

Biomass Strategy 2023

Introduction

The government acknowledged in the recent Net Zero Strategy that biomass would have a key role to play in the UK's commitment to reach net zero, including in the transition away from fossil fuels and in the development of greenhouse gas removal technologies to achieve net zero. Biomass is particularly interesting to landowners and farmers as many biomass feedstocks are of agricultural and arboricultural origin. However, developing renewable biomass resources poses a threat to the government's other targets for land use. To bring coherence to the role that biomass will play in the period up to 2050, the government has published a [Biomass Strategy](#) for the UK. The strategy applies to the whole of the UK, whilst acknowledging that many of the policies will be implemented at national level.

Why biomass?

Biomass is defined as any material of biological origin, including the biodegradable fraction of products, crops, wastes and residues. The use of biomass is already common throughout the economy, including through burning for renewable electricity generation and heating (such as wood pellets), for creating biomethane for use in heat, transport and power (including maize for anaerobic digesters), and in the production of transport fuels. Increasingly, biomass is being used as a feedstock for low-carbon hydrogen production and in diverse non-energy uses in the 'bioeconomy' – for example as building materials, and as the origin of innovative biochemicals and bioplastics. As an alternative to non-renewable fossil fuels, sustainably produced biomass offers direct carbon-capture, infinitely renewable and locally sourced feedstocks, which are key advantages in a net zero, energy-insecure world.

The government has invested considerable resources in the development of renewable energy from biomass since the 2000s, but the economy-wide net zero target places an additional burden on biomass as a source of energy and materials. For example, biomass plays a critical role in emerging bioenergy carbon capture and storage (BECCS) technologies, where biofuels are burnt and the carbon captured and stored underground rather than returned to the atmosphere. BECCS, although yet to be proven at commercial scale, is a core element of the government's plan to achieve net zero. The biomass strategy attempts to assess how supply can be increased sustainably to meet projected demand under a number of short, medium and long-term net zero scenarios.

UK biomass facts and figures

Biomass feedstocks used in renewable energy	66% domestically sourced
Plant biomass (straw, wood, agricultural residues)	35% of domestic biomass supply
Biomass crops grown for energy in the UK (2020)	c121,000 hectares
Biogenic waste (waste wood, sewage gas, food waste)	18% of domestic biomass supply
Renewable transport fuels	10% sourced from UK feedstocks
Perennial energy crops	c10,000 hectares (2020)
Energy from waste plants in the UK	57 (2022) with 1,505 MW capacity
UK woodland currently 'unmanaged'	70%

What is meant by 'sustainably produced'?

Key to the development of biomass supply chains is a common framework for assessing the sustainability of production for any biomass source. Currently, there are some sector-specific schemes which have broadly similar overarching sustainability criteria but differ in the detail. This variability impedes comparison of biomass sources and has been identified as a barrier to the development of flexible and innovative biomass supply chains.

To solve this, the biomass strategy commits government to a consultation on consolidating the sustainability framework criteria for sourcing biomass and to improving the governance mechanisms to ensure that the criteria are effective, particularly with regard to overseas sourcing of biomass. The consultation will be wide-ranging and will include questions on how indirect land use change can be assessed to ensure that biomass production on agricultural land in the UK does not result in offshoring food production or intensifying land use overseas, and on how soil carbon changes can be accounted for as part of biomass sustainability assessments. Ecosystem services assessment, land and labour rights, health and safety criteria and community impact will also be considered. The consultations will take place during 2023 and 2024.

What's the future demand for biomass?

The availability of sustainable and suitable biomass feedstocks at sufficient scale and at appropriate prices will determine the overall contribution of biomass to net zero. There is, therefore, some need for government to incentivise the development of supply chains (locally and through trade) for industry to access resources. The strategy acknowledges that there are risks involved if this is done badly, particularly on food production and land use change, and therefore, the use of biomass must be prioritised for hard-to-decarbonise sectors and negative emissions opportunities like BECCS. Taking this into account, the strategy assumes that government meets all its targets for waste reduction and afforestation, and that the only 'flex' in the amount of supply as we head for 2050 is the area of purpose-grown energy crops (such as miscanthus and short rotation coppice) planted in the UK. However, even with substantially increased areas of energy crops, the UK will be dependent on biomass imports to achieve a theoretical net zero target by 2050. The strategy notes that the forthcoming land use framework is expected to help balance the demands on land, and that substantial government intervention will be needed to make this level of biomass supply both achievable and affordable.

What are the opportunities for farmers and land managers?

1. Miscanthus, short rotation coppice and short rotation forestry: the strategy sets an ambition for perennial energy crops to account for a major part of the domestic increase in biomass production, increasing from a negligible c2,000 hectares total today, to an annual establishment rate of 17,000 hectares within 15 years. Both forestry and coppice species offer above and below-ground carbon sequestration potential, flood water management and agroforestry opportunities; miscanthus is well suited to growing on wet soils. The planting of woodland species being 'permanent land use change' is a current barrier to coppice establishment - this rule has been consulted upon and an announcement is expected soon.
2. Wheat, sugar beet, oilseeds: data on the actual volumes of food and feed crops being diverted into bioenergy or biofuels is limited. However, the strategy is clear that, whilst growing crops for the biofuel sector offers farmers flexibility and pricing advantages, sustainability principles for biomass sourcing will continue to limit the amount of food and feed crops being used for renewable energy generation.
3. Anaerobic digestion: government support will favour the use of wastes over food or feed crops to expand the biomethane market. The use of more livestock wastes in AD will be encouraged to create a more circular economy for nutrients and assist with agricultural decarbonisation. AD plants in turn will need to ensure CO₂ is captured for storage or sale.
4. Existing woodlands: subject to UK Forestry Standards the amount of biomass sourced from UK woodlands could be increased. This could be through afforestation, expanding the UK domestic timber production sector (a proportion of which is typically used for bioenergy), recovering a greater proportion of existing felled material for biomass, and bringing unmanaged woodland into production. The latter offers the potential for one million oven-dried tonnes of biomass per year.
5. Hemp: the strategy singles out hemp as a crop of particular interest for bioenergy, given its ability to fit into an existing agricultural rotation as an alternative break crop. Hemp produces a variety of end products, including around eight tonnes per hectare of dry biomass. Breeding efforts are focussing on high biomass varieties and there are efforts within government to streamline the crop's licensing process.

Conclusion

The government is clear that the responsible development of biomass supply chains underpins its strategy for reaching net zero. In the short term, research will carry on into a wide range of market and technological barriers, and government needs to update the legal framework to enable farmers to respond. The anticipated Land Use Framework for England will steer the development of the biomass sector and help reconcile competing land use demands. Long term, much is unknown about the technological mix that will underpin the net zero economy, from widespread electrification to successful hydrogen deployment. Flexibility in policy and markets will be key to allowing farmers to adapt to a variety of bioeconomy end uses and, therefore, to support viable business models.

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