The role of sustainable biomass in delivering energy security and reaching net zero

drax

Drax plays a critical role in supporting UK energy security, providing more renewable power for the country than the next two generators combined. We're investing £2.5bn in enhancing grid stability, boosting energy resilience and positioning the UK as a global leader in carbon capture and pumped storage hydro. Through pioneering green technology and innovation, we're helping the UK decarbonise, creating a path to net zero and beyond.

At this critical time for the UK, Drax is supporting the country by:

1. Bolstering UK security of supply
2. Creating and supporting thousands of jobs across the UK
3. Pioneering bioenergy with carbon capture and storage (BECCS) to help the UK decarbonise
4. Making the UK a global leader in climate-saving technologies
5. Sustaining healthy, growing forests across the world

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A truly renewable power system

The action we all take over the decade ahead will decide whether the world tackles the climate emergency or falls victim to it.

The backbone of a net zero economy will be a zero-carbon power system. This means renewable power generation must be maximised. Investment in technologies such as bioenergy, energy storage and hydrogen can balance and stabilise the electricity grid and enable more intermittent renewables, such as wind and solar, to come online.

The UN's IPCC and the UK's Committee on Climate Change agree that using sustainable biomass to generate bioenergy is a critical technology in the fight against climate change, but only when done well.

Sustainable biomass already delivers up to 17% of the UK's renewable electricity when the system is tight. This is because biomass delivers the necessary system support services required to maintain a stable electricity grid.

The global pandemic has accelerated the role technology plays in our lives, at home and at work. These changes demand that we reduce and remove carbon emissions now, while ensuring there are flexible, secure energy systems for everyone. It is important to support a just transition to a green economy where jobs are both protected and created.

Alongside carbon emissions reductions, negative emissions technologies are needed to remove carbon from the atmosphere. These technologies will be critical to help decarbonise harder-to-abate sectors such as agriculture and aviation so we can meet net zero by 2050 faster, and even go beyond it – helping to lower the carbon concentration in the atmosphere.

What is a biomass pellet and what makes it sustainable?

Biomass is organic matter, like wood or plant material.

Biomass pellets used for bioenergy are generally made of low grade or low value wood which is a by-product of the production of higher-value wood products.

Pellets can also be made from the by-products of active forest management and sawmill residues like sawdust. As biomass comes from organic, living matter, it grows naturally, absorbing carbon dioxide (CO_2) from the atmosphere in the process.

Sustainable biomass is classified as a renewable source of energy because of its short regrowth time and ability to keep the carbon cycle in balance.

At Drax, we believe the right biomass requires careful and robust governance and traceability, and needs to meet the criteria set out by policy makers and leading international scientists. This will in turn deliver transparent, evidence-based, positive outcomes for our climate, nature and people.

Sustainable biomass regulation sets strict standards for suppliers and end users for delivering the right biomass and encourages a high standard of forest management, which drives a breadth of additional societal benefits. It also helps reduce the risk of forest fires and pest infestation, ultimately supporting healthy forests.

5 MT

The EU plans to remove 5 MT of CO_2 from the atmosphere each year by 2030.

Levelling up, global leadership and a just transition

The successful conversion of Drax Power Station to run on sustainable biomass is Europe's largest single-site decarbonisation project.

Sustainably sourced biomass used at Drax Power Station in Selby provides a scalable case study of a crucial renewable source of power that has replaced fossil fuels, and is supporting around 6,000 jobs across the North of England – at a time when other coal fired power stations have closed with the loss of thousands of jobs.

Biomass grown through sustainable means is classified as a renewable source of energy because of the process of its growth.

It means that when biomass is combusted as a source of energy – for example for heat or electricity production – the CO_2 released is offset by the amount of CO_2 it absorbed from the atmosphere while it was growing.

Adding carbon capture and storage to power generation from biomass (Bioenergy with Carbon Capture and Storage – BECCS) delivers negative emissions as emissions are captured and stored, taking carbon out of the atmosphere. Research has found that, globally, there is potentially 2-4 gigatonnes of sustainable biomass available per year for BECCS.

BECCS at Drax will create around 10,000 new jobs in the UK whilst supporting and preserving many more existing roles in industries around the world, which would otherwise not survive in a net zero future.

By developing this vital new technology needed globally to achieve climate commitments, the UK will demonstrate a model for accelerating the transition away from coal, and be at the forefront of a post-covid green recovery.

10,000

New jobs in the UK created by BECCS at Drax.

Safeguards and transparency

Drax biomass complies with stringent standards set out in UK and EU law.

The sustainability of our biomass and our carbon savings are verified for the UK regulator, Ofgem. Drax's biomass is also certified by voluntary schemes such as the Sustainable Biomass Program (SBP).

At Drax, we also have our own sustainable biomass sourcing policy which goes beyond existing regulations and is led by science, best practice, and transparency.

In 2019, an Independent Advisory Board was established. It comprises scientists and forestry experts led by former UK Chief Scientific Adviser Sir John Beddington to peer review Drax's transition to net zero and our use of sustainable biomass. The IAB scrutinised Drax's biomass sustainability and found that Its sourcing policy is in line with the UK Forest Research report recommendations.

Drax is committed to using fibre from actively growing forests. Our Catchment Area Analysis (available online at **drax.com/sustainability**) provides evidence that we are meeting our biomass sustainability commitments. This ensures that we are delivering a positive impact on the climate, nature and the communities in each area we source our pellets from.

Data gathering allows us to keep track of the carbon storage in the regions where we source, including how forests are growing and what they are being used for. The evidence from our analyses demonstrates that Drax's sourcing practices do not cause deforestation, forest decline or carbon debt.

Working alongside leading sustainability non-profit Earthworm Foundation, Drax has also been at the forefront of developing a data and evidence-led approach – known as Healthy Forest Landscapes (HFL) – to measure and evaluate source forest health by assessing forest cover, carbon stock, biodiversity, and community wellbeing.

HFL gives a clear picture of forest health and allows us to obtain the evidence that the forests we source from are replanted, continue to store carbon, and remain biodiverse and healthy while sustaining jobs and communities.

By developing this vital new technology needed globally to achieve climate commitments, the UK will demonstrate a model for accelerating the transition away from coal at COP26 and beyond, and be at the forefront of a post-covid green recovery.

Sustainable Biomass FAQs

No	Question	Answer
1	**What is biomass?**	Biomass is organic matter. In the case of bioenergy, it typically refers to agricultural by-products and residues, woody waste products, and crops and microbes that can be used for fuel.
2	**How is biomass used?**	Biomass, in the form of compressed wood pellets, is a low-carbon replacement for coal that can be used at power stations to generate renewable energy such as electricity and heat. The UK, Continental Europe and Japan are some of the countries that are already using biomass as a fuel to generate renewable electricity and heat.
3	**What is sustainable biomass?**	Sustainable biomass is made of the low grade and low quality by-products from the forestry industry that don't negatively impact the growth of the forest, the amount of carbon being stored, biodiversity and the socioeconomic wellbeing of the communities that surround them. When used for heat and power, sustainable biomass releases significantly less carbon dioxide than fossil fuels. Using forestry residues from harvesting also helps reduce the risk of forest fires, pests and disease outbreaks in places like California where there is very little forest management.

No	Question	Answer
4	**How is burning wood sustainable?**	Biomass comes from organic, living matter that is in a constant cycle of growth and renewal, absorbing carbon dioxide (CO_2) from the atmosphere in the process. So when biomass is used to generate energy – such as heat and/or electricity – the CO_2 released is offset by the amount of CO_2 it absorbed from the atmosphere while it was growing as well as new growth. Biomass is a very small part (just 4% in the US) of a broader forest products industry that includes the harvesting of wood for solid wood product sectors such as construction, where the use of wood reduces the carbon impact in those industries as well as locking away the carbon for longer.
5	**How is shipping pellets around the world sustainable?**	North America is a key supply region because of its well managed commercial forestry industry, commitment to sustainability and good infrastructure. The working forests in the US South alone are about three times the size of the UK and forest stocks have almost doubled since the 1950s. The UK does not have sufficient forest capacity to meet demand and trucking pellets from Scotland to Drax Power Station would release more CO_2 than shipping the pellets from the US South. Drax has a low-carbon supply chain for its biomass and is working with its partners to further decarbonise the supply chain. Drax reports its supply chain emissions in its Annual Report, which is independently audited.

No	Question	Answer
6	**Does Drax cause carbon debt?**	Drax only uses sustainable biomass from areas of managed forests which are stable or growing at a greater rate than they are harvested, such as in the US South, where two thirds of our supply is sourced. As long as the annual forest harvest doesn't exceed annual growth, switching from coal to woody biomass reduces atmospheric CO_2 over timescales relevant to stabilising the climate, the IEA has said. According to analysis from the US Department of Agriculture, US South forest stocks have increased by a fifth over the past two decades and have almost doubled since the 1950s. According to a report from Forest Europe, forest areas have increased by 9% in the last 30 years and the volume of wood and carbon has increased by 50%.
7	**Where do Drax pellets come from?**	Areas Drax sources its pellets from January 2021 to December 2021 include USA (64.9%), Canada (15.5%), Latvia (9.3%), Estonia (2.8%), Brazil (2.5%), Portugal (2.4%), Belarus (1.4%)*, UK (0.7%). Russia (0.4%)*, and other European countries (0.1%).
8	**Are wood pellets sustainable long-term without subsidies?**	Yes, they are – Drax is making good progress with our biomass strategy to increase our self-supply and reduce the costs of our biomass generation to £50/MWh by 2027, keeping Drax on track to continue using biomass when subsidies end in 2027.

*Drax no longer sources biomass from Russia or Belarus, in line with international sanctions brought against Russia due to its war on Ukraine.

No	Question	Answer
9	**What kinds of feedstocks go into the wood pellets at Drax?**	Drax's pellets are made from a mix of harvesting residues (including tops and limbs, low-grade roundwood and the by-products of active forest management activities such as thinning) and secondary residues (such as sawdust). The wood is low grade with low commercial value, and in some circumstances has a limited or unavailable market. In some regions, such as British Columbia, the harvesting residues we would use to make biomass pellets to generate renewable energy would otherwise be burnt on site to reduce the risk of forest fires and pest and disease outbreaks. **As of 2021:** Sawmill and other wood industry residue (38.0%), Branches and tops (6.3%), thinnings (16.3%), Low-grade roundwood (36.9%), Agricultural residues (2.5%).
10	**Doesn't burning biomass produce more emissions than burning coal?**	Unlike coal, sustainable biomass doesn't add any new CO_2 to the atmosphere. When sourced sustainably, biomass is in a constant cycle of renewal and carbon absorption across a landscape. When sustainable biomass is used to generate renewable electricity, it only releases the CO_2 that was stored while the trees were growing before they were harvested. Because the biomass is sustainable, that CO_2 is already being absorbed by other growing forests. Conversely, burning coal releases carbon that has been locked up for millions of years, increasing the amount of new carbon accumulated in the atmosphere.

No	Question	Answer
11	**How is bioenergy renewable?**	Sustainable biomass is renewable because of the closed carbon cycle created when trees grow and take CO_2 from the atmosphere. Whether the wood is used for bioenergy or these trees naturally decompose, the same amount of CO_2 is released into the atmosphere. The cycle remains in balance because the working forests which supply the low-grade wood used for biomass are replanted and these growing trees absorb more carbon. The CO_2 released when biomass is used to generate power is CO_2 which was already in the atmosphere and is therefore not increasing the amount of carbon dioxide. This is different to fossil fuels, which release CO_2 into the atmosphere which had previously been locked away underground for millions of years – that's why fossil fuels contribute to climate change and sustainable biomass does not.
12	**What certification does Drax use?**	Drax's biomass complies with stringent standards set out in UK and EU law. Drax is independently audited by UK regulator Ofgem and is required to demonstrate that the biomass used is sustainably sourced. Drax's sustainable biomass sourcing policy goes beyond existing regulations and is led by science, best practice and transparency. We also engage with voluntary certification schemes and systems such as the Sustainable Biomass Program (SBP), Forest Stewardship Council (FSC), Sustainable Forest Initiative (SFI), among others.

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