



Interested Party Number: 20032286

Drax Bioenergy with Carbon Capture and Storage, PINS Reference: EN01012

Just Transition Wakefield response to the Examining Authorities questions in “The Examining Authority’s written questions and requests for information (ExQ2) Issued on 19 April 2023”.

Just Transition Wakefield welcomes the Examining Authority’s request for comments on these documents. As an organisation, we are deeply frustrated that so many critical policy documents have only been released **during** the enquiry period, and that the crucial updated biomass policy will not be available until the very end of June. Indeed, at the start of this enquiry, we made written representation asking that the enquiry be delayed until these updated policy frameworks were released to the public. This was not agreed, so we must ask that

- a) Interested parties are given the opportunity to respond to the Biomass Strategy between its publication at the end of June and the close of the enquiry on July 17th;
- b) Decision making and recommendations of the Examining Authority take account not only of the Biomass Strategy once published, but also the evolving policy framework.

Notwithstanding the above, we are pleased that throughout the enquiry period the nature of public discourse about biomass, BECCS and Drax has changed significantly, both in the press and in parliament. This gives us some confidence that whatever the recommendations from this enquiry, the recognition that the industrial burning of forests is damaging and dangerous is growing. We expect this to be reflected in future recommendations for UK industry feedstocks and viability.

The submission date for these questions is Tuesday May 9th, 2023.

We are not even half way through 2023, but already we have seen record breaking temperatures across large parts of continental Asia, reaching 44 to 45°C.

There is a second year of drought in the Po Valley in Italy and across Spain, impacting significantly on European agriculture and horticulture, threatening the reliability of UK food imports.

We have not yet seen the impact of the Pacific climate system switching from “La Nina” to “El Nino” which will significantly exacerbate atmospheric heating, but we have nonetheless seen accelerating Antarctic glacial melting and new peaks in atmospheric carbon dioxide concentrations. We have also heard alarm from scientists over the unexpectedly high ocean temperatures this year.

And we are seeing the current warming accelerate methane releases from natural stores such as the arctic tundra, further accelerating global heating.

This is the background to the Examining Authority's consideration of this planning application.

What effect will permitting this development have on the actual climate and the very real biodiversity collapse?

Just Transition Wakefield response to PPL2.1

PPL2.1 All parties A suite of documents published under 'Powering up Britain' was published on 30 March 2023. What, if any, are the implications for the consideration of the application?

The suite of documents associated with "Powering Up Britain" have multiple implications for the Power BECCS project proposed by Drax Power. The Examining Authority must consider which implications are relevant to the planning enquiry and which are policy implications for a more political consideration elsewhere.

1. Powering Up Britain

On page 6, the government explains

This paper sets out how the government will enhance our country's energy security, seize the economic opportunities of the transition, and deliver on our net zero commitments. To meet this ambition, the Department for Energy Security and Net Zero will deliver:

1. Energy security: setting the UK on a path to greater energy independence.

2. Consumer security: bringing bills down, and keeping them affordable, and making wholesale electricity prices among the cheapest in Europe.

3. Climate security: supporting industry to move away from expensive and dirty fossil fuels.

4. Economic security: playing our part in reducing inflation and boosting growth, delivering high skilled jobs for the future.

Unabated biomass and BECCS, both at Drax and elsewhere, require such significant quantities of biomass in the form of wood pellets that the UK is not able to supply this amount. Therefore millions of tonnes of wood pellets are imported from the US, Canada and Baltic countries. We have to question how being so dependent on imports and global shipping supports energy security.

The high cost of unabated biomass and the even higher cost of BECCS is incompatible with 2 above: bringing bills down, keeping them affordable and making UK electricity among the cheapest in Europe.

Whilst biomass and BECCS do not use actual fossil fuels, as we have shown in previous submissions, short term carbon dioxide emissions from biomass are higher than from fossil fuels because of the lower energy density of the fuel; biomass is even more expensive than fossil gas, and there are questions about particulate emissions and dust hazards both in the plant and in communities surrounding overseas pellet mills. In addition, there are questions about the pay back period that we have already raised.

Finally, once the construction phase is over, there will be very few additional jobs at Drax, so contribution to high skilled future employment is actually minimal.

On page 10, the government states

We do not wish to participate in a discriminatory subsidy race, which will be harmful to many nations' intentions to transition.

Sadly, Drax is already heavily dependent on long term subsidies, and the costs of retrofitting CCS are at best eye watering, requiring an estimated £31 billion in additional subsidy over the lifetime of the project. This proposal to retrofit CCS to Drax is not compatible with this ambition for a genuinely free (unsubsidised) market.

On pages 11 and 12, there are a number of strategies listed, including wind, nuclear, CCUS and hydrogen. There is no mention of BECCS. BECCS does get mentioned later in the document, such as on page 21 where the document says

Fifth, to meet our sector aims and Net Zero target we are committed to further development of Industrial Carbon Capture, Waste, CCUS-enabled Hydrogen, Power CCUS, and engineered GGRs. As part of this, we will work closely with electricity generators currently using biomass to facilitate their transition to power BECCS, subject to value for money, taking account of energy security on the road to net zero.

The government make clear that the transition from unabated biomass to power BECCS is dependent on the industry providing value for money and energy security. There is no evidence to support the affordability of BECCS at Drax, particularly bearing in mind the inefficiency of the old technology deployed, dating as it does from the 60s and 70s.

In summary, BECCS and therefore Drax's application to retrofit 2 units, are at best a minor part of the UK energy strategy. The industry is highly vulnerable to energy security, value for money and climate mitigation tests as well as biodiversity and sustainability tests. This collective set of challenges must cast doubt on the viability of the application.

There are additional questions about the ability of BECCS to deliver negative emissions for the wider net zero strategy.

2. Powering Up Britain – Energy Security Plan.

On page 27 of this document, under a heading "A future of Cheap, Clean and British Energy", the government reiterate their ambition saying

The Government has committed to achieving fully decarbonised electricity by 2035, subject to security of supply. We are taking the actions that will set us on course for this. As we make the transition to a secure and low-carbon electricity system, affordability will remain at the centre of our thinking. This is why we have set a new ambition. By 2035, our goal is for Britain to have among the cheapest wholesale electricity prices in Europe.

As in the previous section, the government is clear that affordability is a key consideration, as is security of supply. The regulatory pressures in both the US and Canada suggest that there is no long-term security of supply, and as highlighted above, BECCS at Drax does not provide value for money for either the tax payer or the bill payer.

On page 29, the document states

CCUS is an emerging sector that is a central pillar of Government's plan to deliver net zero. It is the key to unlocking decarbonisation of industrial sectors, delivering engineered greenhouse gas removals, and enabling low-carbon hydrogen production and flexible low-carbon electricity generation to complement renewables. CCUS forms part of the most cost-effective route to net zero, and represents a significant economic opportunity, with the potential to support up to 50,000 jobs in our industrial heartlands and across the supply chain, and deliver 4-5 billion in Gross Value Added by 2050 through exports. We are building on skills and experience gained via our well-developed offshore industry and our significant storage potential.

It is clear that the government ambition to develop carbon capture and storage technologies are not dependent on BECCS. The sectors that are explicitly described here are industrial sectors and hydrogen production. They do mention "low carbon electricity generation to complement renewables" which we take to assume gas powered generation as biomass is already considered (falsely) part of the renewables sector. In the government's eyes, there appear to be better cases for CCUS than BECCS.

On page 39, there is a section on bioenergy. Whilst the government does repeat Drax's claim that power BECCS will deliver negative emissions, we and others have already demonstrated that this claim is false over the timescale of our net zero target date of 2050. Successfully capturing 95% of the emissions from 2 of 4 units will reduce the smoke stack emissions (of these 2 units) to just 5%, but this will not ever abate the supply chain emissions, nor will it deliver any negative emissions for 25 years after the burned forests have been replanted.

This is not just assertion. The Chatham House publication (*BECCS Deployment: The risks of forging ahead of the evidence; Dan Quiggin, October 2021*) makes a number of significant points on negative emissions, including:

- *A worst-case scenario of over reliance on BECCS policies and their poor implementation could delay or deter emissions reductions, and result in 'imagined offsets'. One analysis indicates that this could cause an additional temperature rise of up to 1.4°C.*
- *While scientists treat models as 'experimental sandpits', policymakers tend to see them as 'truth machines'. As a result, there is a clear risk of policy and market support mechanisms developing ahead of resolving crucial scientific and engineering uncertainties. The UK is leading efforts to develop policies and market frameworks to support BECCS, and must do so cognisant of the risks of under-performance and supply chain impacts, especially if BECCS is scaled internationally.*
- *This is particularly pertinent given that the 'middle-of-the-road' 2050 IPCC global pathway towards 1.5°C compliant scenarios envisages around 1.5 GtCO₂/yr of BECCS removals. If this were supplied solely by wood pellets it would require a scaling of supply by more than 12,000 per cent, relative to what Drax, the UK's largest bioenergy producer, currently combusts at its Selby power plant.*
- *Due to the potential scaling pressures on wood pellet supply chains, the risk of carbon debt¹ remains of concern. As one recent study pointed out,*

‘in the US coastal southeast there were fewer live and growing-stock trees and less carbon in soils with every year of milling operation than in the rest of the eastern US’. As such, a diversity of feedstocks should be pursued.

- *Biomass supply chains embody non-marginal emissions. Setting aside the risk of carbon debt, and assuming robust reporting of supply chain emissions, a future BECCS-to-power plant that combusts wood pellets is likely to exhibit a carbon efficiency of around 76 per cent. Significantly less than the 90 per cent capture rate targeted at the plant level and planned for in models.**
- *If BECCS is to play the crucial role that models, policymakers and net zero targets imply, then carbon efficiencies and the energy output–capture rate trade-off needs to be at the heart of policy development, otherwise there is a risk that already tight carbon budgets become unresolvable, leading to runaway climate change.*

*In reality, of course, we cannot set aside carbon debt or the robust reporting of supply chain emissions. In fact, as we have already highlighted, the carbon debt will require a payback period of **at least** 40 years, so negative emissions cannot be achieved by 2050 even from current combustion/replanting, never mind post-retrofit. Further, we know that the IPCC model that initially rated biomass as zero rated is outdated, hence the admission that biomass is not actually zero carbon. We know that with the current national and global scrutiny of the biomass industry, this language matters and is likely to change. Therefore it is clear that consenting this application is likely to open a series of legal and/or regulatory challenges.

Even then, the negative emissions will only be delivered slowly over future decades, of no use to our 2050 net zero target date nor to the current climate. It will however, lead to the significant increase in future atmospheric carbon dioxide concentrations. As Dr Boswell calculated in his submission of March 28th, *“These emissions are approximately 1/1000th of the entire remaining global carbon from 2020 for a 50% likelihood of limiting global heating to 1.5°C, the Paris temperature target.”* 1/1000 (0.1%) is an enormous contribution from just one site in just one country. Further, despite this application process closing in mid-July, we are not expecting the Biomass Strategy from the government until the end of June.

3. Powering Up Britain – Joint Overview

On page 21 of this document, the government makes it clear that in addition to energy security, biomass projects (including BECCS) will be subject to new value for money tests. Allowing for the estimated cost to the public of £31 billion over its operating life, it is hard to imagine that this can be considered value for money. We would go further and say that any project that cannot operate without public subsidy is not economically viable, and that a study of Drax’s annual accounts will demonstrate clearly the co-dependency of its subsidy and its profits.

Just Transition Wakefield response to PPL2.2

PPL.2.2 All parties The Government's response to the recommendations made by the Independent Review of Net Zero was published alongside the Powering Up

Britain: Net Zero Delivery Plan on 30 March 2023. What, if any, are the implications for the consideration of the application?

The Government response to the Review of Net Zero is interesting. It has much to say about CCUS (such as responses 43 to 56) including on pipeline and non-pipeline transport of carbon dioxide captured. We note that the Humber Low Carbon Pipeline has recently stalled as National Grid Group indicated its intention to seek a buyer for the pipeline project. We can only guess that this was at least in part behind this project moving into Track 2. This instability and economic doubt at this early stage is clearly significant, including in the context of the government's responses to the Independent Review of Net Zero.

Specifically, in response 57 (*Government should announce, as soon as is possible, its intentions for engineered Greenhouse Gas Removal (GGR) business models including timings and eligibility. This announcement must clearly outline what standards these business models are expected to require.*) the UK government has said

"In the Net Zero Strategy, we committed to developing incentives for investment in GGRs by consulting on our preferred business models in GGRs. In 2022, we published a consultation on both power BECCS and GGR business models. We will publish the power BECCS response imminently and intend to provide a response to the GGR consultation and set out the next steps this year.

In the consultations, we asked for opinions on factors such as net negativity and permanence to help define legitimacy in carbon removals, as well as committing to reviewing the existing landscape of standards and initiatives relating to engineered GGR MRV (monitoring, reporting, and verification). BECCS projects will be required to demonstrate compliance with strict biomass sustainability criteria. In January this year, we also held the first GGR Business Model Expert Group. This group of experts from industry will advise on the design of the GGR business model, alongside our wider stakeholder engagement."

There are a number of relevant points to note within this response:

- By explicitly asking for opinions on the permanence of storage recognises that this is emerging technology without a proven track record;
- By explicitly asking for opinions on net negativity reinforces that Drax have now clarified that biomass is **zero-rated** not zero-carbon. This admission casts doubt on the ability of BECCS to engage in carbon trading through the sale of carbon credits. We also note that the government has not yet caught up with Drax's position, still basing policy on the outdated view that biomass is zero-carbon not zero-rated. Because this admission was made during the enquiry, it is unlikely that government policy will have caught up within the release of the Biomass Strategy. Therefore we can expect further policy review in a relatively short timeframe.
- The government response emphasises that biomass projects will be subject to "*strict sustainability criteria*". Whilst we do not know how much stricter these criteria will be compared with current criteria, we do know that there have been multiple claims that the current wood pellet supply chains do not comply with current sustainability criteria. These claims refer to the Baltic supply (an Ember report), to British Columbian clear felling of virgin forest

(BBC Panorama, CBC The Fifth Estate, Stand.Earth) and South Eastern USA (Dogwood Alliance) with evidence having been shared in previous submissions. It is worth reiterating that sustainability criteria are likely to include both climate emissions and biodiversity criteria, and that we have raised significant concerns about the impact of the biomass industry on both.

Just Transition Wakefield response to PPL2.3

PPL.2.3 All parties The Government published 'Planning for new energy infrastructure: revised draft National Policy Statements - consultation document' on 30 March 2023. All parties are asked whether they would like to comment on the implications of the revised draft NPS EN-1 & EN-3

From EN-1

In the introduction, section 1.3, Scope of the Overarching National Policy Statement for Energy, the document lists the documents as

1.3.2 A further five technology specific NPSs for the energy sector cover: • natural gas electricity generation (EN-2);

- *renewable electricity generation (both onshore and offshore) (EN-3);*
- *gas supply infrastructure and gas and oil pipelines (EN-4);*
- *the electricity transmission and distribution network (EN-5);*
- *and nuclear electricity generation (EN-6).*

We presume from this paragraph that BECCS is considered under “renewables”, with the associated pipeline and undersea storage presumably featuring in EN-4, being classed as a gas pipeline.

It is not clear that BECCS or the woody biomass it depends on is actually renewable **within the timeframe achieving net zero by 2050**. The carbon debt created across the supply chain, and the lengthy payback period of at least 40 years means that the wood pellets burned today will not have sequestered sufficient carbon by 2050 to be classed as “renewable”. This gets worse throughout the proposed operating period of 2027 to 2050.

We find this problematic, and would suggest that, in line with paragraph 1.3.3, there should be a further policy document, EN-7, dealing with CCS, BECCS, biomass, etc, leaving EN-3 for genuine renewables: onshore wind, offshore wind, solar, tidal and wave power.

This is reinforced by paragraph 1.3.4 which indicates that EN-1 is the primary advice.

Later in section 2.5: Energy Security, in paragraph 2.5.12, the NPS says *Plants burning fossil fuels that began generating before July 2019 must either demonstrate that they emit below 550gCO₂/kWh electricity generated or must not emit more than 350kgCO₂ per year on average*. Because of the emissions problems now understood to be associated with biomass, we believe that this

requirement should also be applied to biomass plants **at the smokestack**, not using carbon accounting tricks to hide actual atmospheric emissions.

Section 2.6, Sustainable Development is also interesting. We believe that the biomass industry has to be looked at globally, not on a plant-by-plant basis, and over the 27 years to 2050. Although as an Examining Authority you are only considering one DCO, it is clear that by 2050, there are plans for many more BECCS facilities in many countries. It is NOT clear that current forestry and biomass policies are robust enough to respond to the planned expansion of this industry. This does not sit well with sustainable development, nor our existing commitments for 30x30x30 following COP15 in Montreal in December 2022, nor our existing commitments to end deforestation.

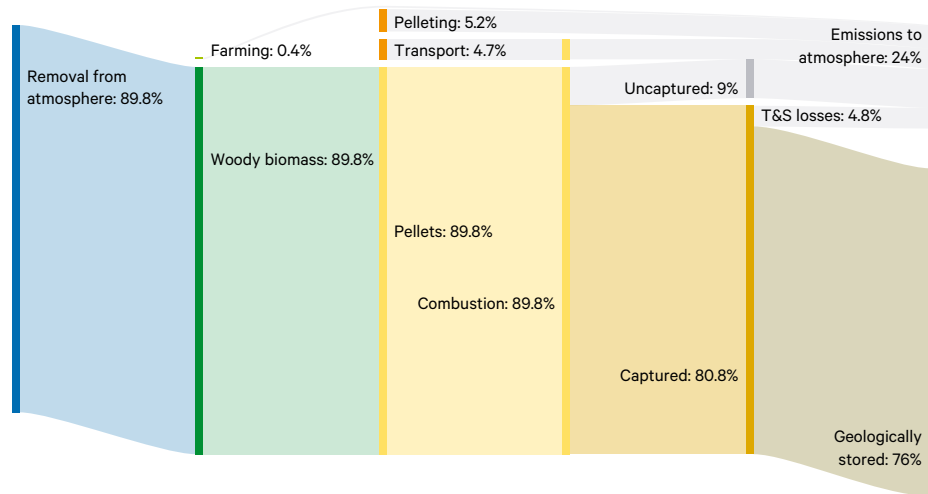
The Chatham House report, BECCS Deployment: the risks of policies forging ahead of the evidence, in section 4, Feedstock Choice: Carbon efficiency and carbon debt explains some of the issues. At the bottom of page 20, the report says *“Under GHG reporting requirements, biomass is considered carbon neutral at the point of combustion. However, the reality of supply chain emissions and potential carbon debt could result in wood-pellet-based BECCS failing to deliver the negative emissions that are technically possible.”* The chapter then expands on this, including this paragraph on page 23:

“As can be seen from Figure 5, the supply chain emissions that Drax reports, combined with assumptions as to downstream CO₂ losses from the uncaptured emissions, as well as those from transport and storage would see around 24 per cent of the aggregate embodied CO₂ emitted to the atmosphere, and around 76 per cent geologically stored. This of course assumes trees are planted to replace those combusted in the BECCS facility, and ignores the time needed for the growing trees to recapture the carbon emitted on combustion (see the discussion on carbon payback periods below).”

It is clear that when full supply chain emissions, **and** regrowth time are accounted for, there is a major problem with Drax’s calculations of sequestering rates. This will have knock-on implications for their carbon accounting to sell carbon credits via emissions trading schemes.

The figure referenced in the quote is reproduced here for completeness:

Figure 5. Carbon efficiency of a future wood pellet BECCS-to-power plant, based on Drax's current supply chain, assuming a 90 per cent capture rate and 5 per cent transport and storage losses (T&S)



Source: Adapted from Drax (2021), *Drax Group plc Annual report and accounts 2020*.

Note: Values from Drax's annual report converted on the basis of the embodied CO₂ of the wood pellets (1.8 kg CO₂/kg dry matter (DM), also calculated from Drax's annual report).

Chapter 4.2, *The risks of wood pellet carbon debt as BECCS is scaled* from the same report is instructive. The argument is complex, so rather than summarise, we reproduce the section. The document is publicly available via the Chatham House website.

4.2 The risks of wood pellet carbon debt as BECCS is scaled

As the number of net zero pledges by countries indicates, along with the forecasts of the IEA and IAM pathways of the IPCC SR1.5 report,⁵³ the future scale up of BECCS could be enormous. As Table 1 indicates, to scale BECCS-to-power solely combusting wood pellets to meet the UK CCC 2050 target of 51 MtCO₂/yr would require the combustion of more than four times that currently burnt at Drax, and 126 times greater to meet the 'middle-of-the-road' IPCC 1.5°C pathway, also by 2050. Such a significant global scaling of wood pellet demand risks putting significant pressures on the global supply chains. Clearly alternative feedstock choices are available, other than woody biomass. However, given that the leading BECCS developer uses 97 per cent woody biomass (3 per cent agricultural residues⁵⁴) and the global supply of pellets comprised of other feedstocks remains marginal, the scaling comparison of Table 1 is an indicator of the upper limit to wood pellet scaling over the next 30 years. It is also interesting to note that the UK CCC BECCS removal target of 51 MtCO₂/yr would require 119 per cent of the 26 Mt of wood pellets consumed across the EU27 + UK, which in turn represents 50 per cent of global consumption.

Table 1. Scaling up BECCS-to-power solely combusting wood pellets to the UK CCC target and global IPCC IAM indications

	EU27 + UK (2018)	Drax (2020)	UK CCC Target* (2050)	Global IPCC** 1.5°C (2050)
Wood pellets burnt/required (Mt)	26	7	31	926
Embodied CO ₂ (MtCO ₂) ⁵⁶	47	13	57	1667
CO ₂ capture potential (90% capture rate) (MtCO ₂)	42	12		
CO ₂ capture target (90% capture rate) (MtCO ₂)			51	1500

*Net zero, further ambition scenario;⁵⁷ **‘middle-of-the-road’ IPCC 1.5°C compliant pathway.⁵⁸

Source: Compiled by the author.

The initial combustion of biomass, along with the associated life cycle emissions of the biomass feedstock, create what is termed a ‘carbon debt’. Over time, regrowth of the harvested forest removes this carbon from the atmosphere, reducing the carbon debt. The period until carbon parity is achieved is usually termed the ‘carbon payback period’.

Calculating carbon payback periods is complex, because they depend not only on the type of feedstock used, but on the counterfactual – what would have happened to the feedstock if it had not been used for energy. The shortest carbon payback periods derive from the use of residues and wastes from forest industries that imply no additional harvesting and would otherwise be burnt as waste or left to decay, releasing carbon to the atmosphere in any case. The longest carbon payback periods derive from increasing harvest volumes in managed forests, harvesting natural forests or converting them into plantations, or displacing wood from other uses. Where whole trees are harvested and used for energy, not only is the stored carbon in the tree released into the atmosphere immediately, but the future carbon sequestration capacity of the tree is lost, and it takes time for the residual trees or new trees to compensate. Plantation forests have higher growth rates than natural forests and are typically harvested at a relatively young age, while naturally regenerated forests tend to be older and have larger trees when harvested; therefore, more stored carbon is lost when natural forests are harvested.

On the other hand, in the absence of forest management, the rate of net carbon absorption by most forests falls as the incidence of dead and diseased trees increases, and over time the forest may also become more vulnerable to wildfire or other disturbances. There can, therefore, be benefits over the long term from some level of management, and in the absence of demand for wood for energy or other products, many forests may not be managed in a manner that can increase forest carbon stocks. However, this assumes that forest management for conservation is not subsidized in the way that biomass for energy currently is. It is often claimed that using thinnings of trees from forest management practices – which account for about 30 per cent of Drax’s feedstock – results in shorter carbon payback periods because they promote tree growth and allow higher stocking of

trees. It should, however, be noted that the evidence on thinning practices indicates forest carbon stocks are either redistributed (to the remaining trees), or decline. While using wastes and residues as feedstock minimizes the carbon payback period, the volumes available are limited. Thus, as BECCS is developed at scale, there is a risk of using feedstocks with longer and longer carbon payback periods. Particular attention needs to be paid to the carbon payback period if roundwood from mature trees enters the supply chain. This is principally because mature trees take many years to grow, and support greater soil carbon, meaning any next generation tree replacement (plantation saplings) would be subject to a significant carbon payback period. The carbon payback period of a mature tree is likely to be at the upper end of the range of 44–104 years (calculated for a clearcut forest), but could be longer, meaning geologically stored CO₂ from mature trees should not be considered carbon negative until the next generation of trees has grown for this period of time.

Figure 6 illustrates the risks of carbon debt, as wood pellet supply is scaled to service the future global demand from BECCS. It should be noted that the diagram is not applicable to a supply chain of wood pellets derived from plantations grown on marginal or degraded land. As can be seen, the energy requirement to dry high-moisture-content woody biomass, and conversion of mature forests to plantations represent the major potential supply chain emissions. The sustainability criteria in place currently in the UK and EU do not place limits on feedstocks by category, though in July 2021 the European Commission published proposals for modifications to the EU's sustainability criteria, which would end incentives for using saw or veneer logs, stumps and roots, and also prohibit sourcing from primary forests. Transparent monitoring and enforcement of sustainability criteria is often challenging. This is illustrated by investigating the sourcing of wood pellets from the US southeast.

As noted above, Drax complies with the UK's sustainability criteria for solid biomass. The company's 2020 annual report indicates that 36 per cent of its wood pellets are derived from low-grade roundwood. While this may be parts of trees not utilized for wood products, there is a risk that it can contain whole trees, even mature trees. Of the total supply, 63 per cent is sourced from the US southeast, of which 38 per cent is low-grade roundwood. Although Drax diligently reports the categories of feedstock sources used within its own mills, only 20 per cent is currently sourced from pellet mills it directly owns. To ensure wood pellets sourced from suppliers are compliant with regulations, supply chain emissions are minimized and forests sustainably managed, Drax requires suppliers to be certified under the Sustainable Biomass Program (SBP). However, concerns surround potential flaws in SBP standards, with critics concerned SBP certification leaves open loopholes that could undermine the sustainability of wood pellets.

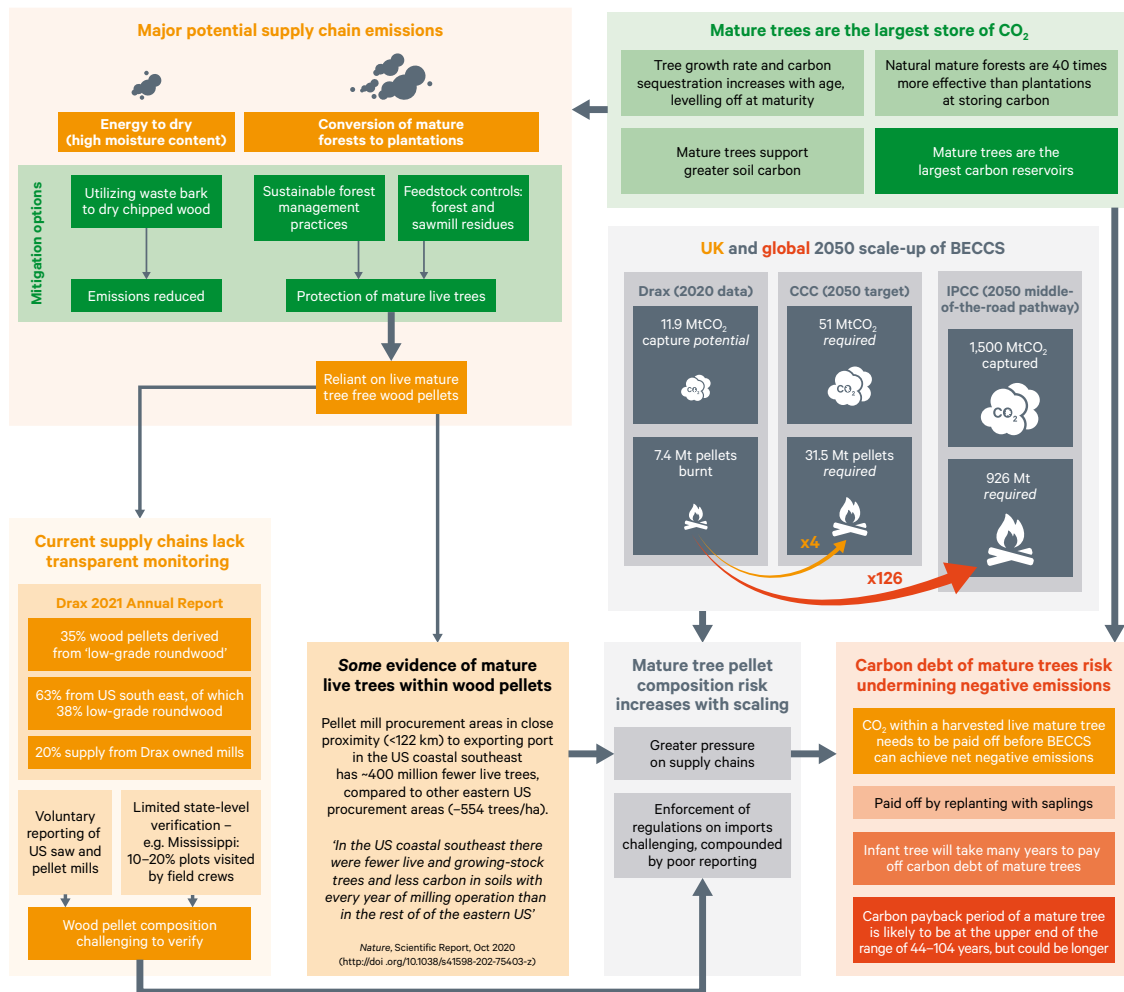
Reporting by saw and pellet mills in the US as to their forest extraction practices is not mandatory. The US Department of Agriculture (USDA) Forest Service Forest Inventory and Analysis (FIA) programme utilizes sampling techniques to estimate the timber product output (TPO). The TPO data provides a means to estimate the feedstock sources used in the mills, as well as the health of forest and carbon stocks. At the forest level, rather than the mill level, the vast areas of the forests and large number of plots necessitates the sampling approach adopted by the FIA. In the state of Mississippi, in 2019, there were nearly 4,000 plots that were

forested, with around 10–20 per cent of those plots visited and measured by field crews each year.

Utilizing the FIA data, a 2020 study investigated the impacts of recent wood pellet production expansion in the US. While the study found ‘largely positive trends in timberland conditions... potentially negative trends suggests that continued monitoring of localized impacts of wood pellet mill operations is important’.

When looking at the specifics of pellet mill procurement areas in close proximity (within 122 km) to exporting ports in the US coastal southeast, the study found around 400 million fewer live trees compared to other eastern US procurement areas, equivalent to 554 fewer live trees per hectare. And importantly the study states that, ‘in the US coastal southeast there were fewer live and growing-stock trees and less carbon in soils with every year of milling operation than in the rest of the eastern US’. It should be noted that this is only one study. However, very few studies have recently investigated the specifics of wood pellet demand pressures on forest management and sourcing practices in this region. Given wood pellet sourcing in the US southeast has rapidly expanded in recent years, and the potential drawbacks of mill reporting and SBP certification, this study is an early indicator of the risks that increased demand pressure can place on supply chains. If these trends continue the risks of carbon debt associated with wood pellets could correspondingly increase. Considering the 44–104-year carbon payback periods, and that carbon budgets to limit global warming to 2°C run till the end of the century, pressure on wood pellet supply chains should be minimized to mitigate carbon debt risks.

Figure 6. The risks of carbon debt as wood pellet supply chains scale with increased global BECCS demand



Source: Compiled by the author.

Note: Applicable to mature forests, not for instance SRC willow. Not applicable to converting marginal or degraded land.

For an importing country, such as the UK, this future risk could be mitigated by sourcing woody biomass domestically as tight regulations are more easily enforced within a domestic supply chain, rather than import compliance being reliant on voluntary reporting, sampling or inadequate certification schemes. To mitigate the risks of carbon debt undermining the carbon negativity of BECCS as wood pellet supply chains are scaled up, BECCS feedstocks should be diversified to ease future demand pressures. Furthermore, it is impossible for biomass pellets derived from other bioenergy feedstocks, such as grasses (miscanthus and switchgrass), to be whole trees in disguise. Or in other words, the issues of transparent reporting to ensure the minimization of carbon payback periods from the use of forest biomass all but vanish. That said, other feedstocks can exhibit a carbon debt if significant land-use change (LUC) is required to cultivate the first generation of that feedstock. For instance, if forests were clear felled to grow miscanthus, or indeed grassland or cropland converted. Or indeed if indirect LUC (ILUC) occurs due to displacing the original agriculture. The avoidance of carbon debt and associate payback periods is, therefore, contingent on ensuring that the

conversion of land for the growth of bioenergy feedstocks is constrained to marginal and degraded land.

Clearly, as we have already raised, there are problems with the calculation of pay back periods, there are problems scaling up the biomass and BECCS industry on a global scale (as Drax is doing via its purchase of pellet mills in the US and Canada), and the problems worsen when roundwood is used and when clear felling occurs. There is clear evidence that both roundwood is used and of clear felling from virgin or mature forests. See for example the BBC and CBC documentaries previously referenced.

This is an important consideration, because if these longer term, scaling issues are not considered, there is a strong likelihood that the UK will build an overcapacity of BECCS facilities that the market will not be able to support. This will then lead to problems with energy security energy costs and of course the impact of (hypothetical) negative emissions technologies.

We summarise thus.

There has been a difficulty throughout this enquiry caused by key policy documents not being published. This vacuum has been filled through a stream of politicians questioning the sustainability, the carbon neutrality and the cost in subsidy of the biomass industry, and therefore of BECCS as a negative emissions technology. As these policy documents have been released, whether as final or consultation documents, it has become clear that the issues we have raised throughout that

- Biomass is not carbon neutral;
- Therefore BECCS cannot be carbon negative to the extent claimed;
- The supply chain is vulnerable to disruption and this will get worse in future years;
- Carbon dioxide emissions will increase as a result of this project, accelerating and deepening climate impacts as atmospheric concentrations rise.

For all of these reasons, we are clear that this Development Consent Order should not be granted.

Stuart Boothman

On behalf of Just Transition Wakefield

May 9th 2023