Consultation response
re: State aid SA.38762 (2015/C) (ex 2014/N)

INVESTMENT CONTRACT FOR LYNEMNOUTH POWER STATION BIOMASS CONVERSION

Biofuelwatch would like to present evidence on the likely environmental impacts that will result from an investment contract awarded to Lynemouth, as well as current evidence on wood pellet imports to the UK.

According to 1.1 (6) of the COMMUNITY GUIDELINES ON STATE AID FOR ENVIRONMENTAL PROTECTION (2008/C 82/01): "*The primary objective of State aid control in the field of environmental protection is to ensure that State aid measures will result in a higher level of environmental protection than would occur without the aid and to ensure that the positive effects of the aid outweigh its negative effects in terms of distortions of competition, taking account of the polluter pays principle established by Article 174 of the EC Treaty.*"

Rather than resulting in a higher level of environmental protection, a biomass conversion at Lynemouth will add to the environmental harm currently resulting from large-scale biomass operations in the UK. This will add to the negative effects of distortion of competition for wood.

Consequently, we believe that the Investment contract for Lynemouth power station biomass conversion fails to meet the primary objective of State aid in the field of environmental protection of the European Union, and should not be approved. We also believe that an award for a further Contract for Difference to biomass electricity would result in unfair competition with other forms of electricity classed as renewable, namely solar power and onshore wind.

Environmental Impacts

Carbon emissions associated with burning biomass

Mounting evidence and opinion from the scientific community[1] shows that the carbon intensity of biomass electricity, and the carbon debt that is created when it is burned, must be fully accounted for. Currently, flawed carbon accounting methodologies that assume biomass is carbon neutral are resulting in highly inaccurate assessments of the carbon intensity of biomass electricity, and therefore the level of subsidy and support awarded to it.

UK biomass power stations such as Drax are currently getting away with reporting substantial carbon emission reductions because of a flawed carbon accounting methodology. This carbon accounting relies on the Ofgem Solid and Gaseous Biomass Carbon Calculator (B2C2), which is based on a framework that does not account for changes in the carbon stock of the forest, foregone carbon sequestration of land, or indirect impacts on carbon stocks in other areas of land.

This methodology has been criticised in the UK Department of Energy and Climate Change's recent report "Life Cycle Impacts of Biomass Electricity in 2020 - Scenarios for Assessing the

1 The scientific community is increasingly appealing to policy makers to correct carbon accounting mistakes, for example http://docs.nrdc.org/energy/files/ene_13090603a.pdf

Greenhouse Gas Impacts and Energy Input Requirements of Using North American Woody Biomass for Electricity Generation in the UK" (BEAC).

Documented evidence by environmental organisations in the southeastern US can be used to show that certain sourcing by Enviva, a major Drax pellet supplier, is comparable to BEAC Scenario 13(a) resulting in a carbon intensity of 3346 kg CO2/MWh, and BEAC Scenario 13(b) resulting in a carbon intensity of 2717 kg CO2/MWh. An average of these two scenarios results in a carbon intensity 3 times the 1018 kg CO2/MWh attributed to burning coal.

Furthermore, a large and growing number of peer-reviewed scientific studies confirm that carbon emissions associated with carbon stock reductions and foregone carbon sequestration capacity resulting from bioenergy can be very substantial – and in many cases higher than emissions from coal (per unit of electricity) when considered over a number of decades. This 'carbon accounting error' was explained in the Opinion of the European Environment Agency on Greenhouse Gas Accounting in relation to Bioenergy in September 2011[2]
Please see http://www.biofuelwatch.org.uk/biomass-resources/resources-on-biomass/ for a list of several relevant studies. Please also see http://im.ft-static.com/content/images/0ee06ecc-d3ae-11e3-8d23-00144feabdc0.pdf for a letter by US scientists highlighting the flaws in the carbon accounting methodology used by the UK government.

Given that wood pellet sourcing at Lynemouth is likely to be similar to other converted coal power stations in the UK, the resulting carbon emissions are likely to be extremely high in reflection of this.

For a list of studies into the carbon impacts of biomass electricity, see www.biofuelwatch.org.uk/resources-on-biomass.

Biodiversity and forest impacts in North America's

RWE have not publicly stated where they would source the pellets for a converted Lynemouth Power Station. This means that the full environmental impacts cannot be known at this stage. However, the vast majority of the wood pellets imported to the UK comes from the southern US and Canada, with imports expected to increase significantly as new pellet facilities begin production. Even at the early stages of the growth of this industry, whole trees are being turned into pellets, with a significant proportion of the UK's biomass sourced from biodiverse hardwood forests in the southern US.

Evidence of forest destruction and use of whole trees in the southern US by pellet suppliers to the UK has been extensively documented, examples of which can be found here: http://www.dogwoodalliance.org/2012/11/new-report-discredits-uk-energy-company-claims-that-pellets-come-from-wood-waste/ and http://www.dogwoodalliance.org/2013/08/press-release-new-maps-reveal-envivas-ahoskie-wood-pellet-facility-threatens-southern-wetland-forests-surrounding-ecosystems-and-wildlife/.

In its recent biomass sourcing report[3], the UK's largest importer of wood pellets, Drax power station, insists it uses predominantly 'forest residues' and 'thinnings'. However, on-the-ground research in the southern US shows that much of the biomass being sourced and falling within these categories is very large material, including whole trees cut from mature hardwood forests. This has serious impacts on biodiversity, and means that the carbon emissions quoted by Drax are likely to be seriously underestimated.

In May 2012, Drax advised the UK Department for Energy and Climate Change that its converted power station could only burn wood pellets sourced from slow-growing trees with a low bark

2 http://www.eea.europa.eu/about-us/governance/scientific-committee/sc-opinions/opinions-on-scientific-issues/sc-opinion-on-greenhouse-gas

3 http://www.drax.com/media/56590/drax_ar14_final.pdf

content[4] – which rules out most sawmill residues since those are high in bark. This is due to the fact that burning other types of biomass results in greater corrosion, fouling and slagging due to alkali salt concentrations. We understand that the same would apply to a conversion of Lynemouth power station since this, like Drax, is also a subcritical pulverised fuel plant. This means that RWE would also likely rely on pellets made from slow-growing whole trees, with a particularly serious impact on forests as well as carbon emissions.

Air quality and health impacts

Burning wood emits similar levels and a similar range of pollutants as burning coal, albeit smaller quantities of certain pollutants (mainly sulphur dioxide and mercury) and greater quantity of others (such as Volatile Organic Compounds and, generally, small particulates, i.e. PM2.5).

The largest volume of air pollutants are oxides of nitrogen (NOx), carbon monoxide (CO), small particulates (PM10, including PM2.5) and sulphur dioxide (SO_2) (as well as carbon dioxide, which affects the climate rather than public health when emitted at rates typical for power plants). Burning virgin wood also results in a wide range of other pollutants. These include Antimony, Arsenic, Cadmium, Chromium, Copper, Dioxins and Furans, Lead, Manganese, Mercury, Nickel, Polycyclic Aromatic Hydrocarbons (PAHs), Selenium, Vanadium and Zinc.

Power station operator claims about 'average' rates of emissions are usually based on emissions while the plant is smoothly operating. However, every power station will be shut down and restarted several times a year even when there are no technical problems which would otherwise cause shutdowns. When a new power station starts operating – or when a modified and converted coal power station first starts to operate as a biomass plant – shutdowns and startups initially will be more frequent. During these periods, emissions, of Dioxins and Furans, or Polycyclic Aromatic Hydrocarbons (PAHs) and of other pollutants, including NOx, have been found to spike, often significantly so. For example, a Japanese study found that for an incinerator that had low dioxin emissions during steady state operation, four startups accounted for 41% of all such emissions in a year[5]. A Taiwanese study[6] showed that a single startup operation could emit 60% of the dioxins and furans that would be emitted during a whole year of continuous operation otherwise.

Vulnerable groups of people are at greater risk. Babies, children, elderly people and people with underlying health problems such as asthma or heart disease are particularly vulnerable. Newcastle, just to the south of Lynemouth is a sizeable population centre.

In 2009 the British government estimated that UK biomass policy would result in between 340,000 and 1.75m life years lost in 2020.[7]

Detailed evidence of the health effects of different air pollutants has been published by the World Health Organisation[8]. Here is a very brief summary:

- 80% of deaths linked to air pollution are due to heart disease and strokes, 14% to lung and bronchial disease and 6% to cancer;
- Long-term exposure to nitrogen dioxide (NO_2) is linked to reduced lung functions and increased symptoms of bronchitis in children with asthma;
- Short-term exposure to very high levels of NO_2 causes inflammation of airways;
- NO_2 is an important source of ultrafine particulates (PM2.5);

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4 http://biofuelwatch.org.uk/docs/DECC%20FoI%20EIR%2013-0340%20Q1%20Documents%20Drax%20etc%209May%202013.pdf

5 Characteristics of dioxin emissions at startup and shutdown of MSW incinerators, Hajime Tejima et al, Chemosphere 66 (2007) 1123–1130

6 Influence of start-up on PCDD/F emission of incinerators, Lin-Chi Wang et al, Chemosphere 67 (2007) 1346-1353

7 http://www.publications.parliament.uk/pa/cm200910/cmselect/cmenvaud/229/229we02.htm

8 http://www.who.int/topics/air_pollution/en/

- NO_2 is a major source of ground-level ozone, which is linked to breathing problems, asthma attacks, reduced lung function, lung and heart disease;
- Long-term exposure to small particulates (PM10) is linked to respiratory and heart disease and to lung cancer. Most serious are the impacts of the smallest of those particulates (PM2.5), for which there are no safe levels of exposure;
- High levels of SO_2 affect the respiratory system and lung function and are a particular risk to people with asthma;
- Polycyclic Aromatic Hydrocarbons (PAHs) are carcinogenic and directly damage cells;
- Dioxins and Furans are highly toxic and persist long-term in the environment. They can cause reproductive and developmental problems, damage the immune system, cause cancer and interfere with hormones. Air emissions of dioxins can be inhaled, but they can also end up in the food chain. They also bioaccumlate in the body.
- Other pollutants emitted by biomass burning in power stations pose a range of health risks, including cancer, inflammation of airways, hormone disruption and birth defects.

Recent studies suggest that air pollution may be responsible for a wider range of health effects, including learning and memory difficulties, depression[9], the risk of dementia[10], autism and schizophrenia[11].

Distortion of Competition

We agree with the prediction outlined in the Commission's consultation paper that the hugely significant scale of the additional demand for wood pellets from Lynemouth would lead to a distortion of the wood market for other wood-using industries (e.g. pulp and paper, particle board manufacturing etc.) as well as a distortion of the European pellet market between the UK and other European countries competing for the same resource for energy production (in particular Belgium and the Netherlands; countries that also rely heavily on biomass for energy imported from North America).

It is important to also note that the renewable heat market also relies wood pellets. Additional increasingly important competitors for woody biomass are cellulosic ethanol producers and the emerging EU bio-economy.

UK's wood pellet demand

According to statistics released by Ofgem[12], the UK imported 3.5 million tonnes of wood pellets over 2013/2014, more than doubling from the 1.7 million tonnes imported in the previous year. Drax power station has recently published information on its 2014 sourcing, showing that it alone imported 4 million tonnes of pellets in 2014. This shows that UK import figures for 2014/15 are likely to increase substantially again, as Drax's imports increase to close to 7 million tonnes, and other pellet-burning infrastructure comes online. Each tonne of pellets is made from around 2 tonnes of green wood.

The UK is currently sourcing the vast majority of its wood pellets from the southern US and British Columbia, in Canada.

Since 2013, the UK has been consuming a far greater share of global wood pellet production than any other EU country (and possibly any country in the world)[13]. According to the US Energy

9 http://www.sciencedaily.com/releases/2011/07/110705071735.htm
10 http://www.alzinfo.org/07/articles/prevention-and-wellness/air-pollution-raise-dementia-risk
11 http://www.urmc.rochester.edu/news/story/?id=4100
12 https://www.ofgem.gov.uk/environmental-programmes/renewables-obligation-ro/information-generators/biomass- sustainability
13 http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Biofuels%20Annual_The%20Hague_EU-28_7-3-2014.pdf

Information Administration, almost three-quarters of all US wood pellet exports in 2014 went to the UK, mostly for electricity generation[14]. This means that UK subsidies for biomass electricity, and especially for coal-to-biomass unit conversions are having a disproportionate impact on the overall global trade in biomass in relation to the size of the country and the UK's own limited wood production (11 million tonnes in total in 2013, according to Forestry Commission Statistics).

Wood pellet producers compete with existing industries – especially wood panel and pulp and paper producers – for the same feedstock and growing trade in wood pellets therefore affects trade in and prices of other wood products, too. This may have other impacts. For instance, biomass burnt for electricity becomes atmospheric carbon immediately. Biomass manufactured into wood panels is sequestered. Rising wood panel prices cause 'substitution' carbon impacts – people purchasing high carbon alternatives such as gypsum board. The wood panel industry in the UK employs between 8-9,000 people. Jobs will be lost.

Lynemouth fuel requirements

If converted to biomass, Lynemouth power station will require around 1.7 million tonnes of wood pellets[15], equivalent to total imports for the 2012/2013 period, which would represent another significant increase in wood pellet imports to the UK. Much of this additional fuel is likely to be sourced from the southern US, the world's biggest pellet producing region, where substantial environmental impacts are being witnessed because of the wood pellet industry.

Lynemouth subsidy levels

At current wholesale electricity prices, Lynemouth would be eligible for around £191 million in subsidies through its Contract for Difference.[16]

In addition to this, Lynemouth would generate Levy Exemption Certificates, and would earn £16 million from these[17], bringing total subsidy levels to £207 million per year.

Competition with other forms of energy classed as renewable

So far, there have been two rounds of allocations for Contracts for Difference[18]. Contracts for Difference have been awarded for 1,365 MW of biomass electricity capacity, mainly coal-to-biomass conversions. By comparison, only 748.55 MW of onshore wind and 71.55 MW of solar capacity have been awarded Contracts for Difference. We believe that this gives large-scale biomass electricity investments an unfair competitive advantage.

The Commission's assumption in point 70 of the invitation document and 90 EEAG that '*aid for environmental purposes will by its very nature tend to favour environmentally friendly products and technologies at the expense of other, more polluting ones'* is not borne out in practice. Biomass electricity is highly inefficient in land-use terms compared with other renewable energies that could receive this state aid such as onshore wind or solar. To generate 1TWh of electricity Biomass requires 543 km2 of land, wind 72 km2 and solar PV, 32 km2[19]. State aid for Biomass electricity

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14 http://www.eia.gov/todayinenergy/detail.cfm?id=20912

15 This figure is a Biofuelwatch estimate based on an assumed efficiency of 35% and 7000 hours of operation annually.

16 CfD calculation: 420MW x 7000hrs = 2940000 Mwh. (2940000 x 105) – (2940000 x 40) = £191100000. £191 million per year

17 LECs calculation: 420MW x 7000hrs = 2940000 Mwh. 2940000 x 5.41 = £15905400

18 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/305781/Successful_Projects.pdf and https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/407059/Contracts_for_Difference_-_Auction_Results_-_Official_Statistics.pdf

19 Energy Sprawl or Energy Efficiency: Climate policy impacts on natural habitats for the United States of America,

has the 'harmful effect' outlined in EEAG 3.2.6.1 (91) that '*more efficient or innovative competitors, for example competitors with a different, possibly even cleaner technology, that would otherwise be able to enter and expand are unable to do so'.*

State aid to biomass electricity not only fails to achieve carbon emissions reductions and 'increased environmental protection', it fails to move towards a 'secure, affordable and sustainable energy market' (EEAG). It supports old, inefficient, carbon intensive, polluting combustion technologies and a dependence upon imported feedstock from a market subject to growing demand pressures. By contrast wind and solar pay off up-front construction emissions in a very short time, have a small footprint and use a zero-carbon, domestic, free energy source.

Conclusions

The significant environmental risks posed by the conversion of Lynemouth power station to burning biomass highlighted above show that UK state aid for this conversion fails the test for common interest. We believe that this Contract for Difference would be anti-competitive by further distorting the global wood pellet trade (with the UK already accounting for 60% of imports from the world's largest pellet producing region) and thereby global wood markets and by creating further unfair competition with onshore wind and solar investments in the UK.

Therefore UK state aid for Lynemouth power station is incompatible with the common market and should not be approved by the European Commission.