

2025: THE YEAR OF THE BIOECONOMY

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As we stand in 2025, we find ourselves at a pivotal midpoint between two significant milestones: the turn of the millennium and the globally agreed deadline to achieve net zero emissions by 2050. The next 25 years represent a critical window for transformative action, and at the heart of this transformation lies the bioeconomy.

The Y2K Midnight Moment

The year 2000 was not only the dawn of a new millennium, but also a moment of heightened anticipation and anxiety. Many feared the infamous Y2K bug—a computer glitch that could arise because older systems recorded years with only two digits. As clocks ticked toward midnight, there were widespread concerns that the transition from "99" to "00" might cause systems to interpret the year as 1900 instead of 2000. This was believed to potentially disrupt banking, utilities, aviation, and even critical infrastructure worldwide.

Thanks to extensive preparation, the feared chaos largely did not materialise. Governments, businesses, and IT professionals worked tirelessly in the lead-up to January 1, 2000, testing and updating systems. As the world celebrated the new year, the power stayed on, planes remained in the air, and life continued as usual. The Y2K scare became a symbol of the importance of proactive problem-solving and collaboration—a lesson that holds relevance as we face the even greater challenge of achieving net zero by 2050.

Bioeconomy: Cornerstone of Net Zero

The bioeconomy is not just a complementary strategy for tackling climate change; it is the essential foundation of a sustainable, net-zero future, enabling the global transition toward decarbonisation and defossilisation.

At its core, the bioeconomy harnesses renewable resources such as biomass, agricultural residues, and organic waste to produce energy, materials, chemicals, and fuels. These biobased solutions are critical for reducing greenhouse gas (GHG) emissions in hard-to-decarbonise sectors like chemical manufacturing. Unlike fossil resources, biological materials absorb carbon during growth, creating a circular carbon cycle that minimises net emissions.



A once-in-a-generation opportunity

Bio-based chemicals and materials designed, developed, and manufactured in the UK offer a once-in-a-generation opportunity to secure industries in the transition away from oil-and-gas. Building from world-leading expertise in these sustainable technologies, we can create a resilient engine for net-zero, securing and growing hundreds-of-thousands of highly skilled and productive jobs.

Manufactured chemicals are in everything we use in our daily lives – plastics, food, textiles, energy, batteries, defence products, mobile phones, and medicines. They are vital to our food security, the clothes we wear, heating our homes, affording national security, enabling communications, and delivering treatments for diseases. Today, almost all chemicals are manufactured from fossil oil-and-gas, and are responsible for ~10% of Global-Greenhouse-Gas-Emissions.

As global temperatures continue to rise, the drive towards a more environmentally friendly economy is not an option; it is a necessity. We simply cannot afford to keep digging up fossil resources and releasing more carbon dioxide into the atmosphere. It's time to start using carbon that is already above ground (or in our soils). Future sources of carbon for the chemical industry include biomass, carbon dioxide capture, and recycled feedstocks.

The UK Bio-based sector has ambition

The UK chemicals industry has an ambition. By 2050, it will have doubled in size whilst sourcing 30% of its carbon feedstock from biomass. With the right support bio-based chemicals and materials have the potential to generate upwards of £204 billion annual revenue for UK plc by 2050 and significantly contribute to the UK's Net Zero commitment.

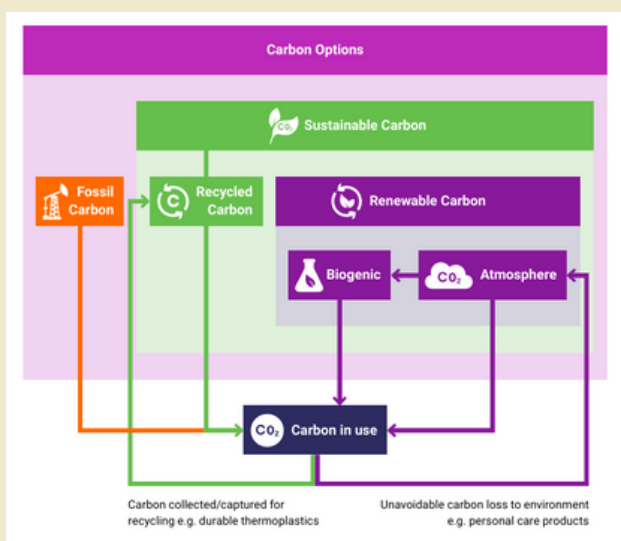
Evidence has shown that starting with the adoption of just fifteen high-potential bio-based chemicals will achieve more than 5.2 million-tonnes CO₂eq GHG-savings annually. This is greater than the CO₂eq GHG-savings generated through the Road Traffic Fuel Obligation in 2021.

Think global, act local

The very nature of biomass means that rurally based businesses and communities can use local biomass – agricultural crop residues, non-agricultural organic waste, and forest products – to create bio-based chemicals and materials, reducing transport emissions and creating local value chains.

In addition, this can encourage farmers to adopt sustainable farming techniques like agroforestry, crop rotation, and using composts and/or digestates. These techniques can enhance soil fertility, biodiversity and carbon sequestration.

By "thinking global" in terms of adopting the overarching goals of sustainability and a circular bioeconomy, and "acting local" through targeted initiatives using local resources, the bioeconomy can drive rural regeneration.



Innovate UK, 2024: 'Sustainable Carbon Ambition for the UK Chemicals Industry



As we approach 2025, it's critical to recognise that we face an action gap, not an awareness gap.

Lesson from the last 25 years

The image below, published in The Daily Telegraph on December 31, 1999, reflects public predictions about events likely to happen by 2100. Among these, climate change ranked second, with 81% of respondents believing that global warming would lead to significant climate impacts.

As we approach 2025, it's critical to recognise that we face an action gap, not an awareness gap. Discussions often centre on raising awareness about climate issues, to gain public support. However, this poll, from a right-leaning publication 25-years ago, already placed climate change high on the public's list of concerns. Despite this awareness CO₂ emissions have surged from 368 ppm in 1999, to 421 ppm today.

This reveals two key challenges:

1. An Action Problem: While people recognise the issue, action is not being taken to address it effectively.
2. A Perception Problem: Many see climate change as a distant threat for 2100, rather than an urgent crisis of 2025. And this includes the Government.



UK losing competitive advantage

The UK has a sustained record of global academic excellence in bio-based chemicals research, underpinning the potential for UK businesses to be industrial leaders in this space. Other areas of the world are already implementing policies to drive bio-based sectors forward but the UK risks losing its competitive advantage if action is not taken soon.

The policy and regulatory landscape encompassing bio-based materials and chemicals is complex and spans several Government departments. This has led to conflicting policies and regulations that hinder commercialisation of these vital products.

Previous government strategies have promised support for bio-based materials and chemicals, but translation into policy and regulations has not yet been realised, for example:

-In 2018 the UK's Bioeconomy Strategy (now withdrawn) recognised the vital importance of bio-based materials, with a vision to "enable rapid development and deployment of new technologies, including, regulation and industry guidance on waste; the impact of bio-based procurement and standards for bio-based plastics and other bio-materials"

-In 2021 the UK's Innovation Strategy[2] stated that "engineering biology will help lessen our dependence on fossil fuels and simplify global supply chains, shifting us from an oil-based economy towards a bio-based economy. Where fossil-derived fuels or plastics are required, biomanufacturing will deliver biobased and waste-derived alternatives in 80% of the cases by 2035".

No time to waste to get to “no waste”

The opportunity to create value is intimately linked to the chance to minimise avoidable waste and GHG emissions. Bio-based materials and chemicals can be derived from low value biomass, and in many cases can be designed for circularity. The future bioeconomy offers the promise of an end to linear management of wastes, where products at the end of life instead become valuable resources for new materials and chemicals.

The Covid pandemic demonstrated the potential for industry and academia to accelerate translation of research excellence into urgently needed practical application. It reduced the time taken to develop a vaccine from the previous record of 5 years to under a year, from design to patients receiving doses.

The defossilisation of the chemicals and materials industries is no less of an urgent challenge. We must act now to secure the future prosperity and wellbeing of society by supporting the transition to climate-positive industries.

Less talk, more action

To create a booming bioeconomy, and enable our Net Zero 2050 commitments, the coming years are critical - and the bio-based sector needs to grow exponentially. This will require coordinated efforts between governments, industries, and research institutions.

Key areas for action include:

- **Scaling Innovation:** Investing in research and development, and scale-up facilities to make bio-based solutions cost-competitive and widely accessible.
- **Policy Support:** Implementing regulations and incentives that drive the adoption of sustainable materials and processes, and providing long-term investor confidence.
- **Public-Private Partnerships:** Encouraging collaboration between stakeholders to accelerate market entry for bio-based technologies.
- **Consumer Awareness:** Educating the public on the benefits of bio-based products to drive demand and behavioural change.

2025: Year of the Bioeconomy

As we reflect on the last 25 years, it's clear that incremental progress is no longer sufficient. The bioeconomy must become a central pillar of our strategy to achieve net zero by 2050.

The lessons of history remind us of the widespread anxiety during Y2K New Year's Eve, as the clock struck midnight on the year 2000. We cannot afford to face similar uncertainty on the eve of 2050 when the stakes—achieving net zero—will be even higher.

With the right investments, policies, and partnerships, we can build a future where economic growth and environmental stewardship go hand in hand.

The next quarter-century holds immense potential. By embracing the bioeconomy, we can ensure that 2050 is not just a deadline but a milestone in our journey toward a sustainable and equitable world.

Now is the time to act. The countdown to 2050 has begun.

2025 must be the year of the Bioeconomy.

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