

Biofuelwatch response to UK Government Consultation : “Coal Generation in Great Britain”
November 2016

We are pleased that the Government is planning a phase-out of electricity generation from coal.

However, we disagree firmly with the proposal as it stands. The mechanisms proposed in the consultation paper to supposedly bring about a phase-out of coal generation are totally inadequate. They seek to ensure the phase-out of coal generation cannot occur before 2025, even though the current economics of coal, and even the central economic scenario contained within the paper, suggest a much earlier closure of all coal-fired power in the UK.

Furthermore, the proposed mechanisms contain loopholes which could perpetuate coal-burning in this country indefinitely, and we anticipate these loopholes to be widened with lobbying from the coal and biomass industries.

The proposal as stands is therefore not commensurate with the severity of the climate crisis, nor with the disastrous impacts of coal mining on communities and their environments around the world, nor with the destructive impacts of logging for energy generation (biomass) on forests and biodiversity.

We shall now outline our responses to the consultation in more detail:

1. General objections to the parameters of the Consultation Paper and the Impact Assessment

1. The document begins in Chapter 1 with contrasting the carbon intensities of coal and gas, implying that the lost generation from the closure of coal-fired power should be replaced with gas. This is a false binary. To avoid catastrophic climate change, both coal power and gas power must be phased out - plans should be made to phase out gas power after coal power, not to invest in new gas plant.

It is now widely recognised that global available reserves of fossil fuels (oil, coal and gas) if burnt would greatly exceed the 'carbon budget' for 2°C. This has been calculated and confirmed by the IPCC [1] and scientists estimate at least two-thirds must remain 'in the ground' and unburnt (see [2]). A recent report finds that current global reserves of oil and gas alone are enough to take global warming over 1.5°C [3]. McGlade & Ekins (2015) estimate the proportion of each fuel which must remain unburnt in each region – for Europe's gas it is 6% [4]. However, note this is of reserves – which are mapped and for which there are plans to extract - not for resources (total gas available i.e. all unconventional gas). This report also concludes that gas use in the UK must begin to fall in the late 2020s to keep within the 2°C target, rendering investment in shale gas production obsolete [5].

2. Secondly, the proposals prioritise maintaining current electricity supplies over ending coal use: “the Government has made clear that it will not proceed to impose requirements that would lead to the closure of unabated coal by 2025 without assurance that a secure and reliable electricity supply will be maintained.” However, this ignores the fact that reducing our demand for electricity should be a key part of the strategy to meet our climate goals and to provide for our electricity needs.

There is a great scope for investment in efficiency and conservation, for instance in home insulation, which could additionally provide thousands of jobs [6]. A recent energy modelling report suggests that demand reduction measures could save 10TWh of electricity, 40% of the anticipated 3.2GW new capacity from Hinkley point C, and demand-side reduction (DSR) could free up 11GW [7]. The report notes that energy demand reduction could be far more ambitious and we agree – for instance, in 2011, in the wake of the Tohoku earthquake and the Fukushima disaster, Japan managed to reduce its energy demand by almost half [8]. We note that the Government scrapped the flagship Green Deal scheme and urge the implementation of a more effective replacement.

3. Nowhere does the consultation or impact assessment consider the impacts of coal mining. This is a serious omission. In a recent report, Coal Action Network investigated the impact of the UK's coal mining [9]. In 2014-15, coal burnt in UK power stations came from Russia, Colombia and the USA, as well as opencast mines in the UK itself. Mines in Colombia that provide coal to the UK are causing forced evictions of entire communities, paramilitary murders and disappearances and serious health and malnutrition problems in the local community. This is in addition to the destruction of large areas of land and localised environmental problems caused generally by opencast mining. Families, communities and environments which are currently impacted by coal extraction deserve decisive action now.

2. Objections to the proposals presented

1. These proposals appear to ensure that coal-fired power stations stay operational until 2025 when the central scenario of this report predicts that all coal-fired power stations will close by 2021. The earlier coal is phased out the better in terms of climate change, impact on coal-affected communities and ecology. However the proposals consulted on explicitly seek to prevent a rapid coal phase-out, saying “one of the Government’s objectives in taking action on unabated coal generation is to ensure an orderly transition and avoid the risk of coal closures happening at once.” All of the coal closing at once, as soon as possible, is exactly what we need to maintain a liveable planet – again, I point you to McGlade and Ekins which states that 80% of coal *reserves* must remain unburnt to have a 50:50 chance of remaining below 2°C. On a UK basis, the faster coal is phased out, the more flexibility we have in reducing our emissions to meet the carbon budget in the future.
2. Option 1 proposes that coal generation continue if CCS is 'demonstrated on a proportion of the capacity'. Given the desperate need to reduce global and national emissions in line with the global carbon budget, as outlined above, this proportion would have to be close to or at 100%. However, progress on this technology has been very limited and only one commercial power station CCS projects exists worldwide (in Canada), which has not been a success [10] - the best capture rate is only 65% and the plant has been shut due to mechanical issues 50% of the time. Furthermore it is only made commercially viable due to pumping CO₂ to oil fields to increase extraction – leading to no net decrease in CO₂ emissions. It is very unlikely that companies will decide to install CCS in coal power stations due to the high cost. CCS installed on a low proportion of capacity would not achieve the aims of the consultation: to comply with the Paris Agreement and the UK Climate Change Act. Just classing coal with a low proportion of CCS as 'abated coal' and excluding it from the new regulations is unfortunately not going to make emissions from it disappear.
3. Option 2 proposes the EPS be modified to impose a concentration-based limit on

emissions at any point in time (rather than overall for the year), which would “prevent coal generating units from operating without investment to reduce emissions”. The proposal states that this could be any form of investment, but in reality the only affordable option would be to convert to high rates of biomass co-firing or a total conversion to biomass. We are opposed to this as an outcome for several reasons:

a) The levels of financial support for biomass are already too high. As the consultation document rightly points out biomass co-firing is currently supported via the Renewables Obligation, which is controlled via the Levy Control Framework, and warns that an increase in biomass co-firing could lead to an even greater overspend on the LCF. However, the document fails to mention the effect of an increase in biomass conversions, which are currently grandfathered under the RO and new conversions are supported by the contracts for difference (CfD) scheme. We estimate that in 2015-2016, subsidy for biomass burning for electricity (co-firing, waste and dedicated biomass) via the RO amounted to just over £800 million [11] and projects currently supported by the CfD scheme will be in receipt of over £880 million annually [11] assuming electricity remains at its current wholesale price. These costs are passed on to the bill-payer directly (given the CfD) or indirectly (the LCF). This is an obscene waste of money, particularly given the large drop in support for genuinely low-carbon renewables such as onshore wind and solar and hydro power.

b) This imposition on the bill-payer is even more scandalous as, as we have repeatedly stated in previous consultations, **the emissions from biomass electricity are not properly accounted for - biomass electricity is not a true carbon saving, but in fact a high-carbon technology**. There are multiple studies refuting the assumption that emissions from burning woody biomass can be ignored as the process is inherently ‘carbon neutral’ [12]. If whole trees are burnt to produce electricity, the carbon debt produced will take decades to repay, the exact time depending upon the resequstration rate. The initial ‘Manomet’ study of Massachusetts forests estimated 32 years [13], but subsequent studies in different regions have estimated longer (e.g. Canadian boreal forest, 90 years[14]). The Department of Energy and Climate Change’s own study modelled life cycle emissions for different scenarios of harvesting biomass from North American forests (a significant source of wood pellets for UK biomass electricity) and found that of 29 scenarios, 16 had emissions in excess of the recommended 200kgCO₂e/MWh, 11 in excess of natural gas and 6 in excess of coal over a period of 40 years [15].

This is simply not compatible with the timescale for tackling climate change. Emissions reductions must be rapid in the next three decades to have a likely (66%) chance of remaining below 2°C [16]. Kevin Anderson estimates that emissions from deforestation and land-use change could optimistically be capped at ~60GtCO₂ between 2011 and 2100 to remain within the global carbon budget, if carbon emissions from cement processing are capped at ~150GtCO₂ and emissions from fossil fuel burning decline 10% per annum from 2025 to their elimination at 2050 [17]. However last year alone, emissions from land use change and deforestation were 4.8GtCO₂ and average at 3.7GtC a year [18]. Therefore, replacing fossil fuel burning with biomass burning is not a solution. Both must be reduced in order to stay within the 2°C 66% carbon budget.

c) There is significant evidence that sourcing biomass for UK electricity is already causing harm to biodiversity. For instance, a large portion of the wood pellets supplying UK biomass plants are sourced from forests in the South-East USA, recently designated part of a

'biodiversity hotspot' (an area with an exceptionally high level of biodiversity and also under a critical level of threat) [19]. US scientists, forest and conservation NGOs are deeply concerned about the rate of loss of these forests [20] and the impact on biodiversity and ecosystem services. Wood for biomass is an additional pressure on these forests, and is rising rapidly: exports of wood pellets were 1.6 million tonnes in 2012 and 6.1 million tonnes in 2015. The UK is projected to consume 23 million tonnes of green wood by 2020 [21].

More broadly, "waste wood" is often cited as a biomass feedstock which is carbon neutral and has little negative effect on biodiversity. However, burning residues from logging or sawmills does not necessarily represent a carbon saving [15]. Additionally, the volume of residues available is not sufficient to supply the biomass electricity sector at its current size, let alone larger: figures contained in a US Department of Agriculture Report from 2012 show that 59.3 million dry tonnes of wood residues arose at timber-processing facilities in the US, but less than 1% of those were not used for other purposes and thus available for pellet production [22].

d) Sustainability standards are not enough to solve this problem. As reported in a previous briefing [23], the current Government land criteria for biomass are woefully inadequate: based on vague principles rather than measurable standards, and not requiring external auditing and verification. Furthermore, as highlighted above, the problem is one of scale of demand: there is not sufficient waste wood to meet current demand for biomass electricity, let alone future, therefore requiring deforestation, conversion to plantations and increased harvesting to meet demand, which puts pressure on other land uses and biodiversity.

3. Our suggestions

1. Air emissions legislation, which has been a key factor behind the closure of nine coal power stations since 2012, stems from an EU directive: the Industrial Emissions Directive. Given the Government's intention to leave the EU in 2019, **there needs to be a commitment to maintain emissions regulations at least as stringent as the EU's, if not more so.** Scrapping emissions rules would remove one of the key incentives for shutting down coal power stations, and increase the numbers of deaths caused by poor air quality from all sectors.
2. The Government's proposals do not recommend any legislation which will encourage power stations to close prior to 2025. One clear way for this to happen would be to **prevent coal power stations from entering into any further Capacity Market Auctions** and to force or at least encourage coal power stations to remove themselves from Capacity Market Payments already secured. Yet the Government now recommends making it more difficult for operators to close coal power stations after they have been awarded Capacity Market Payments. This could keep coal in the potential energy mix for longer than market conditions would otherwise encourage.
3. A coal phase out should involve **removing restrictions against construction of onshore wind farms and solar PV projects and giving far greater support to genuinely renewable and low carbon energy.** It will require close collaboration with other European countries to build a grid flexible enough to rely heavily on wind and solar power, and it will require public investment in electricity storage. Existing government policies guarantee that new capacity will not come from onshore wind

and solar power. This is due to subsidies having been axed for new wind and solar PV projects above 5 MW, drastically cut for smaller ones, as well as other measures introduced to prevent more onshore wind turbines and solar panels (e.g. through new planning rules in England [24]). Although, the Government supports offshore wind power, new offshore wind schemes are particularly vulnerable to Brexit. Offshore wind power in the UK has so far heavily relied on funding through European Investment Bank loans, with new ones already having been put on hold pending Brexit negotiations. High levels of EU grants for offshore wind are also at risk, which is affecting investments now. For example, Siemens (a major player in offshore wind) has stopped all future investments in offshore wind energy in the UK [25].

Renewables are mentioned in the proposal but there is not provision to reverse the current trends against their construction. Without a reversal of those trends, the Government's proposals simply tie a coal phase out to an increased reliance on gas (including deeply unpopular and dangerous fracked gas), biomass and nuclear energy, all of which are extremely problematic in terms of environmental and human rights impacts.

4. There is no mention in the document of energy demand which is desperately needed to tackle climate change and one of the simplest ways to procure a higher proportion of our energy through renewable means. Talk of 'keeping the lights on' needs to go alongside an honest discussion of our demand for energy and how to reduce it. **The government should greatly increase support for energy demand reduction, at the very least by supporting energy efficiency measures such as home insulation**, but more broadly reducing the demand for energy in industry, transport and other sectors as well.
5. To ensure the drop in coal-burning is not simply replaced with a greatly increased use of biomass electricity, a vastly wasteful form of energy which is leading to forest loss and worsening climate change, all the more because the emissions are 'hidden' by inaccurate accounting, **biomass power's status as a 'renewable energy' should be revoked and it should be excluded from support by CfDs and grandfathered ROCs**. Current biomass electricity units, for example the three operating at Drax, should be wound down.

References

1. p64 of IPCC, 2014a. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp. Available at: https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_All_Topics.pdf
2. e.g. Meinshausen, M. et al., 2009. Greenhouse-gas emission targets for limiting global warming to 2 degrees C. *Nature*, 458(7242), pp.1158–62. Available at: <http://dx.doi.org/10.1038/nature08017> [Accessed March 14, 2016].

e.g. 2 CTI 2011. Unburnable carbon – are the world's financial markets carrying a carbon bubble? [Lead author: J. Leaton] Carbon Tracker Initiative, London, UK. Available at: <http://www.carbontracker.org/report/carbon-bubble/> [Accessed 19th January 2017]
3. Hansen, J. et al., 2013. Assessing “dangerous climate change”: required reduction of carbon emissions to protect young people, future generations and nature. *PloS one*, 8(12), p.e81648. Available at: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0081648> [Accessed March 15, 2016].

e.g. 4 McGlade, C. & Ekins, P., 2015. The geographical distribution of fossil fuels unused when limiting global warming to 2 °C. *Nature*, 517(7533), pp.187–190. Available at: <http://dx.doi.org/10.1038/nature14016> [Accessed January 7, 2015].

From abstract: "It has been estimated that to have at least a 50 per cent chance of keeping warming below 2°C throughout the twenty-first century, the cumulative carbon emissions between 2011 and 2050 need to be limited to around 1,100 gigatonnes of carbon dioxide (Gt CO₂). However, the greenhouse gas emissions contained in present estimates of global fossil fuel reserves are around three times higher than this."

3. OCI, 2016. *The Sky's Limit : Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production*. [Lead author: Greg Muttitt]. Oil Change International, Washington, USA.
4. Summary at of McGlade & Ekins (2015) at <https://www.carbonbrief.org/meeting-two-degree-climate-target-means-80-per-cent-of-worlds-coal-is-unburnable-study-says>.
5. UKERC, 2014. Gas can be a bridge to a low carbon future. Available at: <http://www.ukerc.ac.uk/news/gas-can-be-a-bridge-to-a-low-carbon-future.html>.
6. CCC, 2014. *One million climate jobs: tackling the environmental and economic crises*. Johnathan Neale (ed.) Campaign Against Climate Change, London, UK.
7. ECIU, 2016. *Hinkley: What If? Energy and Climate Intelligence Unit*, London, UK. Available at <http://eciu.net/reports/2016/hinkley-what-if-can-the-uk-solve-its-energy-trilemma-without-hinkley-point-c>. **Summary** of the research here: <http://www.cleanenergynews.co.uk/news/efficiency/energy-efficiency-and-dsr-could-offset-or-replace-the-need-for-hinkley>
8. <https://www.greentechmedia.com/articles/read/how-japan-replaced-half-its-nuclear-capacity-with-efficiency>
9. CAN 2015. *Ditch coal: the global impacts of the UK's addiction to coal*. [Lead authors: A. Harris, S. Hall, K. Brown, O. Munnion]. Coal Action Network. Available at <http://coalaction.org.uk/ditchcoal.pdf>
10. <http://globalnews.ca/news/2342420/u-s-senator-says-saskpower-carbon-capture-a-failed-project/>
11. Biofuelwatch's calculation of subsidies awarded to biomass electricity via the Renewables Obligation in 2015:
Figures are based on searches for "technology group" by year
here:<http://www.ref.org.uk/generators/group/index.php?group=TechGroup> and on the 2015 average market price per ROC which was £42.69.

Total ROC subsidies for biomass and waste in 2015: £1.08 billion

ROC subsidies for dedicated biomass in 2015: £696.44 million

ROC subsidies for co-firing in 2015: £121.13 million

Combined subsidies for solid biomass in 2015: £817.47 million

Biofuelwatch's calculation of subsidies awarded to biomass electricity via the Contracts for Difference scheme annually:

Drax Units 2&3: 645MW x2, £100/MWh, 6,500 hrs

RWE Lynemouth : 420MW, £100/MWh, 6,500 hrs

MGT Power Teesside : 299MW, £115/MWh, 7,000hrs

Tilbury Green energy/green power : 40MW/300GWh per year. £115/MWh

NB : 1 GW = 1000 MW

Calculations (total strike price):

Drax = $645 * 2 * 100 * 6500 = 838,500,000$
Lynemouth = $420 * 100 * 6500 = 273,000,000$
MGT = $299 * 115 * 7000 = 240,695,000$
Tilbury = $300000 * 115 = 34,500,000$

Calculations (total wholesale price)

Drax = $645 * 2 * 37 * 6500 = 310,245,000$
Lynemouth = $420 * 37 * 6500 = 101,010,000$
MGT = $299 * 37 * 7000 = 77,441,000$
Tilbury = $300000 * 37 = 11,100,000$

Total subsidy (strike price - wholesale price)

Drax = 528,255,000
Lynemouth = 171,990,000
MGT = 163,254,000
Tilbury = 23,400,000

Total = £886,899,000

[Sources:

Strike prices from

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/263937/Final_Document_-_Investing_in_renewable_technologies_-_CfD_contract_terms_and_strike_prices_UPDATED_6_DEC.pdf

Assuming 6,500 hours per year operational for coal-to-biomass conversions and 7,000 for dedicated biomass plant.

Tilbury Green energy expected to produce 300GWh a year <http://www.letsrecycle.com/news/latest-news/tilbury-waste-plant-gets-70m-funding-boost/>

Wholesale price of electricity £37/MWh at the end of 2016

https://www.ofgem.gov.uk/system/files/docs/2016/08/wholesale_energy_markets_in_2016.pdf

12. E.g. Joshua Clark et al., "Impacts of Thinning on Carbon Stores in the PNW: A Plot Level Analysis", Oregon State University, May, 2011; Stephen R. Mitchell et al., "Carbon Debt and Carbon Sequestration Parity in Forest Bioenergy Production", Duke University and Oregon State University, May 2012. Andrea Colnes, David Saah, et al., "Biomass Supply091 and Carbon Accounting for Southeastern Forests", The Biomass Energy Resource Center, Forest Guild, and Spatial Informatics Group, February 2012; Thomas Buchho, "Mineral soil carbon fluxes in forests and implications for carbon balance assessments" <http://onlinelibrary.wiley.com/doi/10.1111/gcbb.12044/abstract>
13. Thomas Walker et al., "Biomass Sustainability and Carbon Policy Study", Manomet Center for Conservation Sciences, June 2010 Available at https://www.manomet.org/sites/manomet.org/files/Manomet_Biomass_Report_Full_LoRez.pdf

14. [Bernier & Paré \(2013\) "Using ecosystem CO2 measurements to estimate the timing and magnitude of greenhouse gas mitigation potential of forest bioenergy" GCB Bioenergy Vol. 5 pp67-72](#)
15. Stephenson, A. L. & MacKay D. J. C (2014) "Life cycle impacts of biomass in 2020" Department of Energy and Climate Change
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/349024/BEAC_Report_290814.pdf
16. Raupach, M.R. et al., (2014) calculated that for a 50%/66% chance of remaining within 2 degrees warming requires global emissions reductions of 5.5%/7.9% every year since 2015 (it would be steeper now).
("Sharing a quota on cumulative carbon emissions." Nature Climate Change, 4(10), pp.873–879.
Available at: <http://dx.doi.org/10.1038/nclimate2384>)
Friedlingstein et. al. (2014) calculated that the carbon budget for a 66% chance of remaining below 2 degrees would be used up in 30 years at current global emissions rates. ("Persistent growth of CO2 emissions and implications for reaching climate targets." Nature Geoscience, 7(10), pp.709–715.
Available at: <http://dx.doi.org/10.1038/ngeo2248>)
17. Anderson, K., 2015. Duality in climate science. Nature Geoscience, 8(12), pp.898–900. Available at: <http://dx.doi.org/10.1038/ngeo2559>.
18. Global Carbon Project : Global Carbon Budget 2015 Highlights
<http://www.globalcarbonproject.org/carbonbudget/16/highlights.htm>. Using conversion factor of 3.664 to convert GtC to GtCO2
19. A hotspot is defined here : <http://www.cepf.net/resources/hotspots/Hotspots-Defined/Pages/default.aspx> The North American Coastal Plain was designated a hotspot in 2015
<http://www.cepf.net/resources/hotspots/North-and-Central-America/Pages/North-American-Coastal-Plain.aspx>
20. E.g. <https://news.mongabay.com/2010/04/us-eastern-forests-suffer-substantial-decline-3-7-million-hectares-gone/>; 61 US scientists wrote a letter to DECC in 2014 titled " Problems with burning wood from Southern US forests to generate electricity in the UK" <http://im.ft-static.com/content/images/0ee06ecc-d3ae-11e3-8d23-00144feabdc0.pdf>;
The US-based NRDC have multiple reports highlighting the threat of the wood pellet industry to Southern Forests <https://www.nrdc.org/issues/support-renewable-energy-protects-wild>
21. 2012 wood pellet exports: <https://www.nrdc.org/sites/default/files/southeast-biomass-exports-report.pdf> p3. 2015 wood pellet exports: <http://biomassmagazine.com/articles/13224/north-american-wood-pellet-exports-reached-record-high-in-2015>.
23 million tonnes a year is an estimate from reference [15] (DECC)
22. USDA "Forest Resources of the United States, 2012." http://srs.fs.usda.gov/pubs/gtr/gtr_wo091.pdf
23. <http://www.biofuelwatch.org.uk/wp-content/uploads/Biomass-Sustainability-standards-briefing1.pdf>
24. See <https://www.ft.com/content/53e897f4-1586-11e5-8e6a-00144feabdc0>,
<https://www.theguardian.com/environment/2016/mar/04/solar-thermal-panels-latest-to-behit-by->

uk-subsidy-cuts , <http://www.independent.co.uk/news/uk/home-news/britainsrenewable-energy-industry-is-about-to-fall-off-a-cliff-says-new-research-a6818186.html>

25. energydesk.greenpeace.org/2016/10/13/brexit-billions-climate-funding-risk/