

Biomass in a low-carbon economy

Biomass is a broad term covering all organic carbon-based materials including plants and animals. We use it here to refer to forests, crops grown for energy (e.g. willow and miscanthus) and organic wastes (e.g. food waste, agricultural residues and sewage).

Biomass can help tackle climate change in two ways:

- 1

Biomass growth *removes* carbon dioxide from the atmosphere and *stores* it for long periods of time in soils, trees and other plants.
- 2

When managed and harvested in a sustainable way, biomass can also be used to *reduce* fossil fuel emissions to the atmosphere.

Biomass is an integral part of the global carbon cycle

Plant 27,000 hectares of new forests every year in the UK by 2030

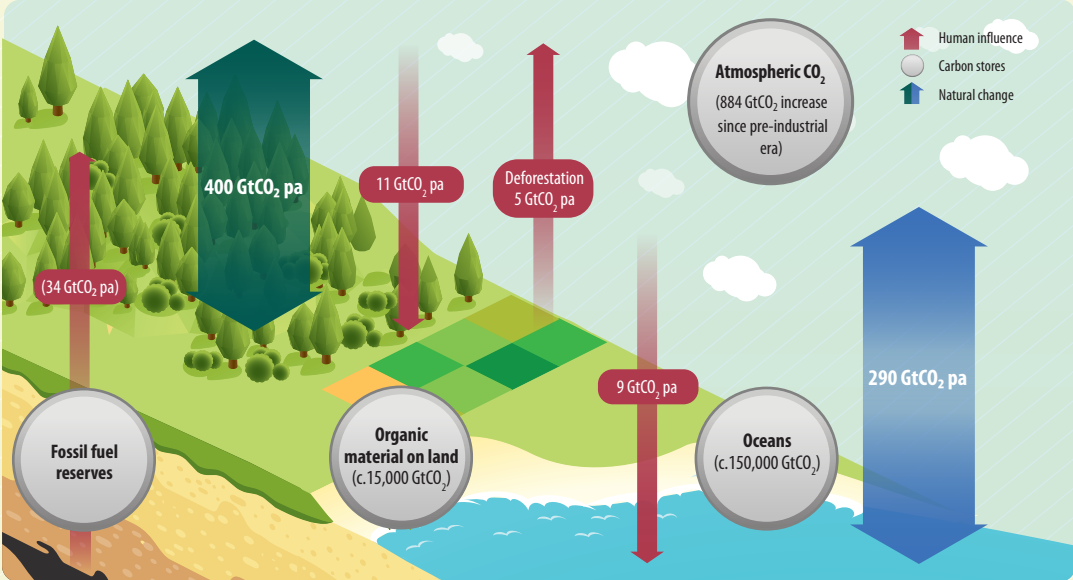
Increase planting of energy crops on lower quality land

Organic wastes: reduce, reuse and recycle, then use what's left for energy

No biodegradable waste to landfill by 2025

The careful management of biomass stocks will play a critical role in limiting the rise in global temperature in the 21st century...

...most pathways for mitigating climate change also require some harvesting of biomass to increase total carbon storage and provide useful low-carbon services (e.g. timber, energy).



Producing biomass in a sustainable, low-carbon way

Harvesting and using biomass *can* be sustainable and low-carbon, but *only if* the following critical criteria are met:

- ✓

Protects or enhances biodiversity, soils and water quality
- ✓

Minimises supply-chain GHG emissions
- ✓

Does not compete with food production and respects land rights
- ✓

Only from forests managed sustainably for a range of products
- ✗

Not from virgin slow-growth, highly-diverse or high-carbon forests
- ✗

No 'mining' of carbon stocks in the landscape
- ✗

Not using residues needed for soil carbon and quality or other existing uses
- ✗

Not producing harmful levels of air pollution when burnt

Stronger sustainability governance for managing risks

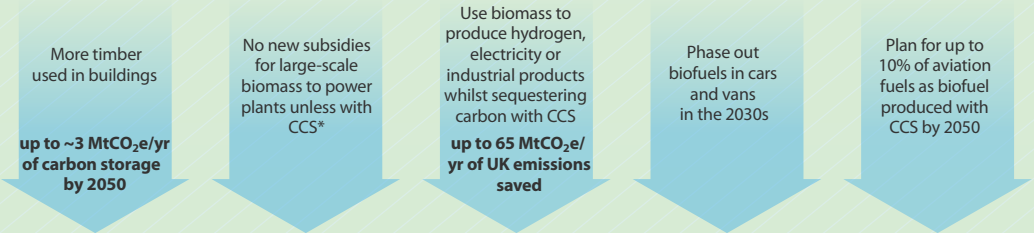
Achieving this *in practice* is the fundamental challenge. The UK Government must:

- Tighten sustainability criteria based on the latest evidence and drive a race-to-the-top
- Lead a shift towards high-quality independent monitoring and reporting (e.g. using satellite data, track-and-trace, better soil carbon monitoring)
- Encourage new supply-chains to **drive up standards globally** (e.g. in developing countries)
- Extend scope of **governance beyond subsidy-schemes** (e.g. trade and development policy, standards, procurement and finance rules)

The long-term role of biomass imports to the UK should depend on the success of these efforts.

How can biomass be used effectively?

In the future, demand is likely to outstrip sustainable supply. Harvested biomass will be used most effectively where it *maximises* the removal and *minimises* the release of carbon into the atmosphere.



Between now and 2050, the current uses of biomass in the UK need to change:

	Most effective use today	2020s and 2030s	By 2050
Bioeconomy	Wood in construction	Wood in construction, potentially other long-lived bio-based products (within circular economy)	
Buildings	Biomethane, local district heating schemes and some efficient biomass boilers in rural areas		Only very limited additional use for buildings heat: niche uses in e.g. district heat and hybrid heat pumps
Industry	Biomass use for processes with potential future BECCS** applications		BECCS in industry alongside other low-carbon solutions
Power	Ongoing use in power sector in line with existing commitments or small scale uses	Demonstration and roll out of BECCS to make H ₂ and/or power	Biomass used for H ₂ production or power with CCS
Transport	Liquid biofuels increasingly made from waste and lignocellulosic feedstocks	Liquid biofuel transitioning from surface transport to aviation, within limits and with CCS	Up to 10% aviation biofuel production with CCS

Maximising abatement means using biomass to sequester carbon wherever possible (opportunities to do this will increase over time)

*Carbon Capture and Storage **Bioenergy Carbon Capture and Storage