

## Written evidence submitted on behalf of The Lifescape Project and The Partnership for Policy Integrity

### Executive summary

- A. It is unlikely that BECCS with woody biomass will provide negative emissions, significantly limiting the potential of this technology to help achieve net zero by 2050.
- B. There are also likely to be negative societal and environmental impacts associated with BECCS with woody biomass.
- C. There is therefore a danger that government policy may end up relying on a technology which does not provide the benefits claimed for it and which has negative impacts associated with it too.
- D. This has implications for government policy (including the proposed biomass strategy 2022), and in particular whether the government should provide subsidies or other support for this form of BECCS.

### Introduction

1. This response is submitted on behalf of The Lifescape Project (Lifescape) and The Partnership for Policy Integrity (PFPI). Under the banner of “The Forest Litigation Collaborative”, we use litigation and quasi-legal mechanisms to promote the protection and restoration of forest ecosystems and their associated carbon sinks. Much of our current work focuses on countering the increasing use of forest biomass for renewable energy, a trend which is increasing net CO<sub>2</sub> emissions while destroying some of the most biodiverse and carbon-rich forests in the world. For example, we recently submitted a complaint under the OECD Guidelines in relation to public statements about woody biomass energy made by Drax Group Plc: [https://lifescapeproject.org/wp-content/uploads/2021/10/2021-10-21\\_OECD-complaint\\_Drax-Group-plc\\_FINAL-as-filed.pdf](https://lifescapeproject.org/wp-content/uploads/2021/10/2021-10-21_OECD-complaint_Drax-Group-plc_FINAL-as-filed.pdf). Together, we have significant expertise in the legal, scientific and policy issues associated with woody biomass energy and BECCS. We note in particular that Dr Mary Booth of PFPI has authored the peer-reviewed paper "Booth, M. S. (2018). Not carbon neutral: Assessing the net emissions impact of residues burned for bioenergy: Environmental Research Letters 13(3): 035001",<sup>1</sup> has provided expert evidence in relevant court cases (Case T-141/19 *Peter Sabo & Others v (1) The European Parliament and (2) The European Council*)<sup>2</sup> and has made submissions on these issues to relevant authorities in the US.
2. Overall, we agree that carbon dioxide removal (CDR) is by definition necessary for achieving net-zero emissions, but the focus must be on reducing emissions in the first place and also on increasing natural carbon sinks, an approach which will have a dual benefit in relation to the biodiversity crisis.
3. Our Response focuses on the role of BECCS where the biomass burned as fuel is woody biomass (“BECCS with woody biomass”). Woody biomass is biomass from wood feedstocks, for example roundwood from harvested trees, residues left over after forestry and sawmill residues. For commercial power generation in the UK this wood is generally manufactured into wood pellets,

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<sup>1</sup> <https://iopscience.iop.org/article/10.1088/1748-9326/aaac88>

<sup>2</sup> Applicant’s submissions available at: <http://eubiomasscase.org/wp-content/uploads/2019/08/EU-Biomass-Case-Main-Arguments.pdf>

which are burned as a biomass feedstock in power stations (this is the case at Drax Power Station, the largest woody biomass-burning power station in the UK).

4. We are submitting this Response to explain why BECCS with woody biomass is unlikely to be a carbon negative fuel source and should therefore not be relied on to contribute to the government's 2050 net-zero strategy.
5. We urge the Committee to recommend that government policy should not support BECCS with woody biomass either in its Biomass Strategy 2022 or through its renewable subsidies.

#### **What contribution could BECCS make to achieving net zero by 2050?**

6. BECCS with woody biomass is unlikely to result in negative emissions and this reality should be reflected in government policy.
7. Any claim that BECCS can deliver negative emissions rests on the underlying assumption that bioenergy is carbon neutral, meaning that emissions are offset in a timely way so there is no net addition of CO<sub>2</sub> to the atmosphere. Mechanistically, CCS is assumed to mitigate smokestack CO<sub>2</sub> emissions so that the carbon uptake associated with biomass regrowth can now effect a net drawdown of atmospheric CO<sub>2</sub>, hence producing 'negative' emissions. Obviously, the rate at which biomass feedstocks regrow (very slowly in the case of trees) is central to whether biomass can be considered "carbon neutral" or "carbon negative" when paired with CCS. As outlined below, in fact woody biomass cannot generally be considered to be carbon neutral, so the claim that BECCS delivers negative emissions falls at the first hurdle.
8. Below, we debunk key arguments that are generally relied on to support treatment of woody biomass energy as carbon neutral, and present additional evidence about the ineffectiveness of CCS in capturing full lifecycle emissions from woody biomass.

#### *The international carbon reporting rules*

9. IPCC rules identify two sectors relevant to measuring the biogenic carbon impact of burning wood for energy: the land sector and the energy sector. Under these rules, the loss of forest carbon from harvesting wood is, in theory, noted as a reduction in forest carbon stocks, and then reported in the land sector as a potential impact on the forest carbon sink (which is the difference between forest stocks in subsequent measurements). In order to avoid double-counting this forest carbon loss from harvesting, emissions from burning biomass are not counted in the energy sector.<sup>3</sup>
10. However, this is not the same as woody biomass energy *actually* having zero emissions, and in fact by requiring that emissions are recorded in the land sector the rules inherently acknowledge that woody biomass energy produces carbon emissions. The IPCC explicitly warns that "*the approach of not including these [bioenergy] emissions in the Energy Sector total should not be interpreted as a conclusion about the sustainability or carbon neutrality of bioenergy.*"<sup>4</sup>

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<sup>3</sup> [https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/2\\_Volume2/19R\\_V2\\_2\\_Ch02\\_Stationary\\_Combustion.pdf](https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/2_Volume2/19R_V2_2_Ch02_Stationary_Combustion.pdf)

<sup>4</sup> <https://www.ipcc-nggip.iges.or.jp/faq/FAQ.pdf> at Q2-10: "According to the IPCC Guidelines CO<sub>2</sub> Emissions from the combustion of biomass are reported as zero in the Energy sector. Do the IPCC Guidelines consider biomass used for energy to be carbon neutral?"

*Tree regrowth*

11. When trees are harvested for woody biomass energy, the forest may be replanted or allowed to regenerate naturally. Any such regrowth will capture carbon. However, studies have shown that it takes decades to centuries for tree regrowth to reduce emissions from woody biomass energy to the point where cumulative CO<sub>2</sub> emissions are equal to those which would have been released if fossil fuels had been burned instead,<sup>5</sup> far too late to contribute to the UK's 2050 net zero targets.
12. Some of the woody biomass burned in the UK is sourced from whole trees. Investigations by NGOs indicate that some wood pellet manufacturers supplying wood pellets for use in electricity generation in the UK such as Enviva in the US and Graanul Invest in Europe source a significant amount of their wood from whole trees. A report from PFPI in 2016 concluded that a significant proportion of Enviva's feedstock comes from whole trees.<sup>6</sup> Graanul Invest's 2020 sustainability report indicates that over a third of its wood for that year was roundwood.<sup>7</sup> In Canada, pellet manufacturer Pinnacle Renewable Energy reports that it obtains nearly 28% of its wood from primary feedstocks (i.e. roundwood or in-forest chipping) in British Columbia.<sup>8</sup>

*"Sustainable" harvesting*

13. Compliance with the UK's sustainability criteria does not make woody biomass energy carbon neutral because such compliance cannot change the fact that (1) harvesting and burning wood releases CO<sub>2</sub> and (2) it takes decades to centuries for tree regrowth to reduce cumulative net CO<sub>2</sub> emissions to the same level which would have been released if fossil fuels had been burned instead. The belief that sustainability criteria can result in GHG savings from burning forest biomass incorrectly equates sustainability with carbon neutrality.<sup>9</sup> However, these are two separate concepts. Wood harvesting that may be considered 'sustainable' (in the sense that harvesting is held to a level lower than the growth increment) is not in fact carbon neutral. The CO<sub>2</sub> emissions from harvesting and burning trees are not 'cancelled out' by the fact that harvested trees will eventually regrow in the distant future, or by the fact that tree growth has occurred elsewhere in the supply base outside of the area harvested, because carbon captured in this way is not "additional", as is necessary for an immediate offset to occur.

*Forestry and mill residues*

14. Biomass sourced from forestry residues (tops and limbs left over after harvesting) or mill residues (sawdust, etc) is also not carbon neutral, because burning emits CO<sub>2</sub> instantaneously, whereas if forestry residues were left to decompose, they would emit CO<sub>2</sub> slowly and would contribute to building soil carbon. Accordingly, the decision to burn forestry residues for energy results in a net addition of CO<sub>2</sub> to the atmosphere. In the case of mill residues, unless the alternative fate for this material is burning without energy recovery, the decision to burn the material will nearly always result in a net addition of carbon to the atmosphere. Theoretically, capturing and storing CO<sub>2</sub> from burning forestry and mill residues does prevent that carbon from entering the atmosphere, but it does not elicit some additional offsetting that results in "negative" emissions.

<sup>5</sup> <https://onlinelibrary.wiley.com/doi/epdf/10.1111/gcbb.12327>; <https://apps-scf-cfs.rncan.gc.ca/calc/en/bioenergy-calculator>; <https://www.frontiersin.org/articles/10.3389/ffgc.2021.642569/full>; [https://www.researchgate.net/publication/241746647\\_Carbon\\_Accounting\\_for\\_Woody\\_Biomass\\_from\\_Massachusetts\\_USA\\_Managed\\_Forests\\_A\\_Framework\\_for\\_Determining\\_the\\_Temporal\\_Impacts\\_of\\_Wood\\_Biomass\\_Energy\\_on\\_Atmospheric\\_Greenhouse\\_Gas\\_Levels](https://www.researchgate.net/publication/241746647_Carbon_Accounting_for_Woody_Biomass_from_Massachusetts_USA_Managed_Forests_A_Framework_for_Determining_the_Temporal_Impacts_of_Wood_Biomass_Energy_on_Atmospheric_Greenhouse_Gas_Levels); <https://www.southernenvironment.org/wp-content/uploads/legacy/publications/biomass-carbon-study-FINAL.pdf>; <https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1757-1707.2012.01173.x>.

<sup>6</sup> <https://www.pfpi.net/wp-content/uploads/2016/03/Report-to-SEC-on-Enviva-March-14-2016.pdf>, pp.27-30.

<sup>7</sup> <https://www.vpro.nl/argos/lees/onderwerpen/money-to-burn/interactive.html>

<sup>8</sup> Supply Base Report: Third Surveillance Audit (2020): <https://sbp-cert.org/certificate-holders/#4149>

<sup>9</sup> See further: <http://eubiomasscase.org/wp-content/uploads/2020/07/RED-II-biomass-Paper-Tiger-July-6-2020.pdf> at pp.8-9, pp.26-30.

### **Issues with BECCS technology**

15. BECCS with woody biomass is very unlikely to be 100% efficient at capturing combustion CO<sub>2</sub>. Existing CCS technology has not yet been proven to work efficiently at industrial scale. For example, an analysis of the Petra Nova carbon capture facility for coal burning in Texas, USA found that this only captured 55.4% of CO<sub>2</sub> smokestack emissions (despite the facility reporting that 92.4% of CO<sub>2</sub> emissions were captured).<sup>10</sup> Once the additional electricity required for the carbon capture process was considered, just 33.9% of total CO<sub>2</sub> emissions had been removed. This was reduced to 10.8% over 20 years once upstream emissions were taken into account.<sup>11</sup>
16. In addition, there are several categories of CO<sub>2</sub> emission which cannot be captured using BECCS, namely upstream/supply chain emissions and emissions from foregone carbon sequestration. Supply chain emissions include fossil fuel emissions from wood pellet manufacture, transport etc, as well as biogenic emissions such as emissions from the decomposition of roots and other residues left after harvest which are not used for pellet manufacturing, emissions from soil carbon loss, and emissions from wood burned to dry pellets during the pellet manufacturing process. These uncapturable lifecycle emissions are likely to significantly decrease the proportion of total carbon emissions from woody biomass that can be stored using CCS.<sup>12</sup>
17. Government policy regarding BECCS must account for such technological limitations and associated CO<sub>2</sub> emissions.

### **Timescales for rollout of BECCS with woody biomass**

18. Proposed timescales for rolling out BECCS with woody biomass are unrealistic. BECCS is still many years from a full-scale commercial roll-out and this must be reflected in government policy.
19. This is particularly with respect to planning permissions for converting woody biomass generators to include carbon capture technology, and for carbon storage sites in the North Sea. For example, Drax Group Plc has only initiated the planning approval process for BECCS technology on a single unit at its Drax Power Station site, with the preparation of an initial scoping opinion. According to a note of a meeting between Drax and the UK Planning Inspectorate in December 2020, *“The Applicant’s target submission date [for a Development Consent Order] is end of Q1 2022. The Applicant aims to start construction on BECCS Unit 2 in Q2 2024.”*<sup>13</sup> We are not aware of equivalent planning processes having commenced for the other units.
20. Furthermore, we understand that there is currently no storage site for captured CO<sub>2</sub>, without which the BECCS unit will not be able to operate. According to Drax’s scoping opinion, CO<sub>2</sub> *“would be transported via a proposed National Grid Ventures pipeline for compression at a site at Easington and storage in naturally occurring aquifers under the southern North Sea. The pipeline and the storage infrastructure will be the subject of separate DCO applications and do*

<sup>10</sup> <https://www.biofuelwatch.org.uk/wp-content/uploads/BECCS-letter-by-scientists-and-economists-1.pdf> (referring to Jacobson, M.Z. (2019) *The Health and Climate Impacts of Carbon Capture and Direct Air Capture, Energy and Environmental Science*, 12, 3567-3574)

<sup>11</sup> <https://www.biofuelwatch.org.uk/wp-content/uploads/BECCS-letter-by-scientists-and-economists-1.pdf>

<sup>12</sup> <https://www.biofuelwatch.org.uk/wp-content/uploads/BECCS-letter-by-scientists-and-economists-1.pdf>

<sup>13</sup> [https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010120/EN010120-Advice-00001-1-EN010120\\_Drax\\_%20Meeting%20Notes\\_1.12.20\\_FINAL.pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010120/EN010120-Advice-00001-1-EN010120_Drax_%20Meeting%20Notes_1.12.20_FINAL.pdf)

*not form part of the Proposed Development.*<sup>14</sup> These separate Development Consent Order applications have not been initiated yet and the permission process can take over a year to complete.<sup>15</sup>

### **Other drawbacks for the environment and society from BECCS with woody biomass**

21. BECCS with woody biomass may also have negative environmental and societal impacts in addition to being unlikely to provide negative emissions to contribute towards the UK's net zero goal.
22. First, there is evidence that feedstocks for existing woody biomass energy are sometimes obtained from forests in biodiverse areas, harming biodiversity and reducing the carbon sink. For example:
  - a. Biomass demand from countries such as the UK is leading to increased logging activity in Estonia and Latvia.<sup>16</sup> In Estonia, logging is taking place in Natura 2000 sites (a type of protected area)<sup>17</sup> without appropriate environmental risk assessments being undertaken. This activity has resulted in the European Commission initiating infringement proceedings against the Estonian government.<sup>18</sup>
  - b. In Southeastern USA, clearcutting of bottomland hardwood forests for use in the production of wood pellets poses a threat to species of conservation concern in this global biodiversity hotspot area. Wood pellet harvesting combined with other pressures mean that these biodiverse forests are projected to decline by 5-12% between 2010 and 2060.<sup>19</sup> In 2016 alone, demand for wood pellets for woody biomass energy in the UK resulted in approximately 303 square kilometres of biodiverse forests in the Southeastern USA being harvested.<sup>20</sup>
  - c. In British Columbia, evidence suggests that wood pellets are likely being made with wood from threatened species habitat.<sup>21</sup> For example, one third of the pellet industry's logging areas in British Columbia exist in the Inland Temperate Rainforest ecosystem. This globally rare ecosystem consists of ancient primary forests of international importance in terms of biodiversity and carbon storage.<sup>22</sup> These forests are home to Southern Mountain Caribou herds which in 2018 were declared by the federal government to be at imminent risk of extinction, a situation which is exacerbated by felling whole trees within their habitat.<sup>23</sup>
23. Second, the mills where wood pellets are manufactured can emit pollutants which impact the health of local people<sup>24</sup> and those working in the power plants themselves may be exposed to harmful dust from wood pellets.<sup>25</sup>

<sup>14</sup> <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010120/EN010120-000009-DBCC%20-%20Scoping%20Opinion.pdf>. At para 2.2.3

<sup>15</sup> <https://infrastructure.planninginspectorate.gov.uk/application-process/the-process/>

<sup>16</sup> [https://media.voog.com/0000/0037/1265/files/Biomass\\_report\\_ENG%20\\_2020.pdf](https://media.voog.com/0000/0037/1265/files/Biomass_report_ENG%20_2020.pdf). At p. 5 and graph on p. 12

<sup>17</sup> [https://ktu.ee/Report%202021%20-%20Estonia%20Natura%202000%20forest%20logging%20\(ENG\).pdf](https://ktu.ee/Report%202021%20-%20Estonia%20Natura%202000%20forest%20logging%20(ENG).pdf)

<sup>18</sup> [https://ec.europa.eu/commission/presscorner/detail/en/inf\\_21\\_2743](https://ec.europa.eu/commission/presscorner/detail/en/inf_21_2743)

<sup>19</sup> [https://www.southernenvironment.org/wp-content/uploads/legacy/words\\_docs/Biomass\\_Biodiversity\\_white\\_paper.pdf](https://www.southernenvironment.org/wp-content/uploads/legacy/words_docs/Biomass_Biodiversity_white_paper.pdf)

<sup>20</sup> Ibid

<sup>21</sup> <https://www.stand.earth/sites/stand/files/report-canada-wood-pellet-industry.pdf>

<sup>22</sup> Ibid

<sup>23</sup> Ibid

<sup>24</sup> <https://edition.cnn.com/interactive/2021/07/us/american-south-biomass-energy-invs/>

<sup>25</sup> <https://news.sky.com/story/taxpayer-subsidised-drax-in-court-over-concerns-its-biomass-risks-employees-safety-12396773>

**Implications for government policy**

24. We are concerned about the government relying on BECCS with woody biomass as part of its plans for reaching net zero when this technology is enormously expensive and resource-intensive, yet unlikely to provide the negative emissions benefits claimed for it while perpetuating the well-documented impacts of the woody biomass industry.
25. In our view, BECCS with woody biomass energy should not form part of the government's strategy for achieving net zero emissions by 2050 for the reasons given above. As such BECCS with woody biomass energy should not receive subsidies or other support from the government and this should be reflected in the proposed 2022 biomass strategy.

*October 2021*