Call for evidence on 'fuelled technologies' response from Biofuelwatch.

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Summary:

Biomass should not be eligible for subsidy. It is not genuinely renewable in the definition of the IPCC and the IEA: '*any form of energy from solar, geophysical or biological sources that is replenished by natural processes at a rate that equals or exceeds its rate of use.'*

It does not meet other policy aims. It is high-carbon, damages forests, biodiversity, pollutes people and is more expensive than genuine low-carbon renewables such as wind and solar, that use domestic 'free at source' natural resources.

Burning forests (carbon sinks) to cure climate change is not a good policy.

Subsidy spent on biomass locks in our dependency on inefficient (38% max) centralised combustion technology and imported feedstock subject to the vagiaries the market and currency fluctuations.

Subsidy should be spent first on demand reduction and smart grid management and storage to reduce peaks and enable intermittent renewables; then on genuine low-carbon renewables that do not involve combustion.

With respect to bio-energy from waste we urge you to give serious consideration to the submission from UK Without Incineration Network (UKWIN).

Biofuelwatch recommends:

- No subsidies for biomass.
- Removal of the 'zero-carbon' fallacy for biomass.

Question 1:

How should the CFD scheme treat biomass conversion in future? Please provide evidence supporting your suggestions and set out what you think the impact of these would be.

Biofuelwatch believes that no more subsidy should be provided to coal conversions in future. It should remain in Pot 3 and end when that Pot is deleted. It should not be put into any other CfD pot. With the coal phase-out a number of power-stations may seek to convert to biomass-burning. Drax has been lobbying hard for subsidy to convert its remaining 3 coal boilers.

Biomass electricity, especially in old power station conversions is not, nor can ever be, low carbon. So cannot "deliver low carbon electricity through the 2020s and in the years beyond." nor, obviously, help with "cost-effective decarbonisation". Principle 1 of the UK Bioenergy Strategy 2012 states: "*Policies that support bioenergy*

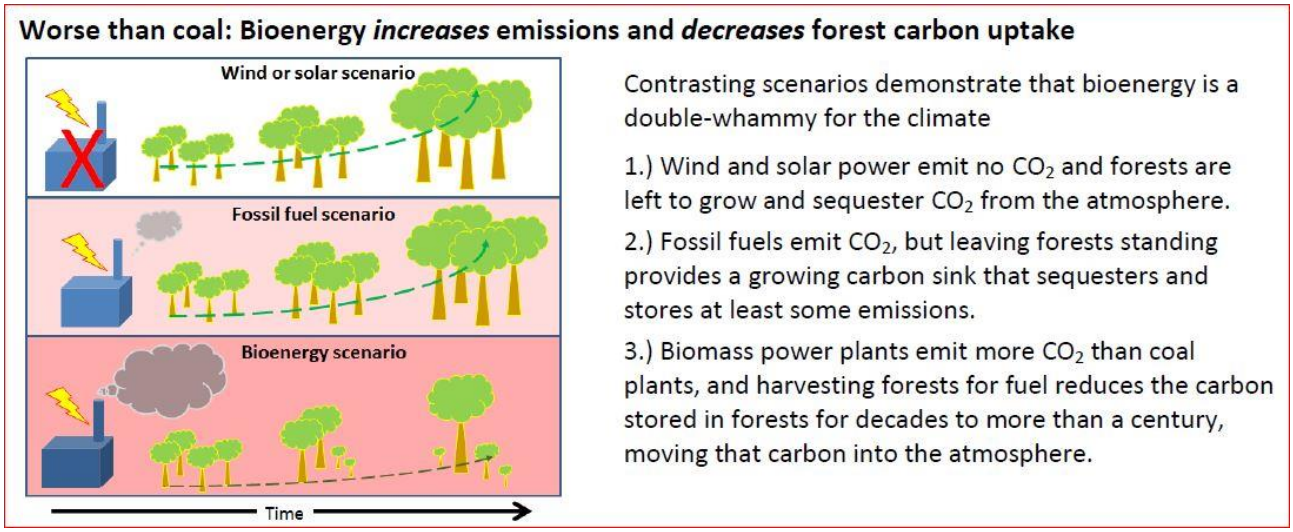
should deliver genuine carbon reductions that help meet UK carbon emissions objectives to 2050 and beyond.' taking into account '*carbon impacts for the whole system, including indirect impacts such as ILUC, where appropriate, and any changes to carbon stores.'* Current UK carbon accounting fails to address all these.

It is also expensive compared to solar and onshore wind and even off-shore wind where technology costs are falling faster than predicted. (see below)

Biomass is classed as zero-carbon because the carbon is assumed to be taken up by regrowth. This was described in 2011 as a 'serious carbon accounting error' by the European Environment Agency Scientific Committee.[1] A large and growing body of science[2], including the Biomass Emisssions and Counterfactual (BEaC) report[3] by DECC's chief scientist, shows that the zero-carbon assumption is false.

Biomass emits more carbon at the stack than coal per unit of energy produced. Drax power station admits this (2013 coal 862kgCO2 p MWh - biomass 965kgCO2 p MWh)[4]. Much of the wood sourced for UK wood pellets is from large whole hardwood trees clear-felled from carbon-rich, highly-biodiverse wetland forests in the southern US. UK Biomass Sustainability Standards do nothing to prevent this damaging sourcing which is intrinsically high-carbon for many reasons.

Regrowth is slow and far from guaranteed. It takes minutes to burn a tree but decades or even centuries for that carbon to be reabsorbed. Burning wood results in a carbon spike (or debt) for between 35 and 200 years at a time when we must be reducing emissions drastically to avoid runaway climate change. For it to be genuinely carbon neutral or negative the regrowth would have to be **instantaneous and additional to what would have happened had the forest not been cut for fuel.**



The BEaC report showed that very high-carbon scenarios emitting much more CO2 over decades that coal, would, under UK carbon accounting methodologies, still be accounted as coming in under the thresholds required to receive subsidy. 'Harvesting additional roundwood from naturally growing forests' or converting forests into plantations result in high GHG or very high GHG emissions.

1 http://www.eea.europa.eu/about-us/governance/scientific-committee/sc-opinions/opinions-on-scientific-issues/sc-opinion-on-greenhouse-gas
2 http://www.biofuelwatch.org.uk/biomass-resources/resources-on-biomass/
3 *Lifecycle Impacts of Biomass Electricity in 2020*, DECC, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/349024/BEAC_Report_290814.pdf
4 http://www.biofuelwatch.org.uk/wp-content/uploads/MPs-briefing-on-biomass-sustainability-standards.pdf

Journalistic research on the ground shows the former scenario is playing out: Wall St Journal5: "With Enviva opening up, you can justify shovel-logging* again," Mr. Burby said. (*clear-cut with bulldozer-like vehicles riding on makeshift roads made of trees) And a recent article6 from the Fayetteville Observer from N Carolina indicate the demand is causing owners to harvest earlier. "The demand has got some people harvesting their trees early," said Robeson County assistant forester Jimmy McCullough. "In the past, you'd wait longer and let the trees grow bigger for lumber."

A comprehensive recent report[7] commissioned by the European Commission confirms that EU biomass demand is sourcing from whole trees and brings with it serious risks of countries failing to meet legally binding GHG reduction targets and biodiversity targets. UK is a member of the Convention on Biological Diversity whose Aichi targets require that, by 2020, "subsidies harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts"

Research taking the BEaC report as starting point[8] has confirmed that these High Carbon Scenarios make up significant proportions of wood pellets burned for electricity in the UK.

The Natural Resources Defense Council commissioned modelling[9] which showed that 'even when whole trees make up as little as 12% of pellets, ... burning pellets still produces emissions comparable to natural gas... for approximately 50 years.' Whole trees make up a much greater percentage than that.

The Southern Environmental Law Center commissioned modelling[10] which showed that a maximum of 8% of biomass from additional hardwood harvests could be contained in the feedstock mix, assuming that the remainder of the feedstock mix is derived from low-emission saw mill residues only if the current emissions threshold of 285kg CO2e/MWh is not to be exceeded. It should be remembered that the emissions threshold drops to 200kg CO2e/MWh in 2020 and again to 150kg in 2025.

Drax's main supplier Enviva admits to using 50% hardwoods a large proportion of which are large whole trees from naturally regenerating forest. They call these 'waste trees' or 'forest residues'.

There is no guarantee of regrowth. Shrubland (which clear-felled forest will remain for many years) has recently been redesignated as 'forest' by the US Department of Agriculture. Without that change of designation, USDA figures show that forest land in the Southern US would be officially in decline.

The default harvesting method is clear-felling with heavy machinery which causes significant soil disturbance and soil carbon loss, and results in increased soil erosion, run-off pollution and loss of flood protection.

If the forest is converted to monoculture plantation thereby deleting the biodiversity and removing much of the long-term sequestration potential of the forest

Drax power station can claim an 80%+ carbon saving over coal because under UK GHG accounting it only has to

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5 http://www.wsj.com/news/articles/SB10001424127887324082604578485491298208114

6 http://www.fayobserver.com/news/local/a-cut-above-for-sandhills-logging-crews-business-is-booming/article_cf7b6457-32ee-526b-aec9-5136948d8dd8.html

7 Environmental implications of increased reliance of the EU on biomass from the South East US, http://bookshop.europa.eu/en/environmental-implications-of-increased-reliance-of-the-eu-on-biomass-from-the-south-east-us-pbKH0116687/

8 https://www.dogwoodalliance.org/wp-content/uploads/2013/05/Wetland-Logging-Ahoskie-March-2016.pdf

9 *Think Wood Pellets Are Green? Think Again.*, Natural Resources Defense Council, https://www.nrdc.org/sites/default/files/bioenergy-modelling-IB.pdf

10 *Carbon Emission Estimates for Drax powerplants in the UK sourcing from Enviva pellet mills in US Southeastern hardwoods using the BEAC model*, Southern Environmental Law Center, https://www.southernenvironment.org/uploads/audio/2015-05-27_BEAC_calculations_SE_hardwoods.pdf

count and declare the carbon from fossil fuels used in the production and transport of the biomass - not the carbon emitted when it is burnt or the considerable soil carbon emissions caused by land disturbance during clearfelling.

Biomass is as polluting as coal and in some cases worse. According to the recent Dark Clouds report Drax is responsible for 590 premature deaths a year as a result of its coal burning. The median of calculations of health costs is £820m a year.

Question 2

n/a

Question 3:

What factors will affect cost reduction potential for the fuelled technologies from 2020-2030? Please provide evidence to support your assessment. Please describe any barriers to these cost reductions taking effect and be specific about the technology and fuel type you are referring to.

Vivid Economics' recent Money to Burn? report[11] concluded that biomass is high carbon and expensive: "biomass conversion is already a mature technology, so comparatively little capital cost reduction is expected over time; fuel costs, which make up the bulk of biomass costs, are highly uncertain" In respect of fuel costs they observe: "Biomass fuel prices are also uncertain given the immaturity of the market and because international competition is likely to increase in the coming decades. There is no established spot or futures market for biomass, and trade is done via bilateral contracts. To reduce risk, generators have entered into joint ventures with pellet suppliers. In the future, investment in new capacity for biomass import terminals and associated infrastructure, as well as maturing supply chains, may lead to lower prices. However, increased demand for biomass fuel over time will tend to increase prices."

Biomass does meet the fundamental policy aim of 'delivering genuine carbon reductions'. So no matter how cheap it is or becomes it should not be 'supported'.

Subsidy spent on biomass locks in our dependency on inefficient (38% max) centralised combustion technology and imported feedstock subject to the vagiaries the market and currency fluctuations.

If bioenergy subsidy were spent on demand reduction it could remove the need for the generation capacity that is being supported to achieve effects opposite to policy aims and no structural change in our energy system. This would bring numerous benefits in cost saving to consumers, more money in the real economy, greater wellbeing, less fuel-poverty, reduced health costs and more. This calculation was made using IEA energy efficiency cost figures contained in the World Energy Outlook 2012[12]

Question 4:

What changes could be made to the CFD scheme to drive more cost effective decarbonisation of electricity generation or improve its 'carbon cost effectiveness'? Please provide any evidence you have on how the different fuelled technologies compare (with each other and with other renewables) in this respect.

To 'more effectively drive down the cost of decarbonisation of electricity generation' the best thing BEIS could do is remove all subsidy from Bio-energy and re-instate subsidies for Wind and Solar. Biomass is subsidy dependent throughout its lifetime because of the cost of the feedstock.

11 https://www.nrdc.org/resources/money-burn-uk-needs-dump-biomass-and-replace-its-coal-plants-truly-clean-energy
12 http://www.worldenergyoutlook.org/publications/weo-2012/

Principle 2 of the Uk Bioenergy Strategy states '*Bioenergy policies must therefore assess the cost effectiveness of bioenergy in reducing carbon emissions as well as producing energy compared to alternative options.'* It should be calculated per unit of carbon saved. On these grounds even using the partial carbon accounting currently in place most bio-energy should not be supported when compared with other non-combustion renewable technologies. (see the Money to Burn? report by VIVID Econonics cited in note 11)

When Bioenergy is subsidised it is assumed to be 'zero-carbon' – which has been disproved above. This disregards biogenic carbon emissions from burning the biomass, the carbon debt resulting from lost sequestrations and slow regrowth, soil carbon emissions and the emissions from burning biomass in the production process.

Part of the reason for zero-counting bioenergy in the energy sector is that, to avoid double counting, emissions are expected to be counted in the land sector at the time of the production of the biomass. However most biomass burnt in the UK comes from the US and Canada which are not signatories to the Kyoto Protocol and do not report land sector emissions[13]. This means the grounds for zero-counting biomass from these countries is absent. The US relies on its forest sector to remove about 16% of its emissions.

The zero-carbon assumption must be removed from bio-energy carbon accounting. It could be replaced by genuine full life-cycle emissions calculation. The BEaC report showed how extremely complex this is. And experience from the last few years has shown how difficult it is to enforce any controls. Under the precautionary principle the high risk of biomass resulting in increased emissions means it should not be subsidised.

The VIVID economics report already mentioned calculates conservatively that Biomass produces 1277g (2677g) CO2 p KWh (against an allowed emissions threshold of 200g from 2020). This makes is as bad as or worse than coal. It also shows that even when proper carbon accounting is not in place and discounting the carbon costs of extra emissions biomass is likely to be a more expensive way of meeting government targets in 2020 than wind and solar. This calculation includes the System Integration Costs for wind and solar.

The UK Biomass Sustainability and GHG Standards do nothing to prevent the worst effects of hugely increased demand for biomas from the southern US including clear-felling of ecologically sensitive native forest, wetland logging and conversion of biodiverse forest to monoculture plantation. The coastal plain in this region has just been designated a new Global Biodiversity Hotspot by Conservation International. There are few environmental regulations relating to privately owned forest in the southern US (the vast majority). The Sustainable Biomass Partnership, the only certification scheme recognised under the Sustainability Standards as a complete assurance of sustainable biomass is an industry body chaired by the CEO of Drax. It recently gave a blanket certification to 2 Drax pellet mills covering 7m ha of diverse forest with a site visit lasting 7 hours.[14]

There is little point in improving standards that are unenforced and unenforceable. The GHG accounting enshrines the zero-carbon fallacy by requiring only fossil fuel emissions from production, processing and transport to be reported. This produces a dangerously inaccurate picture of Biomass's 'carbon cost effectiveness. Until and unless indirect impacts and emissions from changing carbon stocks and lost sequestration are properly accounted for Biomass should not be subsidised

Question 5:

What factors do you think Government should take into account in considering the interaction between the CFD scheme and support for decarbonisation of heat?

Electricity-led biomass electricity generation should not be subsidised. CHP, indeed all biomass use, should meet

13 See attached Chatham House report on the 'international carbon loophole'

14 http://www.biofuelwatch.org.uk/2016/drax-sbp-pr/

a minimum conversion efficiency of 70%.

Currently subsidy for the the so called 'good quality CHP' scheme rewards only the electricity generated so there is no incentive for the operator to use the heat efficiently or significantly exceed the extremely low efficiency threshold of 35%. This is lower than Drax power station's 38% efficiency. EU Renewable Energy Directive Article 13 (6) of the current Renewable Energy Directive (DIRECTIVE 2009/28/EC) requires that "In the case of biomass, Member States shall promote conversion technologies that achieve a conversion efficiency of at least 85 % for residential and commercial applications and at least 70 % for industrial applications." Additionally these schemes do not have to capture any heat for 5 years.

CHP should be designed around a heat-load and the electricity generation is an added efficiency gain. They should only genuine local biomass surplus that does not have a better non-combustion use. So subsidy should reward schemes sited to supply genuine heat-load achieving at least 70% conversion effiency and to use local feedstocks. The heat must also be efficiently used so that subsidised heat is not wasted or used carelesslessly. Currently, as with the planned 299MW MGT plant on Teesside it is sized to push at the limits of the subsidy and sited to enable import and storage of wood pellets. There are few local heat customers and no incentive to the operator to gather new heat customers. Local anecdotal evidence has it that it will heat an Azda Warehouse.

See the Biofuelwatch briefing on this CHP subsidy loophole[15].

CfD Scheme and Advanced Conversion Technologies (ACT)

Question 6:

How can the Government use the CFD scheme to promote the development of innovative ACT projects which will help develop a circular economy using waste as a fuel? Please provide evidence for or against making changes to the support of ACT and set out what you think the impact of making these changes would be.

Biofuelwatch believes that Advanced Conversion Technologies (ACT) , whether for waste or virgin biomass, must be excluded from renewable electricity subsidies, including Contracts for Difference.

In 2015, Biofuelwatch published a detailed report about biomass gasification and pyrolysis projects across the UK (http://www.biofuelwatch.org.uk/wp-content/uploads/Biomass-gasification-and-pyrolysis-formatted-full-report.pdf). Based on extensive desktop research we found that 40 biomass and pyrolysis power and/or combined heat and power plants with a minimum capacity of 1 MWe had been proposed in Britain in recent years. At least 9 such plants had been built, although some of those have never been fired up. Out of the 9 biomass gasification and pyrolysis plants constructed, 8 had been closed down, either before or after being fired up. Two had been redesigned and re-opened, but one of them had attracted no Renewable Obligation Certificates, i.e. can be assumed to have generated no electricity, whereas the other one had been operating for five months, but at less than ten percent of its capacity, which is an indication of technical problems. Not one biomass ACT plant had ever operated successfully.

We have not become aware of any biomass gasification or pyrolysis plant having been successfully operated since we published that report. UK Without Incineration Network have published evidence showing that the same is true for the non-biomass waste ACT sector in Britain.

15 http://www.biofuelwatch.org.uk/2016/biomass-chp-loophole-policy-briefing/

One of the failed biomass gasification schemes was a plant installed by the University of East Anglia. A confidential report about the failure of that project has recently become available through Freedom of Information rules (https://drive.google.com/file/d/0B9iIc9n8hjCpWlRja1BHSFhHNDQ/view).

As a result of those project failures, hardly any renewable electricity subsidies (so far Renewable Obligation Certificates) have actually been paid towards biomass gasification and pyrolysis. However, the fact that a high subsidy rate is available in principle appears to be misleadinly raising investors' confidence in those unproven and failure-prone technologies. As our 2015 report shows, tens of millions of pounds of investors' - in some cases small investors' - money has been lost on failed schemes of this type. CfD awards for ACT projects might, believe, have the unintended effect of causing more investors to wrongly believe that schemes are viable and to end up losing significant sums of investment when they do not work out.

The UK's first ever biomass ACT project was the Arable Biomass Renewable Energy (ARBRE) project in Eggborough, which was granted planning consent in 1997. It attracted a European Commission grant for 40% of the original cost estimate (28% of the final cost), and a guarantee of UK subsidies for renewable electricity generation. The plant was fired up in 2001 but failed to operate successfully and the scheme went into liquidation in 2002. The failure of this first project was examined in a peer-reviewed study (Piterou,A.,etal.,Project ARBRE: Lessons for bio-energy developers and policy-makers, Energy Policy (2008),doi:10.1016/j.enpol.2008.02.022). Multiple reasons for the failure of the project were identified, and the authors concluded: “Arguably, there was insufficient control and monitoring by the organisations and companies involved in Project ARBRE. This lack of control seems to have exacerbated the degree of technical errors and the failure to address these errors in sufficient time. Perhaps the key policy message to emerge from the case is that effective scrutiny and oversight of publicly funded demonstration projects is required throughout their development, especially when bodies that might usually be performing this function in a commercial setting (e.g. banks) are not involved in this capacity”. Renewable electricity subsidies were identified as unsuitable for a technology so clearly in the Research and Development stages. Yet those lessons have never been heeded and we believe that as a result, the story of new gasification and pyrolysis projects being developed, attracting investment, and then failing to perform, will continue.