios for the amount of sustainable bioenergy resource available to the UK over the coming decades. Our central 'Extended Land Use' scenario suggested that around 10% of the UK's primary energy demand could be met from bioenergy in 2050, with over half coming from domestic feedstocks. We are now looking to develop new supply scenarios through to 2050 to reflect the latest evidence on sustainability and different assumptions about the potential future availability of imported and domestically produced bioenergy resources.

To support the development of these scenarios and our wider work, the CCC is currently undertaking new analysis on how the use and management of land in the UK can deliver deeper emissions reduction and increased sequestration. This analysis will provide updated data on the potential supply of non-waste and non-food bioenergy resources from UK sources. For projections of international bioenergy resources and waste-based UK bioenergy resources we will review the latest evidence and publicly available literature. We are particularly interested in quantitative estimates of resource potential, broken down by feedstock type, that are underpinned by explicit assumptions relating to sustainability.

12. What are the most credible and up-to-date estimates for global bioenergy resource potential through to 2050, broken down by feedstock type? What key assumptions underpin these estimates?

Please provide details of any assessments of global bioenergy resource explicitly tied to sustainability standards (covering GHG emissions, biodiversity, water use, land-use, land-rights, air-quality and other social and environmental issues)

13. What is the latest evidence relating to the availability of 'marginal' and abandoned agricultural land for growing bioenergy crops (where possible, reflecting broader sustainability requirements e.g. water stress, biodiversity, social issues)? Is this evidence adequately reflected in global resource estimates?
14. What are the most credible and up-to-date estimates for the amount of bioenergy resource that could be produced from UK waste sources through to 2050? Where possible please state any assumptions relating the reduction, reuse and recycling of different future waste streams.

Energy generation should not become a hinderence to recycling; there is concern that investment in energy generation infrastructure locks in a demand for waste irrespective of the underlying dynamics of waste generation. This could be to the detriment of material recycling systems.

We also draw attention to increasing research into the possibility of processing bio-materials from bio-based feedstock that could prove to be a more productive use of such material than simple energy recovery.

15. What factors (opportunities, constraints, assumptions) should the CCC reflect in its bioenergy resource scenarios through to 2050?
16. What should be the assumptions on the share of international resource which can be accessed by the UK (e.g. per capita, current or future energy demand)?
17. What are the prospects for the development and commercial production of 3rd generation bioenergy feedstocks (e.g. algae)? What are the timescales, costs, risks, opportunities and abatement potential of using algae to make biofuels?

Scaling up UK sustainable supply

An objective of our current work on bioenergy is to better understand and reflect the potential for scaling-up of the supply of sustainably produced domestic (UK) bioenergy resources through to 2050. We aim to identify and develop policy recommendations for 'low-regrets' measures/strategies that can be implemented in the near term.

18. What are the main opportunities to scale-up the supply of sustainably-produced domestic bioenergy supply in the UK? Where possible please provide details on the scale of opportunity.
19. What risks are associated with scaling-up domestic supply and how can these risks be managed?
20. What 'low-regrets' measures should be taken now (e.g. planting strategies) to increase sustainably-produced domestic bioenergy supply?

21. What international examples of best-practice should the UK should look to when considering approaches to scaling-up domestic supply?
22. What policy measures should be considered by Government to help scale-up domestic supply?

We would strongly support a large increase in domestic tree planting with the intention of increasing the UK forestry resource delivering a range of benefits including the provision of energy and an increased long-term domestic supply of timber.

As well as more traditional forestry, a number of community forests and other urban fringe projects could be further developed and supported.

Best-use of bioenergy resources

Our 2011 review developed a hierarchy of appropriate uses for bioenergy feedstocks based on minimising costs and maximising abatement. We concluded that if CCS technology is available it is appropriate to use bioenergy in applications with CCS, making it possible to achieve negative emissions under the right circumstances. This could include power and/or heat generation, hydrogen production, and biofuels production for use in aviation and shipping. If CCS is not available, bioenergy use could be skewed towards heat generation in energy-intensive industry, and to biofuels in aviation and shipping, with no appropriate role in power generation or surface transport. In either case, we concluded the use of woody biomass in construction should be a high priority given that this can potentially secure negative emissions through a very efficient form of carbon capture.

We are now looking to update this analysis to reflect the latest technological and market developments. We are particularly interested in technologies such as biomass gasification, CCS and advanced second and third generation biofuels as well as the potential role of hydrogen to support decarbonisation across the economy. To support our consideration of these areas, the CCC is currently undertaking analysis into the potential of the hydrogen economy and we are planning to undertake further investigation into non-energy uses of bioenergy resources.

23. Gasification has been identified as a potentially important technology for unlocking the full potential of bioenergy to support economy-wide decarbonisation.
 - a) What are the likely timescales for commercial deployment of gasification technologies?
 - b) What efficiencies and costs are likely to be achieved? What scope is there for improvement and/or cost reductions over time? Please differentiate between feedstocks where possible/necessary.
 - c) What are the main barriers and uncertainties associated with the development, deployment and use of gasification technologies?
 - d) What risks are associated with gasification technologies and how can these be managed?

- e) What policies and incentives are required to facilitate commercial deployment?
24. Bioenergy with Carbon Capture and Storage (BECCS) has been identified as a key potential mechanism for achieving the UK's 2050 carbon target due to the 'negative emissions' it could offer.
- a) What are the potential timescales for commercial deployment of BECCS technologies?
 - b) What are likely to be the optimal uses of BECCS (e.g. electricity generation, hydrogen production)?
 - c) What efficiencies and costs are possible?
 - d) How will performance and cost differ according to feedstock type? What are likely to be the optimal feedstock types for BECCS? What are the implications for domestic supply vs imports (e.g. feasibility, considerations in scaling up over time)?
 - a. What are the main barriers and uncertainties associated with the development, deployment and use of BECCS?
 - b. What are the risks associated with the pursuit of BECCS that go beyond the risks that relate to supplying sustainable feedstocks and CCS more generally? How can these be managed?
25. Once developed BECCS is a technology that could be deployed in many different countries around the world. What principles and mechanisms should be used to determine where BECCS is deployed and how any associated negative emissions are accounted for? Should any UK participation in any international BECCS scheme be counted as additional to efforts to meet domestic carbon budgets?
26. There is currently substantial interest in the development of 'advanced' biofuels for use in sectors such as aviation, shipping and/or heavy duty transport.
- a) What are the most promising technologies/processes for advanced biofuel production up to 2050? Please provide details on each technology/process including advantages/disadvantages, timescales for commercial deployment, feedstock type, fuel type and end-user.
 - b) What efficiencies and costs are likely to be achieved? What scope is there for improvement and/or cost reductions over time? Please differentiate between technologies/processes.
 - c) What are likely to be the optimal feedstock types for advanced biofuel technologies?
 - d) What are likely to be the optimal end-uses of advanced biofuel technologies?
 - e) What are the main barriers and uncertainties associated with the development, deployment and use of advanced biofuel technologies?
 - f) What risks are associated with the pursuit of advanced biofuel technologies and how can these be managed?
 - g) What policies and incentives are required to facilitate commercial deployment of advanced biofuels?

27. In 2015 the Government published the Industrial Decarbonisation and Energy Efficiency Roadmaps to 2050. These Roadmaps explored decarbonisation options across multiple industrial sectors and the estimated deployment potential, timescales, cost data and abatement for each option (including bioenergy). Are there any substantial changes from these estimates that the CCC should consider when assessing abatement options in industry? If so please provide your reasoning and details of any recent evidence that relates to these changes.

During the development of the Roadmaps we consistently questioned if there can be sufficient material at an economic price to allow large-scale fuel switching, especially as a number of different countries are also considering similar uses. Subsidised use could re-route material away from manufacturing use.

On the economic cost issue, while electrification was identified in the Roadmaps, current UK electricity prices make this uneconomic and not commercially possible.

28. In our 2011 review we identified wood in construction as a potentially effective method of CCS and a high priority 'non-energy' use in our best-use hierarchy.
- What lifecycle GHG emissions savings can be achieved by using WIC? Under what circumstances does WIC fail to deliver GHG emissions savings? Please consider the full range of impacts associated with using WIC including substituted product emissions (e.g. cement), product equivalence (impacts on co-products), end-of-life options and biogenic carbon storage.
 - What is the potential for increasing the amount of wood used in construction in the UK? What are the barriers and how can they be overcome?
 - What is the potential for using UK-produced timber in construction rather than imports? What are the barriers and how can they be overcome?
 - What is the expected lifetime of different wood products in construction (e.g. cross-laminated timber)?
 - What currently happens to wood in construction at the end of its useful life? What other viable options should be developed?
29. There are also a number of other potential non-energy uses of bio-feedstocks including bio-based plastics and bio-based chemicals.
- What other non-energy uses of bio-feedstocks have the most potential through to 2050 in terms of GHG abatement, cost, timescales and market size?
 - What are the barriers to increasing these non-energy uses and how can these barriers be overcome?
 - What risks are associated with the pursuit of other non-energy uses of bio-feedstocks and how can these be managed?

GHG emissions reporting and accounting

GHG emissions reporting rules for bioenergy are different to those for other forms of energy. Emissions relating to the use (combustion) of bioenergy resources are not reported

in the country of use but rather in the country where bioenergy resources are produced. Only Annex 1 countries under the Kyoto Protocol currently account for land-use emissions as part of binding emission reduction targets. In addition under Paris Agreement rules emissions (as under the Kyoto Protocol) will be reported against land-use baselines that may already assume a degree of land-use change. For these reasons and others, bioenergy GHG accounting has been criticised for not properly reflecting the impacts of bioenergy.

30. What are the strengths and weaknesses of the current approach to GHG emissions accounting for bioenergy in the UK and internationally? Specifically, what are the main gaps in the current land use emissions accounting rules?

The accounting of emissions in the country of origin is a fundamental issue for carbon accounting and the UK needs to be consistent in the approach taken. Emissions associated with imported manufactured goods are not accounted for in the UK and, if this remains the case, then this principle should be respected across all aspects of reporting.

31. What are the risks, in terms of GHG emissions, associated with importing biomass or other biofuels from countries that have not committed to limiting or reducing emissions under the Kyoto Protocol or Paris Agreement? How can these risks be managed?
32. What alternative method(s) for bioenergy emissions accounting should be considered? What would the implications of these alternative method(s) be?

Indicators

As part of the 2018 Bioenergy Review the CCC is planning to develop a set of indicators to track progress towards key bioenergy outcomes. We envisage these will cover key areas such as sustainability, policy development, supply and best-use.

33. What key areas should be reflected in these indicators?
34. Please provide details of any examples of international best-practice in the area of bioenergy indicators.

Other

35. Please submit any further evidence that you would like us to consider.
 - *The cost of energy is of critical importance to energy intensive manufacturing such as papermaking. The Levy Control Framework has an important role in controlling the cost impact of energy policies on consumers – and certainly for electricity - the UK already has very expensive supply compared to other EU countries. The excessively high cost to consumers of existing renewable UK energy policies is one of the*

findings of the BEIS energy cost review. Large scale subsidy for the use of wood pellets in low efficiency power generation is an important aspect of these high costs and should be scaled back as soon as possible.

- *Considering diverse types of biomass together makes discussions difficult, as the different types all have different characteristics – accordingly the relative merits of each type should be properly examined separately. The approach taken in this consultation is very strong and the Committee is to be commended on this approach.*
- *There is a real risk that subsidised energy use cost result in the transferring of some land from food to energy production – and indeed early biofuels policies ran into exactly this issue. The growing campaign for sustainable palm oil may have some lessons for this debate.*
- *CPI would also reinforce the potential for the UK to support the expansion of its own biomass resource – from not exporting waste for energy use, to increased use of agricultural residue to a major tree planting programme.*
- *Finally, we would strongly urge the principle of cascading use of biomass resources is respected where the best value is extracted from biomass. In reality it's not possible for policy makers to direct the use of biomass and seeking to achieve this aim through the blunt use of subsidy can result in impacts on other non-energy uses of biomass materials not supported by subsidy.*