



Renewable Energy Subsidies in the UK: the case for excluding bioenergy and waste incineration

Biofuelwatch and UKWIN believe that the Government must have an energy policy which results in genuine greenhouse gas reductions. This should be done through reducing the UK's energy consumption (which includes greatly increased support for home insulation), through ending all environmentally harmful subsidies, and through focussing energy subsidies and related supports on genuinely low-carbon and sustainable renewable energy only. This latter point would include the development of energy storage, essential for increasing reliance on low-carbon intermittent renewable energy.

We are deeply concerned that renewable energy subsidies heavily promote large-scale biomass electricity and waste incineration, both of which are linked to high carbon dioxide emissions and significant air emissions which worsen local air pollution. Furthermore, biomass electricity poses a growing threat to biodiverse forests, especially in North America.

Rather than mandating the blending of biofuels with road transport fuels, we need real carbon reductions in the transport system. This should be achieved primarily through policies which reduce reliance on private car use, including through greater support for public transport, walking and cycling.

Instead of subsidising waste incineration, there should be a moratorium on new incineration capacity (including gasification and pyrolysis). Instead, recycling rates should be greatly increased, and the adoption of a 70% recycling target for England implemented. This would require separate collection of food waste, require the removal of dry recyclables from mixed waste prior to incineration (in existing incinerators), and guaranteeing support to Local Authorities wanting to terminate or renegotiate long-term waste management contracts to reduce the financial burden of unwanted incineration capacity.

Which subsidies and support measures should be withdrawn?

1. Biomass and waste incineration must be excluded from renewable electricity subsidies, i.e. from the Renewables Obligation and from Contracts for Difference. This would include dedicated biomass electricity, biomass as well as waste with combined heat and power¹, coal-to-biomass conversions and advanced gasification as well as bioliquids (which are excluded already from Contracts for Difference but not from the Renewables Obligation). The industry is and will continue to be completely dependent on government subsidy. The eligibility rules for ROCs are not enshrined in statute and can and should be amended via secondary legislation to ensure that all subsidies go to genuinely sustainable and genuinely low-carbon renewable energy.

¹ In relation to biomass with CHP, Biofuelwatch's position is that, in order to achieve high efficiency ratings, high rates of heat use need to be prioritised above electricity generation. Currently, the reverse is true. Renewable electricity subsidies for CHP – which are the ones we oppose – reward low levels of heat use and thus low levels of efficiency. At present, power stations with 35% efficiency are subsidised as 'CHP', whilst genuinely efficient plants that produce mainly heat could achieve 80% efficiency.

2. We support Anaerobic Digestion (biogas) from waste but believe that subsidies for biogas must be restricted to genuinely residual waste-based feedstock only, rather than towards biogas from dedicated crops such as maize;
3. Biomass electricity, bioliquids, transport biofuels and waste incineration (including advanced conversion) should be excluded from public loan guarantees and from the remit of the Green Investment Bank;
4. The Renewable Transport Fuel Obligation blending quota for biofuels should be set to zero and under no circumstances should further increases be legislated.

Background to electricity from biomass and waste incineration in the UK

Current renewable energy subsidies are heavily biased in favour of bioenergy (with some energy from waste subsumed into this category), even though scientific evidence and indeed DECC's own Biomass Emissions and Counterfactual (BEaC) report shows that carbon emissions associated with bioenergy can be even higher than those associated with coal (per unit of energy). Over 70% of all energy classed as renewable in the UK currently comes from biomass (including waste)² and this proportion is set to increase. Currently, Government support for electricity from onshore wind and solar power is being cut, with much of it being redirected to biomass electricity. Thus biomass electricity is not displacing fossil fuels but genuine low-carbon, low cost renewable energy. All of the Contracts for Difference confirmed so far have gone to biomass electricity, 'waste for energy' and offshore wind, and the only public loan guarantee under the Guarantee Scheme has gone to Drax for its biomass investment.

The UK burns more wood pellets than any other country in the EU³, the vast majority in power stations. We import more wood pellets from North America than any other country in the world and imports are expected to rise steeply. Current industry plans would, if fully realised, see around 36 million tonnes of wood being burned in UK power stations⁴ every year – compared to a total annual wood production of 11 million tonnes across the country.

Large-scale biomass electricity can be worse for the climate than burning coal

A large and growing number of scientific studies show that electricity from biomass can result in greater CO₂ emissions than electricity from coal and other fossil fuels⁵. A recent report published by DECC confirms this.⁶ 'Biomass Sustainability and Greenhouse Gas Standards'⁷ which became mandatory for the purpose of biomass subsidies were introduced on 1 December 2015. They do not ensure 'genuine carbon reductions' which take into account 'carbon impacts for the whole system, including indirect impacts... and any changes to carbon stores' [UK Bioenergy Strategy 2012⁸] but make biomass that results in higher emissions than coal wrongly appear as 'low

² Duke Renewable Energy Statistics 2013,

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/337684/chapter_6.pdf, Chart 6.1

³ https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Biofuels%20Annual_The%20Hague_EU-27_8-13-2013.pdf

⁴ <http://www.biofuelwatch.org.uk/wp-content/maps/uk-biomass.html>

⁵ See <http://www.biofuelwatch.org.uk/biomass-resources/resources-on-biomass/>

⁶ <https://www.gov.uk/government/publications/life-cycle-impacts-of-biomass-electricity-in-2020>

⁷ See Biofuelwatch's briefing <http://www.biofuelwatch.org.uk/2016/uk-biomass-standards-briefing/>

⁸ http://gov.uk/government/uploads/system/uploads/attachment_data/file/48337/5142-bioenergy-strategy-.pdf p 18

carbon'. Nor do they prevent sourcing of whole hardwood trees clear-felled from some of the most biodiverse and carbon rich wetland forests on the planet in the southern US.

Power stations burning biomass emit up to 50% more CO₂ (per unit of energy) than ones burning coal⁹. The vast majority of biomass burned in UK power stations is wood from whole trees, with converted coal power stations such as Drax incapable of relying on any biomass other than pellets made from slow-growing whole trees (with residues containing too much bark for the boilers)¹⁰. It takes many decades for a new tree to grow back and sequester all of the carbon released when it is burned. Some studies suggest that it can take over a century before the CO₂ remaining in the atmosphere due to biomass burning is equal to that which would have been emitted had fossil fuels been burned instead.

Adverse climate impacts of waste incineration (including gasification and pyrolysis)

Energy generated through waste incineration has twice the carbon intensity (i.e. CO₂ emissions per unit of power) than the same energy produced by the conventional burning of fossil fuels in power stations.¹¹ The Environment Agency's WRATE software is used to back up the claim that energy-from-waste is beneficial, but it is based on faulty efficiency and bio-carbon assumptions. Proper lifecycle calculations using the better ATROPOS model found that "scenarios using incineration were amongst the poorest performing"¹². Further still, by suppressing recycling, incineration encourages more energy and carbon-intensive resources to be used.

Wood-based bioenergy as a growing threat to forests

The UK's growing demand for wood pellets for power stations poses a particular threat to forests in the southern US and Canada, from where the vast majority of pellet imports are sourced. A letter signed by over 60 US scientists warns:

"The bottomland forests that once covered this region have been reduced to a mere fraction of their original extent, and some of the remaining stands are now being logged to supply the wood pellet export industry. Recent reports have documented that Enviva, the largest exporter of wood pellets from the Southern US, sources wood at its mill in Ahoskie, North Carolina, from clear-cut wetland forests in the Mid-Atlantic Coastal Ecoregion. This is only one example of native forest ecosystems threatened by Europe's growing demand for wood as a fuel source for electricity."

In addition, most of the southern US pine plantations have been established at the expense of natural forests, so pushing up the demand for pinewood will almost certainly also cause more forest destruction.

Toxic emissions from biomass electricity and waste incineration

Biomass power plants and waste incinerators are significant sources of air pollutants including NO₂ and fine particulates locally. The latter includes nano-particles which are of great concern because they can pass through the lung lining, causing internal inflammation and penetrating to organs (even to the foetus in a pregnant mother)¹³.

⁹ <http://www.pfpi.net/carbon-emissions>

¹⁰ <http://biofuelwatch.org.uk/docs/DECC%20FoI%20EIR%2013-0340%20Q1%20Documents%20Drax%20etc%209May%202013.pdf51p36>

¹¹ See <http://www.ilsr.org/stop-trashing-the-climate/>

¹² <http://www.gloucestershire-against-incinerators.org.uk/resources/greenhousegasbalances.pdf>

¹³ See <http://ukwin.org.uk/oppose-incineration/#>

Across much of the UK, binding EU limits for such pollutants are being breached, especially for NO₂. Even burning 'clean' virgin wood produces 76 different types of emissions¹⁴.

Burning waste – including municipal solid waste and treated waste wood – emits an even higher range and rate of toxins. Emissions of furans and dioxins are officially restricted to emission limit values by incinerator filters. However, studies overseas show that high levels are emitted during start-up and close-down, during which the normal emission limits do not apply¹⁵. Further still, monitoring for some of the most harmful emissions is twice-yearly rather than continuous in the UK, even though studies show that this can substantially under-estimate reported emission levels¹⁶.

Adverse economic impacts of biomass electricity and waste incineration

Biomass electricity and waste incineration require high levels of capital investment compared to the employment they generate. A 100 MW biomass power station for example will attract around £47 million in subsidies under the Renewables Obligation but typically only create 40 direct full-time jobs. This means that a single job costs £1.2 million. Far more jobs could be created if these subsidies were redirected for example towards home insulation or installing solar panels. Furthermore, burning large quantities of virgin or waste wood diverts this feedstock from industries such as wood panel production. The Wood Panel Industry Federation has warned that up to 8,600 UK jobs are under threat as a result.¹⁷

Waste incineration (including gasification and pyrolysis) suppresses recycling and thereby the jobs which could be created through increased recycling rates. Research for Friends of the Earth, carried out by URSUS Consulting and published in September 2010, found that: "For the United Kingdom, if an ambitious but achievable recycling target of 70% for municipal waste was set and achieved by 2025, then conservative estimates suggest that across the UK this could create 29,400 new direct jobs in recycling, 14,700 indirect jobs in supply chains and 7,300 induced jobs in the wider economy relative to 2006. Of these potential 51,400 total new jobs some 42,300 might be in England with an estimated 4,700 in Scotland, 2,600 in Wales and 1,800 in Northern Ireland."¹⁸ For detailed evidence of how support for waste incineration suppresses recycling, please see <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environment-food-and-rural-affairs-committee/waste-management/written/9294.html>.

Why support for Anaerobic Digestion must be restricted to biogas from waste

¹⁴ <http://www.biofuelwatch.org.uk/2014/biomass-aq-briefing/>, briefing on Public Health Impacts of Biomass

¹⁵ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297004/geho0209bpio-e-e.pdf

¹⁶ http://www.precaution.org/lib/07/ht070712.htm#The_Deadliest_Air_Pollution_Isnt_Being_Regulated_or_Even_Measured and: Vicaretti, M, S Mosca, E Guerriero, and M Rotatori. 2012. Long-term automated sampling of PCDD/PCDF flue gas: Current status and critical issues. Environ Sci Pollut Res Int 19 (6): 1896-907 and De Fre, R. & Wevers, M, (1998) underestimation in dioxin emission inventories. In: Organohalogen Compounds. Vol. 36. 1998 and Reinmann J., Kuch B. and Weber R. Continuous monitoring of unintentionally formed POPs listed under the Stockholm Convention (PCDDs/PCDFs, PCBs, HCB) using AMESA long term sampling system. Organohalogen Compounds 68 (2006) 852-855.

¹⁷ <http://www.publications.parliament.uk/pa/cm201012/cmselect/cmenvaud/1025/1025vw17.htm>

¹⁸ More Jobs, Less Waste. Anna MacGillivray of URSUS consulting (primary author), September 2010. Available from: http://www.foe.co.uk/resource/reports/jobs_recycling.pdf

Turning waste such as food waste into biogas, rather than landfilling or incinerating it, can reduce greenhouse gas emissions and thus generate low-carbon energy. Anaerobic digestion allows for the retention of nutrients from food waste, which can go into a digestate and return nutrients to the soil, avoiding environmentally harmful peat extraction. Therefore, using Anaerobic Digestion to treat genuinely residual food waste would merit support.

However, experience in Germany has shown that blanket subsidies for all types of biogas, regardless of its feedstock, encourages the use of dedicated crops instead of waste. Germany is the world's leading biogas producer and 90% of its biogas is made from dedicated crops, mainly maize.¹⁹ This has led to the conversion of large areas of land otherwise used to produce food or to support biodiverse and carbon-rich ecosystems, including moorlands and natural grasslands. Such land-conversion, both directly and indirectly, results in greenhouse gas emissions which can make biogas as bad for the climate as coal²⁰.

In the UK, a growing number of biogas plants has been approved which will also rely on maize rather than waste. According to the Farmers Guardian²¹, each MW of electricity generated this way requires 450-500 hectares of land. Already, 25,000 hectares of maize are expected to be grown for biogas alone this year in England²².

Why the Renewable Transport Fuel Obligation must be set to zero and must not be increased under any circumstances

Europe's demand for biofuels for transport is a major driver for the expansion of monocultures such as oil palms, sugar cane and soya worldwide. Even the UK's use of waste-derived biofuels is unsustainable because it heavily relies on imports from countries which then use palm oil rather than domestic used cooking oil for biofuels.

+ Biofuels are an important driver behind global food price rises and food price volatility. A 2011 Report by a High Level Panel of Experts, published by the UN Food and Agriculture Organisation (FAO)²³, showed that biofuels have been responsible for most of the growth in demand for vegetable oils and a significant proportion of the demand for grains since 2000²⁴. A subsequent report published by the FAO confirms what the 2011 report had concluded, i.e. that biofuels have played an important role in commodity food price increases since 2004²⁵.

+ The promotion of biofuels is undermining the right to food, and not just through rising food prices and greater food price volatility. According to ActionAid research, six million hectares of land in sub-Saharan Africa have been taken over by EU companies producing or planning to produce biofuel feedstock²⁶. Research by the NGO Grain shows that 293 land grabs have been reported worldwide between 2002 and 2012, covering more than 17 million hectares, with the stated intention of producing biofuel feedstock²⁷.

¹⁹ http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Biofuels%20Annual_The%20Hague_EU-27_8-13-2013.pdf

²⁰ <http://www.spiegel.de/international/germany/biogas-subsidies-in-germany-lead-to-modern-day-land-grab-a-852575.html>

²¹ <https://web.archive.org/web/20140413015219/http://www.farmersguardian.com/home/arable/taking-maize-for-energy-production-to-the-next-level/59704.article>

²² <http://web.archive.org/web/20140320215615/http://www.farmersguardian.com/home/livestock/livestock-news/maize-industry-will-see-more-specialist-growers-and-specialist-varieties/58721.article>

²³ http://www.fao.org/fileadmin/user_upload/hlpe/hlpe_documents/HLPE-price-volatility-and-food-security-report-July-2011.pdf

²⁴ http://www.fao.org/fileadmin/user_upload/hlpe/hlpe_documents/HLPE-price-volatility-and-food-security-report-July-2011.pdf

²⁵ http://www.fao.org/fileadmin/user_upload/hlpe/hlpe_documents/HLPE_Reports/HLPE-Report-5_Biofuels_and_food_security.pdf

²⁶ http://www.actionaid.org.uk/sites/default/files/publications/if_media_report.pdf

²⁷ <http://www.grain.org/article/entries/4653-land-grabbing-for-biofuels-must-stop>

- Scientific studies show that once all direct and indirect impacts of land-conversion and increased agro-chemical/fertiliser use are taken into account, biofuels result in very significant greenhouse gas emissions and can be worse for the climate than the fossil oil they replace. This has been confirmed by the European Commission's own studies.²⁸

Why Environmentally Harmful Subsidies must be phased out

+ Member States to the Convention on Biological Diversity (including the UK) have unanimously agreed to the Aichi Biodiversity Targets which, amongst other measures, require that:

“By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.”

+ As the European Commission's Roadmap to a Resource Efficient Europe²⁹ states:

“Market prices are the primary guide for purchasing choices and investment decisions but they do not necessarily reflect the true costs of using resources and their environmental impacts. In addition, prices may be deliberately distorted by Environmentally Harmful Subsidies (EHS) by governments which confer an advantage on certain consumers, users or producers, in order to supplement their income or lower their costs, but in doing so, discriminate against sound environmental practice. Moving away from EHS can deliver economic, social and environmental benefits, and allow for improved competitiveness...”

+ As other EU policy papers and proposals explain:

*“...The Union and Member States will need to put in place the right conditions to ensure that environmental externalities are adequately addressed and that the right market signals are sent to the private sector, with due regard to any adverse social impacts. This will involve applying the polluter-pays principle more systematically, through phasing out environmentally harmful subsidies and shifting taxation away from labour towards pollution...”*³⁰

*“Concerning the application of market-based instruments aiming at creating the economic conditions to support the waste hierarchy, the main challenges are related to: in some MS [Member States], presence of harmful subsidies (e.g. to support incineration)...”*³¹

Ending harmful subsidies for biofuels, biomass electricity and waste incineration (including gasification and pyrolysis) would free up substantial amounts of funds for supporting genuinely low-carbon and sustainable measures, including home insulation, genuinely low carbon renewable energy, waste minimisation and recycling.

²⁸ IFPRI study “Assessing the Land Use Change Consequences of European Biofuel Policies”, October 2011

<http://web.archive.org/web/20140320215615/http://www.farmersguardian.com/home/livestock/livestock-news/maize-industry-will-see-more-specialist-growers-and-specialist-varieties/58721.article>

²⁹ Roadmap to a Resource Efficient Europe. European Commission, 20 September 2011

³⁰ (Paragraph 74, 'Priority objective 6: To secure investment for environment and climate policy and get the prices right' from Proposal for a decision of the European Parliament and of the Council on a General Union Environment Action Programme to 2020 "Living well, within the limits of our planet". European Commission, November 2012)

³¹ Impact Assessment accompanying the proposal for a new general Union Environment Action Programme to 2020, Annex 6: The underlying analysis of priority objectives