

## **Biofuelwatch's Closing Deadline 10 Submission**

### **Summary**

The vast majority of our concerns with Drax's application for BECCS at its Selby plant remain.

Our concerns regarding climate impacts remain and we now submit that due to a combination of these factors the ES is unlawful in its treatment of GHGs.

Although this application focuses solely on the carbon capture aspect of BECCS, its success is dependent on successful transport and storage of the captured CO<sub>2</sub>, our concerns remain at the viability of these aspects of the wider scheme and in addition we provide very recent additional information calling into question the viability of underground storage of CO<sub>2</sub>.

We are concerned regarding the delay, regulatory changes and research developments that may take place between now and then, and also the fact that *as the examination is drawing to a close the long awaited biomass strategy has still not been published.*

Our concerns remain regarding the modelling of uncertainties and cumulative impacts with regard to emissions. We are also concerned at Drax's insistence that it's non-BECCS units not operating is unrealistic and that therefore no air pollution modelling of this scenario is required, particularly given the latest Climate Change Committee recommendation that biomass power plants *"are not given extended contracts to operate unabated at high load factors beyond 2027."*

### **Outstanding concerns**

Our concerns remain regarding the following issues we have previously raised:

That the BECCS technology is unproven and the scheme relies on unsustainably produced imported energy which is at odds with commitments to increase energy security.

The scheme involves the disturbance and degradation of vital habitats including internationally designated sites, and risks harming protected species including Great Crested Newts. It is not sustainable development as it fails to protect the natural environment and enhance biodiversity and involves potential damage to watercourses by sediment and accidental release of chemicals.

The application includes outdated biodiversity surveys (which will be exacerbated further by the proposed delayed commencement.) The proposed development allows for, and in fact includes, the continuation of biomass burning even if CCS isn't working. The proposed development doesn't reflect the growing scientific consensus that the carbon payback period for woody

biomass burning with CCS is too long to be relevant for addressing the climate crisis now and cutting emissions by 2050, and that carbon negative claims are false.

We maintain our concerns around waste water, flood risks, climate change impacts on surface water receptors and the incorrect use of Biodiversity Net Gain (mitigation not enhancement).

We maintain our concern that UKHSA/OHID opted out of involvement with the process and that non-governmental organisations have been left to provide this scrutiny for an application which involves the introduction of novel chemicals whose degradation products - which it is known will form as a result of the industrial process - are known carcinogens and endocrine disruptors. The development is not in line with the precautionary principle in terms of either health or environmental impacts, as not enough is known about these chemicals. In addition there is an absence of proposals to monitor emissions and an absence of information about how this will be paid for.

### **Further concerns**

#### **GHG emissions**

We previously submitted evidence on GHGs at REP2-073 Pages 66 - 85 covering the following headings:

Policy Framework

Emissions Trading Scheme

Carbon Capture at Boundary Dam and Shute Creek

Lack of Evidence to Support CO<sub>2</sub> Removal Performance using BECCS

Calculation of Emissions Associated with Production of Chemicals

Greenhouse Gas Emissions - Inaccuracies and Omissions in the Application

Importance of Other Sustainability Factors

#### *Our original concerns remain*

Drax has commented at REP4-028 "Ultimately the achievement of the 95% figure is a matter not for this DCO Application but is rather a matter that the Environment Agency will control under the terms of the Environmental Permit. Nevertheless the Applicant considers that the figure of 95% is achievable". However, if the capture rate falls far below this level, as is likely, given the track record of other CCS projects so far, this is a matter for the DCO application.

The Applicant has given emissions scenarios in the Environmental Statement with all four units running - two abated, two unabated. Therefore there will be entirely uncaptured emissions from the unabated units. The energy penalty, to re-cap, will result in a reduction in electricity generation (itself in contradiction with national energy policy commitments to *increase* what is

classed as renewable electricity production, as well as electricity production overall) which is likely to be compensated for elsewhere by fossil gas.

In addition there are significant supply chain emissions.

A low capture rate and the risk of carbon dioxide leaking from underground storage increase the likelihood that the addition of BECCS to the Drax plant will lead to *greater* carbon dioxide emissions than without such technology.

This is very much a matter for consideration for the decision of whether to grant the DCO.

Add to this the fact that *even if it were to work at the proposed capture rate* the carbon payback period of woody biomass is too long to be of any help in reducing carbon dioxide in the atmosphere within meaningful timescales for tackling the climate emergency.

We now submit that due to a combination of these factors the ES is unlawful in its treatment of GHGs.

### **Unlawfulness of GHG gas emissions in the Environmental Statement (ES)**

We now submit that the ES is unlawful in its treatment of GHGs for the following reasons. Climate Emergency Planning and Policy provided a detailed submission on this in REP9-032, so we provide here a summary (without full references which may be found in REP9-032) with which we concur:

1. The applicant has not clearly distinguished Direct and Indirect impacts for the scheme. This error is made from the EIA Scoping report onwards.
2. Critically the applicant has not fully, nor correctly, considered the likely significant effects and climate impacts of both the Direct and Indirect impacts with respect to GHGs which is required by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the “2017 Regulations”), both at the scoping and environmental statement stages.
3. The application is a Schedule 1, paragraph 23 project under the 2017 Regulations – a carbon capture and storage (CCS) scheme - although the application in fact only addresses a carbon capture project. In particular, the Indirect impacts from the upstream biomass combustion emissions have not been estimated, nor assessed, in the ES (despite having been scoped-in in the EIA Scoping Report).
4. There is a strong causal interdependence between the upstream biomass combustion emissions and the application project. The application project cannot take place without the upstream biomass combustion emissions first being generated to capture.

5. Consideration of the likely significant effects and climate impacts of the upstream biomass combustion emissions requires those emissions, as strongly causal indirect effects of the project, to be estimated and assessed. The estimated quantity of emissions is not difficult to determine as the Applicant, itself, has provided it at the Table on PDF page 34 on REP-028. Whilst the figure given in REP-028 of 19,383,135tCO<sub>2</sub>/yr is for all four Drax biomass burning units, the value for the two units which provide the upstream biomass combustion emissions generation for the project may be easily derived from it (ie: by halving the number).

6. The error is that this known quantification of the combustion emissions is then abandoned by the applicant who instead estimates the emissions as zero in Table 15.11 in the ES. Table 15.11 is the key data table in the ES against which the likely significant effects and climate impacts of the project are assessed when the output values from Table 15.11 are taken forward to compare with the UK carbon budgets in Table 15.13.

7. The applicant, then, makes the false claim that the scheme has a “significant beneficial effect”. However, this may only be claimed because the zero estimate of the combustion emissions has been used instead of the real value, which is already known to the applicant as above. This results in the scheme being falsely reported by the applicant for EIA purposes as a net negative producer of GHG emissions.

8. Climate Emergency Planning and Policy [REP9-032] has calculated using the applicant’s own data that the project is in fact a dangerous, and net positive, emitter producing over 2 million tonnes of CO<sub>2</sub> a year, even if CCS efficiency attained 90% (an optimistic assumption) when the upstream combustion emissions are quantified and assessed for EIA purposes on the estimate already known to and calculated by the Applicant.

9. The EIA assessment of the climate impacts of the project, for the factor of GHGs, is therefore not lawful as a zero estimate has been given for upstream combustion emissions rather than actual quantity for which the applicant already has an estimate.

10. The Applicant has claimed during the examination that the estimate of zero may be given for Environmental Impact Assessment (EIA) purposes because there are conventions and rules in other regimes (such as IPCC national GHG accounting procedures) that rate the biomass combustion emissions as zero. This is also an error of law. The EIA regime requires an Environmental Statement which estimates and assesses the likely significant impacts of the environmental factors (including GHGs and climate) impacted by the project. Nowhere does the EIA regime say that the likely significant impacts of the GHGs (Direct and Indirect) from the project may be estimated on the basis of such conventions from other regimes. EIA assessment is about realistic assessment of environmental impacts, not about arbitrary, and irrelevant, GHG accounting rules.

11. It is particularly disingenuous for the applicant to estimate the emissions as zero for EIA assessment purposes (ie at Table 15.11) when they have provided the real estimate elsewhere to the examination (ie in REP-028).

12. A further related issue is that the applicant falsely conflates the upstream biomass combustion emissions with the downstream carbon payback process. The carbon payback after forest harvesting takes decades or centuries but has been conflated by the Applicant as happening instantly at the same time as the combustion. The EIA process requires the Direct and Indirect effects to be carefully distinguished, and then the likely significant effects to be estimated and assessed. The correct way to treat the downstream carbon payback process is as a separate downstream Indirect effect. It may in time give rise to sequestration of carbon from the atmosphere although there is no guarantee of this, especially as climate breakdown advances: however, the recent science shows that the sequestration from forest regrowth is not likely to produce any significant sequestration in the 25-year project lifetime. Even if some sequestration might occur for wood burnt in the first years of the project, emissions from forest harvest of wood burnt in the latter years of the project will most likely see net positive GHGs as the impact of harvesting biomass fuel is to increase forest emissions for around 15 years (see REP9-032, 3.10).

13. Further the applicant claims that the upstream biomass combustion emissions would “happen anyway” and therefore do not need to be included in the EIA assessment for the project. This false because:

a. The continued biomass burning of Units 1 and 2 (without the CCS, the CC part being the project under consideration) is extremely unlikely to be financially viable for the applicant, and the applicant well knows this.

b. The applicant, itself, includes the biomass combustion emissions in Table 15.11 which provides “Estimated Operational GHG Emissions from the Proposed Scheme”. So the Applicant, itself, considers the Indirect upstream emissions from the biomass combustion emissions to be part of the operation (and has scoped these emissions in the EIA Scoping report). This contradicts the Applicants claim that the emissions do not need to be counted as they would “happen anyway”.

c. The 2017 Regulations require the assessment of the Direct and Indirect likely significant effects of the project on the climate and GHG (and also all the other EIA environmental factors). The relevant legal issue is that the upstream biomass combustion emissions are strongly functionally interdependent with the project being considered under Schedule 1, paragraph 23, and are an Indirect effect which has been scoped in in the EIA Scoping. Hypotheticals about the existing operation are irrelevant.

14. Climate Emergency Planning and Policy [REP9-032] has provided a more detailed analysis for the examination, and we concur with this. Further, we support CEPP in requesting that the ExA fully reproduces these points in the Examination Report and explicitly requests that the SoS considers them, him or herself, in his/her decision making. The Application is in error(s) of law from the EIA Scoping report onwards. The error(s) infect(s) all subsequent processes including the decision making.

## **Concerns regarding the viability of underground storage**

Since our main submissions a report has been published by the Institute for Energy Economics and Financial Analysis, just last month, June 2023 “Norway’s Sleipner and Snøhvit CCS: Industry models or cautionary tales? Unexpected subsurface geology developments in the two projects call into question the world’s offshore CO<sub>2</sub> storage ambitions. Grant Hauber, Energy Finance Analyst. June 2023

Sleipner and Snøhvit CCS are offshore fields used for CCS storage which are widely cited as proof of the technology’s viability. However the paper reports on leaking carbon dioxide in these underground geological storage sites with the following key findings:

Sleipner and Snøhvit demonstrate carbon capture and storage is not without material ongoing risks that may ultimately negate some or all the benefits it seeks to create.

Every project site has unique geology, so field operators must expect the unexpected, make detailed plans, update the plans and prepare for contingencies.

Ensuring storage is securely maintained implies a high level of proactive regulatory oversight, activities for which governments may not be adequately equipped.

Sleipner and Snøhvit cast doubt on whether the world has the technical prowess, strength of regulatory oversight, and unwavering multi-decade commitment of capital and resources needed to keep carbon dioxide sequestered below the sea – as the Earth needs – permanently.

In an article published in the Guardian “Carbon Capture and Storage is ‘no free lunch’ warns Climate Chief” on 6th June 2023, IPPC chair Hoesung Lee says over-reliance on the technology could mean the world misses 1.5C target and that “I have noticed that, in the past, various people cite the IPCC in a way that suits their needs, for unknown purposes.”

We submit that BECCS is a dangerous distraction from genuine climate solutions.

## **Concerns regarding the delay**

We reiterate our concerns regarding the requested delay to the window for commencement and the developments that may have taken place within this time including but not limited to: accelerating climate breakdown; further knowledge on amine breakdown products; further research into CCS and its viability (as highlighted by the research paper mentioned above, published only last month). The matters on which the delay is hinged are of equal concern, again highlighted by the IEEFA paper, that the technical feasibility and financing for the pipeline and storage infrastructure may simply not come online.

BECCS is novel, and in fact most dangerous in that it diverts effort and funding from actions that are known to be effective.

The policy environment may well have changed. To note as we submit this the government's biomass strategy has *still* not been published though it is expected to be published imminently and could inform the decision.

### **Air Pollution Impacts**

Biofuelwatch's concerns remain despite both the Applicant and Natural England's responses to our concerns. In many cases, the responses have reinforced our concerns particularly in relation to the many sources of uncertainty detailed by Biofuelwatch. The cumulative uncertainty has been neither minimised nor quantified.

The proposal's air quality impacts have not been assessed based on maximum possible levels, and the cumulative uncertainty in the predictions has not been quantified. Significant scientific uncertainty therefore exists that critical load/level exceedances may be significantly greater than the predictions used for the assessment. In *Landelijke Vereniging tot Behoud van de Waddenzee v Staatssecretaris van Landbouw, Natuurbeheer en Visserij (Case C-127/02)* [2005] 2 CMLR 31, the Grand Chamber of the European Court of Justice considered there to be a principle that the Habitats Directive must be interpreted in accordance with the Precautionary Principle. Biofuelwatch considers that the lack of consideration given to the likely impact of potentially significantly higher pollution levels is contrary to the Precautionary Principle, and therefore also the Habitats Directive. We have seen no explanation as to why modelling that does not comply with ADMLC guidance should be considered precautionary and an appropriate basis for assessing the proposal's impacts.

Designated features of protected habitats are known to be present in areas that would be impacted by the predicted air pollution in excess of critical loads/levels. Natural England referred to *Compton v Guildford Borough Council* 2019, but, in *Compton v Guildford Borough Council*, the particular species of concern was not present in the limited area affected by a critical load/level exceedance. This is very different from the Drax proposal where critical load/level exceedances are expected over large areas where designated features are known to be present. We have not seen any response to our comments on this matter nor further explanation from Natural England. Critical loads/levels are set such that, by definition, exceedances to those loads/levels are likely to result in harm. Habitats with those critical load/levels are present and so we expect sites afforded the highest levels of legislative protection would be harmed.

Only a small number of nature reserve/wildlife sites have been considered. Biofuelwatch has provided reasons why impacts on nature reserve and wildlife sites in the wider area would be likely. Impacts at such sites do not appear to have been considered. The EA has provided no evidence to show its criteria are sufficient to protect species dependent on those habitats from harm. The criteria used by the EA is not consistent with scientific understanding which recognises likely harm when total environmental levels (and not just Process Contributions<sup>1</sup>) exceed critical loads/levels. It would therefore be incorrect for the ExA to assume that the EA's regulatory approach will protect nature reserves and wildlife sites from harm. No reassurance

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<sup>1</sup> Process contribution (PC) is a term used by the applicant and also the Environment Agency to define the contribution to ambient concentrations and deposition rates due to the emissions from the process.

can be gained from a lack of comments from Natural England about impacts at these sites because Natural England has a policy of not commenting on nature reserve and wildlife site impacts at sites without national or international designation. Biofuelwatch requests that the ExA require an assessment of potential impacts at *all* nature reserves and wildlife such sites in the wider area, so that the impact of the proposal on these sites can be considered.

The proposal is expected to result in the atmospheric formation of very toxic nitrosamines. There is a paucity of scientific toxicity research to determine a tolerable level. Nitrosamines are relatively stable and Biofuelwatch quoted evidence showing long distance pollution is to be expected. The applicant has made no measurement of background amine and nitrosamine concentrations. The applicant has made no measurement of existing amine emissions arising from the combustion of biomass nor the nitrosamine breakdown products that arise from these emissions. With the background levels unknown, the applicant has not demonstrated that cumulative nitrosamine levels would not exceed the thresholds that have been put in place for the protection of human health.

The applicant's assessment of the nitrosamine health risks relies on proprietary data and analysis that has not been disclosed for public scrutiny and comment. An assessment reliant on data of unknown robustness is also not sufficiently robust to be used for planning purposes. The applicant's assessment relies on the ADMS Chemistry Module. This software had not been independently validated using real-world atmospheric measurements. The software is based on 2011 research without updates to reflect the most recent scientific research on nitrosamine formation. The EA recognises that the method is very uncertain. Approving the proposal would require trusting the health of a considerable number of people to an uncertain method, that is not worst-case, with unvalidated software that is based on old scientific understanding, using proprietary data based on undisclosed assessments, with no measurements of existing levels, and no assurance of sufficient environmental nitrosamine monitoring to ensure tolerable levels are not exceeded. The proposal would result in many people being exposed to increased nitrosamine pollution of unknown magnitude. The site is not appropriate for the uncertainty and risks arising from such pollution. Likely significant in-combination effects with other sources of NO<sub>x</sub> and amines have also not been modelled.

The proposal would increase levels of non-threshold air pollutants (pollutants, such as NO<sub>x</sub>, for which there is no level below which harm does not occur), so the proposal, if implemented, would harm human health. Pollution would be increased above critical load/levels so ecological harm is to be expected. The unquantified uncertainties are such that the harm may be much greater than predicted. Further steps are needed to quantify the level of uncertainty to inform an assessment of the proposal from a land-use perspective. The EA cannot, and will not, make an assessment of the proposal from a land-use perspective<sup>2</sup>. Biofuelwatch feels that without the

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<sup>2</sup> The Environment Agency's consultation on the permit application for the proposal (EPR/VP3530LS/V022, <https://consult.environment-agency.gov.uk/psc/y08-8ph-drax-power-limited/>) says:

*"We cannot take account of*

- *Issues beyond those in the relevant environmental regulations.*
- *Anything outside the remit of the EPR, e.g. the proposed location of the site, which is done by the local authority via land use planning.*
- *...*
- *Land use issues when determining a permit application, even if changing the location of the activity would improve its environmental performance.*
- *..."*



applicant having quantified cumulative uncertainties to inform the ExA's assessment of the proposal, significant gaps remain.

Drax has attempted an almost withering dismissal of Biofuelwatch's air pollution concerns, though it does accept our concerns 'in theory'. The environmental permit variation application states that the system is novel and complex, which is itself, at odds with the submissions to the ExA arguing that this is a proven technology.

Our concerns regarding Drax's application and its emissions modelling are in relation to the use of novel amine chemicals which are not well understood, hence Biofuelwatch's concerns that the Applicant's assumptions are not precautionary enough. What is better understood is the air pollution limits associated with wood pellet mills, yet Drax has committed repeated air pollution violations in the US.

As reported in the Guardian "Drax-owned wood pellet plant in US broke air pollution rules again" 29th May 2023 Drax owned Amite BioEnergy was fined \$2.5m in 2021 over air pollution violations. The Guardian article reported that the company has *again* been found to have violated air pollution limits in Mississippi. The Mississippi Department of Environmental Quality (MDEQ) has written to Amite BioEnergy to notify the company that it had violated emissions rules. The notice said a review of Amite's monitoring reports had shown the factory had been a "major" source of hazardous air pollutants from January 2021 until late last year, in violation of its permit which allows it to "operate as a minor source for hazardous air pollutants"

This demonstrates that Drax is a bad actor in terms of staying within emissions limits for known pollutants, this should therefore be taken into account when considering the company's insistence that we should trust its judgement in modelling its projected emissions for much less well known substances.

In its response to our deadline 8 comments REP9-023 at 3.1.4. Drax states *Furthermore, prior to providing additional detail, the Applicant notes the following: a. The technology suppliers for Keadby and the Proposed Scheme are different and, therefore, the amine compounds will be different. Their toxicology and mechanism for action will likely be different and, therefore, even where cumulative impacts occur, it is by no means certain that cumulative health effects will occur;*

This implies that the applicant considers the onus is on us, and the public to prove that harm *will* occur, rather than on them to prove that it *won't*. It is extremely concerning that Drax is prepared to take such a laissez faire approach. Without full disclosure of the solvents and the derivation of important reaction rates and thresholds, it is impossible to properly assess the risk of harm and cumulative effects.

It is normal and accepted practice for air quality assessments for planning purposes to model cumulative effects, but the application includes no modelling of the cumulative impact of amine breakdown products. The Applicant refers to the limitations of the ADMS Chemistry Module

(paragraphs 3.1.4c and 3.1.11 of REP9-023) that it says prevent the modelling of multiple reaction rates. The ADMS limitation could be addressed by using worst case reaction rates sufficient to cover all relevant amine reactions, but, despite the complex nature of the atmospheric chemistry and the highly toxic nature of the breakdown products, the applicant has instead chosen to carry out no cumulative modelling of amines and their breakdown in the atmosphere.

Biofuelwatch considers that the applicant is incorrect in its assessment of the zone of potential plume overlap in REP9-023 because the applicant's assessment considers neither the impact of calm conditions nor north-westerly winds.

The applicant's response in section 4 of REP9-023 neglects the context of Biofuelwatch's comment that "Drax's emissions can be expected to disperse further because of its higher stack" which was:

*"If the peak concentration is only just within the figure then that suggests that there may be important impacts outside the figures. The Norwegian study found slight declines after 10km, but Drax's emissions can be expected to disperse further because of its higher stack. The "slight decline" after 10km, suggests a considerably larger area than 15km, which only just includes the peak concentration, it should be modelled and shown in order to consider impacts on the wider area, such as near Keadby3."*

The applicant's response only considers the dispersion of pollutants emitted from the stack, not the formation of nitrosamines in the atmosphere. Whilst higher stacks do disperse pollutants more than lower stacks, stack height can also be expected to affect where peak nitrosamine concentrations will occur. The Norwegian study with a stack height of only 60m showed Nitrosamine impacts over considerable distances with only slight declines after 10km. Biofuelwatch considers the applicant's 15km study area is inadequate to show the likely considerable range of the nitrosamines and the potential for very significant and harmful cumulative nitrosamine impacts.

Biofuelwatch deadline 2 submission REP2-073

*REP2-073 Such an assessment of uncertainties is very limited. This document has already shown that the applicant predicts aldehyde and nitrosamine concentrations from the BECCS units would decrease when the non-BECCS units operate continuously. This strongly suggests that aldehyde and nitrosamine concentrations will increase if the non-BECCS units were not to operate at all, yet no modelling predictions appear to have been carried out of a scenario where only the BECCS units are operational. For this one source of uncertainty alone, nitrosamine concentrations may be significantly higher than predicted, but there are many other sources of uncertainties as the following sections show.*

Drax states at 9.10 (75 – 84) in its response to Biofuelwatch's deadline 2 submissions [REP4-020]

*“An assumption that the non-BECCS units do not operate at all in the future is unrealistic and irrelevant and would require a wholesale change in government policy”*

Yet it's not that unrealistic and irrelevant given the Climate Change Committee's June 2023 report to parliament said:

The Climate Change Committee makes the following recommendation: Ensure that large-scale unabated biomass power plants are converted to BECCS as early as feasible, **and are not given extended contracts to operate unabated at high load factors beyond 2027**. (recommendation R2023- 124).

## **Conclusions**

Drax is unlikely to achieve the carbon capture rates it aspires to, other plants have not yet been able to do so, and woody biomass is not carbon neutral in terms of the timeframe of the carbon payback period vs the timescale of the climate crisis. Combined with the current slow trajectory of the technology development in terms of capturing, as well as transporting and storing CO<sub>2</sub>, this means BECCS at Drax is unlikely to come online in time to make any contribution to the UK achieving Net Zero in the required timescale (by 2050) and is in fact not compatible with the UK's ambitions to reach Net Zero by 2050. In addition BECCS at Drax is incompatible with the need for the UK to increase electricity generation as it will take electricity out of the grid.

There is a very real risk that BECCS at Drax will lead to greater GHG emissions. A glance at the subsidy model Drax is pushing the government to adopt, which allows for subsidies to be provided for electricity generation whether or not any carbon is captured or not, makes it clear that Drax's motivations for this scheme are its own economic survival rather than that of the planet. BECCS is a dangerous distraction from genuine, proven, climate solutions.