



European Biotechnology

ISSN 2364-2351 | A 60711 | BIOC.COM

Life Sciences and
Industry **Magazine**

Summer Edition 2025 | Volume 24 | 20 €


Interview

Duncan Lugton,
Head of Policy
and Impact at
IChemE (UK), on
scale-up investments
in Engineering
Biology



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Industrial Biotech



Upscaling: the growth factor

Global politics

How Donald Trump is reshaping
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SOFIE CARSTEN NIELSEN is the Director of the European Biosolutions Coalition and of the biosolutions industry community in Danish Industry since May 2023. She is a former political party leader and former Minister of Higher Education and Research, and was a member of the Danish Parliament for more than 10 years. She is a political scientist by education and has a Master's in European Politics and Administration from the College of Europe, Bruges.

As the global race for biosolutions intensifies, Europe is at a critical crossroads, and I am deeply concerned about the future of our continent's biotech industry. While countries like China and the United States rapidly advance their biotech industries, Europe's slow and not up-to-date regulatory system poses a significant risk to maintaining our leadership. With recent global events and tariffs shaking global trade, immediate action is required to ensure our bio-companies thrive. We need a bold and broad EU Biotech Act to boost competitiveness, accelerate the green transition, and enhance European self-reliance.

Biotechnological solutions – we call them biosolutions – can meet global needs by boosting food production and enabling sustainable industrial processes. A McKinsey report highlights that advanced biotechnology could generate up to US\$1trillion in global economic value over the next 15 years. The biosolutions industry supports over 700,000 jobs in Europe, strengthening sustainable supply chains and a circular economy.

However, biosolutions in Europe face fragmented regulatory regimes that hinder companies from scaling efficiently. They lack funding opportunities and encounter lengthy approval processes, which dishearten many firms. Addressing regulatory inefficiencies and enhancing strategic investments is necessary to secure our competitive edge – and there is no time to waste.

Three critical areas need immediate attention to help Europe's biotech sector thrive:

- 1. Our regulatory processes are the slowest worldwide, adhering to outdated legislation, impairing our competitiveness. Reforming these frameworks is crucial to unleashing Europe's innovative potential.*
- 2. Second, strategic investment is vital to scaling biosolutions beyond pharmaceuticals. Investing in biomaterials can lead to groundbreaking products like biodegradable silk. We must ensure financing is accessible and avoid barriers that hinder investments.*
- 3. Third, prioritising biosolutions within EU industrial policy will accelerate the shift to a bio-based economy and position Europe as a leader in sustainability. Advanced biotechnology can generate significant economic value, reduce CO₂ emissions, and save water.*

The need for action is undeniable. To solidify our role as a global leader in sustainability and innovation, Europe must embrace biosolutions by speeding up registration processes, ensuring accessible finance and infrastructure, and prioritising biosolutions in our industrial strategy. We must urge the European Commission, the European Parliament, and the EU Council to enact a bold and broad European Biotech Act to champion biosolutions as the cornerstone of our competitiveness and green transition. Let setbacks become comebacks and seize this opportunity to lead the biorevolution for a sustainable future in Europe.

COVER STORY



Industrial Biotech: The art of **upscaling***

Many industrial biotech projects compete directly with established and optimised petrochemical processes, and most struggle to be as efficient on cost. Big outlays for new production plants can make price parity for greener processes a distant dream, choking off industry investment and further support from policymakers. Now a publicly funded French-German-Belgian initiative is showing how petroleum-based industrial advantages can shrink once a bioeconomy facility is up and running.

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GEOPOLITICS

The Trump factor*

“Uncertainty” is the word most often used to describe President Donald Trump’s approach to trade, science and pharmaceutical pricing policy. His strategy seems to be to shock first and negotiate later – even with arch-rival China, which is challenging the United States’ decades-long dominance in most biotech fields. EUROPEAN BIOTECHNOLOGY takes a closer look at the situation as of June 2025.



IN FOCUS



Bioengineering

Although ongoing trade disputes and protectionist policies dominate the headlines, regions and industry leaders that recognise the potential of bioengineering are already preparing for the future. EUROPEAN BIOTECHNOLOGY spotlights emerging open innovation clusters and cutting-edge bioengineering platforms.

EDITORIAL

Stand together!

Science is not flawless. It’s a deeply human endeavour that’s often slow to accept breakthroughs. Just consider the HPV cancer vaccine, which took two decades to gain mainstream recognition. Prestige often goes to the well-connected, measured more by h-index than by true innovation. Yet one thing will never change: science depends on international cooperation.

This cooperation doesn’t arise due to personal rapport. It’s born of necessity. Only by working together can we develop cures for untreatable diseases, build waste-free industries, secure food supplies despite threats like avian flu, or construct engines powered by CO₂ and saltwater. These ideas and others are not dreams. They’re the foundation of a sustainable, competitive economy.

Today, that foundation is cracking. The current US administration is undermining global science by banning foreign talent, replacing experts at the FDA and CDC with loyalists, promoting protectionism, and slashing NIH, NASA and NSF funding. These moves threaten to stall biomedical progress – and hand scientific leadership to authoritarian regimes like China.

The US is still a scientific powerhouse. But isolationism weakens global innovation. The democratic world must recover from its shock and act with unity, resolve and a renewed dedication to working together: Make Collaboration Great Again.



Thomas
Gabrielczyk
Editor-in-Chief

SPECIAL

BioFairs Compass

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New production plant for bio-based biochemicals in Carling Saint-Avoid (France)

The art of upscaling industrial biotech

BIOECONOMY Many industrial biotech projects compete directly with traditional petro-based production processes. And many that start out in publicly funded industrial biotechnology start-up ecosystems in Europe fail because they're simply not at first competitive when it comes to costs. The petrochemicals industry has had decades to optimise both production processes and return on investment in existing plants. Now a French-German-Belgian project is showing how those advantages dwindle when a bioeconomy plant is up and running.

To reach the goals set out in Europe's Clean Industrial Deal, it will be essential to rapidly transform energy-intensive, fossil-based industries. So to kick things off, let's take a look at the deal's objectives and do a quick reality check.

Biotechnology has emerged as the central technology platform capable of supporting the planned transition. It offers a wide range of tools for doing so, among them energy-efficient biocatalysts for the chemical sector, climate-friendly production of food and animal feed proteins, microbial recovery of rare critical materials, manufacturing of pharmaceutically active substances and many others.

These applications are closely aligned with objectives laid out in the EU Bioeconomy Strategy (2020). These include achieving food security, promoting the sustainable use of natural resources, reducing dependence on fossil inputs, mitigating climate change, and contributing to economic competitiveness and job creation within the European Union.

Despite its big ideas and huge potential, however, the EU has often lagged behind in the global race to 'biologise' industrial processes. Countries with more aggressive strategies like the US, China, Singapore and Brazil are more often viewed as benchmark setters. China for instance has invested heavily in fermentation capacity. Singapore is expediting regulatory approval for novel foods. Brazil is advancing with a clearly defined bioeconomy roadmap. The new government in the US, on the other hand, seems to have slammed the brakes on what large-scale biomanufacturing has achieved there so far (s. page 54). Might that mean opportunities for Europe?

Huge demand for financing

One of the biggest barriers to reaching clean industry goals within the EU is the high capital expenditure (CAPEX) associated with building demonstration or production facilities. Many biotech processes could be competitive with petrochemical alternatives in terms of operating costs. But when major new

infrastructure investments are required to get things up and running, that doesn't mean much. Many a promising business model has struggled to survive the Valley of Death between innovation and industrial implementation. Many don't.

Europe will help get it going...

The Circular Bio-based Europe Joint Undertaking (CBE JU) was set up to help more of these projects get the support they need. It's a €2bn partnership between the European Union and the Bio-based Industries Consortium (BIC) that funds projects advancing competitive circular bio-based industries in Europe. The partnership seeks to build on the success of its predecessor, the Bio-based Industries Joint Undertaking (BBI JU) while addressing the current challenges facing the industry. To reach clean industry goals and hit ambitious climate targets by shifting away from non-renewable fossil raw materials and minerals, the EU will have to strengthen its resource independence and support sustainable economic growth.

The stated role of CBE JU is to bring together various groups – ranging from farmers to scientists to large bio-based industries – to solve the technological, regulatory and market challenges facing the sector. Its public-private funding scheme is supposed to boost innovation and market deployment, and pave the way for future investment.

...but industry has to step in

There are many EU-funded projects in circularity and biobased industries. A short list from the field of biomass utilisation alone reveals a very wide range in the field:

- › Rural BioReFarmeries: Develops small-scale, decentralised green biorefineries to enhance farmer sustainability and competitiveness. Funding: €7.35m. Coordinator: Munster Technological University, Ireland.
- › ONE EARTH: Establishing a circular bioeconomy by valorising residual animal biomass for terrestrial and marine

applications. Funding: €4m. Coordinator: University of Bologna, Italy.

- › LUCRA: Demonstrating sustainable production of bio-succinic acid from organic waste using integrated electrochemical bioreactors. Coordinator: Bio Base Europe Pilot Plant, Belgium.
- › NewWave: Develops sustainable, bio-based manufacturing lines by converting biomass residues into valuable products. Funding: €8.5m.
- › Bio-LUSH: Valorises underutilised European plant resources like forest residues or marine plants to produce high-quality fibres for sustainable products. Coordinator: Stockholm University, Sweden.


When it comes to nuts and bolts, the BBI JU/CBE JU-funded AFTERBIOCHEM project is one of the very few projects that has managed to actually build a flagship biorefinery, now up and running in Carling Saint-Avold (France). There, sugar industry by-products and other non-food agricultural biomass are turned into seven high-added-value bio-based organic acids for fragrances and flavourings, personal care, food and feed, industrial chemicals and a potassium-rich fertiliser.

Accounting for around half of global production, the EU is the world's largest producer of sugar beets. The crop is important to Europe's economy, but prices for beet-derived sugar have fallen, so the sector is being forced to capitalise on every potential income source. The industry supports 140,000 farmers in the bloc, as well as around 27,000 direct jobs in processing and further upstream employment. Until 2017, sugar-beet production in Europe was shored up by a quota system. However, since this system was scrapped, its end and other factors have led to a 30% fall in sugar prices. EU sugar-beet producers have responded by increasing production. But against a backdrop of worldwide overproduction of the commodity, that move has only increased price pressures.

Being competitive is key

AFTERBIOCHEM brought together 12

» Read the full story in the printed issue.



In addition to implementing a 40% budget cut at the US Department of Health & Human Services in 2026, the Trump administration plans to eliminate all funding previously allocated by the Biden administration for industrial biotech expansion. However, in a move that has received little public attention, the administration is also quietly advancing sustainable industrial biotech production through the multibillion-dollar budget at the NSCEB (<https://t1p.de/r4erg>).

Picking on biotech – the Trump Factor

BIOTECH GEOPOLITICS The threat of high import tariffs and government-enforced price cuts in the world's leading pharmaceutical market, the US, are beginning to have an impact on the global biopharmaceuticals sector. What exact geopolitical consequences the dismantling of US research funding and mass layoffs in regulatory, epidemic, and climate protection agencies will have remains to be seen. But the existing biotech world order is faltering and changing in unforeseen ways. Who stands to benefit?

Donald Trump entered his second term of office on January 20, but by mid-June most of the threats made by the US President still had yet to be fully implemented. Nor had his regime's drastic cuts to the country's research budget been upheld in court. But if announced plans for import tariffs, pharmaceutical price reductions, and cuts to research freedom really do go into full force, they could do serious damage to the fields of biomedicine and industrial biotechnology internationally.

The mere fact that 80% of planned NIH research funding has not been disbursed since February 2025 and 40% of the NIH budget plus 50% of the National Science Foundation (NSF) budget is to be cut in 2026 has been enough to incite panic in the biopharmaceutical ecosystem. NIH funding alone exceeds the R&D budget of the largest industry sponsors of clinical trials: 99% of the drugs approved by the FDA between 2010-2019 can be traced back to NIH-funded research (10.1001/jamahealthforum.2023.1921). Of the NIH's annual US\$47bn budget, US\$18bn is used to fund international clinical trials in which US groups are involved.

Research and industry partners are suffering, of course, but also clinical service providers (CROs) and contract manufacturers (CDMOs). "Severe cuts to US re-

search funding, combined with deep uncertainty caused by unpredictable policies on tariffs and drug pricing, have led to significant investor hesitation in biotechnology and clinical research," says Martin Krauss, President of the CRO association BVMA and CEO of FGK GmbH. "This is critically slowing the development of new therapies. Beyond the economic damage to innovation-driven industries, the long-term consequence will be fewer treatment options for patients," he fears. "This troubling trend must be urgently addressed and reversed. At the same time, it presents a strategic opportunity for Europe to position biotechnology as a key sector and to strengthen the political and regulatory framework to attract increased investment and use its excellent basic research."

Investor insecurity

There's no question that the 157 executive orders issued during Trump's first five months in office – just five fewer than Joe Biden signed in his entire term – are unsettling biopharmaceutical investors worldwide. Because they bear the hallmarks of protectionism and hostility to multilateralism, the biopharmaceutical financial engine that is fueled by international deals is sputtering. According to the EY Firepower Report, Big Pharma generates around 65% of its revenue from

products acquired through international M&A, agreements or joint ventures. Since 2023, cancer-related deals with Chinese biotech companies have taken centre stage. There and in other areas the impact of the new geopolitical approach that's being nurtured by the White House – geared toward national interests – is already being felt. For May 2025, investment bank Jefferies reported a 57% decline in biotech financing (to US\$2.7bn) compared to the same period last year. That followed an April that marked the worst figures since 2021. EY also reports record investment last year, along with its abrupt end in the first quarter of 2025. Jefferies analyst David Windley blames mass layoffs at the FDA, budget cuts at the NIH, and unclear statements from the White House about the structure of US drug prices. "Biotechs want clarity on FDA regulation, funding and drug pricing before committing to large investments," Windley comments.

Fair pricing – Trump style

The US President is not taking a very systematic approach to his key objectives. To achieve his stated goal of bringing production back to the US, for example, he initially threatened to impose import tariffs on biopharmaceuticals, services

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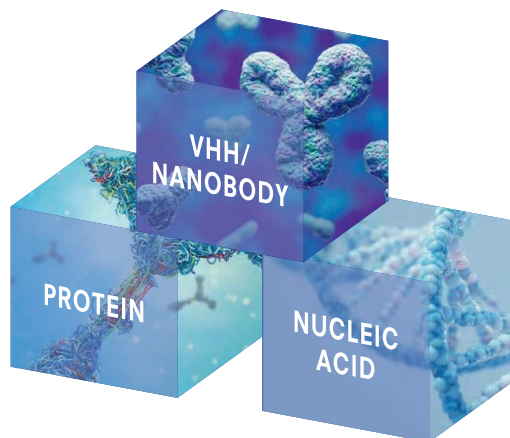
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