European Commission
Directorate-General for Competition
For the attention of the State Aid Registry
1049 Bruxelles/Brussel

BELGIQUE/BELGIË

Concerns: Comments to case no. SA.38760

Sent by email: stateaidgreffe@ec.europa.eu
Sent by: Mrs. L. Zuidema, linde@fern.org, on behalf of undersigned organisations

07 March 2016

The undersigned organisations herewith submit comments to State aid case no. SA.38760 – Investment Contract for Biomass Conversion of the first unit of the Drax power plant.

BiofuelWatch reserves its right to submit additional comments separately.

We find that the notified measure is State aid which is not compatible with the internal market.

A. The measure does not contribute to an objective of common interest.

1. We note that in its description of the measure, the Commission indicates as an objective of the aid, amongst others, meeting the 2020 renewable energy targets of the United Kingdom (hereafter: UK).[1] The Commission also refers to the UK sustainability criteria with regard to (1) Greenhouse gas (hereafter: GHG) emissions savings, (2) the protection of biodiversity, and (3) unsustainable practices, implying that the UK criteria present an effective tool to achieve these objectives[2] and characterises the energy which would be generated after the project goes forward as "low-carbon".[3] In its assessment of the measure, the Commission expressly identifies as a further aim of the measure, carbon dioxide (hereafter: CO2) reduction objectives set by the EU as part of its EU 2020 strategy, relies on UK estimates of 28.8 million tons of CO2 reduction, and accepts that the aid is aimed at an objective of common interest.[4]

2. However, the GHG emission reduction estimates, on which this assessment of the Commission is based, are inaccurate and themselves not based on the best available scientific methods. This fact has already been known to the UK government since the preliminary findings of a report of the Department of Energy and Climate Change were

[1] COM, C(2015) 9719 final of 05.01.2016 (hereafter: opening decisions), para. 6.
[2] COM, opening decision, para. 12.
[3] COM, opening decision, para. 13.
[4] COM, opening decision, para. 53.

presented in March 2013, which is well before the UK government approved aid to the conversion of the first unit of the Drax power plant.[5]

3. We understand that the Commission recommended a methodology for calculating GHG emission reductions in 2010.[6] However, as this methodology is not legally binding upon the Member States, and as the Commission does not present a specific standard with regard to GHG emission reduction calculations in the Environmental and Energy State Aid Guidelines (EEAG), an objective standard based on the most suitable available scientific method should be applied. As the UK has been aware of more suitable calculation methods, it also has no legitimate expectation that the methodology recommended by the Commission in the past would be applied in the case at hand. We also understand that the EEAG and EU legislation still characterises biomass as a renewable energy source.[7] However, if an aid measure has multiple objectives, such as increasing the share of renewable energy and GHG emission reductions, the attainment of one of those objectives cannot be sacrificed in favour of the other. An increase in the share of renewable energy hence cannot be an objective of common interest if, at the same time, the measure leads to higher GHG emissions. We address these issues in detail in the Annex to this submission where we show the likely level of GHG emissions which would be caused by the project.

4. Even if the measure contributed to a well-defined objective of common interest, the notified measure would not be compatible with the internal market because (1) the amount of aid which would be granted is disproportional, and (2) the measure would unduly distort competition and trade.

B. The amount of aid which would be granted is disproportional.

The aid amount is not limited to the minimum needed to incentivise the conversion of Drax unit 1.

5. The Commission observes that calculations provided by the UK show that the Internal Rate of Return (IRR) can be significantly affected by the initial assumptions used in the financial calculations, such as fuel costs or 'load factor'.[8] For example, lower fuel costs and a higher load factor can positively impact the IRR, elements that are further considered below.

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[5] "DECC, Life Cycle Impacts of Biomass Electricity in 2020 - Scenarios for Assessing the Greenhouse Gas Impacts and Energy Input Requirements of Using North American Woody Biomass for Electricity Generation in the UK (2014; hereafter also "BEAC report"), pp. 5-6: "Recent reports have shown that the above factors omitted in the Renewable Energy Directive LCA methodology can have significant impacts on the total GHG intensities […] and therefore need to be considered […; with further reference]",https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/349024/BEAC_Report_290814.pdf

[6] COM(2010)11 final, Report from the Commission to the Council and the European Parliament on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling.

[7] See, e.g. EEAG, para. 19 sub-para. 5-6.

[8] COM, opening decision, para. 68.

6. Market information indicates that Drax would be overcompensated for the project. The significant difference between earnings before interest, taxes, depreciation and amortization (EBITDA) and gross margin of coal, on the one hand, and the Contract for Difference ("CfD") scheme on the other, implies overcompensation. According to a market analysis, the EBITDA for wood pellet burning facilities is £10.11/MWh and £32.12/MWh under the CfD. Meanwhile, the EBITDA for coal stations is £4.23/MWh. The gross margin for pellet-fired generation with a CfD for £105/MWh is 25%. Coal production under our assumptions carries a gross margin of 10%.[9]

7. Using an "ability to pay" methodology that calculates the costs of operating a biomass facility under both UK subsidy schemes, an analysis by RISI concludes that, under the Renewable Obligation (RO) scheme, a plant could pay approximately $215 per ton for pellets and remain profitable while, under the CfD scheme, a plant could pay about $275 per ton for pellets and remain profitable.[10] Both aid schemes result in an "ability to pay" that is substantially higher than the average market price of wood pellets from North America, which the study calculates at about $187.50 per ton, including shipping.[11] This implies that the amount of aid is not limited to the minimum needed to achieve the stated objective.

8. The requested aid amount is based on an overestimation of fuel costs. The UK bases its cost calculations on $229/t biomass. The Commission cites current wood pellet prices of $160/t.[12] At the same time, Argus Biomass projects that wood pellet prices for export will be between 148-168 $/t between 2016 and 2018 and Pöyry projects wood pellets will be around 180 $/t between 2017 and 2022, but drop to around 160 $/t by 2027.[13] This would argue that feedstock costs for Drax are significantly overestimated by around 27% if the (highest) estimated $180/t price materialises. This would lead to a significantly higher IRR, which amounts to overcompensation especially if combined with other variables operating in Drax's favour (see load factor below).

9. Other important factors that play a role in Drax's IRR are the 'technical availability' and the 'load factor' of the plant, which Drax assumes at 83.7.1 % and 70.5 % respectively.[14] For example, according to the UK sensitivity analysis, if thermal efficiency and load factor were to increase by 5% and fuel costs decrease by 5%, the IRR (on pre-tax real basis) would increase from 4.7 to 15.6%.[15] This would exceed the range of IRR specified by DECC in Table 2 and amount to overcompensation. Based on experience from Drax's first two unit conversions, it seems the load factor has been underestimated.

[9] RISI, "An Analysis of UK Biomass Power Policy, US South Pellet Production and Impacts on Wood Fiber Markets" (2015), p. 10.
[10] *Id*.
[11] *Id*.
[12] COM, opening decision, para. 71.
[13] See in this respect also recent study done by www.3e.eu on the costs of large scale biomass power in Belgium, which suggests that prices of biomass will increase when global demands increase according to scenarios of the International Energy Agency.
[14] COM, opening decision, para. 16.
[15] COM, opening decision, under 3. Assessment of the measure

10. Based on the experience of Drax's first 2 commissioned units, both of these factors have been underestimated. Drax results for 2013[16] reported that the load factor of its first converted unit commissioned in that year was 75% despite 'start-up logistics constraints' in the first half of the year that limited performance. Availability that year was 88%. In 2014, Drax's second unit was co-firing from May and burning 100% biomass from October. Yet Drax results for 2014[17] report: 'Significant increase in biomass generation to 7.9 TWh (2013: 2.9TWh)'. If both of these units had generated at the capacity predicted for unit 1 they would only have generated 7.966 TWh - not much above what they actually produced with significant operational handicaps - which implies that the load factor for unit 3 has been underestimated.

11. In conclusion, there is a risk that the aid for the conversion of unit 1 of Drax Power Station leads to overcompensation, because the aid would not be limited to the minimum needed to achieve the stated objective. Reasons to arrive at this conclusion concern the projected wood pellet price compared to the level of aid foreseen, as well as the level of IRR and related assumptions made on the availability and load factor.

C. The measure would unduly distort competition and trade.

In addition to the concerns already expressed by the Commission in its opening decision, market information shows the negative effects that the notified measure would have on various markets.

12. *Wood pellets and raw material market* - The cumulative negative effect on the biomass market is palpable and not outweighed by a positive environmental effect of the notified measure, even if the latter was assumed.

In the following, this submission will address: (1) effects on the US/global market; (2) the connection of the US and EU markets; and (3) the resulting negative effects on the EU market.

Distortion of competition and trade in the United States; global supply risks

13. The European Commission's opening decision identifies concerns that the UK subsidy of biomass conversions creates competition and trade distortions in the US forest product sector that are not outweighed by any intended and potential environmental benefits. These concerns include that the Drax conversion alone will increase demand specifically for industrial wood pellets by "approximately 50% compared to 2012 levels" (paras. 78-79); that including other biomass projects, demand will increase higher than 50% of 2012 levels (para. 79); and that about 60 to 80% of industrial wood pellets satisfying this demand will come from the US Southeast, and the Drax conversion could "require approximately half of the total amount of pellets produced in the US Southeast in 2014" (para. 83). Based on this and other information available at this stage, the Commission concludes that it "cannot exclude with sufficient certainty the existence of undue

[16] http://www.drax.com/media/32643/fyr-results-2013-final-.pdf
[17] http://www.drax.com/media/56579/preliminary-results-for-the-year-ended-31-december-2014.pdf

distortions on the raw materials markets and trade" (para. 85). Further, in light of likely distortions of the wood markets in the Southeast US, the Commission expresses "doubts as to whether the expected environmental benefit of the measure will outweigh the potential negative effects on other market participants" (para. 87).

14. The same combination of concerns about market distortions and environmental impacts is reflected in the Commission's Communication to the European Parliament, The Council, and the European Economic and Social Committee and the Committee of the Regions, which included the following recommendations for the 2030 EU Directive on renewable energy sources:

> *"This approach means that the Directive on renewable energy sources will need to be substantially revised for the period after 2020 to give the EU the means of ensuring that the 2030 EU level target is met.* ***An improved biomass policy will also be necessary to maximise the resource efficient use of biomass in order to deliver robust and verifiable greenhouse gas savings and to allow for fair competition between the various uses of biomass resources in the construction sector, paper and pulp industries and biochemical and energy production.*** *This should also encompass the sustainable use of land, the sustainable management of forests in line with the EU's forest strategy [11] and address indirect land use effects as with biofuels."*[18]

15. The following section offers up-to-date studies assessing how additional demand from UK biomass projects will distort markets in the US Southeast. In addition, it briefly lays out evidence supporting the conclusion that the expected environmental benefit of the subsidies in question will not outweigh the predicted market distortions—a set of issues which are covered in greater detail in the Annex.

16. According to Forisk, an independent consulting firm that analyzes forest supplies, the UK accounted for about 40% of the global industrial wood pellet consumption—about 4.1 million tons of the world's 10.6 million tons (excluding pellets used for residential or heating purposes) in 2014.[19] Global industrial pellet demand is projected to increase from 10.6 million to 25 million tons over the next five years (excluding pellets for heat), with "[t]he largest projected increases" to occur in the UK, where demand will grow an additional 8.8 million tons.[20]

17. The UK is the single largest importer of wood pellets from the US In 2014, the US exported approximately 4 million tons of pellets, with 73% of this total shipped to the UK[21] Based on Forisk's viability screens for planned pellet manufacturing facilities in the

[18] COM, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A policy framework for climate and energy in the period from 2020 to 2030 /* COM/2014/015 final */, Section 2.2, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52014DC0015

[19] "How can global demand for wood pellets affect local timber markets in the U.S. South?" and addendum by Forisk Consulting, page 4 (May 2015).

[20] *Id.* at 6.

[21] *Id*. at 7.

US, it is predicted that US export capacity could increase to 10.7 million tons by 2019.[22] Assuming the US retains its market shares of 60%-70% in Belgium, Denmark, and the UK and demand remains at 2014 levels for the Netherlands, South Korea, and Sweden, European demand for US wood pellet exports will likely exceed capacity in 2019.[23] Increased demand for wood pellets will increase the use of pine pulpwood as opposed to other forest products in pellet manufacturing; specifically, pine pulpwood use at pellet plants is expected to grow from 4.9 million tons in 2014 to 16.9 million tons by 2019.[24]

18. In a 2015 study, RISI projects US wood pellet exports will increase from 3.9 million metric tons in 2014 to 10.6 million metric tons in 2019.[25] The RISI study also predicts that "demand for wood fiber from bioenergy industries will grow at 11% annually from 2015 to 2019. According to RISI, the vast majority of feedstock used to produce pellets in the U.S. South is pulpwood (76 percent) and clean sawmill residuals (12 percent) that could otherwise be used to make paper and wood products. Concurrently, RISI projects a resurgence in the oriented strand board (OSB) markets, spurring 6% annual growth in roundwood consumption by that industry over the same period. Pulp output in the US South is expected to remain flat throughout the forecast period. In aggregate, the US South's demand for all pulpwood and lower-grade feedstock will increase 2.2% annually from 2015-2019."[26] The RISI study also observes that, "[g]oing forward, the overall share of pulpwood [trees used to make pellets] will grow, relative to mill residuals [or wood waste], as production shifts to larger industrial facilities that rely more predominantly on pulpwood."[27]

    Using the "ability to pay" numbers of the RO and CfD schemes, the RISI study calculates the price at which pellet manufacturers could purchase wood and still break even. RISI finds that under the RO scheme, "US South pellet producers would be able to pay approximately $48 [per green short ton] of delivered fiber or $26 [per green short ton] of stumpage at breakeven," while under the CfD scheme, "US South pellet producers would be able to pay approximately $75 [per green short ton] of delivered fiber or $53 [per green short ton] of stumpage at breakeven." Under either scheme, the subsidies enable pellet producers to out-compete other market participants by paying prices that are substantially higher than the current average pulpwood stumpage price in the South, which is about $11 per green short ton, according to RISI.

    The RISI study also shows that prices for both hardwood and softwood pulpwood in the Southern US have increased dramatically from 2011 to 2015: 27% for softwood and 56% for hardwood.[28] These figures indicate pellet demand has already raised pulpwood prices

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[22] *Id*.
[23] *Id*. This also assumes that exports to heating markets in Italy increase 15% each year for the next three years, and that there will be some delays in bringing proposed bioenergy projects online. Page 8.
[24] *Id*. at 10.
[25] "An Analysis of UK Biomass Power Policy, US South Pellet Production and Impacts on Wood Fiber Markets" by RISI, pages 1 and 17 (2015).
[26] *Id*. at 18.
[27] *Id*. at 19.
[28] RISI at 18. See also COM inquiry paragraph 45.

and distorted the market as a result of the existing Drax subsidies. Hence US pulpwood users have filed complaints against the proposed state aid.[29]

19. In its study, Forisk concluded that increased UK demand for industrial pellets will increase the stumpage prices by about 30% to 40% in the Southern US over 2015 to 2019.[30] On the conservative end of the estimate, assuming no increase in demand for paper or OSB, increased demand from biomass-burning plants could increase average stumpage prices in the US South by 31% in the next five years.[31] Price effects would vary greatly by state, from 0% price growth from bioenergy in Alabama and Tennessee to 50-55% in Mississippi and Arkansas and 84% in Louisiana.[32]

20. Additional risks of undersupply lie in a recovery in US housing which is realistically expected. It will boost demand for OSB and, along with a significant increase in pulpwood demand, lead to even higher stumpage and delivered wood costs in the US South. This increase in demand is projected to occur at the same time that large-scale pellet projects will commence operations.[33] Including expected demand for pulpwood and OSB alongside pellet demand, stumpage prices could increase by 41% in the next five years across the South, with the greatest impacts occurring in North Carolina, Tennessee, Arkansas, and Texas.[34]

UK market share and reliance on US supplies

21. These effects on the US market will have repercussions on the EU market, given the relevance of the demand created in the UK and in particular by the beneficiary Drax as well as the dependence on US supplies.

22. The World Bioenergy Association reports a rapid growth of the global wood pellet market, i.e. from 19.5 million tonnes in 2012 to 27 million tonnes in 2014, which constitutes a growth of 38% over two years.[35] Between 2009 and 2013 the EU production of wood pellets increased 97.6% to 13.2 million tonnes, while imports rose by 267.6% to 6.4 million tonnes within the same period.[36] At the same time the 2015 Aebiom statistical report shows that between 2010 and 2014 the production of wood pellets in the EU grew 35% on average, but slowed down to 11% between 2013 and 2014.

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[29] COM opening decision, paragraph 43.

[30] "How can global demand for wood pellets affect local timber markets in the U.S. South?" and addendum by Forisk Consulting, page 4 (May 2015).

[31] *Id.* at 16.

[32] *Id.*

[33] *See* "US Southern Pulpwood Study: Emerging Competition, Mill Closure Risk and Future Prices," by RISI, (November, 2015).

[34] "How can global demand for wood pellets affect local timber markets in the U.S. South?" and addendum by Forisk Consulting, page 16 (May 2015).

[35] World Bioenergy Statistical Report 2015

[36] Eurostat forestry statistics (2014). Eurostat notes however: "Although potential biomass supplies within most EU member states are substantial, some countries import significant volumes of fuel pellets and other forms of biomass as they seek to meet their renewable energy targets, raising concerns about the impact of importing wood as a source of energy and the consequences this may have on the global sustainability of forests and resulting levels of carbon emissions".

23. The EU is responsible for 74% of global wood pellet consumption. The EU is producing 13.2 million tonnes but consuming 18.8 million tonnes, which makes the EU the biggest importer in the world. The EU is the biggest consumer of biomass for electricity production, which expanded (globally) from 5 to 10% of all biomass supply for energy over the period 2000-2012.

24. The UK is Europe's largest consumer of industrial wood pellets by a significant margin. The UK consumption in 2014 increased to 4.7 million tonnes from 3.5 million tonnes the previous year.[37] This is 39% of the EU wood pellet import and 33% of the global wood pellet import.[38] The figure below shows the UK relies mainly on imports to supply its demand.

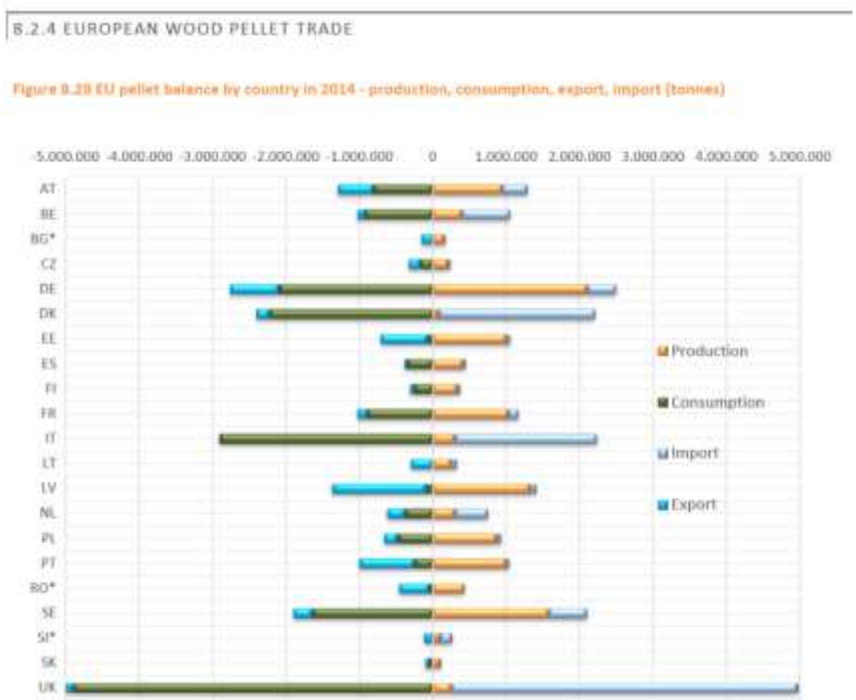

Figure 1: EU pellet balance per country in 2014 - production, consumption, export, import (tonnes). The figure shows the UK consumes significantly more wood pellets than other EU countries, and also mainly relies on imports to supply its consumption (Aebiom, 2015 statistical report)

25. Drax consumed 4 million tonnes of pellets in 2014.[39] This is 85% of the UK imports of wood pellets. Considering the global production of wood pellets was 27 million tonnes, Drax alone consumes 15% of the global wood pellet production, which means it uses more than any EU country. This is a disproportionate market share. Conversion of unit 1

[37] Aebiom statistical report, EU wood pellet market overview (2015), page 43
[38] Aebiom statistical report, 2015; 2014 FAO Global Forest Products Facts and Figures; also see analysis Carbon Brief and World Bioenergy Statistical Report, 2015
[39] Drax Annual Report, 2014

would consume an extra 2.4 million tonnes of wood pellets. This would increase the current UK share of the global wood pellet consumption from 15% to almost 24% on the basis of 2014 production levels.

26. Drax sources 58% of its biomass supply from US sources. The demand from the UK has triggered a rapid expansion of the wood pellet market in the US. Between 2013 and 2014 the wood pellet production for export in the US grew from 3.2 to 4.4 million tons short (from 2 million tons in 2012). 72% of this production was exported to the UK, of which 82% was destined for Drax Power Station (2.4 million tons). Drax thus consumes 60% of the US total export volume of wood pellets.[40]

27. The big market share of the UK brings into question what is the global potential for the expansion of the wood pellet market. It should be recognised that potentials are highly dependent on support policies, logistics and the possible introduction of sustainability criteria (expected for EU bioenergy post 2020).[41] However, it has been suggested that EU demand for wood pellet export will exceed capacity, assuming the US retains its market shares of 60% to 70% in Belgium, Denmark and the UK and demand remains at 2014 levels for the Netherlands, South Korea, and Sweden. Biomass availability was already mentioned as a main barrier by wood pellet producers in the EU in recent years, which corresponds with our analysis of EU availability of biomass (see below).[42]

28. The tightening wood pellet market in the US and EU is already visible from the expansion of the wood pellet market into new areas: Russia, CIS countries, Brazil, China. This is problematic because scientists have recognised that if more land and forests are being used for bioenergy, this can cause market distortion locally, regionally or globally, and endanger the supply of biomass for other uses, e.g. food, feed and fibre.[43] As a result, we assume that opposition to large scale bioenergy projects - because of competition, climate, environmental and health impacts - could become an increasing economic and financial risk for operations.[44]

Distortion of competition and trade in the European Union

29. Biomass available from EU domestic sources is subject to various limitations. Estimates on the total available potential of wood supply ranges between 620 and 891 million cubic meters. The range reflects different scenarios including social-economic developments as well as policy choices, such as on the level of environmental protection or the promotion of forests' climate mitigation role.[45] This is also recognised by the EU Forest Strategy

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40 https://www.eia.gov/todayinenergy/detail.cfm?id=20912

41 See, Deloitte (2012) 'Knock on Wood, is biomass the answer to 2020?'; IRENA (International Renewable Energy Agency, 2012) 'Renewable Energy technologies, cost analysis series. Volume 1, power sector - Biomass for Power Generation'

42 Aebiom Statistical report, 2015

43 World Resource Institute (2015), Searchinger et. al. Avoiding Bioenergy Competition for Food Crops and Land

44 For illustration of opposition to large scale bioenergy, see Fern case study report (2015), 'Up in Flames, how biomass burning wrecks Europe's forests'

45 Verkerk (2015) and IINAS, EFI, JR (2014) provides a range between 590 and 931 million m3, also depending on different policy scenarios.

(2013) and the Commission's Staff Working Document 'State of play on the Sustainability of Solid and Gaseous Biomass used for Electricity, Heating and Cooling in the EU'.[46] These documents indicate that energy demands for biomass are likely to exceed the potential before 2020, causing a gap of between 21.4 and 38 Mtoe corresponding to minimum 15% of EU primary energy supply by 2020. Imports are therefore expected to rise to between 6-12 Mtoe, corresponding to 15-30 million tonnes.

30. The energy sector has a very strong influence on the wood market in the EU. Already before the introduction of the EU Renewable Energy Directive (RED), a high share of the total forest potential was used for energy, (i.e. 48 % (EU27).[47] Five years after the RED came into place, half of the renewable energy consumed in the EU is produced with woody biomass (Eurostat, 2014) and biomass as an energy source is still expanding (although less rapidly than other renewables such as wind and solar).[48] Capacity of installed pellet boilers and stoves is still increasing.[49] For example, Germany and France jointly plan 2500 new commercial boilers in 2015, on top of the existing 15,000. Most of energy produced with solid biomass is residential or industrial heating and cooling: 72.4 out of 88.1 Mtoe.[50] However, it should be noted that relatively more biomass is needed to generate electricity than heat, because of a lower efficiency rate, so their actual impact on the biomass market is greater than these figures would suggest.

31. The growing demand means there is more likely to be increasing competition of demand over biomass. As shown already in 2013, the (bio)energy sector increasingly uses the same woody biomass raw materials as other forest industry sectors use, placing a new competition on the same raw material supplies.[51] The figure below from the Indufor (2013) study indicates that energy competes for basically all woody raw materials types in the market. In 2014, the Commission confirmed that 'competition is rather likely to increase the use of lower-grade wood that is commonly used for the production of pulp, paper and particle board, as well as for energy generation, which could lead to upward price pressure on wood markets in general, with possible displacement of intermediate grades.'[52] In its response to the Consultation on the Renewable Energy Directive, CEPI (Confederation of European Paper Industries) indicates[53]: '*The RED has also led to measures promoting the demand for bio-energy, not sufficiently taking into account the availability of wood for the wood processing industry, which is producing substitutes to*

[46] Commission SWD (2014) 259, 'State of play on the sustainability of biomass for electricity, heating and cooling.' According to the Commission's 2015 renewable energy progress report, bioenergy accounts for 84% of renewable energy used in heating and cooling; EU Forest Strategy, COM (2013) 659 final; see also EU Wood Study, Mantau et al (2010).
[47] Biomass Futures Study, deliverable 3.3. See also, Eurostat Waste Statistics, overview of renewable energy from forestry (wood and wood residues) (2007)
[48] Commission SWD (2014) 259, 'State of play on the sustainability of biomass for electricity, heating and cooling.' According to the Commission's 2015 renewable energy progress report, bioenergy accounts for 84% of renewable energy used in heating and cooling; EU Forest Strategy, COM (2013) 659 final.
[49] Aebiom statistical report (2015)
[50] Eurostat, forestry statistics (2014)
[51] Indufor Study (2013), commissioned by the European Commission: 'Study on the Wood Raw Materials Supply and Demand for the EU Wood-processing Industries.
[52] Commission SWD (2014) 259, 'State of play on the sustainability of biomass for electricity, heating and cooling.'
[53] http://www.cepi.org/node/20094

fossil fuel based and more carbon intensive products. This negative impact on the competitiveness of the wood processing industry is hampering the uptake of the bio-economy and its climate change mitigation potential.' [..] '*In general terms, the potentials at local level have been over-exploited. Support to energy from biomass led to unfair competition between energy and forest-based industries, and between Member States. This market distortion needs to be monitored and addressed, to avoid non-resource efficient use of wood.*'

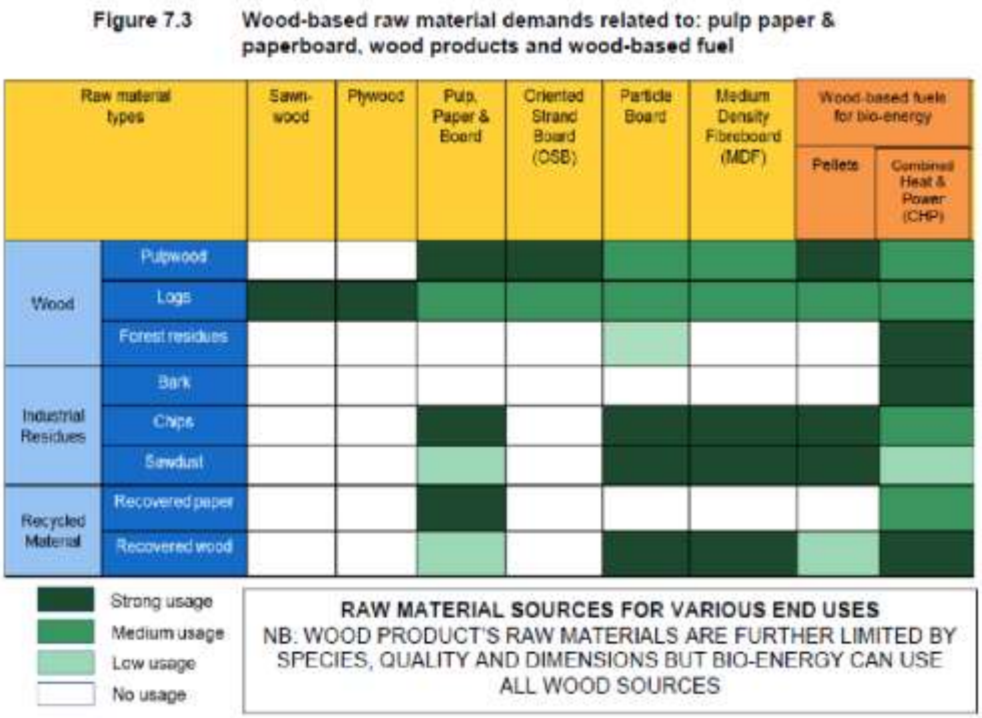

Figure 2: Raw material sources for various end uses, Indufor study (2013)

32. In particular, the effect of the conversion of unit 1 of the Drax Power Station on the EU market will be significant. Firstly, the focus of wood supply for UK/Drax biomass supplies could shift from the US to the EU, risking increasing pressure on the market of raw materials in the EU which can affect the EU forest-based industry. A particular driver for this potential shift is fluctuating wood pellet prices due to currency moves.[54] When the USD rises compared to the GBP or Euro, the financial viability of bioenergy projects that solely rely on wood pellet imports comes under pressure (potentially also leading to significantly increasing subsidy costs).[55] Plants may therefore target euro-markets.

[54] See Aebiom Statistical Report (2015), which reports that recently more wood pellets have been supplied from EU countries, e.g. Portugal and the Balkans.

[55] See Aebiom Statistical Report (2015) and A sensitivity analysis on exchange rates by www.3e.eu

33. Also, variations in the demand from biomass power stations, which often need vast amounts of wood annually, may impact the price of wood pellets and raw material.[56] The artificial pricing support created by the RO scheme and the CfD scheme creates an un-level playing field in the marketplace and raises serious concerns about the distortion of competition in markets and trade.

    Also, Aebiom reports industrial pellet prices fluctuate because "of power plants coming off line, owing to a fire or other incident, or coming on line, backed by renewable subsidies. Because the existing pool of converted units is small, every time that there is a shutdown at a sizeable plant or a plant loses a subsidy and is forced offline, this can have a material impact on the spot price.' This suggests that new sizeable plants coming 'online' will have a material impact on the spot price.

34. These prices effects can thus not only negatively affect the forest-based industry, but also the supply of biomass and wood pellets to (more efficient) biomass energy generation, such as Combined Heat and Power or heating installations that rely to a lesser extent on subsidies and cannot pay the amounts that subsidised electricity providers can pay. Thus, the disproportionate demand of Drax created by the notified aid could disadvantage more efficient biomass and wood pellet uses in the heating sector, where fewer alternatives for renewable energy generation are available. The RED provides that 'Member States shall promote conversion technologies that achieve a conversion efficiency of at least […] 70 % for industrial applications' (Article 13(6)). With a thermal efficiency of 38.6%,[57] Drax unit 1 will clearly not fall in this category of more energy efficient uses of biomass. Therefore, it would go against the spirit and purpose of said provision to now 'lock in' vast amounts of biomass, creating distortions of the market for more efficient applications which the Member States are charged to promote.

No positive environmental effects to outweigh market distortions

35. The measure's impact on competition and distortion on trade are not outweighed by intended or potential environmental benefits, both with respect to impacts on climate change and forest ecosystems and diversity. As noted in the January inquiry letter, the Commission assumes that "wood pellets used in the Drax plant will have to satisfy the UK sustainability criteria including a minimum of 60% greenhouse gas savings against the average fossil grid intensity in the Union" (para. 12), and identifies that the measure is intended to help the UK reach its renewable energy targets by "saving 28.8 million tons of CO2 during the lifetime of the project" (para. 53).

36. In 2014, the UK Department of Energy and Climate Change's own emissions model showed that utilizing pellets manufactured from natural, hardwood forests in the Southeastern US will increase rather than decrease CO2 emissions over the life of the Drax conversions.[58] In 2015, Spatial Informatics Group LLC (SIG), an expert in carbon

[56] Aebiom statistical report (2015)
[57] COM, opening decision para. 16
[58] DECC, Life Cycle Impacts of Biomass Electricity in 2020 - Scenarios for Assessing the Greenhouse Gas Impacts and Energy Input Requirements of Using North American Woody Biomass for Electricity Generation in the UK;

lifecycle modeling, incorporated the observed harvesting practices of pellet manufacturers from the US Southeast into the UK Government's model to more accurately identify the likely atmospheric carbon effects of UK subsidized conversions.[59] The study concluded that Drax conversions utilizing wood pellets from Enviva, the primary US pellet manufacturer contracted to provide industrial wood pellets to Drax conversions, would emit 2,677 kgCO2e/MWh over 40 years, which is more than nine times the CO2 emissions standard in the UK for coal to biomass conversion (285 kgCO2e/MWh), and more than two-and-a-half times the CO2 of emissions of continuing to burn coal for the next 40 years at the Drax plant (1018 kgCO2e/MWh).[60] The results of a subsequent SIG analysis were largely consistent, showing that wood pellets made of even relatively small proportions of harvested whole trees—rather than wood wastes or sawdust—will emit carbon pollution comparable to or in excess of fossil fuels for more than 50 years.[61] The results of all three analyses are discussed in greater detail in the Annex.

37. In addition to impacts on the climate, a 2013 study commissioned by the National Wildlife Federation found that increased UK demand for wood pellets manufactured from forests in the Southeast US threatens biodiversity by increasing the conversion of natural forest to pine plantation and increasing harvest of ecologically valuable hardwood and wetland forests.[62] A 2015 study commissioned by the Natural Resources Defense Council and conducted by the Conservation Biology Institute (CBI)—an independent scientific organization that uses applied research and GIS and remote sensing to support the conservation and recovery of biological diversity—demonstrated that the operating and proposed pellet facilities of Drax and Enviva, the primary supplier of wood pellets to Drax, are sited within harvest range of both plantations and unprotected, natural bottomland hardwood forests. The potential scale of the threat is significant: the report concludes millions of acres of wetland hardwood forests in the southeastern US—which provide critical habitat to a host of rare species and deliver important ecosystem services to local communities—are within the potential sourcing areas of these facilities. The results of both these studies are discussed in greater detail in the Annex.

(2014). Scenario 13a and 13b, where "additional demand for hardwood pulpwood for pellet production could result in a greater area of hardwood forest being harvested each year in the region," as observed and discussed *supra*. Assuming the intensity "of electricity generated from fossil fuels in the UK (e.g. ~ 437 kg CO2e/MWh for electricity from natural gas, ~ 1018 kg CO2e/MWh for electricity from coal.)".
Drax has recently claimed that it is meeting DECC's CO2 emissions target. In making this claim, it uses the OFGEM calculator. This calculator fails to consider the change in carbon stocks in the forest/or its mirror image, the combustion emissions from burning the biomass pellets. In order to get a true picture of Drax's and others carbon emissions, the UK and EU must adopt a calculator similar to the BEAC model that includes the change in carbon stocks. See the Appendix attached.

[59] SIG Report, May 27, 2015 attached

[60] SIG report 8.

[61] *Id.* at 2.

[62] Evans, J.M., R.J. Fletcher, Jr., J.R.R. Alavalapati, A.L. Smith, D. Geller, P. Lal, D. Vasudev, M. Acevedo, J. Calabria, and T. Upadhyay. 2013. Forestry Bioenergy in the Southeast United States: Implications for Wildlife Habitat and Biodiversity. National Wildlife Federation, Merrifield, VA, 275p. http://www.nwf.org/pdf/Conservation/NWF_Biomass_Biodiversity_Final.pdf

D. Conclusion

38. As the notified State aid is not compatible with the internal market, it must not be put into effect.

SIGNATURES

biofuelwatch

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Dogwood Alliance
Contact person: Adam Macon
Campaign Director

Birdlife Europe
Contact person: Sini Erajaa
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Natural Resources Defense Council
Contact person: Debbie Hammel
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Southern Environmental Law Center
Contact person: David Carr
General Counsel

Annex: Lack of environmental sustainability of the Drax unit 1 conversion

The measure's competition and trade distortions are not outweighed by intended or potential environmental benefits.

A. **DECC 2014 Study: The UK Department of Energy and Climate Change emissions model shows that utilizing pellets manufactured from natural, hardwood forests in the Southeastern US will increase rather than decrease CO2 emissions over the life of the Drax conversions.**

In a 2014 study, the UK Department of Energy and Climate Change used a Biomass Emissions And Counterfactual Model (the "BEAC" model) to calculate the lifecycle CO2 emissions of biomass fuels utilized in UK subsidized conversion projects.[63] Because, unlike other fuels, the lifecycle CO2 emissions of biomass fuels changes based on the specific type of biomass and assumptions about future regrowth of that biomass source over time, the DECC study calculated separate CO2 values for different scenarios reflecting different types of biomass fuels.[64] The study finds that under a scenario where electricity generated by burning pellets produced from natural hardwood forests in the Southern US, UK biomass conversion projects would generate more than three times the CO2 emissions than continuing to burn coal for the next 40 years—specifically, 3,346 kg CO2e/MWh compared to an estimated 1,018 kg CO2e/MWh from coal—and more than four times the CO2 emissions of continuing to burn coal for the next 100 years—specifically, 4,348 CO2e/MWh.[65] It warned that under the RED carbon calculation methodology adopted by the UK government, these scenarios would still be improperly accounted as emitting less than the 200kg CO2e/MWh set by the UK government as the threshold for funding biomass.[66]

The UK government has not sufficiently taken this study into account when drafting its sustainable bioenergy policies, even though the study was commissioned by DECC in parallel to the legislative process. In 2012 the UK government announced that biomass sustainability and GHG standards would be introduced from October 2013. The details of the study have been discussed within DECC since at least 2012. The original proposal was similar to but not identical to the final version, eventually introduced 1st December 2015 (which was identical on the GHG

[63] The UK estimate that the conversion could save 28.8 million tons of CO2 is based on a seriously incomplete and flawed analysis. The UK carbon accounting fails to consider the change in carbon stocks where the trees are harvested or the stack emissions where the biomass is burned. See the Appendix attached.

[64] *Id.*

[65] Life Cycle Impacts of Biomass Electricity in 2020 - Scenarios for Assessing the Greenhouse Gas Impacts and Energy Input Requirements of Using North American Woody Biomass for Electricity Generation in the UK; DECC 2014. Scenario 13a and 13b, where "additional demand for hardwood pulpwood for pellet production could result in a greater area of hardwood forest being harvested each year in the region," as observed and discussed *supra*. Assuming the intensity "of electricity generated from fossil fuels in the UK (e.g. ~ 437 kg CO2e/MWh for electricity from natural gas, ~ 1018 kg CO2e/MWh for electricity from coal.)"
Drax has recently claimed that it is meeting DECC's CO2 emissions target. In making this claim, it uses the OFGEM calculator. This calculator fails to consider the change in carbon stocks in the forest or the combustion emissions from burning the biomass pellets. In order to get a true picture of Drax's and others carbon emissions, the UK and EU must adopt a calculator similar to the BEAC model that includes the change in carbon stocks. See the Appendix attached.

[66] "BEAC Report, page 125.

methodology). The BEAC report was published in July 2014.[67] The actual legislation was in the form of a Statutory Instrument (affirmative procedure) and that was laid before Parliament long after the BEAC report was published.[68]

B. SIG 2015a Study: Incorporating actual harvesting data supplying Drax facilities in the UK government's BEAC model confirms that the measure will increase CO2 emissions over the life of the Drax conversions.

Spatial Informatics Group LLC (SIG), an expert in carbon lifecycle modeling, incorporated the observed harvesting practices of pellet manufacturers from the US Southeast into the BEAC model developed by the UK Government to more accurately identify the likely atmospheric carbon effects of UK subsidized conversions.[69] In its study, SIG incorporated the harvesting practices of Enviva, the primary US pellet manufacturer contracted to provide industrial wood pellets to Drax conversions. Enviva currently operates numerous pellet plants across the Southeastern US in Virginia, North Carolina, Florida and Mississippi.[70] Enviva's three plants in southeast Virginia and northeast North Carolina produce about 1.38 million metric tons of industrial wood pellets annually, most of which is shipped directly to Drax, and rely on approximately 80% or more freshly cut hardwood trees as feedstock for pellets.[71] Investigations show that Enviva's Southeastern plants use mature hardwood trees from ecologically sensitive wetland forests some of which can be larger than 24 inches in diameter to manufacture industrial wood pellets for Drax.[72]

Based on this information, SIG used the UK Governments' BEAC model to calculate the lifecycle carbon emissions of industrial wood pellets according to Enviva's observed harvesting practice of utilizing mature hardwood trees. The study concluded that Drax conversions utilizing Enviva pellets emitted 2,677 kgCO2e/MWh over 40 years, which is more than nine times the CO2 emissions standard in the UK for coal to biomass conversion (285 kgCO2e/MWh), and more than two-and-a-half times the CO2 of emissions of continuing to burn coal for the next 40 years at the Drax plant (1018 kgCO2e/MWh).[73]

The SIG study further assessed the lifecycle emissions of industrial wood pellets under more sustainable harvesting practices than observed with Enviva. For example, the study modeled a scenario where only 35% of the feedstock came from harvesting hardwood trees,

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[67] "BEAC report"
[68] http://www.legislation.gov.uk/uksi/2015/1947/pdfs/uksi_20151947_en.pdf
[69] SIG Report, May 27, 2015 attached and available at www.southernenvironment.org/uploads/news-feed/SIG_BEAC_calculations_SE_hardwoods_2015-05-27.pdf?cachebuster:11
[70] U.S. Securities and Exchange Commission (SEC) 2014. Forms S-1, Registration Statement under the Securities Act of 1933. Enviva Partners, LP. Washington DC. https://www.sec.gov/Archives/edgar/data/1592057/000119312514383777/d808391ds1.htm [Last accessed on May 8 2015].
[71] *Id.* See also June 2, 2015 memo from SELC attached for more detail, and available at www.southernenvironment.org/uploads/news-feed/Cover_letter_to_UK_EU_Re_SIG_report.pdf?cachebuster:51
[72] https://www.washingtonpost.com/national/health-science/how-europes-climate-policies-have-led-to-more-trees-cut-down-in-the-us/2015/06/01/ab1a2d9e-060e-11e5-bc72-f3e16bf50bb6_story.html. https://www.youtube.com/watch?v=G3b1VWCWXm8&feature=youtu.be See photos in appendix to June 2, 2015 memo from SELC.
[73] SIG report at 8 and SELC memo at 2, attached.

while the rest comes from wood wastes and other feedstocks. This proportion reflected Drax's reported supply categories.[74] Under this scenario, the SIG study concluded that Drax's biomass emissions would still exceed the UK carbon standard by four times, and would result in at least 20% more CO2 than continuing to burn coal.[75]

The SIG study concluded that pellet manufacturers would have to reduce hardwood harvest input to 8% of the overall feedstock in order to meet the UK's 285 kgCO2e/MWh standard, which is unlikely given the types of forest surrounding pellet manufacturing facilities and high demand for non-hardwoods by other forest industries in the Southeast US[76]

C. SIG 2015b Study: Burning wood pellets manufactured from whole trees, hardwood or softwood, harvested from the Southeastern US to produce electricity in the UK results in greater CO2 emissions than burning coal and natural gas.

In a separate 2015 analysis, SIG further compared carbon emissions of burning wood pellets manufactured from Southeastern forests to produce electricity with carbon emissions from burning coal and natural gas.[77] The results are largely consistent with the study cited above, showing that pellets made of even relatively small proportions of harvested whole trees—rather than wood wastes or sawdust—will emit carbon pollution comparable to or in excess of fossil fuels for more than 50 years.[78] The modeling assumed that the biomass feedstocks used to produce pellets were typical of the pellet industry (i.e., forestry residues—tops and limbs from forestry operations that are non-merchantable to other markets; whole trees—merchantable pulpwood, trees from thinning operations, and non-merchantable trees; and mill waste—by-products of sawmill operations such as sawdust and chips).[79] SIG varied the amounts of each of these three feedstocks, running scenarios in which the proportion of whole trees in the wood pellets ranged from 20 % to 70 %.[80] In each of these scenarios, they modeled the emissions resulting from burning the pellets in a typical power plant over a 100-year period and compared these estimated biomass CO2 emissions with the CO2 that would have been emitted by fossil fuels to produce the same amount of electricity.[81]

The study shows that when the proportion of whole trees ranges from 40 % to 70 %, it will take approximately 55 years for forest regrowth to recapture enough carbon from the atmosphere to reduce the power plant's cumulative emissions below the emissions of continuing

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[74] SIG Report at 2, Table 1. This scenario is unrealistic given (1) the reliance on hardwoods and the additional harvesting discussed above, (2) the difficulty and expense in sourcing fine forest residues, and (3) the fact that utilities do not want the bark content in fine forest residues.
[75] See SIG Report at 9.
[76] Evans, J.M., R.J. Fletcher, Jr., J.R.R. Alavalapati, A.L. Smith, D. Geller, P. Lal, D. Vasudev, M. Acevedo, J. Calabria, and T. Upadhyay. 2013. Forestry Bioenergy in the Southeast United States: Implications for Wildlife Habitat and Biodiversity. National Wildlife Federation, Merrifield, VA, 275p. http://www.nwf.org/pdf/Conservation/NWF_Biomass_Biodiversity_Final.pdf .
[77] Natural Resources Defense Council, Issue Brief, "Think Wood Pellets are Green? Think Again," May 2015, http://www.nrdc.org/land/files/bioenergy-modelling-IB.pdf.
[78] *Id.* at 2.
[79] *Id.* at 1.
[80] *Id.*
[81] *Id.*

to burn coal.[82] When the proportion of whole trees in pellets is greater than 40 %, pellets emit more carbon than coal for most of this period.[83] When whole trees make up 20 % of the wood in pellets, emissions are slightly higher than natural gas and slightly lower than coal for a period of approximately 55 years.[84] Even when whole trees make up as little as 12 % of pellets, the modeling showed that burning pellets still produces emissions comparable to natural gas for approximately 50 years.[85] In addition, as the percentage of whole trees increases above 70 %, the level of carbon emissions continues to increase.[86]

D. JRC 2013 Study: Carbon accounting for forest bioenergy.

This study by the European Commission's in-house research center confirmed that it's false to assume that all woody bioenergy would create zero emissions i.e. deliver 100% GHG savings. This is largely due to the fact that emissions related to bioenergy use in the land and forest sectors (LULUCF) are ignored. Nevertheless, the UK sustainability schemes on bioenergy do not take into account these emissions and therefore do not guarantee GHG savings from woody bioenergy use,[87] nor do the Commission recommendations for biomass sustainability in 2011.[88]

E. DG Energy 2016 Study lead by UK Forest Research: Carbon impacts of biomass consumed in the EU.

The new study once more confirms that there are significant emissions related to EU's current and projected bioenergy use if no new policies are put in place, both from biogenic sources (forest carbon stocks) and from manufacturing and processing, especially in the case of imports. These emissions are mostly not accounted for when estimating GHG savings for bioenergy use.[89]

F. NWF 2013 Study: Observed impacts of increased UK demand for wood pellets manufactured from forests in the Southeast US threaten biodiversity by increasing the conversion of natural forest to pine plantation and increasing harvest of ecologically valuable hardwood and wetland forests.

In 2013, the National Wildlife Federation (NWF) commissioned a study to help elucidate potential impacts on biodiversity and wildlife habitat from rapid growth in biomass harvesting in Southeastern forests. The study observed seven operating biomass facilities in Southeastern forests—three pellet manufacturing facilities, three biomass fired power plants, and one power plant co-firing coal and biomass—to identify how their harvesting demands impact wildlife and

[82] *Id.* at 2-3.
[83] *Id.*
[84] *Id.*
[85] *Id.*
[86] *Id.*
[87] See http://iet.jrc.ec.europa.eu/bf-ca/sites/bf-ca/files/files/documents/eur25354en_online-final.pdf
[88] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0011&from=EN
[89] See: https://ec.europa.eu/energy/sites/ener/files/documents/EU%20Carbon%20Impacts%20of%20Biomass%20Consumed%20in%20the%20EU%20final.pdf

habitat values based on forest type and composition within their sourcing areas.[90] The study explicitly considered all relevant state "Best Management Practices" (BMP) and other sustainability criteria applicable to wood product and biomass harvesting in the sourcing area.[91]

The NWF study concludes that increased demand for plantation pine-based softwood material threaten biodiversity by encouraging conversion of standing, natural forest to pine plantations and by encouraging increased density in managed pine plantations, both of which decrease habitat value.[92] The study further concludes that industrial hardwood biomass sourcing within the Coastal Plain sites will generally result in substantial pressure to harvest from ecologically valuable wetland forests, causing substantial impacts to habitat.[93] Importantly, the study identifies that BMPs and sustainability criteria are not sufficient to prevent impacts to biodiversity. Specifically, the study finds that US state-level BMP guidelines for forestry operations are not designed for the enhancement or maintenance of biodiversity at stand or landscape levels, and that existing voluntary forestry certification programs generally do not apply to biomass sourcing.[94]

G. NRDC/CBI 2015 Study: Increased UK demand for wood pellets manufactured from forests in the Southeast US threaten unprotected, ecologically valuable wetland forests.

In 2015, the Natural Resources Defense Council (NRDC) commissioned a study with the Conservation Biology Institute (CBI) – an independent scientific organization that provides expertise through applied research, GIS and remote sensing to support the conservation and recovery of biological diversity globally.[95] CBI compiled spatially explicit data showing the geographic nexus between unprotected, biologically rich wetland forests in the US southeast region and existing and proposed wood pellet manufacturing facilities – in particular, Drax and Enviva facilities.

The CBI/NRDC study shows that Enviva's and Drax's operating and proposed pellet facilities are sited within harvest range of both plantations and unprotected, natural bottomland hardwood forests. The analysis illuminates both the places where there are particularly high concentrations of pellet facilities (hotspots include the Virginia–North Carolina border, southeastern Georgia, the Alabama–Mississippi border and Louisiana) as well as the acres of vulnerable wetland hardwoods in their sourcing areas.

The report concludes that the potential scale of the threat to southeastern wetland hardwood forests from Enviva, Drax and other wood pellet mills in the region is significant. Millions of

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[90] Evans, J.M., R.J. Fletcher, Jr., J.R.R. Alavalapati, A.L. Smith, D. Geller, P. Lal, D. Vasudev, M. Acevedo, J. Calabria, and T. Upadhyay. 2013. Forestry Bioenergy in the Southeast United States: Implications for Wildlife Habitat and Biodiversity. National Wildlife Federation, Merrifield, VA, 275p. at 16-17. http://www.nwf.org/pdf/Conservation/NWF_Biomass_Biodiversity_Final.pdf [Last accessed on May 8 2015].

[91] *Id.* at 19.

[92] *Id.* at 256-57, 259.

[93] *Id.* at 259-60.

[94] *Id.* at 260.

[95] NRDC Report, "In the U.S. Southeast, Natural Forests Are Being Felled to Send Fuel Overseas," http://www.nrdc.org/energy/files/southeast-biomass-exports-report.pdf.

acres of these forests—which provide critical habitat to a host of rare species and deliver important ecosystem services to local communities—are to be found within the potential sourcing areas of these facilities.

H. Compliance with sustainability standards

The UK sustainability standard has many loopholes and thus does not provide a useful methodology of ensuring sustainability of bioenergy production in the UK. Only 70% of feedstock has to meet sustainability criteria, while 30% of it can be just legal.

To prove compliance with the UK sustainability standard, operators can use a certification method or use a bespoke evidence approach that obliges them to prove there is no risk of unsustainability at regional level. The regional risk approach is a not a reliable compliance method. Drax sources a large portion (almost 60 %) of its feedstock from the US South-Eastern region, where there is a severe lack of sustainability legislation and where implementation on the ground varies greatly. This makes a regional (US state level) approach risk-laden. See section F above and Evans et al. footnote 87 above.

Also, even though other certification systems can be used to proof compliance with certain sustainability elements, the certification system of the Sustainable Biomass Partnership is the only scheme that is recognized by the UK as a *full* assurance of biomass sustainability. SBP is a utility and biomass industry body chaired by Dorothy Thompson, CEO of Drax, the plant that consumes the most wood pellets/biomass world-wide.[96]

UK Sustainability and GHG Standards do not accord with the UK's own Bioenergy Strategy 2012[97] whose Principle 1 states: *Policies that support bioenergy should deliver **genuine carbon reductions** that help meet UK carbon emissions objectives to 2050 and beyond. This assessment should look – to the best degree possible – at **carbon impacts for the whole system**, including indirect impacts such as ILUC, where appropriate, and **any changes to carbon stores**.* The BEAC report specifically looks at 'carbon impacts for the whole system' and addresses the loss of carbon stores caused by burning trees. It identified various scenarios, since observed to be used by suppliers to Drax, that could be 3 times worse than coal. Drax, using the seriously flawed OFGEM calculator (see Appendix 1), can improperly claim to be 86% better than coal. The Bioenergy Strategy also warns: *The use of the entire tree for bioenergy is undesirable as it is generally associated with sub-optimal carbon scenarios and can result in increased greenhouse gas emissions.* This is precisely the feedstock that suppliers to Drax are using as documented by the media and US NGOs[98]. As discussed above, biomass electricity at Drax does not yield 'genuine carbon reductions'.

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[96] http://www.drax.com/about-us/corporate-governance/board-and-executive-committee-members/dorothy-thompson-cbe/; http://www.sustainablebiomasspartnership.org/about-us/governance/sbp-board
[97] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48337/5142-bioenergy-strategy-.pdf
[98] https://www.dogwoodalliance.org/wp-content/uploads/2015/05/InvestigationFlyer-12.18.14.pdf

Appendix

Major Flaws in OFGEM Calculator Used by UK to Evaluate CO2 from Biomass

The OFGEM calculator is the official calculator used to calculate biomass GHG emissions in the UK. The BEAC report mentions that the OFGEM calculator is based on the carbon methodology laid out in Annex V of the EU RED.
http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0028&from=EN

Annex V says:

> "C. Methodology
> 1. Greenhouse gas emissions from the production and use of transport fuels, biofuels and bioliquids shall be calculated as:
> $\mathbf{E = e_{ec} + e_l + e_p + e_{td} + e_u - e_{sca} - e_{ccs} - e_{ccr} - e_{ee}}$"
> where:
> "13. Emissions from the fuel in use, **eu**, shall be taken to be zero for biofuels and bioliquids"

Strictly speaking this only refers to biofuels and bioliquids. However, the "Report From the Commission to the Council and the European Parliament on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling" clarifies that the same methodology is to be used for solid biomass: (http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0011&from=EN)

> "ANNEX I – Methodology for calculating greenhouse gas performance of solid and gaseous biomass used in electricity, heating and cooling.
> 1a. Greenhouse gas emissions from the production of solid and gaseous biomass fuels, before conversion into electricity, heating and cooling, shall be calculated as:
> $\mathbf{E = e_{ec} + e_l + e_p + e_{td} + e_u - e_{sca} - e_{ccs} - e_{cco}}$,"
>
> "where eu = emissions from the fuel in use, that is greenhouse gases emitted during the combustion of solid and gaseous biomass;"
>
> "12. Emissions from the fuel in use, e_u, shall be taken to be zero for solid and gaseous biomass."

Since the RED and the OFGEM calculator do not account for the stack emissions from burning the biomass, they must account for the carbon stock changes at the sourcing landscape, which they do not. According to the BEAC Report at page 41-42:

"…the following factors are not considered in the Renewable Energy Directive(2009/28/EC) LCA methodology:

Carbon debt: when a stand of trees in a forest is harvested all at once and replanted (or left to regenerate), it takes time (possibly several decades) for the tree store-grow to their pre-harvest mass. Until that time, the amount of carbon stored on the stand is lower than it was before harvest. If the wood removed from the land is combusted, the net reduction in carbon stored on the land would cause an equivalent temporary increase in carbon in the atmosphere. This term considers carbon impacts at the stand level rather than at the overall forest level (see page 48 for the difference between stand and forest level).

Changes in average forest carbon stock: the average carbon stored in a forest consisting of multiple stands can change over time if, for example, forest management practices change (e.g. harvest rates, silvicultural regimes, or tree species change).This term considers carbon impacts at the overall forest level, rather than stand level.

Foregone carbon sequestration: if the harvest of trees in a forest stops or reduces, the forest would likely continue to grow and reach a new equilibrium carbon stock. If this is the alternative (or counterfactual) to continuing to harvest a forest, the foregone carbon sequestration is the sequestration which has been prevented by the continued harvesting. This term considers carbon impacts at the overall forest level, rather than stand level.

Indirect impacts: If land used for bioenergy would otherwise have been used for the production of a different commodity, the displaced commodity may be produced by another method (e.g. from wood harvested elsewhere, or using non-biomass alternatives), which would have associated resource costs and GHG emissions."