Wildlife and Countryside Link Bioenergy Position Statement

August 2023

Introduction

The use of biomass for energy production has grown in recent years, posing risks to nature, the climate, food production and human health. This briefing focuses on the use of biomass for power, including with carbon capture and storage, but many of those risks apply to its other uses as well.

Headline position

The use of bioenergy currently poses significant risks to nature and the climate because large amounts of it are imported from forests important for wildlife and carbon. Future increased use of bioenergy, whether with Carbon Capture and Storage or not, risks increasing these impacts. This could either be through increased logging of forests overseas, or conversion of land in the UK to grow energy crops, taking land away from nature and food production.

The growing use of bioenergy

Bioenergy's role (along with the use of waste), especially in electricity generation, has significantly increased, rising from 1% of electricity in the mid-1990s to almost 13% of the UK's electricity in 2021.

This increase occurred primarily when the UK was still part of the EU, and had 2020 renewable energy targets to meet. Since then, the UK has charted its own net zero path, setting a legally binding target for 2050. The single largest use of bioenergy in the UK is burning wood in power stations to generate electricity. In 2021, the UK imported over 9 million tonnes of wood pellets (many of which will have been used to burn in power stations).[1]

The Government plans to increase the use of bioenergy in the future - this was underscored in its March 2023 update to its plan for net zero, the Powering Up Britain report. It hopes that from the late 2020s onwards Bioenergy with Carbon Capture and Storage (BECCS) will be

[1] Forest Research, 2022, "UK Wood Production and Trade: provisional figures",

used, with the carbon dioxide emissions captured and buried.[2] However, the climate change benefits of this can be overestimated because it is assumed that the biomass is carbon neutral.

Why bioenergy poses a serious risk to nature and the climate

The assumption that biomass is carbon neutral is made on the basis that bioenergy is counted as zero carbon in the UK energy sector. This is because emissions are assumed to be properly counted in the land use sector where the biomass comes from – in the UK the vast majority is imported. But land use accounting often fails to fully account for impacts on the climate, including the reduced carbon absorption of a forest, such that it can take years or decades to compensate for. So while bioenergy is counted as instantly zero carbon, it can actually take a very long time to be zero carbon (if it happens at all). Any assumption about instant negative emissions on this basis is deeply flawed and should be revisited because unwarranted privileging of bioenergy distorts the marketplace.

In fact, there is only a significant climate benefit once trees have regrown to replace the ones cut down, which could take decades.

By 2050, the UK Net Zero Strategy plans for BECCS to be the largest form of negative emissions in the UK, with an assumption of offsetting ongoing greenhouse gases from farming, aviation, and industry. The energy from this BECCS would be used in a range of ways, including electricity generation for homes, to make hydrogen that could be used by vehicles, or to power industry. BECCS has not yet been deployed or proven at scale.[3]

Key recommendations on bioenergy

All of the below recommendations should be implemented together. It would not be enough to implement one of these recommendations but not all of them. The Government should reflect the following recommendations in upcoming policies and strategies related to bioenergy, the energy system, and net zero.

Properly reflect climate impacts

Bioenergy has significant impacts on the climate and makes carbon dioxide emissions worse. That is because burning wood from forests releases more carbon dioxide than burning coal,[4] and because of the impact on forests and their ability to absorb carbon.[5] However, all of these emissions are ignored in counting the climate impact, with bioenergy classified as zero carbon, except for the climate impact of transporting it and making wood pellets.

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[2] UK Government, 2021, "Net Zero Strategy: Build Back Greener", and "Powering Up Britain"
[3] Biofuelwatch, 2022, "Carbon capture from biomass and waste incineration: Hype versus reality",
[4] Chatham House, 2021, "Greenhouse gas emissions from burning US-sourced woody biomass in the EU and UK"
[5] Hammerschlag LLC, 2021, "Uncaptured Biogenic Emissions of BECCS Fueled by Forestry Feedstocks"

In reality, bioenergy can make climate change worse for decades to come until new trees have regrown.[6] Where natural forests are logged and replaced with plantation forestry, this may never replace the carbon originally stored and so result in a permanent increase in carbon dioxide in the atmosphere. Crops that might be grown and used for energy can displace food production elsewhere. When this happens, the food production can result in the loss of habitats elsewhere (e.g. woodland), which can also have a big carbon impact.

These emissions could be fully calculated when biomass is burned and used to determine eligibility for subsidies. However, they wouldn't have to be added to the UK's official greenhouse gas accounts, avoiding the need to negotiate changes to those accounting rules with other countries.

End support for high-carbon biomass

Alongside this, it is clear which the highest-carbon types of biomass are. Primary wood from forests - sawlogs, branches, tops, low-grade roundwood, and coarse residues - are the highest carbon sources of biomass. The European Union has moved towards limiting subsidies for some primary wood from forests that is used for bioenergy. Australia recently removed woody biomass from native forests from the category of renewable energy.[7] This would have the effect of significantly reducing subsidies for some current power plants that are largely reliant on forest biomass to produce energy. This would mean an end to current subsidies for high-carbon biomass power plants that burn forest wood, such as Drax.

Protect nature from harm

Perversely, logging wood from forests can harm wildlife and important ecosystems, but the bioenergy can still be certified as sustainable. The UK's sustainability standards for bioenergy must set a higher bar than current certification schemes, prohibiting the use of biomass if there is evidence that it was sourced in a way that degraded or damaged natural ecosystems and/or harmed species.

If the UK Government incentivises growing more energy crops in the UK to use for bioenergy, this must be part of a clear Land Use Strategy that will help achieve the Government's ambition to protect and manage 30% of land for nature and meet the legally binding 2030 target for species recovery. The large areas of energy crops that might be required - potentially up to 10% of all land in England - could undermine both these nature protection goals and UK food security.

Other climate measures are proven, safe bets

The Government plans to make greater use of BECCS. This is to theoretically offset greenhouse gases from other parts of the economy like farming and flying. But BECCS using wood actually increases climate change because it harms a forest's ability to absorb carbon

[6] European Academies Science Advisory Council, 2022, "Forest bioenergy update: BECCS and its role in integrated assessment models"
[7] Morton, A., The Guardian, 2022, "Electricity generated by burning native Australian timber no longer classified as renewable energy"

for many years. Only once new trees have fully regrown could it start cutting emissions. BECCS looks carbon negative because the UK ignores these forest carbon impacts. That is neither sound policy nor science.

The Government also predicts that BECCS will be very expensive. It would be an extremely costly way to increase climate change. It also remains unproven – CCS at the scale needed has not been proven as a technology. Waiting for it to potentially work could risk delaying immediate climate action on the bet that this technology will come along one day.

The single biggest area of remaining emissions in 2050 in the UK is agriculture. It is far cheaper and more reliable to be more ambitious about cutting emissions from agriculture than to burn trees and bury the carbon dioxide under the North Sea. In fact, most measures to cut emissions in agriculture actually generate overall financial savings. There are better ways to invest the billions that could end up being spent on BECCS - rewarding farmers to restore nature alongside food production would help store more carbon too (and it would cost the taxpayer 1.6 times less and be financially better for farmers too).[8]

Furthermore, relying on imported biomass leaves our energy supply at risk should other countries change their forest policies to meet their own net zero goals, likely increasing the cost of biomass further or rendering the UK's demand insatiable.

Make electricity in cheaper and cleaner way

Technologies like wind and solar are providing cheap and clean electricity that is already paying back to households. Projects like battery storage and hydropower stations that can store water and generate electricity when needed are accelerating. These can provide backup power for use at times of peak demand, replacing the need for dirty and expensive bioenergy.

Bioenergy's impact on the environment

Why burning trees can make climate change worse

Bioenergy is assumed to be carbon neutral due to an anomalous carbon accounting convention. This states that it should be counted as zero carbon in the UK's energy sector. Any emissions caused should be counted by the country where trees are cut down. The UK imports most of its biomass for energy from overseas so this is usually another country, not the UK.

But the bioenergy industry also says that the impact of this logging on the climate is small or even zero anyway because while some trees are cut down, others are growing, or because they are simply burning waste material from the forest floor.

This claim ignores fundamental elements of carbon accounting. If forests are growing, the carbon they absorb is already being counted - usually compensating for emissions from

[8] Green Alliance, 2023, Shaping UK land use: priorities for food, nature, and land use

transport or industry in the country they are found in. Using them to count against logged trees is counting the carbon they absorb twice. That is also poor policy and science.

Claiming that burning woody waste from forest floors is low or zero carbon is not as simple as it seems. If that waste wood were to decay slowly, some of its carbon would get locked up in the soil. The rest would enter the atmosphere very slowly. This process is also beneficial for biodiversity. Burning it releases all its carbon immediately into the atmosphere.

Scientific evidence shows that using trees from forests reduces the overall carbon absorption of those forests, which counts as a climate impact.[9]

The Intergovernmental Panel on Climate Change (IPCC) has said that assuming that bioenergy is carbon neutral is inaccurate, even if it is certified as "sustainable" (sustainability certification schemes used for bioenergy do not consider climate impacts of logging at all).[10] Forest Research has highlighted that assuming that a certificate of sustainability means wood is carbon neutral is a "serious mistake".[11]

The European Union's Joint Research Council found that only a limited number of types of woody biomass (mainly branches) would generate carbon savings in the short term (10-20 years). Other types of woody biomass may only result in a reduction in carbon after 30-50 years or even longer. This is because burning the wood immediately releases carbon dioxide, but the benefit is slow as trees regrow and re-absorb it.[12] The demand for BECCS to reach net zero by 2050 should be met with products that are genuinely carbon negative in that timeframe.

Trees that are cut down stop absorbing carbon dioxide. It takes new young trees some time to catch up with them. The old trees are burnt and their carbon released. Even if Carbon Capture and Storage is used to bury this carbon underground, the lost absorption of carbon must be counted as a cost to the atmosphere. This number is so big that even BECCS could actually leave more carbon dioxide in the atmosphere for many years or decades to come.[13]

Impacts on wildlife

The UK imports the majority of the wood pellets it burns. These come from countries with forests that are critically important for wildlife. The UK sources from:

- **Estonia**: wood pellet companies take trees from Natura 2000 forests, which are protected under European law but the Estonian government allows logging in them.[14]

[9] Hammerschlag LLC, 2021, Uncaptured Biogenic Emissions of BECCS Fueled by Forestry Feedstocks (PDF)
[10] IPCC, Taskforce on National Greenhouse Gas Inventories: Frequently Asked Questions,
[11] Matthews, R., Hogan, G., Mackie, E., Forest Research, 2018, "Carbon impacts of biomass consumed in the EU: Supplementary analysis and interpretation for the European Climate Foundation"
[12] Giuntoli, C. A., et al., European Commission, 2021, "The use of woody biomass for energy production in the EU"
[13] Hammerschlag LLC, 2021, "Uncaptured Biogenic Emissions of BECCS Fueled by Forestry Feedstocks"
[14] Latvian Ornithological Society and Estonian Fund for Nature, 2020, "Hidden inside a wood pellet: Intensive logging impacts in Estonian and Latvian forests"

- **Canada**: trees are taken from the Boreal, a huge intact forest that is home to over 3 billion breeding birds every summer, but where logging is reducing the numbers of species like the woodland caribou.[15]
- **United States:** trees are taken from old forests in the southeast which is part of a Global Biodiversity Hotspot, but where numbers of many bird species are declining and some of them are already endangered or critically endangered.[16]

The alternative to large-scale imports of wood pellets is to replace some of them with energy crops that can be purposely grown, possibly in the UK. But this would require a large area of land. To grow enough energy crops to meet the UK's future bioenergy needs the Climate Change Committee estimates that anywhere from 700,000 to 1.4 million hectares would be needed (and even then wood pellet imports would still be required). This is nearly 6% of all the UK's land – three quarters the size of Wales. With a Government aim to protect and manage 30% of land for nature, putting aside this much land for energy crops could severely affect the prospects of achieving this goal.

There are added complexities and uncertainties too regarding the impact of Carbon Capture and Storage technologies on the marine environment and its wildlife. These include but are not limited to disposal of spoils, impacts of leaks of chemicals during construction of wells, and any leaks during transport and storage of CO_2 during operation.

The risk that BECCS doesn't work

There is a substantial risk that relying on negative emissions technologies will deter decarbonisation across other sectors. BECCS is unproven at scale and may never work. If achieving net zero relies on an unproven technology then this puts net zero itself at risk.

Lancaster University found if we rely on future carbon removal which doesn't materialise, the central risk is of an extra 0.7-0.8°C of warming (above a 1.5°C target). In the worst case, we could face an extra 1.4°C warming.[17] Many scientists think the world is on the verge of irreversible climate tipping points. We cannot afford to risk overshooting these by relying on a technology that is unproven, may never materialise, and allows us to pollute now and (possibly) clean up later.

The latest IPCC climate models show a series of abrupt shifts between 1.5°C and 2°C, where drastic climate tipping points could be triggered, pushing the world into cascading impacts that cannot be undone by removing CO2 from the atmosphere.[18] Projections suggest these could be reached within the next decade. BECCS and other negative emissions technologies are only likely to be deployed post 2030. An embedded reliance on negative emissions to offset ongoing emissions could therefore be catastrophic.

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[15] Stand.earth, 2019, "Investigation: Canada's growing wood pellet export industry threatens forests, wildlife and our climate"
[16] Southern Environmental Law Center, 2021, "Wood Pellet Industry Harms Birds of Conservation Concern In The U.S. Southeast"
[17] McLaren, D. (2020) Quantifying the potential scale of mitigation deterrence from greenhouse gas removal techniques. Climatic Change. 162:2411–2428
[18] IPCC, AR6, 2022, "Climate Change 2022: Impacts, Adaptation and Vulnerability"

However, major climate models (IAMs) disproportionately favour negative emissions technologies like BECCS because they involve simple assumptions, including on discount rates and assumed impact on carbon and costs. These models miss the fact that BECCS and other removal technologies don't (yet) function in practice at scale, could lead to unquantified leakage of carbon from the supply chain, and we don't have proof that the assumptions will actually be achieved.

A sustainable role for bioenergy

Not all biomass comes from crops or forests. It's possible that some waste materials could be used sustainably, as long as they don't compete with other uses.

An analysis by 3Keel for the RSPB found that the following feedstocks may be low risk for energy use: landfill gas, organic (vegetable and plant) waste, and biogas from food waste.[19] Further research would be needed on the wider risks and whether these may be better used elsewhere such as in feeds or as soil conditioners, and we'd need safeguards to avoid unintended consequences and misuse.

The "cascading use" principles should apply – which means that other uses for biomass where it can be used more efficiently or more than once should take priority before burning it for energy. This principle could be incorporated into the sustainability criteria that make biomass eligible for subsidies.

Wildlife and Countryside Link (Link) is the largest nature coalition in England, bringing together 76 organisations to use their joint voice for the protection of the natural world and animals.

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[19] 3keel, 2022, "Biomass for energy: A framework for assessing the sustainability of domestic feedstocks"

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