Department for Business, Energy and Industrial Strategy consultation

The Role of Biomass in Achieving Net Zero

Call for Evidence

Submission from CIBSE

15th June 2021

Name:	Dr Hywel Davies
Position:	Technical Director
Name of organisation:	Chartered Institution of Building Services Engineers
Address:	222 Balham High Road, London, SW12 9BS
Email address:	hdavies@cibse.org

THE RESPONDENT

The Chartered Institution of Building Services Engineers (CIBSE)

CIBSE is the primary professional body and learned society for those who design, install, operate and maintain the energy using systems, both mechanical and electrical, used in buildings. Our members therefore have a pervasive involvement in the use of energy and heating in buildings in the UK and make a key contribution to sustainable development. Our focus is on adopting a co-ordinated approach at all stages of the life cycle of buildings, from concept through briefing, design, procurement, construction, operation, maintenance and ultimate disposal.

CIBSE is one of the leading global professional organisations for building performance related knowledge. The Institution and its members are the primary source of professional guidance for the building services sector on the design, installation and maintenance of energy efficient building services systems to deliver healthy, comfortable and effective building performance.

CIBSE has over 20,000 members, with around 75% operating in the UK and many of the remainder in the Gulf, Hong Kong and Australasia. CIBSE is the sixth largest professional engineering Institution, and along with the Institution of Structural Engineers is the largest dedicated to engineering in the built environment. Our members have international experience and knowledge of life safety requirements in many other jurisdictions.

CIBSE publishes Guidance and Codes providing best practice advice and internationally recognised as authoritative. The CIBSE Knowledge Portal makes our Guidance available online to all CIBSE members, and is the leading systematic engineering resource for the building services sector. It is used regularly by our members to access the latest guidance material for the profession. Currently we have users in over 170 countries, demonstrating the world leading position of UK engineering expertise in this field.

CONSULTATION RESPONSE

EXECUTIVE SUMMARY

CIBSE is grateful for the opportunity to respond to this call for evidence relating to sustainable use of biomass in the UK. CIBSE supports the development of Government strategies which are holistic, adopt a systems based approach and do not allow pursuit of one policy objective to the clear detriment of another. In the case of biomass it is important that measures of its sustainability address a range of factors including greenhouse gas emissions and air quality. It is important to note that biomass installations in urban environments have a negative impact on air quality both directly due to the particulate emissions from the biomass burners, and indirectly due to the emissions associated with fuel delivery. CIBSE considers that there are limited large scale and rural application of biomass which may meet sustainability criteria and not compromise air quality.

Our response to this call should be viewed on the basis of this recommendation.

CONSULTATION RESPONSES

CHAPTER 1

1. Do you give permission for your evidence to be shared with third party contractors for the purpose of analysis?
Answer: Yes.

2. What is the potential size, location and makeup of the sustainable domestic biomass resource that could be derived from the a) waste, b) forestry, c) agricultural sectors, and d) from any other sources (including novel biomass feedstocks, such as algae) in the UK? How might this change as we reach 2050?
Answer: CIBSE does not have data to provide in response to this question.

3. What are the current and potential future costs of supplying these different biomass feedstock types, and the key environmental and land-use impacts (positive or negative) associated with supplying and utilising these different types of biomass, e.g. impacts on GHG emissions, air quality, water quality, soil health, biodiversity, food security, land availability, etc?
Answer: Ammonia may be a problem if used near to an ecologically sensitive site. Excess use of ammonia in fertilisers can impact PM limits.

4. How do we account for the other (non-GHG) benefits, impacts and issues of increasing our access to, or production of domestic biomass (e.g., air quality, water quality, soil health, flooding, biodiversity)?
Answer: The use of biomass will inevitably generate air pollution as even a well maintained biomass boiler will produce more pollution that a similar gas system, in particular increasing PM and NOx emissions. In 2017 the Air Quality Expert Group which advises DEFRA produced a significant report, The Potential Air Quality Impacts from Biomass Combustion, for Department for Environment, Food and Rural Affairs; Scottish Government; Welsh Government; and Department of the Environment in Northern Ireland.

It concluded that whilst *"biomass features within several pathways to a low carbon economy and is an increasing source of secondary domestic heat, measurements and inventories suggest that particulate matter (PM) from biomass burning is on the increase".* It noted that *"A range of incentives that encourage the use of biomass burning for power and heat generation could have adverse air quality impacts in particular around PM and nitrogen dioxide (NO2").*

The full report is available to download at https://uk-air.defra.gov.uk/assets/documents/reports/cat11/1708081027_170807_AQEG_Biomass_report.pdf

There is a need for a systems-thinking approach here across national priorities. We do want to achieve net zero carbon buildings. But we are also acutely aware of the impact of air pollution, especially in urban areas. It is clear that wood burning is an important source in cities. The GLA state that "*wood burning accounts for between 23 and 31 per cent of urban derived PM2.5 in London*". https://www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/guidance-wood-burning-stoves-london So if urban emissions are to be reduced then it does not seem appropriate to seek to use biomass in urban areas to achieve GHG reductions when other low or zero carbon heating technologies are available.

The GLA Air Quality Neutral Policy requires ultra-low NOx boilers in all new developments and sets emissions standards for new CHP and biomass plant, and the IAQM planning guidance recommends use of natural gas-fired installations over biomass boilers, and also outlines minimum emission standards for NOx and PM (https://iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf).

The London Air Quality Positive consultation document contains nothing specific on biomass, but for a development to be considered air quality positive in terms of building emissions by the GLA:

> "*The heat demand for the scheme will be met using Communal Air Source Heat Pumps in combination with*
>
> *peak gas boilers and include a heat exchanger for future connection to the nearby district heat network*".
>
> https://www.london.gov.uk/sites/default/files/air_quality_positive_lpg_pre-consultation_draft.pdf

This policy also needs to be aligned with the long awaited heat strategy – and whilst sustainably sourced and transported biomass may well play a role in meeting net zero targets by fuelling modern, well-designed facilities such as power stations and large industrial plants as well as isolated rural premises, these need to be well away from urban areas. When DEFRA consulted on limiting applications for the RHI for biomass installations, the threshold was established at 10,000 dwellings and this would be a good figure to carry forward, again for consistency of policy making.

In terms of accounting for other impacts: this could be an opportunity to apply the indicators and methodologies expected from the Environment Bill, including those to demonstrate "biodiversity net gain" . Inversely, it would also be a good way to test whether these indicators and methodologies provide a robust and suitable framework .

Maintenance and suitable abatement measures are also critical to minimizing the additional air pollution. Poor maintenance will result in higher emissions.

Careful negotiation will be required with Planners and their support teams on a case by case basis to alleviate any possible AQ concerns

The latest Air Quality guidance on biomass is quite dated. There is an EPUK document from 2009 which is apparently in the process of being updated, "Biomass and Air Quality Guidance for Local Authorities," https://www.environmental-protection.org.uk/wp-content/uploads/2013/07/Biomass_and_Air_Quality_Guidance.pdf

There is also guidance for developers dating from 2007 which is noted as being under revision. https://www.environmental-protection.org.uk/resource/biomass-and-air-quality-information-for-developers/

5. How could the production of domestic biomass support rural employment, farm diversification, circular economy, industrial opportunities, and wider environmental benefits? This can include considerations around competition for land, development of infrastructure, skills, jobs, etc.

Answer: This is not an area in which CIBSE has expertise.

6. What are the main challenges and barriers to increasing our domestic supply of sustainable biomass from different sources?

Answer: This is not an area in which CIBSE has expertise.

7. What is the potential biomass resource from imports compared to the levels we currently receive? What are the current and potential risks, opportunities and barriers (e.g., sustainability, economic, etc) to increasing the volumes of imported biomass?

What is the rationale for importing biomass to provide "net zero" energy generation? How will the possibly considerable carbon emissions from transport be abated? This just does not look like a holistic systems based approach.

We welcome evidence and views on:

8. Considering other potential non-biomass options for decarbonisation (e.g. energy efficiency improvements, electrification, heat pumps), what do you consider as the main role and potential for the biomass feedstock types identified in Question 2 to contribute towards the UK's decarbonisation targets, and specifically in the following sectors?

- **Heat**
- **Electricity**
- **Transport**
- **Agriculture**
- **Industry**
- **Chemicals and materials**
- **Other?**

9. Out of the above sectors, considering that there is a limited supply of sustainable biomass, what do you see as the priority application of biomass feedstocks to contribute towards the net zero target and how this might change as we reach 2050? Please provide evidence to support your view.

Answer: We would refer to the work already referenced in response to Q4 and suggest that UK sourced sustainable biomass should be used where it will have least negative impacts on air quality. As noted above, this is likely to be in isolated rural areas and for large scale power, where emissions are captured and so net negative, and industrial plants located away from settlements and where the costs of best available abatement technology can be reasonably tolerated. This view is also supported by the CCC.

10. What principles/framework should be applied when determining what the priority uses of biomass should be to contribute to net zero? How does this vary by biomass type and how might this change over time?

Answer: There should be a systems based framework that aligns with other related policies seeking multiple benefits and a case by case assessment of the use of biomass, having regard to the answers to Q4 and 9 and the business case for the particular facility and the available alternative technologies for that instance.

11. When thinking of BECCS deployment, what specific arrangements are needed to incentivise deployment, compared to what could be needed to support other GGR and CCUS technologies as well as incentivising wider decarbonisation using biomass in the priority sectors identified?

Answer: This strays into the area of the heat strategy and these questions need to be considered in the light of that. A more strategic approach to incentives is required, seeking to minimise the potential for unintended consequences, which have been experienced in particular in relation to biomass schemes in recent years.

12. How can Government best incentivise the use of biomass, and target available biomass towards the highest priority applications? What should the balance be between supply incentives and demand incentives and how can we incentivise the right biomass use given one feedstock could have multiple uses or markets?

Answer: See answer to Q11 above.

13. Are there any policy gaps, risks or barriers hindering the wider deployment of biomass in the sectors identified above?

Answer: CIBSE does not have any evidence on this point.

14. How should potential impacts on air quality of some end-uses of biomass shape how and where biomass is used?

Answer: As noted in response to Q4, the use of biomass should be limited to keep it far away from sensitive receptors – i.e. rural or industrial areas. Ideally they should be close to the source of the feedstock as emissions from transport can be as important as emission from combustion if travelling long distances. (See response on imports under Q7.)

Supply chain sustainability

Answer: This is not an area of expertise for CIBSE and we have no evidence to offer in this section. We suggest that the sustainability criteria need to fully reflect the impact of biomass, not just on energy and GHG emissions, but on other environmental and social aspects of sustainability such as air quality. It is also essential that the criteria deal very clearly with processing and transport related emissions. Carbon dioxide from transporting biomass is as much a GHG as if it was emitted by burning coal.

We welcome evidence and views on:

15. Are our existing sustainability criteria sufficient in ensuring that biomass can deliver the GHG emission savings needed to meet net zero without wider adverse impacts including on land use and biodiversity? How could they be amended to ensure biomass from all sources supports wider climate, environmental and societal goals?

16. How could we improve monitoring and reporting against sustainability requirements?

17. What alternative mechanisms would ensure sustainability independent of current incentive schemes (e.g., x-sector legislation, voluntary schemes)?

18. What additional evidence could suppliers of biomass-derived energy (for heat, fuels, electricity) provide to regulators to demonstrate they meet the sustainability criteria?

19. How do we improve global Governance to ensure biomass sustainability and what role does the UK play in achieving this?

Accounting for Emissions – How can we improve the way we account for biomass emissions?

We welcome evidence and views on:

20. How should the full life cycle emissions of biomass be reflected in carbon pricing, UKETS, and within our reporting standards?

Answer: It is essential that GHG from biomass really does reflect the full life cycle including transport and that the emissions of biomass are calculated on the basis of where the fuel is used, without which life cycle calculation is not possible.

21. How should BECCS be treated for domestic and international GHG emissions accounting and reporting? What are the implications of existing reporting rules on our ability to deliver negative emissions, when for instance, land use change emissions and stored CO2 are being accounted for in different countries?

Answer: CIBSE has no direct evidence to offer.

Innovation – What technological or systems developments do we need to see?

We welcome evidence and views on:

22. Given the nature and diversity of the biomass feedstock supply (as referenced in Chapter 1), what specific technologies are best positioned to deliver the priority end uses (as referenced in question 9), and how might these change as we reach 2050?

Answer: We suggest that further research is needed on newer approaches to Biomass like biogas from Pyrolysis, and what the impacts are on air quality. Innovation required in the supply chain to ensure external costs, in particular transport costs, are included.

23. What are the barriers and risks to increasing the deployment of advanced technologies (e.g., gasification, pyrolysis, biocatalysis) and what end use sectors do you see these being applied to?

Answer: For pyrolysis please see the answer to Q22. There is the general risk of unintended consequences – as perhaps is the case with air quality issues from previous incentives to adopt biomass in urban areas?

24. In what regions of the UK are we best placed to focus on technological innovation and scale up of feedstock supply chains that utilise UK-based biomass resources?

Answer: As noted in several earlier answers, biomass is best employed away from urban centres and close to the sources of biomass. This would suggest the less densely populated areas of the United Kingdom would benefit from biomass technology, particular more remote rural installations where alternative grid based solutions may be very costly and local supplies of biomass plentiful.

25. Post-combustion capture on biomass electricity generation is one method in which BECCS can be deployed to deliver net-zero. Specifically, how could innovation support be targeted to develop the maturity of other BECCS applications, such as biomass gasification?

Answer This is a question to address to the relevant experts within the UK Research and Innovation community – both academic and industry experts.

26. What other innovation needs to take place in order to reduce life cycle GHG emissions and impacts on air quality in biomass supply chains? Are all of these easily achievable, and if not, what are the barriers?

Answer: See answer to Q22 and the Air Quality Expert Group report referenced in response to Q4.

END

Please do not hesitate to contact us for more information on this response.