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ALL-PARTY PARLIAMENTARY GROUP

SCIENCE IN PARLIAMENT
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SUMMER 2025

Bioeconomy in action

Building regional strategic partnerships

UNIVERSITY of York

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SCIENCE DIARY

Forthcoming discussion meetings

■ Tuesday 9th September 2025

DISCUSSION MEETING

Celebrating the International Year of Quantum Science and Technology

in partnership with the Institute of Physics
5.15pm to 6.30pm, Palace of Westminster
Chairman's Reception 6.45pm to 7.30pm, One Parliament Street

■ Tuesday 14th October 2025

P&SC ANNUAL GENERAL MEETING

5.00pm to 5.15pm, Palace of Westminster

DISCUSSION MEETING

Celebrating World Metrology Day

in partnership with the Institution of Chemical Engineers
5.15pm to 6.30pm, Palace of Westminster
Chairman's Reception 6.45pm to 7.30pm, One Parliament Street

■ Monday 17th November 2025

DISCUSSION MEETING

in partnership with the LGC Group
5.15pm to 6.30pm, Palace of Westminster
Chairman's Reception 6.45pm to 7.30pm, One Parliament Street

■ Tuesday 20th January 2026

DISCUSSION MEETING

Celebrating the International Year of Quantum Science and Technology

In partnership with the Newcastle Upon Tyne Hospitals NHS Foundation Trust and Newcastle University
5.15pm to 6.30pm, Palace of Westminster
Chairman's Reception 6.45pm to 7.30pm, One Parliament Street

A WARM WELCOME TO NEW MEMBERS

The Parliamentary and Scientific Committee is delighted to welcome the following members who have joined us over recent months:

Parliamentary: Pippa Heylings MP; Graham Leadbitter MP; Jack Rankin MP; Dave Robertson MP; Dr Lauren Sullivan MP; Martin Wrigley MP.

Scientific and Technological Organisations/Universities/Commercial: AbbVie Ltd; Academy for the Mathematical Sciences; Aston University; Association for Science Discovery Centres; British Science Association; Chartered Society of Forensic Scientists; Fertility Dietitian UK; Institute of Materials Finishing; Kidney Research UK; Liverpool School of Tropical Medicine; Noise Abatement Society; Photonics Leadership Group; Trident Sensors Ltd.

Individual: Roger Casale; Rod Breen; Professor Sarah Main; Tom Nicols; Dr David Slater; Dr Tobiasz Trawinski; Hans Waltl.

STEM Alumni: Dr Andrea Barbiero; Rosie Barrows; Dr Jose Cabezas Caballero; Nathan Davison; Kyle Greenland; Dr Harry Jarrett; Nidhi Kapil; Karina De Almeida Lins; Max Merrett; Rasma Ormane; Dr Francisco de Melo Virissimo; Anna Weatherburn; Dr Edwina Yeo.

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George Freeman FRSA MP
Chair, Parliamentary & Scientific Committee

Since the last SiP edition we have seen the new Government announce, in a tough spending round for some departments, a 4-year package of £86 billion for public science & R+D. When I arrived in Parliament in 2010 on my mission to make the UK a Science Superpower science spending had for too long been the easy area for Treasury to find savings in CSRs. No more. It is wonderful to see the now universal cross-party commitment to science, technology and industrial R+D as key to UK prosperity & security.

As I write the UK is also sweltering in another heatwave which will doubtless be followed by the increasingly normal cycle of drought and floods as global warming and climate change accelerates. A reminder, if we still need one, of the importance of UK scientific research in both forecasting, modelling, understanding and mitigating global warming.

As all countries and companies around the world invest in their clean growth transition, the UK, which is home to a wealth of deep scientific excellence and clean tech innovation, could and should be attracting billions in inward investment & export contracts.

We desperately need to. Despite welcome continuing Government commitment to back UK science with the new Government building on the increase to £20 billion p/a I was proud to secure in CSR 21, the pressure on government spending will increase, and with many UK universities struggling with higher costs and limits on foreign student numbers, we need to be attracting much more global inward investment and venture finance to complement our public sector R+D spend.

That's why as Minister of State for Science I put such emphasis on deepening the UK's global science partnerships (securing S+T collaborations with Japan, Israel, Switzerland & Canada as well as our re-entry into Horizon) and developing our USPs in the increasingly competitive race for investment: regulatory leadership, investabilty in R+D clusters and cross Government "Missions".

Having pursued this in a non-partisan spirit of cross/party long-term policy it's great to see the new PM, DSIT Secretary and Science Minister Patrick Vallance continuing so many of the projects launched in the last few years.

And as Deputy Chair of the Science, Innovation and Technology Select Committee to be able to cross examine Ministers and officials on what specific plans they have to attract the global investment we need.

Having just returned from a 10-day trip as UK Trade & Investment Envoy to SE Asia it's clear that there is a huge global appetite from governments, sovereign wealth funds, corporate venture capital & family offices to invest in UK science & technology to help economic development.

Across SE Asia I have seen opportunities for long-term collaborations with "win-win" benefits for both parties: from the CleanEnergy transition in Malaysia being led by Petronas to the Digital Verification Cyber Security Mission in the Philippines to the robotic automation of life science for precision medicine in Japan.

To harness UK science for demonstrable global & UK good we urgently need to deepen these collaborations which is what Im committed to doing as UK Trade & Investment Envoy.

Its a big project which demands a lot of time & work, which is why I've decided, having got the Parliamentary & Scientific Committee established in the new Parliament, to hand it on to one of the new MPs in the new Parliament.

I look forward to continuing to support the P&SC APPG in the years ahead.

George

SCIENCE IN PARLIAMENT
SiP
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Science in Parliament has two main objectives:

Inform the scientific and industrial communities of activities within Parliament of a scientific nature and of the progress of relevant legislation

Keep Members of Parliament abreast of scientific affairs

The bioeconomy

York and North Yorkshire's path to sustainable prosperity

David Skaith
Mayor of York and North Yorkshire, one of the UK's newest devolved regions

York and North Yorkshire stands at the forefront of a revolutionary economic transformation that could reshape not only the region's future but also Britain's role in the global green economy. The strength of our city combined with a rural powerhouse uniquely positions us as the nation's bioeconomy hub – promising sustainable growth that addresses some of the most pressing challenges of our time

Understanding the bioeconomy

The bioeconomy represents a fundamental shift in how we produce goods and services, moving away from fossil fuel-dependent processes toward biological resources and biotechnology. It encompasses everything from sustainable agriculture and forestry to industrial biotechnology and engineering biology. Unlike traditional economic models that often pit environmental protection against economic growth, the bioeconomy offers a pathway where both can thrive together.

At its core, the bioeconomy uses renewable biological resources – such as crops, trees, algae, and even waste materials – to produce food, materials, chemicals, and energy. This approach not only reduces our dependence on finite fossil resources but also creates opportunities for innovation in everything from biodegradable plastics to life-saving pharmaceuticals produced using genetically engineered microorganisms.

York and North Yorkshire's unique advantage

What makes York and North Yorkshire particularly well-suited to lead this transformation is its distinctive character as both an urban innovation centre and a rural economic powerhouse. This dual identity creates a rare combination of assets that few regions can match. The area boasts world-class research institutions, a thriving agricultural sector, and the space needed for large-scale bioeconomy operations.

The region's commitment to environmental leadership is evident in its ambitious climate targets: achieving net zero emissions by 2034 and becoming carbon negative by 2040. These aren't just aspirational goals but strategic imperatives that position the region as a testing ground for scalable solutions to climate change. When successful bioeconomy innovations are developed and proven in York and North Yorkshire, they can be exported to similar regions across the UK and internationally.

> Traditional economic models often pit environmental protection against economic growth – the bioeconomy offers a pathway where both can thrive together

This environmental ambition is matched by a recognition of the bioeconomy's potential to address food security challenges. As global populations grow and climate change affects agricultural productivity worldwide, the development of sustainable food production systems becomes increasingly critical. York and North Yorkshire's combination of agricultural expertise and biotechnology innovation makes it ideally placed to develop solutions that can feed the world while protecting the environment.

The innovation ecosystem

The strength of York and North Yorkshire's bioeconomy ambitions lies not just in its natural advantages but in the robust partnerships being forged across sectors. The collaboration between public and private sector partners creates an ecosystem where academic research can quickly translate into commercial applications, and where businesses can access the support they need to scale innovative solutions.

The opportunity to strengthen the region's partnership with neighbouring Tees Valley exemplifies this collaborative approach. By working together as a northern cluster, these regions can combine their complementary strengths – York and North Yorkshire's rural and agricultural assets with Tees Valley's industrial heritage and infrastructure. This partnership approach recognises that the challenges and opportunities of the bioeconomy are too significant for any single region to tackle alone.

York Central: a catalyst for growth

Central to the region's bioeconomy strategy is the proposed Innovation Accelerator at York Central, one of the UK's largest brownfield development sites. This initiative represents more than just another business park; it's conceived as an independent hub that can bring together diverse stakeholders, from researchers and entrepreneurs to investors and policymakers.

The Innovation Accelerator concept addresses one of the key challenges in translating bioeconomy research into commercial success: the gap between laboratory discoveries and market-ready products. By providing a dedicated space where these connections can be made and nurtured, York Central could become the bridge that transforms promising research into investible propositions that attract private sector funding.

This development complements the region's recent bid for an AI Growth Zone, demonstrating how different technological advances can work together synergistically. Artificial intelligence and biotechnology are increasingly intertwined, with AI accelerating everything from drug discovery to agricultural optimisation. By pursuing excellence in both areas, York and North Yorkshire is positioning itself at the intersection of multiple technological revolutions.

Economic opportunities and investment potential

The bioeconomy represents a significant economic opportunity that extends far beyond traditional agriculture. Industrial biotechnology alone is projected to become a multi-billion-pound global market, with applications ranging from the production of sustainable chemicals and materials to the development of new pharmaceuticals and food ingredients.

> The bioeconomy needs everyone from agricultural workers and laboratory technicians to research scientists and business development specialists

For York and North Yorkshire, this translates into the potential for high-value job creation across the skills spectrum. The bioeconomy needs everyone from agricultural workers and laboratory technicians to research scientists and business development specialists. This diversity of opportunities is particularly valuable for a region that combines urban and rural areas, offering pathways for economic participation that don't require everyone to relocate to major cities.

The region's appeal to investors is strengthened by its strategic location, excellent transport links, and the presence of established companies already working in biotechnology and related fields. The combination of academic excellence, industrial heritage, and natural resources creates a compelling proposition for businesses looking to establish or expand their bioeconomy operations.

The forthcoming Local Innovation Partnerships Fund also represents a significant opportunity to accelerate and scale the Yorkshire model across other regions. With its emphasis on co-creation, and alignment with local growth strategies, the fund could provide the strategic public investment we know is critical for dramatically accelerating bioeconomy development. For York and North Yorkshire this represents a chance to build on their existing capabilities into even greater commercial impact.

The fund's focus on high-potential innovation clusters, combined with requirements for private sector co-investment and measurable economic growth, aligns perfectly with BioYorkshire's integrated approach spanning research discovery through to market-ready solutions. Most importantly, it recognises that successful regional development requires sustained, coordinated investment rather than fragmented initiatives. The ambition and potential in York and North Yorkshire is sky high – and the Innovation Partnerships Fund is a critical opportunity for us to make real progress

Defining green growth

What makes York and North Yorkshire's approach particularly significant is its potential to redefine what economic growth looks like in the 21st century. Traditional economic development often came at environmental cost, but the bioeconomy offers a different model where economic success and environmental stewardship reinforce each other.

This has implications that extend far beyond the region itself. If York and North Yorkshire can demonstrate that a largely rural region can achieve prosperity through sustainable innovation, it provides a template that could be applied to similar areas across the UK and internationally. This is particularly important as policymakers grapple with the challenge of ensuring that the benefits of economic growth are distributed more evenly across different types of communities.

Looking forward

The bioeconomy represents more than just another economic sector; it's a new way of thinking about how human societies can thrive while respecting planetary boundaries. York and North Yorkshire's unique position as a devolved region with both urban innovation capabilities and rural resources makes it an ideal laboratory for testing and refining this new economic model.

> It's not just building prosperity for our residents – it's helping to define what sustainable economic growth looks like in the modern world

The region's success in developing its bioeconomy will depend on maintaining the strong partnerships that have brought it this far, continuing to attract investment in research and development, and ensuring that the benefits of growth are shared across all communities. But if successful, York and North Yorkshire could become a model for sustainable regional development that other areas around the world will seek to emulate.

As the region continues to develop its bioeconomy strategy, it's not just building prosperity for its own residents – it's helping to define what sustainable economic growth looks like in the modern world. In doing so, York and North Yorkshire is positioning itself not just as a regional leader, but as a contributor to solutions that the entire planet needs.

How universities can serve as engines of regional economic development

Professor Sarah Thompson MBE
Associate Pro-Vice Chancellor Research, University of York

Professor Ian Graham FRS
Chair of Biochemical Genetics at the University of York

As governments worldwide grapple with the challenge of creating sustainable, innovation-driven economies, the University of York and York and North Yorkshire region experience offers compelling evidence that universities can be crucial partners in transforming local and regional economic landscapes.

The new economic reality

The modern economy demands a fundamentally different approach to growth. Traditional industries are being transformed by technological advancement, environmental pressures, and changing consumer demands. In this context, the ability of regions to innovate, adapt, and create new industries has become paramount. Universities, with their unique combination of research capabilities, skilled workforce development, and entrepreneurial ecosystems, are perfectly positioned to lead this transformation.

> The bioeconomy represents a fundamental shift away from a fossil fuel economy toward using biological resources and processes

Government recognition of this potential is evident across multiple policy areas, and York and North Yorkshire exemplify how this vision can be realised in practice. From innovation and research priorities to skills development and regional devolution, there's a growing consensus that universities must play a central role in delivering economic growth. The University of York's experience shows this isn't just about producing graduates; it's about creating integrated ecosystems where academic research translates directly into commercial opportunities and regional competitive advantages.

The bioeconomy: a case study in university-led growth

Perhaps nowhere is this university-driven economic transformation more evident than in the emerging bioeconomy sector. The bioeconomy represents a fundamental shift away from a fossil fuel economy toward using biological resources and processes to create products, materials, and energy that traditionally came from fossil fuels or other non-renewable sources. This sector encompasses everything from agricultural technology to industrial biotechnology for production of bio-based chemicals and renewable materials.

The numbers tell a compelling story. Recent projections suggest that advancements in biological applications could unlock between $2 to $4 trillion in annual direct global economic impact by 2030 to 2040. For the UK specifically, studies indicate a £440 billion growth opportunity within the bioeconomy sector. These figures represent not just economic opportunity, but necessity – achieving global net-zero emissions targets will require exactly this kind of biological innovation at scale.

What makes the bioeconomy particularly interesting from a regional development perspective is how it builds on existing strengths while creating entirely new industries. Rural economies, often struggling with declining traditional agriculture and an aging workforce, can find new purpose through biotechnology applications. The average age of farmers now exceeds 60, presenting both a challenge and an opportunity for technology-driven solutions that can revitalise agricultural communities.

York and North Yorkshire: leading the bioeconomy revolution

The York and North Yorkshire region provides the most compelling example of how universities can drive regional economic transformation through strategic focus and partnership building. The University of York has world-leading capabilities in engineering biology and bioeconomy research, securing over £140 million in competitive grants since 2004 and that in turn has led to the region becoming a nationally significant hub for bioeconomy innovation. This wasn't achieved overnight – it was built on foundations laid 25 years ago with the establishment of the Centre for Novel Agricultural Products (CNAP), which focused on gene discovery and developing practical solutions for the bioeconomy.

The University's research isn't happening in isolation. Through long-term collaborations with pharmaceutical, chemical, and food sector companies, academic discoveries are being translated into commercial applications. One recent example involves the development of a new industrial hemp variety that produces seed oil with altered fatty acid

composition, making it five times more stable than other hemp oils – as stable as olive oil. This innovation, now registered in the UK with patents in place and field trials underway in North America, demonstrates how university research can create entirely new agricultural opportunities.

The region now hosts up to 10% of the UK's entire bioeconomy activity, with a concentration of bioeconomy businesses three times the national average. Employment in the sector has grown by 13% in York and North Yorkshire, compared to just 6% nationally. This success is the result of deliberate strategy, sustained investment, and effective partnership building.

The power of public–private partnerships

Central to York's success has been the development of BioYorkshire, established in 2020 as a public-private partnership between the University of York, Fera Science Ltd, and Askham Bryan College. Led by Professor Ian Graham as Academic Director, this collaboration creates a unique regional strength that spans the entire innovation pipeline, from early-stage research to market-ready solutions.

BioYorkshire supports development across all Technology Readiness Levels (TRLs), from initial discovery research and proof of concept (TRL 1–4) through to product development, testing, and market-ready solutions (TRL 5–9). This comprehensive approach ensures that good ideas don't fall through the gaps between academic research and commercial application – a common challenge in university-industry collaboration.

The partnership also addresses the critical issue of skills development. Through novel higher education and further education partnerships, BioYorkshire creates pathways for people to access higher-skilled green jobs across all levels – from post-16 education and apprenticeships through to degrees, PhDs, and beyond. This includes everything from biotechnology fundamentals to techno-economics, entrepreneurship, and intellectual property management.

Infrastructure and investment: York Central and beyond

The success of the University of York's approach to regional development requires more than just research excellence and good partnerships. It demands significant infrastructure investment and long-term commitment. The York Central development project exemplifies this integrated approach – one of the UK's largest city centre regeneration schemes that will transform 45 hectares of brownfield land with an anticipated £1 billion gross value added impact.

This isn't just about property development; it's about creating integrated innovation ecosystems. The plans include York's first central business district and a new innovation hub specifically designed to support bioeconomy sector growth. This kind of place-based approach recognises that successful innovation clusters require physical infrastructure that brings researchers, entrepreneurs, and businesses together in productive ways.

The University of York's Biorenewables Development Centre (BDC), part of this ecosystem, has already worked on 1,500 projects, taking products from laboratory research into industrial application. Companies like Azotic Technologies demonstrate the potential – this biotechnology company relocated from Nottingham, was incubated at the York BDC, and is now spinning out into permanent facilities in the region, developing natural nitrogen-fixing technology with revolutionary applications in sustainable farming.

Lessons for regional development

The York and North Yorkshire experience offers several key lessons for other regions seeking to leverage university capabilities for economic growth. First, success requires long-term commitment and strategic focus. The 25-year journey from establishing CNAP to today's thriving bioeconomy cluster demonstrates that building genuine competitive advantage takes time and sustained effort.

Second, effective partnerships are essential. Universities cannot drive regional economic development alone – they need strong relationships with industry, government, and other educational institutions. The public-private partnership model creates shared ownership and aligned incentives that purely academic or purely commercial approaches cannot achieve.

Third, infrastructure investment must be strategic and sector-specific. Generic business parks or innovation centres are less effective than facilities designed around the specific needs of target industries. Modern research spaces, state-of-the-art laboratories, and facilities that enable cross-disciplinary collaboration are essential for translating academic research into commercial success.

The path forward

As Government increasingly recognises the need for innovation-driven economic growth, the University of York's model demonstrates how universities can play an ever more important role in regional development. The Yorkshire bioeconomy example shows how academic excellence, strategic partnership building, and targeted investment can transform regional economic prospects while addressing global challenges like climate change and sustainability.

The University of York and the York and North Yorkshire region show that universities are not just educational institutions but powerful economic actors capable of creating new industries, attracting investment, and building the skilled workforce that modern economies demand. The Yorkshire experience demonstrates that regions which successfully harness this university-led potential will be best positioned to thrive in an increasingly competitive and rapidly changing global economy.

Success requires vision, patience, and commitment from all stakeholders – universities, government, and industry. But the rewards, as demonstrated in York and North Yorkshire, can be transformational, creating sustainable economic growth that benefits entire regions while contributing to solutions for global challenges.

Unlocking regional growth

How public–private partnerships are transforming the bioeconomy

Dr Damian Kelly
Vice President Innovation & Technology Development at Croda

As regions across the globe seek sustainable pathways to economic growth, the bioeconomy has emerged as a transformative opportunity. By fostering strategic partnerships between public authorities and private enterprises, regions can harness biological resources to create high-value industries, attract investment and build competitive advantages that drive long-term prosperity.

This article explores how collaboration between sectors is already reshaping regional economies and offers a blueprint for unlocking the bioeconomy's potential.

The bioeconomy represents one of the most promising frontiers for sustainable economic development, offering regions and organisations therein the opportunity to build competitive advantages while addressing global challenges from climate change to food security. At its core, the bioeconomy encompasses all economic activities that use biological resources to produce goods and services, spanning everything from sustainable agriculture and biotechnology to bio-based materials and renewable energy. What makes this sector particularly compelling for regional development is its potential to create high-value jobs while promoting environmental sustainability.

The key to unlocking this potential lies in strategic collaboration between public and private sectors. When done effectively, these partnerships can develop and accelerate innovation, attract investment, and create the conditions for sustained economic growth that benefits entire regions.

The power of strategic partnerships

The success of bioeconomy initiatives depends heavily on the ability to bring together diverse stakeholders with complementary strengths. Private companies, such as Croda[1], bring technological expertise, market knowledge, manufacturing capability and the agility to respond quickly to opportunities. Public sector organisations contribute policy frameworks, funding mechanisms, and the ability to coordinate across different sectors and interests.

This collaborative approach is already yielding results in regions that have embraced it. Take the partnership between regional Combined Authorities and organisations like BioYorkshire, of which Croda is a member, which demonstrates how public–private collaboration can create momentum around bioeconomy development. By working together to develop investor prospectuses, these partnerships are able to present a unified vision that attracts major investors who might otherwise look elsewhere.

The combined weight of public and private sector endorsement provides credibility that neither sector could achieve alone. When a regional authority partners with established private sector players, it signals to investors that the opportunity is both economically viable and politically supported. This dual validation is crucial in attracting the substantial investments needed to build bioeconomy infrastructure and capabilities.

Creating clusters of excellence

One of the most effective strategies for bioeconomy development is the creation of specialised clusters that bring together companies, research institutions, and support organisations in a concentrated geographic area. These clusters create ecosystems where innovation can flourish through close collaboration and knowledge sharing.

The bioeconomy is particularly well-suited to cluster development because it often requires complex interdisciplinary collaboration. Developing new bio-based materials, for example, might require expertise in biology, chemistry, engineering, and manufacturing. When these capabilities are co-located, companies can more easily access the full range of expertise they need.

Major private sector organisations play a crucial anchoring role in these clusters. Companies like Croda, bring not only their own research and development

1 Croda, a FTSE 100 global speciality chemical company with its headquarters in Yorkshire, has successfully delivered bio-based innovation to its customers for 100 years. Increasingly, Croda is finding significant value in working with strategic innovation partners, such as the University of York, to solve market challenges and unlock new technologies.

capabilities but also extensive networks of suppliers, customers, and partners. Their involvement lends credibility to the cluster and can attract other supply chain companies seeking to be part of a thriving bioeconomy ecosystem.

The academic component of these clusters is equally important. Universities contribute fundamental research capabilities and help train the skilled workforce that bioeconomy companies need. The collaboration between the Centre for Novel Agricultural Products at the University of York and Croda exemplifies how academic research can directly contribute to commercial applications, from improving drug delivery to developing sustainable cosmetic ingredients.

Policy frameworks that enable growth

The most successful bioeconomy regions are those where public sector policies actively support private sector innovation and investment. This support takes many forms, from direct funding for research and development to regulatory frameworks that facilitate the development and commercialisation of bio-based products.

Devolution deals that specifically reference the bioeconomy give elected officials clear mandates to prioritise this sector. This political commitment is essential because bioeconomy development often requires long-term thinking and sustained investment. When mayors and other regional leaders have explicit bioeconomy goals, they can align various policy levers to support sector growth.

The integration of regional bioeconomy strategies with national policies amplifies their impact. Regions that successfully align their initiatives with national industrial strategies, innovation missions, and investment programs like Invest 2035 can access additional resources and ensure their efforts complement broader national objectives.

Identifying and leveraging regional advantages

Every region has unique characteristics that can become competitive advantages in the bioeconomy. These might include specific agricultural resources, particular research strengths, existing industrial capabilities such as manufacturing, or geographic advantages. The key is identifying these unique assets and building bioeconomy strategies around them rather than trying to replicate what has worked elsewhere.

> Political commitment is essential as bioeconomy development often requires long-term thinking and sustained investment

Some regions excel in agricultural biotechnology because of their farming heritage and research institutions. Others might focus on marine biotechnology due to coastal locations and marine science expertise. Still others might specialise in bio-based materials because of existing chemical or manufacturing industries.

The most successful regions view their unique characteristics as opportunities rather than limitations. They use these distinctive features as the foundation for building specialised capabilities that can compete globally while serving regional economic development goals.

Investment and market development

Private sector involvement is crucial for translating bioeconomy research into commercial applications. Companies, such as Croda, bring market knowledge that helps ensure innovations meet real customer needs and can achieve commercial viability. They also provide the risk capital needed to scale up promising technologies.

However, private investment alone is rarely sufficient, particularly in the early stages of bioeconomy development. Public sector support helps reduce risks for private investors and can provide patient capital for longer-term projects that might not attract purely commercial funding.

The combination of public and private investment creates a more robust funding ecosystem that can support bioeconomy companies at different stages of development. Early-stage research might rely heavily on public funding, while later-stage commercialisation attracts increasing private investment as risks decrease and market potential becomes clearer.

Building sustainable competitive advantage

The ultimate goal of public-private collaboration in the bioeconomy is to create sustainable competitive advantages that generate long-term economic benefits for regions. This requires building capabilities that are difficult for competitors to replicate and that continue to evolve and improve over time.

Successful bioeconomy regions focus on developing deep expertise in specific areas rather than trying to compete across all bioeconomy sectors. They invest in specialised infrastructure such as biotechnology, build networks of skilled professionals, and create regulatory and business environments that support continued innovation and growth.

Looking forward

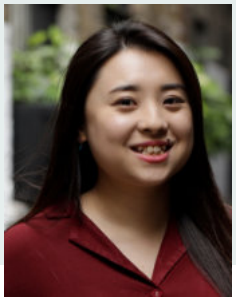
The bioeconomy represents a significant opportunity for regional economic development, but realising this potential requires thoughtful collaboration between public and private sectors. Regions that can effectively align public policy support with private sector capabilities and market knowledge will be best positioned to capture the economic benefits of this growing sector.

The examples of successful collaboration between Croda and the University of York demonstrate that this approach can work. As the bioeconomy continues to grow and mature, regions that establish strong public-private partnerships now will be well-positioned to benefit from the opportunities ahead.

The path forward requires continued commitment from both sectors, strategic thinking about regional advantages, and the patience to build capabilities that will pay dividends over the long term. For regions willing to make this investment, the bioeconomy offers a pathway to sustainable, innovation-driven economic growth that benefits both local communities and the broader environment.

More than trash

The carbon cost of plastic



Melody Chiu MPhil
Climate Tech Analyst , Carbon Limiting Technologies (CLT)

Chris Rapley CBE MAE
Professor of Climate Science, University College London; Chair of the European Science Foundation's European Space Sciences Committee; Chair of the UCL Climate Action Unit; member of the Advisory Board of the UK Clean Growth Fund

Plastics are everywhere. From packaging to products, their convenience has made them indispensable. They are among the fastest-growing bulk materials. But their convenience comes at a steep environmental cost.

A dual environmental threat

Produced directly from fossil fuels, every stage of their life cycle contributes to carbon emissions (Figure 1). Compounding this, most plastics do not biodegrade, leading to long-lasting environmental pollution. Plastics pollute twice: first as carbon emissions, then as waste and contamination.

Here we focus on plastic-related carbon emissions, noting that actions to reduce plastic consumption and enhance recycling yield dual benefits.

The challenge – rising demand, rising emissions

Plastic demand is accelerating, with global production projected to double or even triple by 2050[1]. Oil companies are heavily investing in expanding plastic production as it generates greater revenue growth compared to traditional fuels. Even under a conservative annual growth scenario of 2.5%/y, greenhouse gas emissions from plastic production – currently accounting for approximately 4.5% of the global total[2] – will double (Figure 2). For the UK to meet its Net Zero target by 2050, addressing and eliminating plastic-related emissions will be critical.

Developing a strategy

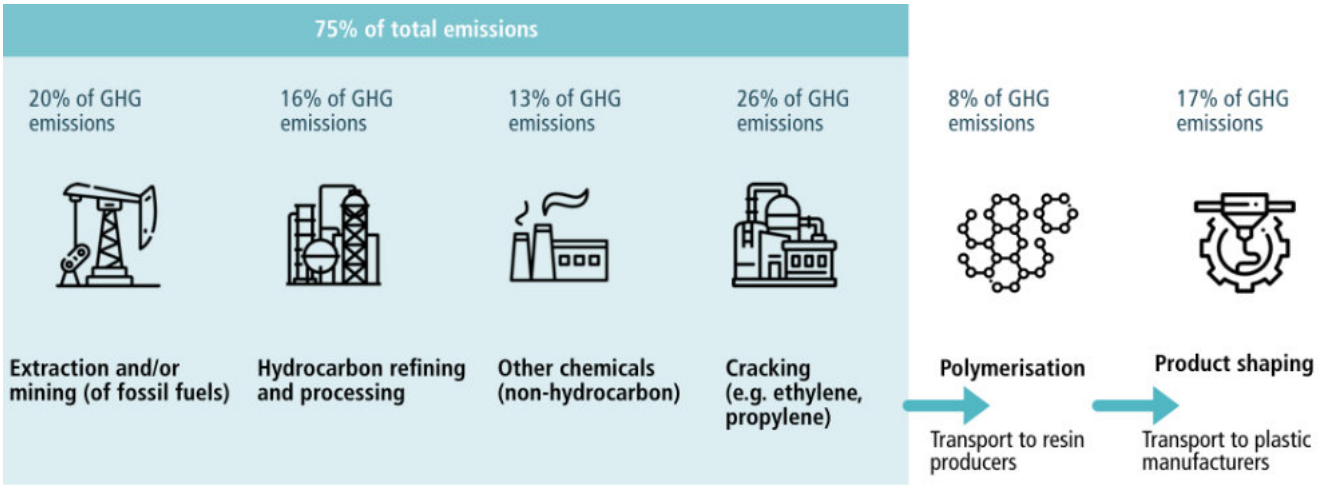
Reducing the emissions from plastics requires a strategic approach, since not all solutions are equally effective. The Plastic Waste Hierarchy (Figure 3), a globally recognised framework backed by DEFRA, makes it clear: Prevention is the most effective strategy, followed by reuse.

When waste is unavoidable, recycling is the next best option. Yet, 73% of plastic waste in Europe is still incinerated or sent to landfill, the two most environmentally damaging disposal methods[3]. The UK has a defining opportunity to lead by example, shifting towards prevention, reuse, and a circular economy to cut emissions, reduce waste, and strengthen resource security.

Barriers to progress

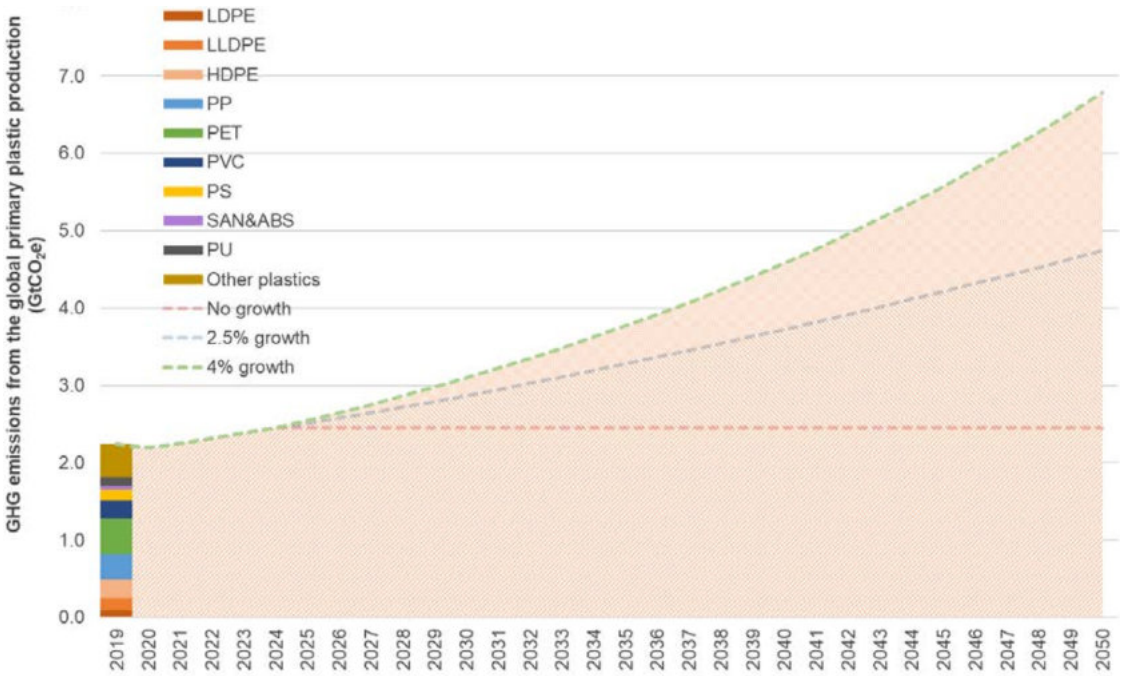
The plastics industry faces significant challenges in decarbonisation, and consumer confusion is a major obstacle. For example, terms like "bioplastic" are often misunderstood, leading to improper disposal. Under EU definitions, bioplastics can still be fossil fuel-based or non-biodegradable, misleading consumers and policymakers alike.

Figure 1: Plastic-related greenhouse gas emissions



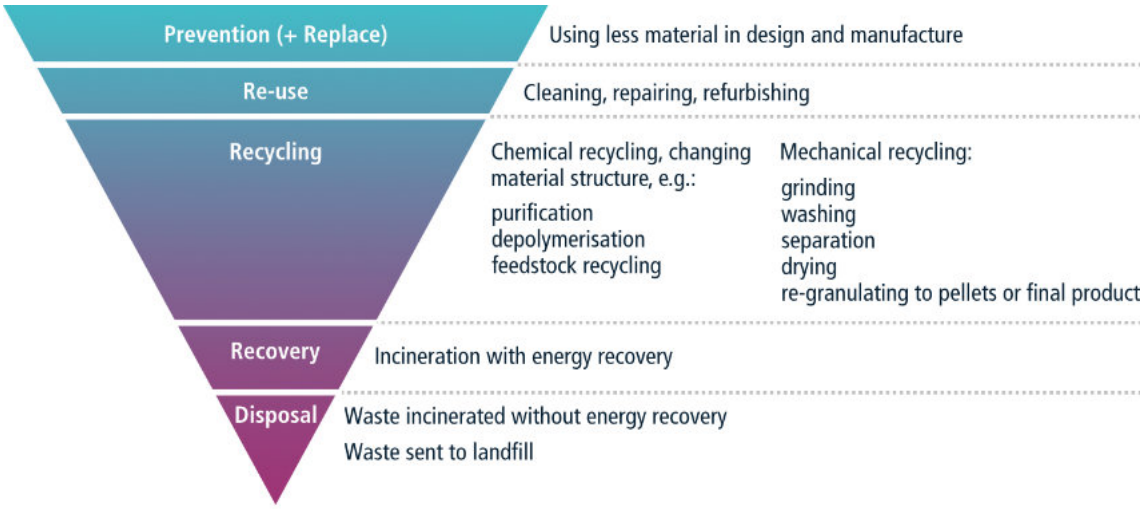
Source: Adapted from Karali N (2024)[2] p. 57.

Figure 2: Plastic greenhouse gas emissions growth



Source: Karali N (2024)[2] p. 6

Figure 3: The Plastic Waste Hierarchy



Source: Adapted from DEFRA (2011) *Guidance on Applying the Waste Hierarchy*. https://assets.publishing.service.gov.uk/media/5a795abde5274a2acd18c223/pb13530-waste-hierarchy-guidance.pdf

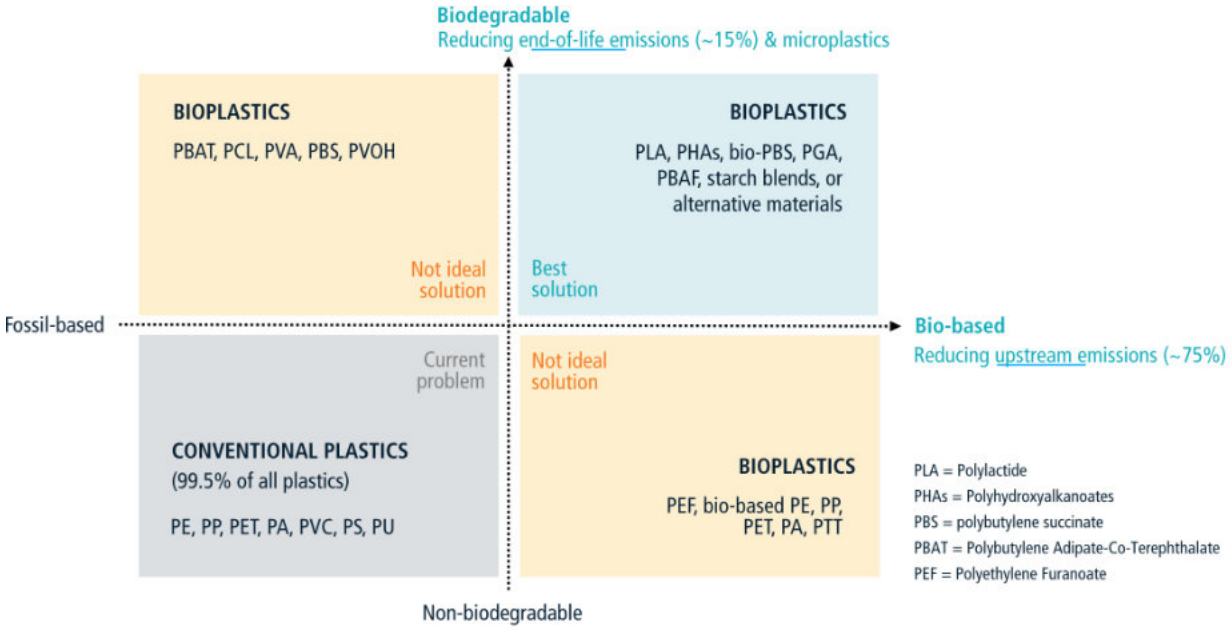
In addition, plastics come in countless forms, each with different properties and recyclability. For instance, supermarket cling films made from PVC (Polyvinyl chloride) and LDPE (Low-Density Polyethylene) look similar, yet PVC contaminates current recycling streams, while LDPE does not. Without clear guidance and policy intervention, these barriers will continue to undermine progress.

The way forward

The scale of the plastic challenge may seem daunting, but there are actually clear priorities to address. Where do the emissions come from? A closer examination reveals key trends:

- 75% of plastic's lifecycle emissions occur before the production of its main ingredients: polymers.
- 58% of total plastic emissions come from just three plastic types – PET (Polyethylene terephthalate), PP (Polypropylene), and PE (Polyethylene), in which they are mainly used for packaging. Packaging consumes nearly 40% of global plastic demand[4].
- Only 28% of plastics were recycled in the UK[5].

Figure 4: Properties of bioplastics



Source: Adapted from Chui M, Carbon Limiting Technologies (2024) Presentation to Clean Growth Fund.

This means:

- If fossil inputs were to be avoided, 75% of plastic life cycle emissions could be addressed.
- If plastic demand for packaging were reduced, nearly 66% of total plastic emissions could disappear.
- There is still huge improvement to be achieved in end-of-life treatment.

Industry actions

The UK market is actively addressing these challenges through impactful initiatives. A notable example is the UK Plastics Pact, led by the Waste and Resources Action Programme (WRAP). This collaborative effort unites businesses across the value chain to pilot innovative solutions and establish best practices. Alongside WRAP's efforts, various industry players—including retailers, technology innovators, and waste management companies—are driving progress through independent and collaborative actions.

Specific initiatives being pursued across the sector include:

Eliminating fossil inputs

Innovators are creating new plastic materials to reduce reliance on fossil fuels, primarily through two approaches: bio-based plastics and biodegradable materials (Figure 4).

- Bio-based plastics utilise organic sources such as starch (e.g., potatoes, corn), cellulose (e.g., sugarcane), chitin (e.g., mushrooms, seaweed), and materials produced by microorganisms. These alternatives aim to lower emissions by replacing fossil-based feedstocks.
- Biodegradable plastics are designed to decompose into natural substances under specific conditions. Among these, compostable plastics meet stricter criteria—they must break down without releasing toxins and can even support plant growth.
  - Industrially compostable plastics require controlled conditions in composting facilities to degrade fully.
  - Home compostable plastics can break down in well-maintained home composting systems.

Compostable plastics are especially promoted as a solution for hard-to-recycle, food-contaminated items like fruit stickers and tea bags. For instance, Waitrose partnered with WRAP to trial selling loose fruits without packaging, offering compostable plastics for customer use. This trial provided valuable insights, enabling WRAP to publish guidelines for retailers to encourage consumers to reduce plastic use[6].

Encouraging impactful recycling

Effective recycling is a cornerstone of the circular economy, preventing plastic waste from polluting the environment. Whilst all plastics are theoretically recyclable, economic and logistical barriers – such as cost, market demand, and collection efficiency – limit real-world recycling rates. PET and HDPE, commonly used in water and milk bottles, are the most recycled due to established markets and infrastructure. In contrast, multi-layered or contaminated plastics often end up in landfills or incineration because recycling them is not economically viable.

- Mechanical recycling, the traditional method, shreds and reforms plastics without altering their chemical structure. However, it requires clean, single-polymer plastics, making it unsuitable for contaminated or mixed materials. UK innovator LabCycle is improving sorting and decontamination technologies to recycle lab plastic waste instead of incinerating it.
- Chemical recycling breaks plastics down at the molecular level, enabling the processing of previously

'unrecyclable' materials. A leading example is Mura Technology's Teesside-based chemical recycling plant. Set to begin operations this year, it has gained market traction for its ability to recycle mixed plastics more efficiently and cost effectively than many existing methods.

Chemical recycling should complement, not replace, mechanical recycling. While mechanical recycling is faster and more resource-efficient, chemical recycling addresses contamination and quality issues, ensuring more plastics remain in the circular economy.

Reducing the use of plastic – the ultimate solution

No single solution is perfect, each comes with trade-offs that must be carefully managed.

- Bio-based plastics offer an alternative to fossil fuel-based plastics, but large-scale production raises concerns about competing with food crops, shifting the environmental burden to land and water use[7].
- Compostable plastics face challenges in real-world conditions, where ideal degradation environments are often unavailable. They are also frequently treated as contaminants in conventional recycling facilities and suffer from misuse due to consumer confusion over terminology.
- Recycling, while essential, is not carbon-neutral – it still emits CO_2 and often requires virgin plastic inputs to maintain material quality.

These challenges reinforce the plastic waste hierarchy: reducing overall plastic demand must remain the top priority in building sustainable solutions.

Businesses need to prioritise reducing plastics' environmental impact across their supply chains rather than making decisions based on broad assumptions about which materials seem "best" on the surface[8]. A strategic, evidence-based approach is critical for driving meaningful change. For example, Carbon Limiting Technologies is hosting roundtables for corporate leaders, providing in-depth research and industry examples to help reduce Scope 3 emissions. These insights are vital for businesses to develop effective strategies that deliver lasting progress in tackling waste and broader sustainability challenges.

Policy opportunities for a sustainable plastic economy

A truly circular economy would eliminate plastic use, reserving it only for essential applications – designed for reuse or made from compostable materials. Any unavoidable waste would be fully recycled into new plastics, ensuring nothing is discarded.

While this ideal scenario remains out of reach, innovative solutions are narrowing the gap between ambition and reality. Some UK businesses are already making promising strides towards sustainable plastic use. Policymakers have a vital opportunity to reduce plastic waste, improve recycling and incentivise sustainable alternatives by aligning regulation, investment, and public engagement towards a circular economy.

Key actions for policymakers

The UK has a unique opportunity to lead the global transition to a circular plastic economy. Here are five critical steps:

1. Strengthen regulations with clear terminologies

- Standardise labelling to differentiate between bio-based, industrially compostable, and home compostable plastics.
- Implement recycled content requirements and clear labelling regulations to improve transparency.

2. Eliminate problem plastics

- Phase out harmful plastics like polystyrene packaging and PVC cling film.
- Enhance Extended Producer Responsibility (EPR) policies to hold manufacturers accountable for the entire lifecycle of their products.

3. Mandate 100% reusable, recyclable, or compostable packaging

- Ensure all plastic packaging is designed for reuse, recycling, or composting.
- Clarify EPR rules to encourage simplifying packaging designs to make recycling more efficient.

4. Accelerate investment in recycling infrastructure

- Expand mechanical and chemical recycling capacity to handle complex plastic waste.
- Support innovations like Mura Technology's chemical recycling plant, which can process previously unrecyclable materials.

5. Foster cross-sector collaboration

- Encourage partnerships between government, industry, and researchers to share case studies and knowledge to drive systemic change by establishing clear guidelines.
- Build on initiatives like the UK Plastics Pact, which brings together businesses to trial sustainable solutions.

The time for action is now. Plastic pollution is a global crisis that demands immediate, bold, and unyielding action. By implementing clear, stringent regulations, enforcing uncompromising producer accountability, and investing in ground-breaking innovative solutions, the UK has the opportunity to establish itself as the market leader in the battle against plastic emissions and pollution.

References

[1] European Environment Agency | Plastics (website). www.eea.europa.eu/en/topics/in-depth/plastics

[2] Karali N (2024) *Climate Impact of Primary Plastic Production*. Berkeley, CA: Lawrence Berkeley National Laboratory, p. 57. https://escholarship.org/uc/item/12s624vf

[3] Plastics Europe (2024) *The Circular Economy for Plastics. A European Analysis*. Brussels: Plastics Europe AISBL, p. 22. https://plasticseurope.org/knowledge-hub/the-circular-economy-for-plastics-a-european-analysis-2024

[4] Ibid p. 53.

[5] Ibid p. 76.

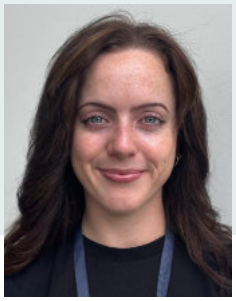
[6] The UK Plastics Pact (2024) *Delivering Impact Together*. Annual Report 2024. Oxford: WRAP, p.13. www.wrap.ngo/resources/report/uk-plastics-pact-annual-report-2023-24

[7] Brizga, Janis et al. (2020) The unintended side effects of bioplastics: carbon, land, and water footprints. *One Earth* 3(4): 515–516.

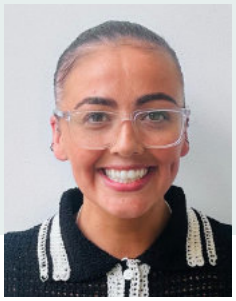
[8] Waste and Resources Action Programme (website). www.wrap.ngo

Improving soil health in the UK

Why a microbial approach is indispensable in attaining sustainable soils



Daisy Neale
Policy and Diversity Manager at Applied Microbiology International



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Soil health underpins many of the UN Sustainable Development Goals since healthy soils not only help to provide food security; they also increase resilience to climate change, reduce the risk of pathogen and AMR transmission through the environment, boost biodiversity, increase carbon storage and nutrient retention and more[1]. With the global population ever increasing and demands on our soils simultaneously growing, soil health must be given the attention it deserves due to the complex processes and factors it underpins, as ultimately healthy soils are essential for a thriving planet and future.

If the UK Government wishes to stay aligned with, and at the forefront of, global developments and ambitions in relation to soil health, imminent action is needed. This action needs to be based on the recognition of the pivotal role played by microbiology in achieving soil health as current practices – which do not consider microbiology appropriately – are unsustainable.

Applied Microbiology International and the wider microbiology community thereby recommends taking action by:

- Considering the opportunity of taking a nation-wide microbiome approach to soil
- Deploying microbial solutions to improve the UK's soil health, whilst exploring and building the basis for a national microbiome approach

The current state of UK soils

Agricultural land covers 70% of the UK, but only 36% was croppable in 2023[2]. Cereals, which heavily deplete soil nutrients, made up 71% of the crop area[2]. Additionally most UK farming practices are mechanised, involving large quantities of agrochemicals (fertilizers and pesticides); practices which are unsustainable as evidenced by diminishing returns that are predicted to worsen with climate change.[3]

The role of soil microbes

Soil consists of minerals, plant, animal and microbial residues (organic matter), living organisms (including micro-organisms, or 'microbes') water, and gas. Soil microbes, including bacteria and fungi, have essential roles including removing contaminants, carbon sequestration, plant protection, crop productivity, soil structure and air/water regulation. This complex community of microbes and their interactions are called the soil microbiome; a cornerstone for taking a holistic One Health approach across all ecosystems[4].

Despite the soil microbiome's significance, much remains unknown about it[5] [6]. On top of this, current soil health initiatives do not factor in the soil microbiome and its complexities, which risks affecting it negatively, or missing opportunities to optimise its benefits. To circumvent this, AMI proposes taking a holistic microbiome approach to UK soils.

A microbiome approach to soil – a long-term solution

A microbiome approach to soil leverages the diverse microbial communities within soil ecosystems to improve soil health, agricultural productivity, and environmental sustainability while acknowledging soil's role in waste removal, climate change mitigation, nutrient cycling, and disease suppression[7].Leveraging the soil microbiome will contribute to achieving net zero, food security, and global health and wellbeing.

To implement this approach in the UK, a comprehensive strategy encompassing research, education, policy support and practical implementation is essential. Actions needed to implement this approach include:

Study & monitoring

- Conduct further research and studies across the UK to define the UK soil microbiome and have protected funding to do so.
- Establish a regular monitoring framework to ensure the long-term viability of a microbiome approach.

Education & outreach

- Better inform farmers, land managers, legislators and the public on soil health.
- Introduce training and incentives to encourage adoption of behaviours that are beneficial to the soil microbiome, while addressing concerns and scepticism.

Policy support

- Establish and modify regulations that provide incentives and assistance for farming methods that promote a healthy soil microbiome.
- Major agricultural policies and projects should be reviewed and amended,

where possible, to ensure they incorporate concerns around practices that negatively impact the soil microbiome and to enable a transition towards more sustainable practices.

Technology & innovation

- Allocate resources towards the advancement of soil health promoting alternatives to current agricultural practices by protecting funding.
- Investment to explore the scalability and efficiency of a microbiome approach.

Collaboration & networking

- Promote cooperation across disciplines (scientists, farmers, industry stakeholders, policymakers) to facilitate knowledge sharing.
- Encourage a holistic, collaborative approach to UK soils to avoid future redundancy.

Intermediary solutions to improve soil health

The microbiome approach to sustainable soils remains in its infancy, but immediate action can improve UK soil health in the meantime. With the agricultural biologicals market projected to grow from $14.6 billion in 2023 to $27.9 billion by 2028, the UK has an opportunity to capitalise on this sector.[8]

Alternatives to artificial fertilizers

Biostimulants are substances and/or microorganisms that stimulate plant processes, reducing fertilizer dependence and improving growth and stress resistance. If adopted across the European Union, biostimulants could reduce nitrogen use by 517,000 tonnes while improving fertilizer efficiency 5–25%, reducing pesticide use 10–15%, and increasing crop yields 5–10%[9].

Biofertilizers

Microbes can be used as alternatives to artificial fertilizers which are known to adversely impact soil by hardening it and reducing soil fertility, while also contributing to greenhouse gas emissions linked to their use and transportation[10 11]. Biofertilizers alone cannot meet food security needs, however, they can supplement and reduce artificial fertilizer use. Efforts to improve biofertilizer reproducibility, shelf-life, and cost-effectiveness are needed, alongside careful regulation to balance innovation with environmental safety[12].

Microbial inoculants

Beneficial microbes can enhance nutrient uptake and help restore soils degraded by artificial fertilizers. Plant-growth-promoting rhizobacteria (PGPR) and arbuscular mycorrhizal fungi (AMF) are key classes of beneficial microbial inoculants. AMFs facilitate nutrient exchange and enhance resilience to stressors, while PGPRs have plant growth-promotion and bioremediation characteristics. Despite their potential, their market shares remain limited due to lack of research and regulatory challenges[13 14]. Better communication between researchers and the regulatory sphere is needed to refine this technology and improve adoption[15].

Biochar

Biochar is formed by heating organic matter. When applied to soil it enhances soil structure, increases nutrient availability, reduces contaminants, and improves water retention. It boosts microbial activity, which supports the soil microbiome. Biochar can be made from local organic waste, reducing waste. However, challenges include varying effectiveness based on feedstock, potential greenhouse gas emissions, and the need for long-term studies on its sustainability[16 17].

Biological control agents

Artificial pesticides harm soil microbiomes and the environment[18 19]. Biopesticides, such as bacteria, fungi, and viruses, provide a sustainable alternative[20 21]. The UK is the fifth largest consumer of biopesticides globally and delays in the UK's National Action Plan for Sustainable Pesticide Use provides an opportunity to incorporate more sustainable solutions including biological control agents[22 23]. Barriers to adoption currently include their narrow spectrum of pest activity and lengthy and expensive regulatory processes.

Modifying current techniques

Although traditional farming techniques have been shown to negatively impact soil health, some conservation agricultural practices have been shown to improve soil health. These techniques

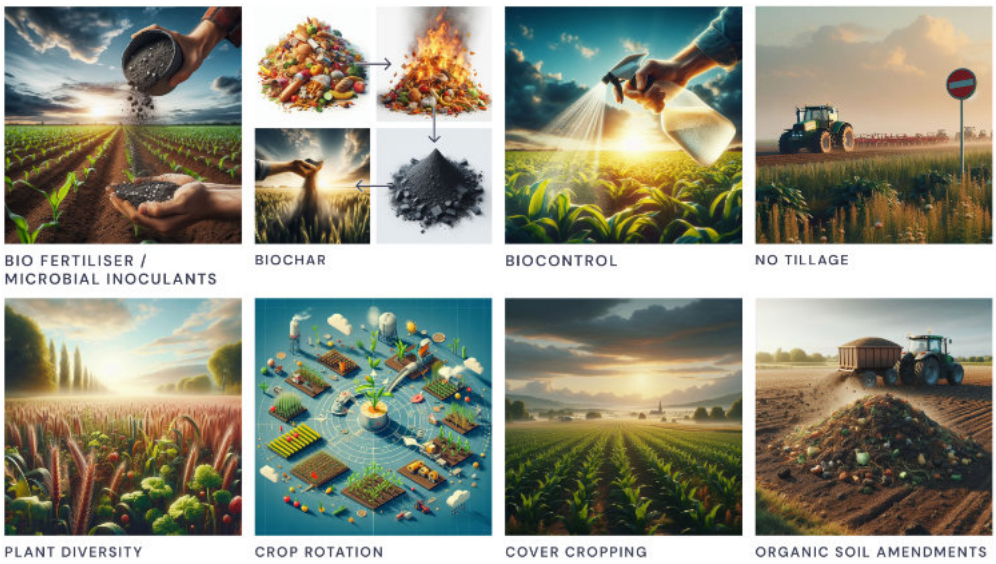

Figure 1: Interim microbial solutions, which can be deployed now to help address the current soil health crisis and increase the health of UK soils in agricultural settings

require appropriate incentives but do not require complex innovation and can be deployed now or with minimal intervention. Conservation agriculture improves soil health and productivity, though transitional periods may see short-term losses. Implementing sustainable practices supports long-term soil fertility, water retention, and pest management. These practices include:

- Reduced tillage
- Cover cropping
- Crop rotation
- Plant diversity
- Organic amendments

A shift towards microbiome-based solutions, alongside regulatory reform and research investment, can help the UK transition to a more sustainable agricultural system.

Conclusion

There is a delicate balance between restoring the health of the UK's soils whilst maintaining sufficient food security. However, historic and current approaches have been, and are, heavily weighted towards the latter. While a short-term drop in yields may be concerning, evidence suggests it is necessary for long-term sustainability. AMI urges the UK government to prioritise soil health to combat climate change, protect ecosystems, and ensure future food security. Supporting microbial solutions outlined in this report is a vital first step. These immediate actions can address the soil crisis while positioning the UK as a leader in microbiome-based agriculture. AMI remains committed to promoting this innovative approach for a sustainable agricultural future.

Citations

[1] Evans DL et al. (2021) Sustainable futures over the next decade are rooted in soil science. *European Journal of Soil Science* 26;73(1).

[2] DEFRA (2023) *Agricultural Land Use in United Kingdom at 1 June 2023*. Available from: www.gov.uk/government/statistics/agricultural-land-use-in-the-united-kingdom/agricultural-land-use-in-united-kingdom-at-1-june-2023

[3] DEFRA (2023) *Total Factor Productivity of the United Kingdom Agricultural Industry in 2023*. Available from: www.gov.uk/government/statistics/total-factor-productivity-of-the-agricultural-industry/total-factor-productivity-of-the-united-kingdom-agricultural-industry-in-2023

[4] Banerjee S, van der Heijden MGA (2022) Soil microbiomes and One Health. *Nature Reviews Microbiology* 23;21.

[5] Buckley DH, Schmidt TM (2003) Diversity and dynamics of microbial communities in soils from agro-ecosystems. *Environmental Microbiology* 5(6):441–52.

[6] Baldrian P (2019) The known and the unknown in soil microbial ecology. *FEMS Microbiology Ecology* 9;95(2). Available from: https://academic.oup.com/femsec/article/95/2/fiz005/5281230

[7] Suman J et al. (2022) Microbiome as a key player in sustainable agriculture and human health. *Frontiers in Soil Science* 11;2.

[8] MarketsandMarkets (2024) *Agricultural Biologicals Market*. Available from: https://www.marketsandmarkets.com/Market-Reports/agricultural-biological-market-100393324.html

[9] Osorio-Reyes JG et al. (2023) Microalgae-based biotechnology as alternative biofertilizers for soil enhancement and carbon footprint reduction: advantages and Implications. *Marine Drugs* 1;21(2):93. Available from: www.mdpi.com/1660-3397/21/2/93

[10] Pahalvi HN et al. (2021) Chemical fertilizers and their impact on soil health. In: Dar GH et al. (eds). *Microbiota and Biofertilizers*. Cham: Springer p. 1–20. doi:10.1007/978-3-030-61010-4_1

[11] Milton M et al. (2020) Microbial fertilizers: their potential impact on environment sustainability and ecosystem services. *International Journal of Chemical Studies* 1;8(6):2308–15.

[12] Milton M et al. (2018) Perspectives of microbial inoculation for sustainable development and environmental management. *Frontiers in Microbiology* 5;9.

[13] Malgioglio G et al. (2022) Plant-microbe interaction in sustainable agriculture: the factors that may influence the efficacy of pgpm application. *Sustainability* 16;14(4):2253.

[14] Salomon MJ et al. (2022) Establishing a quality management framework for commercial inoculants containing arbuscular mycorrhizal fungi. *iScience* 25(7):104636.

[15] Stevenson C, Wentworth J (2020) *Sustaining the Soil Microbiome*. UK Parliament, POST. Available from: https://post.parliament.uk/research-briefings/post-pn-0601

[16] Quilliam RS et al. (2012) Nutrient dynamics, microbial growth and weed emergence in biochar amended soil are influenced by time since application and reapplication rate. *Agriculture, Ecosystems & Environment* 158:192–9.

[17] Steiner C, Bayode AO, Ralebitso-Senior TK (2016) Feedstock and production parameters: effects on biochar properties and microbial communities. In: Lehmann J, Joseph S (eds). *Biochar Application: Essential Soil Microbial Ecology*. Amsterdam: Elsevier; p. 41–54

[18] Hussain S et al. (2009) Chapter 5 Impact of pesticides on soil microbial diversity, enzymes, and biochemical reactions. *Advances in Agronomy* 102:159–200.

[19] Bitew Y, Alemayehu M (2017) Impact of crop production inputs on soil health: a review. *Asian Journal of Plant Sciences* 15;16(3):109–31.

[20] Bonaterra A, Badosa E et al. (2022) Bacteria as biological control agents of plant diseases. *Microorganisms* 31;10(9):1759.

[21] Guzmán-Guzmán P et al. (2023) Trichoderma Species: Our best fungal allies in the biocontrol of plant diseases – a review. *Plants* 17;12(3):432.

[22] AgroPages (2024) *Biopesticides Grow 45% in Brazil*. Available from: https://news.agropages.com/News/NewsDetail---49574.htm

[23] Science, Innovation and Technology Committee (2023) *Insect Decline and UK Food Security*. Available from: https://publications.parliament.uk/pa/cm5804/cmselect/cmsctech/326/report.html

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BE-ST:

Driving built environment innovation towards a net-zero future

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Chief Executive, Institute of Innovation & Knowledge Exchange

Visiting Professor of Innovation and Digital Transformation, University of Westminster

Built Environment – Smarter Transformation (BE-ST) is championing an unprecedented wave of innovation in the built environment sector, setting an international benchmark in the drive towards net-zero carbon solutions.

Their recent Investor in Innovations (I3) Certification by the Institute of Innovation and Knowledge underscores their pioneering efforts, positioning them as a leading force in sustainable transformation.

BE-ST, Scotland's national innovation centre for the built environment, plays a critical role in aligning innovation with policy, industry, academia, and the broader community. With a mission to accelerate a just transition to net-zero, BE-ST fosters collaborations that deliver impactful innovation – faster, more affordably, and sustainably.

A strategic commitment to innovation

BE-ST's strategic framework prominently integrates innovation within its core operational fabric. Recognised officially by the Scottish Government as a national Innovation Infrastructure Asset, BE-ST acts as a catalyst, bridging academia, industry, and public institutions.

The recent Investor in Innovations Certification, aligned to the ISO 56002 standard, demonstrates BE-ST's exemplary innovation management practices. The certification emphasises robust strategic alignment, effective governance, and comprehensive evaluation mechanisms that measure the tangible impacts of their innovative projects.

Douglas Morrison FIKE, Deputy CEO of BE-ST, noted:

"Our experience with the IKE Institute has been so much more than just an assessment – it has fundamentally transformed the way we conceptualise and manage innovation. Through the process, we were able to benchmark our capability against global best practice, align our approach with the ISO 56000 series of Innovation Standards, and develop a clear, actionable roadmap to supercharge our innovation potential. It's given us the foundations to scale up our ambition, strengthen our integration with performance and quality systems, and visibly demonstrate our innovation capacity to collaborators, funders, and investors alike."

The BE-ST Manifesto outlines their forward-looking strategy, embedding values of openness, innovation, and constructive disruption. Their strategic transition from project-centric operations to a national infrastructure platform – through unique Centres of Excellence in Mass Timber and Retrofit – is evidence of their dynamic, mission-driven approach.

Professor Phil Kennedy FIKE[1], a member of the seven-member I3 Assessment and Validation Panel said:

"BE-ST exemplifies outstanding innovation management. Their approach combines rigorous strategic alignment, effective governance, and deep industry collaboration. Their Investor in Innovations accreditation highlights their leadership and sets a benchmark for sustainable transformation in the built environment sector. It's been impressive to witness their journey towards excellence, clearly driven by a profound commitment to impactful innovation and sustainable development".

Infrastructure for innovation

BE-ST's extensive physical infrastructure is another hallmark of their innovative vision. Located at the Hamilton International Technology Park, BE-ST boasts the UK's sole mass timber manufacturing facility and Scotland's National Retrofit Centre. Recent investments exceeding £2.5 million have significantly expanded their capacity, enabling pioneering research, cutting-edge manufacturing, and practical training programmes that bridge skills gaps.

The centre utilises advanced digital technologies, including digital twin infrastructure, sophisticated data dashboards, and collaborative digital tools. These technologies facilitate knowledge-sharing and effective project management, fostering agile, responsive innovation processes.

Commercialising innovation: supporting Ecosystems Technologies

BE-ST has been instrumental in supporting Ecosystems Technologies since its inception in 2019, significantly contributing to its rapid commercial growth. Ecosystems Technologies, a

[1] Visiting Professor QMUL London; former Chairman and CEO of Nanoforce Technology Limited; former Head of External Innovation-3M UK PLC.

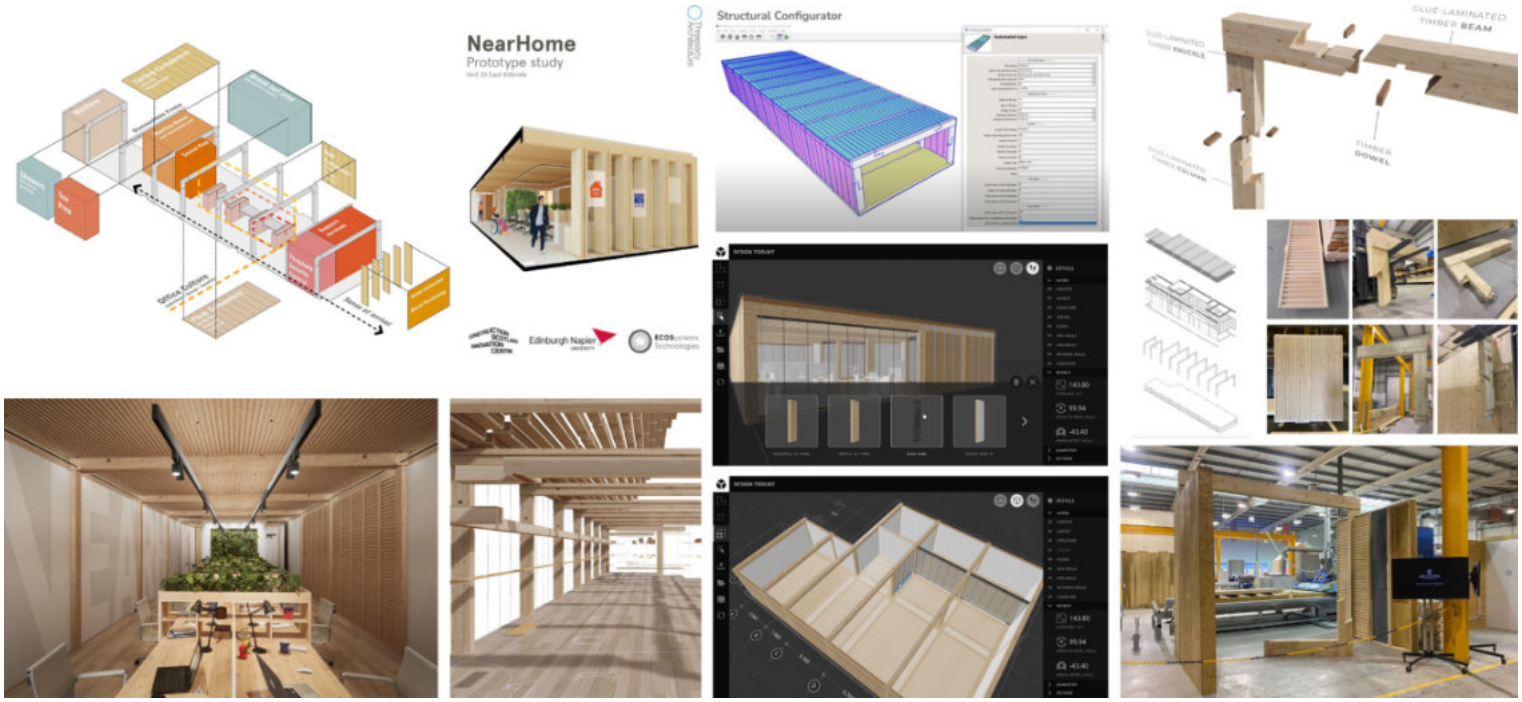

Figure 1: NearHome retrofit kit of parts

pioneer in home-grown timber, modern methods of construction (MMC), and digital construction, has doubled its turnover annually, reaching £4.6 million in 2024/25 and projecting £8.5 million in 2025/26.

Key collaborative initiatives include the £1.4 million Innovate UK-funded 'Transforming Timber' project, which commercialised UK-sourced engineered timber products, and 'NearHome', a retrofitting initiative transforming public sector buildings into efficient office spaces (Figure 1). Additionally, the 'GenZero' initiative, backed by the UK Department for Education, aims to deploy zero-carbon modular systems for schools, demonstrating BE-ST's profound impact on scalable commercial solutions.

Foresight and industry collaboration

Central to BE-ST's innovation leadership is its capacity for industry foresight. Through chairing critical governmental and industry working groups, BE-ST directly informs policies such as the Scottish Government's Green Industrial Strategy and the Climate Emergency Skills Action Plan.

Their extensive stakeholder network – comprising Innovation Champions, Changemaker – drives practical solutions responsive to emerging market trends and policy shifts. Notably, BE-ST administers the Scottish Construction Industry Data Dashboard, leveraging AI-driven data visualisation to inform strategic decision-making across the sector.

Creating real impact and value

BE-ST rigorously evaluates its innovation processes through a clearly defined Impact and Outcome Framework. Metrics span economic growth, environmental benefits, job creation, and sector-wide capacity-building. For example, since inception, BE-ST has facilitated over 500 collaborative innovation projects, directly enhancing Scotland's economic resilience and contributing significantly to the built environment's sustainable future.

Their strategic use of lean methodologies and agile project management ensures that projects maintain flexibility, optimising resources and delivering substantial returns on investment. This disciplined yet adaptive approach allows BE-ST to maximise value from every initiative.

Cultivating a culture of innovation

Innovation at BE-ST isn't confined to organisational strategy and external projects; it thrives within the internal culture. Their organisational structure, underpinned by interdisciplinary teamwork, promotes continuous learning and creative problem-solving. This vibrant innovation culture is sustained through initiatives like internal 'Innovation Weeks' and comprehensive employee development programmes emphasising design thinking and agile methodologies.

Moreover, regular internal and external feedback loops, annual strategic reviews, and staff surveys ensure BE-ST's innovation practices evolve continuously, aligning closely with stakeholder needs and market dynamics.

Looking forward

As BE-ST continues its mission-driven journey, their Investor in Innovations Certification signifies not just recognition but also an ongoing commitment to setting global standards in innovation. Their strategic foresight, robust infrastructure, collaborative ethos, and rigorous evaluation frameworks uniquely position BE-ST as an exemplary innovator within the built environment sector.

In this rapidly evolving landscape, BE-ST exemplifies how structured innovation can yield transformative outcomes, setting the pace for other industries aiming for sustainable futures. Their story is not only one of Scottish leadership but of international influence, demonstrating how strategic innovation can genuinely redefine our built environment for generations to come.

Technologies are transforming our world

Kedar Pandya
UKRI Technology Missions Fund Senior Responsible Owner and Executive Director, Strategy Directorate, at the Engineering and Physical Sciences Research Council, UKRI

The UK has the largest tech ecosystem in Europe, home to a unique combination of innovative and talented entrepreneurs, world-class research expertise and facilities, talent and skills, and pro-innovation regulations.

Thriving UK tech ecosystem

A vibrant UK tech sector is important for unleashing the huge benefits technology provides – ensuring technology is a force for good that improves lives and livelihoods for people across the country.

UK Research and Innovation (UKRI) has a strong history of investing in research and innovation to support the emergence, development and exploitation of tomorrow's technologies[1] that have the potential for radical positive impact on our society and economy.

> Economic growth is enabled by our world-leading tech sector

Economic growth is enabled by our world-leading tech sector. Technological breakthroughs are made possible through rapid advancements in scientific discoveries, to help us tackle global challenges across our net-zero economy, health, resilience and productivity, in a responsible and sustainable way. The impact is wide-ranging, across major sectors of the economy at a regional, national and international scale.

Mission-led approach to tackle global challenges

Through our UKRI Technology Missions Fund[2] we are investing £320 million in Technology Missions to support the critical technologies of tomorrow in artificial intelligence, engineering biology, future telecommunications and quantum technologies.

Our mission-led investments are driving collaborations between innovative businesses, academia and government departments to accelerate innovative technological advancements and new scientific discoveries. Technology developments to help improve lives and grow the UK economy – creating jobs, increasing productivity, and stimulating investment.

- AI is supporting healthcare and high-growth industries, boosting business profitability in a responsible and trustworthy way.
- Engineering biology is reducing plastic pollution and developing new, safer vaccines and therapeutics.
- Future telecommunications technologies are vastly improving the speed, security, reliability and energy consumption of our wireless networks.
- Quantum technologies in positioning, navigation and timing are making transport more resilient, while quantum hardware testbeds are exploring the potential for large-scale quantum computing.

Supporting hundreds of research organisations and businesses

I believe technology is powered and empowered by science and innovation, and technological breakthroughs are substantially enhanced through a multidisciplinary and interdisciplinary, integrated approach. That's why we are bringing together people from diverse industries and sectors to identify and develop technological solutions to shared barriers to innovation, often described as market failures.

> Technology is powered and empowered by science and innovation, and technological breakthroughs are enhanced through a multidisciplinary and interdisciplinary, integrated approach

Over the past two years our Technology Missions Fund investments have supported over 600 projects, including 621 businesses and 92 higher education institutes to collaborate in strategically driven mission-led programmes.

Collaborative R&D projects across engineering biology and AI sectors are bringing together diverse expertise, resources, and perspectives to address complex challenges and drive innovation forward, whilst reducing expenses and risks. So far, we have invested £77m to support CR&D projects.

Regional, national and international scale

We are supporting people and projects right across the UK and globally to boost technology development and productivity at a local, national and international scale.

Engineering Biology Hubs and Missions Awards are supporting researchers and innovators up and down the country from Edinburgh to Portsmouth, to develop pioneering solutions to tackle environmental, clean growth, health and food system challenges.

The Responsible AI UK consortium is creating an international ecosystem for responsible AI research and innovation. By connecting UK research centres and institutions around the world we are supporting world-leading best practices for how to design, evaluate, regulate, and operate AI-systems, helping to maintain the UK's global influence in AI technology on an international scale.

Supporting the whole technology journey

We recognise that researchers and businesses need different forms of financial and advisory support to innovate and grow depending on the technology, the sector, and maturity of idea.

Our Technology Missions Fund is supporting technology across all levels of its journey from fundamental, curiosity-led research all the way through to development, commercialisation and adoption.

> Ensuring the right people have access to the right funding and support at the right time.

Our Mission-led investments are delivered across UKRI, led through EPSRC, BBSRC and Innovate UK working in partnership with the Department for Science, Innovation and Technology (DSIT), other government departments, the research base and industries.

They integrate research, innovation and policy requirements to accelerate technology development, enhance UK capabilities and skills. This ensures the right people have access to the right funding and support at the right time. From early-stage research ideas, through to proof-of-concept and feasibility studies, with later-stage development and seed corn funding to turn those ideas into commercial products, services or processes, quicker.

We embed responsible research and innovation throughout, ensuring the UK remains at the forefront of shaping the responsible use of technology development.

Power of partnerships

We are working in partnership with government departments to drive transformative technological advances that help to deliver against the UK government's national science, innovation and technology strategies and visions, and the government's five missions: growing the economy; an NHS fit for the future; safer streets; opportunity for all; and making Britain a clean energy superpower).

> We ensure researchers and businesses have access to unique facilities and expertise to develop and deploy technologies.

Through partnerships with national infrastructure and capabilities like the National Quantum Computing Centre (NQCC), we ensure researchers and businesses have access to unique facilities and expertise to develop and deploy technologies. NQCC hosts quantum computing testbeds in national lab facilities to drive development and adoption of quantum computers.

The Joint Open Infrastructure for Networks Research (JOINER) project is connecting some of the UK's leading universities, research labs and business partners, so that together they can push the boundaries of future telecommunications innovation.

By delivering AI projects through the Innovate UK BridgeAI programme we are connecting businesses with the developers, tools and training they need to co-create and adopt purposeful technologies that deliver business impact responsibly and ethically. The most powerful aspect of this approach is that it is connecting AI experts with problem owners in businesses in high potential, low (AI) maturity sectors.

Mobilising industry and investor support

UKRI plays a role in both investing public money into R&D, but also helping to leverage private sector investment across multiple disciplines and sectors. Our Technology Missions are helping to mobilise industry and investor support.

The Engineering Biology Science Creates Accelerate programme is partnering with globally recognised venture capitals (VCs) to build an internationally recognised accelerator programme. This provides entrepreneurs with access to training, mentorship and co-investment opportunities, ensuring the best fit between companies and investors. So far, eight new engineering biology companies have been founded through the programme.

Reflections and future opportunities

I am proud of what we have achieved over the past two years, working with agility, flexibility and speed to deliver against the UK's science and technology vision, building sovereign capability for the UK's future growth and prosperity, and enhancing national security and resilience.

I look forward to continuing that momentum to harness more opportunities for technology development, commercialisation and deployment, to maintain the UK's leadership in emerging and expanding national and international markets.

Find out more, read our brochure

Find out more about how our mission-led investments are accelerating technology development to help improve our lives and grow the UK economy: www.discover.ukri.org/ukri-technology-missions-fund-2025

References

[1] UKRI (website). Tomorrow's Technologies. Available at: www.ukri.org/who-we-are/our-vision-and-strategy/tomorrows-technologies

[2] UKRI (website). UKRI Technology Missions Fund. Available at www.ukri.org/what-we-do/browse-our-areas-of-investment-and-support/ukri-technology-missions-fund

Evolutionary neuroscience and public policy:

Designing modern systems for our ancient brains

Dr Paul Goldsmith
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Every week MPs encounter constituents whose lives have been derailed by systems that, despite good intentions, fail to deliver positive outcomes.

Consider three common scenarios:

1. Case one is Sarah, who has fallen out with a friend. She feels rejected, low, anxious. She seeks help. She gets a GP appointment in four weeks. Then a referral to CBT in four months. She starts antidepressants, but they numb rather than resolve the issue. Signed off sick, she spirals into passivity, losing connection with the world.
2. The next case is Tom, who gets into a fight on a night out. It's a stupid mistake, not part of a criminal pattern. But the police are involved, charges are filed, and he's sucked into the slow-moving legal system. Four years later, he's in prison, surrounded by hardened criminals, learning more about crime than rehabilitation.
3. The final case is Jake, who earns enough with a combination of salary and benefits to pay the bills, but is deeply unhappy. He's constantly comparing himself to others and feels like a failure, trapped in a cycle of stress and self-doubt.

Now let's replay these cases in a different policy context – one where things work the way they were designed to.

1. Sarah feels low after falling out with a friend. But instead of waiting months for therapy, she is immediately supported by an integrated care system that re-engages her in daily activities. By the next day, she is back participating, her distress naturally resolving.
2. Tom makes a mistake and gets into a fight. He faces immediate consequences – a brief period of shunning and reputational damage. But he's soon given a chance to make amends and regain his standing. Within days, he's back contributing to the group, the incident forgotten in the face of shared purpose. Swift, reintegrative justice.
3. Jake, who feels pressure to succeed. But for him success isn't defined by abstract, distant goals. It's about visible contribution to the group – tool-making skills, physical endeavour. He has clear pathways to earn respect and status through demonstrating competence and commitment. His motivation remains high as he sees his efforts directly rewarded with esteem from his peers. He gains validation with status.

> Our brains are ancient tools operating in a modern world – shaped for small, fast-feedback groups, not bureaucratic delays and anonymity

The difference between these two versions? My speculation is that version two is how their cases would have played out 30 thousand years ago. The worse outcomes nowadays occur because we are victims of an evolutionary mismatch between the environment that shaped our brains and the one we now inhabit.

Our brains in effect are ancient tools operating in a modern world – shaped for small, fast-feedback groups, not bureaucratic delays and anonymity.

Understanding the brain's hard wiring

To fix modern policy, we need to understand what our brains are designed to do. Let's take this back to the most basic level of brain function, which reflects the fundamental difference between plants and animals. Not photosynthesis – our skin uses UV light to make vitamin D. The difference is movement, as in changing location. Animals must move to survive. But movement alone isn't enough – it must be toward a goal. So our neurobiology is built around rewarding goal pursuit and disengaging us when the effort required exceeds the perceived reward.

Dopamine is the fuel of goal pursuit. Well-being doesn't come from achieving a goal alone but from the striving toward it. Our brains evolved to reward effort and progress, not passive receipt. When rewards come too easily, we feel less fulfilled – because nature never envisaged us sitting still and being handed everything. In ancestral settings, continuous small victories – hunting successfully, finding food, contributing to the group – ensured reliable dopamine release.

However, modern society is full of unachievable expectations leading to widespread dissatisfaction. This is particularly problematic when goals are

distant, abstract, or socially constructed – such as career milestones, social media recognition, or financial success – because the brain struggles to register meaningful progress.

When a goal appears unachievable, our brain triggers disengagement, experienced as melancholy. It's a normal process, providing we switch to a more productive goal – abandon the forage if the yield is too low and weather is closing in. But in modern life it is much more difficult to abandon goals.

The basics of this goal control mechanism, the accelerator and brake – our reward and inhibition systems – lie deep in our brain and are common to all animals.

More specific goals are layered onto this, which evolution has honed for our survival. These are like Maslow's hierarchy of needs. First, the basic survival needs: food, water, warmth.

Layered on top of this is validation – the deep need to receive signals from others that we belong and will be looked after by the group. And beyond that, status – our relative position in the group, which historically ensured better resources, mates, and protection.

We have a whole set of emotions to optimise these group interactions and maximise cooperation and endeavour. Remember that these are all ultimately goals – achieving them increases our wellbeing and failure to do so brings melancholy. We cannot change these aspects of our brains. They are hardwired.

Policy reforms: adapting to the brain's operating manual

Too often modern policies ignore our brain's core needs and functions, to disastrous ends. Let me give you some examples.

Policies often inadvertently promote passivity, weakening goal-seeking behaviour. Welfare systems, while well-intentioned, can sometimes discourage the very activities that boost mood and self-esteem, replacing them with inactivity. Physios say 'Motion is Lotion', and this is important in more ways than one. Staying active not only keeps our bodies healthy, but delivers broader wellbeing to our minds too.

> Ignoring our evolutionary heritage leads to policy that is at best inefficient, at worst actively damaging

Then there's the anonymity of modern reciprocity – where the state or more distant institutions deliver everything – and weaker social cohesion. Consider my old unadopted road. Every year, the residents cleared the drains and swept the leaves to prevent flooding. We worked together, chatted, and strengthened community ties. The elderly prepared tea and cake at the end. Then a new committee chair, an accountant, suggested we simply pay the council £50 to do it. While efficient, this would have destroyed the social bonding, the natural dispute resolution over hedge heights, and the satisfaction of shared effort. Efficiency is different from effectiveness.

Similarly, policies that encourage local responsibility rather than state-dominated handouts foster stronger community ties and individual purpose.

This same principle plays out in welfare. Historically, mutual aid reinforced social bonds – helping others directly was also an investment in future support. In contrast, modern welfare systems anonymize both giver and receiver, stripping away the social reinforcement that made reciprocity effective. The result? A weaker sense of community and personal purpose.

As mentioned earlier, we also have hardwired emotions designed to shape group behaviour – anger, guilt, shame – all of which evolved to drive cooperation in real-time, over short feedback loops. So a further example of modern problems are legal systems which stretch retribution far beyond the timeframes our brains evolved to handle. Instead of swift resolution, victims remain trapped in prolonged distress, while offenders often emerge more alienated than rehabilitated.

This links to the pinnacle, but also Achilles heel, of our brain evolution – our ideating frontal lobes. While they enable us to juggle multi-step processes, inhibit short-term impulses, and track complex social interactions, they also have evolutionary design constraints which mean that we can't think systematically, and like with ChatGPT, are prone to overvalued ideas and even delusions, and at risk of getting trapped in unhelpful rumination. Like with large language models (LLM), this is in part to do with the 'training data' for our frontal lobes – every exposure we've had since childhood, with our earliest foundational learnings having the greatest influence. Except unlike an LLM, our deepest encodings are more hard-wired in.

The implication for policymakers is clear: ignoring our evolutionary heritage leads to policy that is at best inefficient, at worst actively damaging. A growing body of interdisciplinary research, spanning neuroscience, evolutionary biology, and anthropology, now provides actionable insights for better policy design. The goal isn't to replicate ancestral living conditions but rather to shape modern institutions to better fit the brain we have, rather than the brain we might wish for.

Parliament now has the opportunity to leverage an evolutionary-informed framework for policy-making, harnessing cutting-edge research to build a society better aligned with the human brain's ancient wiring.

Bridging innovation and safety:

Communicating risk in modern healthcare

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We live in a world saturated with risk, yet we often struggle to talk about it. This paradox becomes particularly acute in sectors like healthcare and medtech, where uncertainty can have life-altering consequences, and public understanding is critical to trust and uptake

Why risk communication matters more than ever

As engineers and scientists, we deal in evidence, probabilities, and protocols but for policymakers and the public, risk is more than numbers, it is emotion, context, and consequence. The challenge therefore, lies not just in managing risk, but in communicating it.

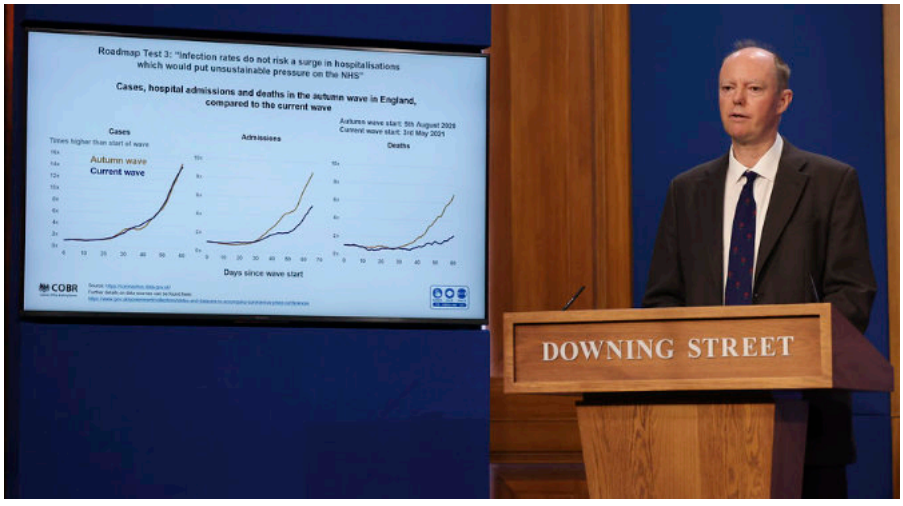
The COVID-19 pandemic laid bare the consequences of communication gone awry: a torrent of information, some of it conflicting, eroded public trust. In the race to make sense of the science, nuance was sacrificed for certainty. The very people most in need of clarity - policymakers and the public – were often left navigating a fog of statistics, speculation, and sensationalism.

This is not a new problem, but it is a growing one. Advances in medical technology, from AI diagnostics to gene editing, bring enormous promise, but they also introduce new layers of complexity and uncertainty. As these innovations reach the front lines of patient care, the role of parliamentarians becomes ever more critical. They are the interpreters of science to society; the bridge between the technical community and the people they serve.

So how can we get better at this? How do we talk about risk in a way that is honest, accessible, and empowering?

Breaking the barrier of technical language

Engineers and scientists are, by necessity, immersed in technical language, but when we talk to policymakers or the public, that precision can become a barrier. Effective communication means simplifying without distorting. Rather than quoting probabilities as percentages, we might say: "This treatment carries a one-in-a-thousand chance of causing harm." Visual aids, analogies, and relatable examples all help bridge the comprehension gap.



But clarity isn't just about language, it's about context. If we tell people that a medical device carries a risk of failure, we must explain what that means in the real world. How does that risk compare to crossing the road or flying in an aeroplane? What happens if the device does fail? And perhaps most importantly, what are we doing to reduce that risk?

We must also be transparent about uncertainty. In emerging fields like AI diagnostics or novel vaccines, there are often more unknowns than knowns. Acknowledging this does not undermine confidence; it builds trust. Phrases like "we are still learning" or "ongoing studies suggest" signal openness and caution, not weakness.

Clear, balanced communication empowers the public to make informed decisions. It also helps prevent the polarisation that can occur when technical messages are reduced to binary positions; safe versus unsafe, success versus failure, when the reality is more nuanced.

Empowering parliamentarians as informed interpreters

Parliamentarians occupy a unique position. They must interpret complex evidence and convey it to a broad audience without losing meaning. To do this effectively, they must be equipped

with the right questions. When faced with a new technology or public health measure, an MP should be asking:

- What is the magnitude of the risk?
- Who or what is affected?
- How uncertain is the data?
- What mitigation measures are in place?
- How does this fit within existing legal or ethical frameworks?

These questions are not just about due diligence, they are about responsible leadership. For instance, during debates over new vaccines, it is not enough to say, "The vaccine is safe". It is more accurate and more powerful to say, "Clinical trials show a 1-in-100,000 risk of severe side effects, far lower than the risk posed by the disease itself."

Avoiding sensationalism is equally important. Emotional narratives may grab headlines, but they can distort reality and damage trust. When ICU occupancy hits 85%, we can frame the situation constructively: "The system is under strain, but contingency measures are in place." Facts must be presented with empathy but without alarmism.

Equally, politicians should avoid amplifying extreme views that lack an evidence base. Social media can distort perceived public consensus and give disproportionate visibility to fringe opinions. Policymakers have a duty to engage responsibly with scientific expertise and to ensure that public discussion is anchored in fact.

Navigating the realities of clinical decision-making

In healthcare, risk is rarely straightforward. It often involves trade-offs between dissimilar options with different timeframes and consequences. Nowhere is this more apparent than in intensive care units (ICUs), where clinicians make split-second decisions about who receives critical care. These choices are not simply medical they are ethical, logistical, and deeply human.

For example, discharging a patient early to make room for someone in more acute need may increase the former's risk of mortality by up to 39%. Yet failing to make space might result in a preventable death. These dilemmas highlight the importance of acknowledging the reality of finite resources and the complexity of prioritisation.

Policymakers must recognise that decisions are often shaped by institutional norms and personal experience. For example, a junior clinician may focus on clinical parameters but a more senior doctor might weigh broader ethical considerations. This variability demands a consistent, transparent framework for risk communication, one that accounts for context and complexity.

Trade-offs must also be communicated openly to the public. Rather than shielding people from difficult truths, we should explain the reasoning behind decisions. Doing so affirms the legitimacy of the process and fosters greater resilience and understanding.

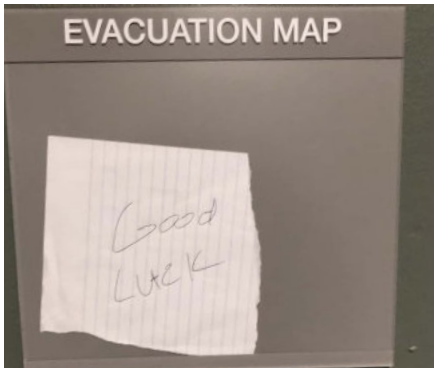
Understanding the distinction between risk and uncertainty

One of the most common misunderstandings in public discourse is the conflation of risk with uncertainty. Risk involves known probabilities: "there

is a 5% chance of this outcome." Uncertainty, by contrast, means the probabilities are unknown, often due to limited data or the introduction of a novel technology.

In medtech, uncertainty is unavoidable. New devices, therapies, and AI tools may have limited track records, but that doesn't mean it is being used recklessly. Regulatory bodies such as the MHRA and NICE, as well as international standards such as ISO 13485, are in place to manage uncertainty through rigorous testing, post-market surveillance, and continuous improvement.

By explaining these systems, we help the public understand that safety is not a static label but a process; an ongoing commitment to quality improvement. Policy should support agile regulation that adapts to new risks without undermining public safety or innovation.



Dispelling the myth of absolute safety

There is no such thing as zero risk. This is a difficult message, especially when lives are at stake, nevertheless we do ourselves no favours by pretending otherwise. Every surgery, every drug, every diagnostic tool carries some potential for harm.

The goal is not to eliminate all risk but to reduce it to acceptable levels. That means defining what "acceptable" looks like and who gets to decide. It also means being honest about the limitations of science. Even in high-income countries, one-in-ten patients is harmed while receiving hospital care, yet half of these incidents are preventable; none are entirely avoidable.

When we say a medical device is "safe," we should clarify that it meets stringent regulatory standards, that known risks have been mitigated, and that its benefits outweigh its harms. This language respects the intelligence of the public and the integrity of the science.

A more mature public understanding of risk allows for better conversations about cost-effectiveness, innovation, and access – conversations that are vital for shaping sustainable healthcare systems.

Bridging the gap between public fear and actual threat

Public perception of risk is not always proportional to the actual threat. People tend to fear so-called "dread risks" – those involving death or irreversible harm – more than familiar hazards, even when the statistical risk is lower. For example, a rare but severe side effect from a vaccine may spark outrage, while far more common risks, like falling at home, barely register.

Effective risk communication must account for these psychological responses. This means not only presenting the data but engaging with the emotion. Community consultations, public forums and targeted education campaigns can help align expert assessments with public values. Trust is built not just through information, but through empathy, respect, and participation.

If we want the public to trust emerging technologies like AI in diagnostics or wearable health devices, we must invite them into the conversation early, long before the technology reaches market. Policymakers have an essential role to play in fostering these dialogues and funding the institutions that support them.

Parliament's role in shaping trust and transparency

As parliamentarians, you are not just lawmakers; you are communicators. Your role in shaping public understanding of healthcare risks cannot be overstated. Risk communication is then, not a one-off message, it is a relationship and you have an obligation to build it on a foundation of truth, empathy, and mutual respect.

In the coming years, as technologies become more sophisticated and healthcare systems face increasing pressures, your voice will be critical in guiding public discourse.

With this in mind, I urge you to:

- Demand clarity and context from experts.
- Resist the temptation of sensational narratives.
- Support regulatory frameworks that adapt to innovation without compromising safety.
- Invest in public engagement strategies that build trust and understanding.
- Foster a culture where risk is discussed openly, honestly, and constructively.

The tools of innovation are only as good as our ability to explain them and the time to strengthen that bridge is now.

Communicating risk:

Bridging science, policy and practice

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This article distils a presentation at a seminar hosted by the Parliamentary and Scientific Committee in partnership with the Hazards Forum on 22 January 2025.

The presentation, part of the session "Communicating Risk – What, Who, Why Does It Matter?", underscored the critical interplay between scientific risk assessment, effective communication, and regulatory compliance. It highlighted systemic gaps in risk identification and the need for a cultural shift in how organisations perceive vulnerability.

The challenge of risk misconception

Many organisations and their people belief that serious incidents are unlikely because of existing procedures, training, and competent staff. This "it'll never happen to us" attitude often stems from an incomplete understanding of risks. An article by Morgan and Fischhoff[1] noted that effective risk communication requires dialogue with stakeholders to identify their information needs – a process often overlooked in traditional science communication. Psychological research further reveals that individuals overestimate mutual understanding, leading to gaps in risk assessment.

Many examples illustrate the consequences of this oversight. In a case involving a construction company, repeated incidents of overhead cables being struck on the M6 motorway highlighted a failure to learn from prior events. Similarly, a rail accident investigation in Scotland exposed lapses in asset inspection and design adherence, despite assurances of robust processes. These are but two examples that support Dame Judith Hackitt's observations in the 2022 Thomas Ashton Institute Annual Lecture,

"There are no new accidents just different people making the same mistakes because of a failure to recognise the relevance to them of other people's experience and therefore not learning."

Not on my watch

Another tendency affecting leadership is what is known as "fundamental attribution error". This is the inclination to judge others implicated in adverse outcomes as bad actors whilst underestimating the impact of other pressures. Organisations assume that in similar circumstances they would have experienced a different outcome: "We would have taken X action" or "we would have followed Y procedure".

> The truth is, across industries, often organisations are blind to their own vulnerabilities.

Most organisations believe they learn their lessons, and that they have measures in place to ensure action points are followed up. They believe there is no falling between the cracks in their organisation. The truth is, across industries, often organisations are blind to their own vulnerabilities. Leaders think they know how managers, staff, suppliers and customers would act in hypothetical situations, but the reality is that real-world pressures often reveal different choices.

Expect the expected

There is another option. To mitigate this natural bias, leadership teams should promote a culture of "it might happen to us". They need to sit comfortably with a level of vulnerability that fully appreciates risk, and places risk at the heart of the organisation.

Understanding risks that cut across sectors allows organisations to mitigate those risks. It opens the door to a tailored understanding of how risk can affect the organisation, whether that is a failure to plan, a failure to supervise, a failure to manage, workers undertaking tasks without the necessary skill or competence and with unsuitable equipment.

Considering potential points of failure such as these thematic strands moves the dial on the conversation around risk. Risk can be seen more positively, as a friend not a foe, that can be mitigated.

What is the risk?

Before this can be achieved, the first task is to properly identify the risk. To reduce the risk, you must see the risk. This is often where the gap exists; risks are not identified despite the allocation of resource to the assessment of risk and the presence of risk assessments and mitigation measures. A failure to identify the risk means an inability to rely on the

defence that the organisation did what was necessary, that it reduced the risk (in a health and safety context) to "as low as reasonably practicable." Without identifying risk, an organisation cannot rely upon this defence *ex post facto* where a catastrophic event occurs.

Say the risk

A tailored and specific kind of communication is essential. Risk communication cannot be overly complex; it requires adopting simple language in multiple forms that communicates clearly how risks have been identified and reduced to, in the context of health and safety, "as low as reasonably practicable". Overly complex reports are the enemy.

It is human nature to overestimate how well we understand one another. We overestimate our understanding of others and assume others' emotional states align more closely with our own than they do. Without talking to one another both clearly and directly, there is no way of ensuring what we are attempting to communicate has been relayed and fully understood. Talk is not cheap, is it a necessary part of the communication process in getting our point across and align understandings.

The importance of plain English

Work-related risk must be communicated in a simple form. Scientists, engineers and other specialist professionals must be able to get to the kernel of the issue in language that non-technical colleagues can understand. They must speak in plain English.

> Work-related risk must be communicated in a simple form … in language that non-technical colleagues can understand.

A failure to do so will mean that the company board, shareholders and others may never fully understand or appreciate the risk that presents itself. It may also mean that the individuals involved will not be able to communicate easily with a regulator, a judge or a jury, should intervention or a catastrophic event ever materialise. Officials operating in overstretched regulatory authorities may not always know or have experience of the specific language of the industry.

In the dock

In this jurisdiction, we do not have specialist business courts hearing cases relating to workplace accidents or other regulatory breaches. Prosecutions brought for breaches of health and safety regulations are heard in the Magistrates and Crown Court, a forum that is more familiar with cases involving violent and economic crime rather than regulatory breaches such as workplace safety incidents. The need to explain the corporate defendant's approach to risk in a language that will assist the Judge is critical to achieving the best outcome in such challenging circumstances.

> Explaining the corporate defendant's approach to risk in language that will assist the Judge is critical to achieving the best outcome

If the organisation and its leadership team want to challenge a prosecution, the case will be heard before a jury. Twelve ordinary people with no prior specialist knowledge will listen to the evidence and decide if the corporate and/or the individuals implicated are guilty, or if they can rely upon a defence. Again, the ability of senior management, board members and others involved or implicated to communicate what happened and how they managed risk in the organisation is critical to achieving the best outcome.

Communicating risk – learning lessons

There is a plethora of information and learning that is publicly available to organisations and leadership teams. But is it in a format that is readily understood?

At the start of 2023, the UK private sector had 5.51 million small businesses (0–49 employees) 99.2% of the total business population. Regulators such as the Health and Safety Executive (HSE) provide a wealth of guidance designed to be easily accessible and readable. The UK government has undertaken several initiatives to simplify government publications, aiming to make them more accessible, transparent, and efficient for users, including public bodies, businesses, and citizens. Since 2003, the HSE have undertaken an exercise of simplifying their guidance. There is a balance between detail and simplicity which has presented some challenges and so this remains a work in progress.

> Public inquiries publish reports and executive summaries … But are they published and promoted in a manner accessible to small businesses?

Public inquiries publish reports and executive summaries which often comment on leadership and management cultures and tendencies that gave rise to the issues at the heart of the matter they have been tasked with examining. Such reports can inform risk in a helpful and meaningful way. But are they published and promoted in a manner accessible to small businesses?

The importance of corporate memory

Organisations with direct experience of serious incidents demonstrate heightened risk awareness. Preserving corporate memory is a challenge as leadership teams change and that memory fades without institutional knowledge sharing. Will AI have a role to play in capturing the memory and in Communicating Risk?

Citations

[1] Morgan K, Fischhoff B (2023) Mental models for scientists communicating with the public. *Issues in Science and Technology*, Vol. XXXIX, No. 2. Available at https://issues.org/mental-models-scientists-risk-communication-morgan-fischhoff

"Hazard – risk – safe"

The need to speak clearly and chose our language carefully

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In public discourse, these words are sometimes used interchangeably; in technical fields they may have distinct and specific meanings. We need to be able to discuss these subjects freely at times and to translate between those domains consistently to reduce misunderstanding.

Hazards Forum: a place to discuss hazards, risks, trade-offs, consequences and lessons learned

Set up to enable interdisciplinary learning between professionals for the prevention and mitigation of hazards and disasters, the Hazards Forum was founded by the UK's four principal engineering institutions in 1989. It now has members from other engineering bodies, industry, and the public and charity sectors. Its vision is to be widely recognised as the independent enabler of the most needed debates and as a key source of interdisciplinary knowledge on the control of major hazards.

To bring definition to those discussions, three interest groups have been formed within Hazards Forum (see Box). These allow members to be part of important discussions on topical issues, as well as create positive change within their own field. Members of the groups meet regularly to learn from different industries and understand how others respond to specific hazards. The aim is that members can find solutions to problems they may experience in their industry and pass on useful practices that can be implemented elsewhere.

Each interest group aims to inform and educate by sharing the latest research tools, methods, solutions and best practice. They also provide a forum in which interdisciplinary practitioners and decision-makers can connect and interact. Members hear from guest speakers, discuss topics of mutual interest, and share lessons, with the aim of turning their deliberations into high quality events imparting information and sharing insights which are made available for the public benefit.

One such event recently was a webinar hosted by the Parliamentary and Scientific Committee in partnership with Hazards Forum in January 2025. Speakers were Richard Roff, Helen Meese and Anne Davies.

Reflections on the internal and external language of risks, tolerability and trade-offs from Hazards Forum's interest groups

An important starting point is to understand that hazard is not the same thing as risk. A definition of hazard might be something with the potential to cause harm, but this must be combined with an understanding of likelihood before we can say anything about risk and we should also understand how significant the harm could be: Risk is, therefore, a combination of our understanding of 'how bad?' and 'how often?' when a hazard can move out of control.

This understanding of risk can be challenging where we have less information about either of those questions, in situations where probability gives way to uncertainty – Helen Meese discusses uncertainty in her article elsewhere in this issue of SiP.

Risk practitioners may use shorthand language or mathematical terms in their internal discussions alongside a deep understanding of the assumptions that

BOX: HAZARDS FORUM INTEREST GROUPS

Interest Group 1: Natural Hazards

Focuses on natural hazards and disasters, such as those that would occur in nature without any human influence (e.g. flooding, earthquake, lightning etc.) as well as those influenced or induced by human activity (e.g. climate change, pandemic etc.)

Interest Group 2: Engineered System Hazards

Focuses on hazards arising from failures of engineered equipment, constructions, products and processes (or systems of these, or in the control of these), which could lead to catastrophic incidents resulting in significant injuries to people, significant damage to the environment, or large financial loss.

Interest Group 3: Emerging and Future Technology

Focuses on new technologies and risks that arise, or are inherent to these technologies, to enable a robust and resilient society (e.g. digitalisation, automation and AI, new energy, new materials and advanced manufacturing).

underpin those, but, even here, it is important to support consistency by thinking about those assumptions in advance – if we say an event or outcome is 'probable', then two people may have a different understanding; if we define probable, then, as something like 'could occur during remaining lifetime of installation. Underlying causes have been seen during lifetime of the installation', then there is likely to be convergence on what that means, and risk assessments will be more consistent across assessors and across time.

When thinking about the translation of this information to other domains, mathematical language can be unhelpful but the concern about consistent understanding remains. Use of natural language to describe probability is helpful in broad communication but people may struggle to understand the timeframe or the size of a population that a risk applies to when taking in that information. If the probability of rain is 1 in 10, does that refer to just here? Across the whole day or an hour? Indeed, how many drops are needed for it to be rain…

> there is no such thing as zero risk and it is incumbent on everyone communicating in this field … to be clear about this

Reducing risk – how far should we go?

With respect to health and safety at work and environmental laws there are requirements to reduce risks so far as is reasonably practicable. Although any test of whether that is achieved is strictly only applicable in court, the idea of reasonable practicability means that there is a point at which it is not worth (in terms of burden) doing any more to reduce risks further – there is therefore a level of harm that can be seen as tolerable to society for the benefit that society derives from a particular work activity and its output.

Here again, discussion of this outside technical domains may be challenging – a societal good may apply unevenly, a harm likewise. However, there is no such thing as zero risk and it is incumbent on everyone communicating in this field, whether policy-maker, technical expert or professional communicator to be clear about this and help the public to recognise the assumptions and trade-offs being made. We should probably steer well clear of terms like zero and never altogether here; however much we wish it weren't so, they make promises they cannot keep.

A place for judgement?

When making decisions about where to apply limited resources, trade-offs may need to be made. It may be necessary to compare non-equivalent risks e.g. structural strength vs. embedded carbon. Here standards are vital for engineers and technical staff, but occasionally there are limitations to their application and people must apply judgement.

Hazards Forum's interest group on engineered systems has spent some time discussing how and when professional engineering or other technical judgement is applied, concluding that there will always be a place for this in a continuum of decision-making tools, that diverse expertise (knowledge and experience combined) is essential, that a consistent approach helps those involved and that clearly recording the process allows for subsequent audit and continuous improvement.

Complexity and resilience

Some time ago, Charles Perrow proposed the idea of 'normal accidents'; once a system or product or process was sufficiently complex then there would eventually be a failure no matter what was done to reduce risk – failure would be 'normal' not exceptional. His preconditions for this were:

- The system is complex
- The system is tightly coupled (a failure in one part leads rapidly to failures in others)
- The system has catastrophic potential

Other things to consider when thinking about this are:

- Cascading or interconnected risks and the difficulty in modelling these (about which Hazards Forum is running an event on 9 October in Manchester)
- Creeping or cumulative change where small alterations in approach have each not been assessed as significant but where the total change has moved the situation, and therefore risk, some way from the original.
- Knowledge about hazards and understanding of effects may change over time so what is acceptable, the 'goal-posts', may also move.

Complex is an appropriate term for modern society, so this adds further weight to the avoidance of talking about zero when discussing risks. This is not an argument for neglecting the systems we have put in place to reduce the risks, but it does suggest a focus on resilience rather than on further risk reduction in some cases – the ability to recover quickly after some significant failure or unwanted event may benefit an organisation or wider society more than moving a low likelihood event to a slightly lower likelihood event. It may cost less overall too.

In communicating this in the public sphere it is possible to run into expectations of perfection. However, most people would recognise that 'stuff happens' and an organisation that can recover relatively smoothly while keeping its stakeholders informed will probably been seen in a better light in the long-run.

Parliament's role in discussing risk

As important communicators in the public sphere parliamentarians have a vital role in helping discussion of risk to be fact-based, honest and transparent. Helen Meese makes a similar plea in her article, but I would ask you:

- Not to be afraid to ask for clarity and context from others; make sure you speak with similar clarity and include context.
- Not to shy away from discussing trade-offs, engage people in this and identify societal goods alongside recognised potential harms.
- To spend time engaging with expertise in technical fields to both understand the details and challenge assumptions.

DISCUSSION MEETINGS

18 MARCH 2025 IN PARTNERSHIP WITH THE UNIVERSITY OF YORK

Accelerating the UK bioeconomy: the scientific and economic case for investment

L–R: Professor Ian Graham, Academic Director, BioYorkshire; Damian Kelly, Vice-President, Innovation & Technology Development, Croda, Rt Hon. Baroness Northover, Vice-Chair, Parliamentary & Scientific Committee; Professor Sarah Thompson, Pro-Vice Chancellor Research, University of York; and Mayor David Skaith, Mayor of York and North Yorkshire

29 APRIL 2025 IN PARTNERSHIP WITH THE UNIVERSITY OF LIVERPOOL

Artificial Intelligence – transforming science and the law

L–R: Leigh Jeffes, Chief Executive, Parliamentary & Scientific Committee; Christina Blacklaws, former President of the Law Society of England and Wales, Founder of Blacklaws Consulting; Professor Andy Cooper, Academic Director, Materials Innovation Factory, University of Liverpool and Director, Leverhulme Centre for Functional Materials Design; Professor Wiebe Van Der Hoek, Pro-Vice Chancellor, Faculty of Science and Engineering, University of Liverpool; Professor Matt Rosseinsky OBE, Professor of Inorganic Chemistry, University of Liverpool; Dr Emma Brass, University of Liverpool; Dr Jonathan Hague, Head of Bright Future Science and Technology, Unilever Homecare; Professor Katie Atkinson, Professor of Computer Science, Associate Pro-Vice Chancellor and Director of the Interdisciplinary Centre for Sustainable Research, University of Liverpool; Professor Tim Jones, Vice-Chancellor, University of Liverpool; and Viscount Stansgate, President, Parliamentary & Scientific Committee

20 MAY 2025 IN PARTNERSHIP WITH THE NPL ON WORLD METROLOGY DAY & THE 150TH ANNIVERSARY OF THE METRE CONVENTION

Celebrating 125 years of impact and innovation from the UK's National Physical Laboratory – what might the next 125 years bring?

L–R: Dr Andrew Pollard, Principal Scientist in Advanced Materials, NPL; Dr Ana Lourenco, Principal Scientist in Radiotherapy and Radiation Dosimetry, NPL; Viscount Stansgate, President, Parliamentary & Scientific Committee; Professor Josephine Bunch, NPL Fellow in Biomolecular Analysis; and Professor Gareth Hinds, Senior NPL Fellow in Electrochemistry

STEM FOR BRITAIN 2025

STEM for Britain is a poster competition to showcase scientific research carried out by early career researchers across five disciplines of STEM: Chemistry, Biological and Biomedical Sciences, Physics, Mathematics and Engineering and to give members of both Houses of Parliament an insight into the outstanding research work being undertaken in UK universities by early-career researchers.

MEDAL WINNERS

BIOLOGICAL AND BIOMEDICAL SCIENCES
Jose Cabezas Caballero, University of Oxford, The Physiological Society Award
Magdalena Armas, The Francis Crick Institute, SILVER
Anneliese Hodge, University of Plymouth, GOLD
Harry Jarrett, Ulster University, BRONZE and The Nutrition Society Award

CHEMISTRY
Nathan Davison, University of Birmingham, SILVER
Bayan Alkhawaja, University of Bath, GOLD
May Ching Lai, University of Cambridge, BRONZE

ENGINEERING
Shadrack Osei Aboagye, Nottingham Trent University, SILVER
Nidhi Kapil, University College London, GOLD
Emma Spooner, University of Manchester, BRONZE

MATHEMATICAL SCIENCES
Holly Chambers, University College London, BRONZE
Edwina Yeo, University College London, GOLD
Rosie Barrows, Imperial College London, SILVER

PHYSICS
Morgan Facchin, University of St Andrews, BRONZE
Max Merrett, AWE, GOLD
Andrea Barbiero, Toshiba Europe Ltd, SILVER

WESTMINSTER MEDAL WINNER

Sponsored by the Society of Chemical Industry, the Westminster Medal is awarded to one of the five Gold winners. The Medal was created in memory of Dr Eric Wharton, who did so much to establish STEM (then SET) for BRITAIN in 1997.

Sue Wharton, Parliamentary & Scientific Committee;
Steve Smith, Science Liaison Lead, Syngenta, representing Society of Chemical Industry;
Dr Edwina Yeo; and **Viscount Stansgate**, President, Parliamentary & Scientific Committee

Photography: John Deehan Photography

More information and photographs are available on the STEM for Britain website: www.stemforbritain.org.uk

SELECT COMMITTEES

HOUSE OF COMMONS BUSINESS AND TRADE COMMITTEE

The Business and Trade Committee scrutinises the policy, spending and administration of the Department for Business and Trade and its public bodies.

CURRENT INQUIRIES

US trade with the US, India and EU
Opened 6 June 2025
Deadline 31 August 2025

Industrial strategy
Report published 6 June 2025

Export-led growth
Report published 15 May 2025

The work of the Business and Trade Committee
Opened: 20 November 2024

Make work pay: Employment Rights Bill
Report published 3 March 2025
Government response published 22 May 2025

MEMBERSHIP

Rt Hon Liam Byrne MP, Labour (Chair)
Antonia Bance MP, Labour
John Cooper MP, Conservative
Sarah Edwards MP, Labour
Alison Griffiths MP, Conservative
Sonia Kumar MP, Labour
Charles Maynard MP, Liberal Democrat
Gregor Poynton MP, Labour
Joshua Reynolds MP, Liberal Democrat
Matt Western MP, Labour
Rosie Wrighting MP, Labour

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HOUSE OF COMMONS EDUCATION COMMITTEE

The Education Committee scrutinises the work of the Department for Education, covering children's social care, schools, colleges, the early years and higher education. The Committee also holds regular hearings with DfE's arms-length bodies, including Ofsted, Ofqual and the Children's Commissioner.

CURRENT INQUIRIES

Higher education and funding: threat of insolvency and international students
Opened: 12 June 2025
Written evidence: Deadline 31 July 2025

Further Education and Skills
Opened: 29 January 2025

Solving the SEND crisis
Opened: 20 December 2024

Children's social care
Opened 22 November 2024

MEMBERSHIP

Helen Hayes MP, Labour (Chair)
Jess Asato MP, Labour
Sureena Brackenridge MP, Labour
Dr Caroline Johnson MP, Labour
Amanda Martin MP, Labour
Darren Paffey MP, Labour
Manuela Perteghella MP, Liberal Democrat
Mark Sewards MP, Labour
Patrick Spencer MP, Conservative
Dr Marie Tidball MP, Labour
Caroline Voaden MP, Liberal Democrat

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HOUSE OF COMMONS HEALTH AND SOCIAL CARE COMMITTEE

The Health and Social Care Committee. Its responsibility is to scrutinise the work of the Department of Health and Social Care and its associated public bodies. The Committee examine government policy, spending and administration on behalf of the electorate and the House of Commons.

CURRENT INQUIRIES

The first 1000 Days: a renewed focus
Opened: 21 March 2025

Community mental health services
Opened: 17 December 2024

The 10 Year Health Plan
Opened: 13 November 2024

Adult social care reform: the cost of inaction
Report published: 5 May 2025

MEMBERSHIP

Layla Moran MP, Liberal Democrat (Chair)
Danny Beales MP, Labour
Ben Coleman MP, Labour
Dr Beccy Cooper MP, Labour
Deirdre Costigan MP, Labour
Jen Craft MP, Labour
Josh Fenton-Cooper MP, Labour
Andrew George MP, Liberal Democrat
Paulette Hamilton MP, Labour
Joe Robertson MP, Conservative
Gregory Stafford MP

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SELECT COMMITTEES

HOUSE OF COMMONS ENERGY SECURITY AND NET ZERO COMMITTEE

The Energy Security and Net Zero Committee scrutinizes the policy spending and administration of the Department of Energy Security and Net Zero and its public bodies, including Ofgem and the Committee on Climate Change.

CURRENT INQUIRIES

National planning for energy infrastructure
Opened: 25th April 2025

Revisiting the nuclear roadmap
Opened 20 February 2025

Building support for the energy transition
Opened: 19 February 2025

The cost of energy
Opened: 18 February 2025

Industrial strategy for green power
Opened: 5 February 2025

Retrofitting homes for net zero
Report published: 22 May 2025

Unlocking community energy at scale
Opened: 11 November 2024

Work of the Department of Energy and Net Zero
Opened: 11 November 2024

Workforce planning do deliver clean, secure energy
Opened: 11 November 2024

MEMBERSHIP

Bill Esterson MP, Labour (Chair)
Polly Billington MP, Labour
Sir Christopher Chope MP, Conservative
Torcuil Crighton MP, Labour
Wera Hobhouse MP, Liberal Democrat
Anneliese Midgley MP, Labour
Luke Murphy MP, Labour
Melanie Onn MP, Labour
Mike Reader MP, Labour
Bradley Thomas MP, Conservative
Claire Young MP, Labour

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Address: Energy Security and Net Zero Committee, House of Commons, London SW1A OAA

HOUSE OF COMMONS ENVIRONMENT, FOOD AND RURAL AFFAIRS COMMITTEE

Looking at issues from the air we breathe to the food on our plates, Parliament's Environment, Food and Rural Affairs Committee (EFRA) exists to scrutinise the administration, spending and policy of the Government's Department for Environment, Food and Rural Affairs

CURRENT INQUIRIES

Preventing waste and enabling a circular economy
Opened: 20 May 2025

Fisheries and the marine environment
Opened: 23 January 2025

Animal and plant health
Opened: 9 January 2025

Fairness in the food supply chain
Opened: 20 December 2024

Reforming the water sector
Report published: 16th June 2025

The future of farming
Report published: 16 May 2025

Work of the Department and its arm's-length bodies
Opened: 6 November 2024

MEMBERSHIP

Rt Hon Alistair Carmichael MP, Liberal Democrat (Chair)
Sarah Bool MP, Conservative
Charlie Dewhirst MP, Conservative
Helen Dollimore MP, Labour
Sarah Dyke MP, Liberal Democrat
Jayne Kirkham MP, Labour
Josh Newbury MP, Labour
Andrew Pakes MP, Labour
Jenny Riddell-Carpenter MP, Labour
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SELECT COMMITTEES

HOUSE OF COMMONS SCIENCE, INNOVATION AND TECHNOLOGY COMMITTEE

The Science, Innovation and Technology Select Committee examines the expenditure, administration and policy of the Department for Science, Innovation and Technology, and associated public bodies. It also exists to ensure that Government policies and decision-making across departments are based on solid scientific evidence and advice.

CURRENT INQUIRIES

Science diplomacy
Opened: 3 April 2025

Digital centre of government
Opened: 3 February 2025

Under the microscope
Opened 13 January 2025

Innovation, growth and the regions
Opened: 6 December 2024

Innovation showcase
Opened: 4 December 2025

Social media misinformation and harmful algorithms
Opened: 20 November 2024

MEMBERSHIP

Dame Chi Onwurah MP, Labour (Chair)
Emily Darlington MP, Labour
George Freeman MP, Conservative
Dr Allison Gardner MP, Labour
Tom Gordon MP, Liberal Democrat
Rt Hon Kit Malthouse MP, Conservative
Jon Pearce MP, Labour
Steve Race MP, Labour
Dr Lauren Sullivan MP, Labour
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HOUSE OF COMMONS ENVIRONMENTAL AUDIT COMMITTEE

The Committee's remit is to consider the extent to which the policies and programmes of government departments and non-departmental public bodies contribute to environmental protection and sustainable development, and to audit their performance against sustainable development and environmental protection targets.

CURRENT INQUIRIES

Addressing the risks from perfluoroalkyl and polyfluoroalkyl substances (PFAS)
Opened 10 April 2025

Airport expansion and climate and nature targets
Opened: 28 March 2025

Governing the marine environment
Report published: 5 June 2025

Flood resilience in England
Opened: 10 December 2024

The UK and the Antarctic environment (revived)
Report published 9 June 2025

Environmental sustainability and housing growth
Opened: 18 November 2024

The role of natural capital in the green economy (revived)
Report published 7 May 2025

MEMBERSHIP

Toby Perkins MP, Labour (Chair)
Olivia Blake MP, Labour
Julia Buckley MP, Labour
Ellie Chowns MP, Green Party
Barry Gardiner MP, Labour
Anna Gelderd MP, Labour
Sarah Gibson MP, Liberal Democrat
Alison Griffiths MP, Conservative
Pippa Heylings MP, Liberal Democrat
Chris Hinchliff MP, Labour
Martin Rhodes MP, Labour
Blake Stephenson MP, Conservative
Alison Taylor MP, Labour
Cameron Thomas MP, Liberal Democrat
John Whitby MP, Labour
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SELECT COMMITTEES

THE HOUSE OF LORDS SCIENCE AND TECHNOLOGY COMMITTEE

The Committee is appointed to consider science and technology. It does this principally through undertaking inquiries.

CURRENT INQUIRIES

Financing and scaling UK science and technology: innovation, investment, industry
Opened: 20 March 2025

MEMBERSHIP

The Lord Mair CBE, Chair, Crossbench
The Lord Berkeley OBE, Labour
The Lord Borwick, Conservative
The Rt Hon the Lord Drayson, Labour
The Lord Lucas, Conservative
The Baroness Neuberger DBE, Crossbench
The Rt Hon the Baroness Neville-Jones DCMG, Conservative
The Rt Hon the Baroness Northover, Liberal Democrat
The Lord Ranger of Northwood, Conservative
The Viscount Stansgate, Labour
The Lord Stern of Brentford CH, Crossbench
The Baroness Walmsley, Liberal Democrat
The Baroness Willis of Summertown CBE, Crossbench
The Baroness Young of Old Scone, Labour

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THE HOUSE OF LORDS UK ENGAGEMENT WITH SPACE COMMITTEE

The Committee was appointed to consider UK policies relating to space, and both the opportunities and challenges related to the UK's engagement with space.

CURRENT INQUIRIES

UK engagement with space
Opened: 26 February 2025

MEMBERSHIP

The Rt Hon The Baroness Ashton of Upholland, Labour (Chair)
The Baroness Bonham-Carter of Yarnbury, Liberal Democrat
The Lord Booth-Smith, Conservative
The Lord Clement-Jones, Liberal Democrat
The Baroness Donaghy, Labour
The Rt Hon the Lord Lansley CBE, Conservative
The Baroness Mobarik Conservative
The Lord Shamash, Labour
Lord St John of Bletso, Crossbench
The Viscount Stansgate, Labour
The Rt Hon The Baroness Stowell of Beeston, Conservative
The Lord Tarassenko, Crossbench
The Rt Hon The Lord Vaizey of Didcot, Conservative

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THE HOUSE OF LORDS ENVIRONMENT AND CLIMATE CHANGE COMMITTEE

The Environment and Climate Change Committee was appointed to consider the environment and climate change.

CURRENT INQUIRIES

Nitrogen
Opened: 30 January 2025

MEMBERSHIP

The Baroness Sheehan, Liberal Democrat, Chair
The Lord Ashcombe, Conservative
The Lord Duncan of Springbank, Conservative
The Lord Jay of Ewelme GCMG, Crossbench
The Lord Krebs, Crossbench
The Lord Layard, Labour
The Earl of Leicester, Conservative
The Lord Lennie, Labour
The Lord Mancroft, Conservative
The Rt Hon. the Lord Rooker, Labour
The Earl Russell, Liberal Democrat
The Lord Trees, Crossbench
The Baroness Whitaker, Labour

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UK Parliament POST

The Parliamentary Office of Science and Technology (POST) is an impartial research and knowledge exchange service based in the UK Parliament. POST connects members of parliament with cutting-edge research and evidence. We publish evidence-based, peer-reviewed briefings on a wide range of subjects and have a UK-wide network of researchers and academics ready to share their expertise with parliamentarians. We also help researchers understand parliament and contribute to its work.

NEW POST RESEARCH

POST research is available to all at **post.parliament.uk**. Recent briefings include:

REGENERATIVE AGRICULTURE

POSTnote, published 16 June 2025

This briefing explores regenerative agriculture, a farmer-led approach aiming to restore soil health, biodiversity and water quality while maintaining food production. It outlines the evidence for environmental benefits, the variability in outcomes depending on context, and the challenges to wider adoption. The briefing also considers economic trade-offs, policy gaps, and the role of knowledge-sharing and infrastructure in supporting uptake.

REGULATION AND REMEDIATION OF 'FOREVER' CHEMICALS

POSTnote, published 2 June 2025

Examines regulatory approaches to managing PFAS, which are persistent synthetic chemicals found widely in the environment. It reviews health risks, challenges in defining and monitoring PFAS, and the technical and economic barriers to remediating existing pollution. The briefing also considers critical uses, alternatives, and opportunities for innovation in monitoring and clean-up technologies.

UK STEM SKILLS PIPELINE

POSTnote, published 28 May 2025

This POSTnote assesses the UK's STEM skills pipeline, highlighting workforce shortages, underrepresentation, and systemic barriers in education and training. Read our briefing for a review of evidence on the economic impact of skills gaps, and an exploration of policy responses, including vocational routes and curriculum reform. It also looks at differing stakeholder views on the scale and causes of shortages.

IMPACTS OF BIRTHRATE DECLINE

POSTnote, published 20 May 2025

In 2023, the total fertility rate in England and Wales was 1.44 children per woman, the lowest on record. Our briefing explores the implications of declining fertility rates in the UK, including effects on the workforce, public services, and economic productivity. It considers the evidence for demographic trends, projections, and policy responses, including the role of migration and family support measures. The paper also highlights uncertainties around the effectiveness of interventions to raise fertility.

VIRTUAL WARDS AND HOSPITAL AT HOME

POSTnote, published 28 April 2025

Reviews the use of virtual wards – hospital-level care delivered at home – within the NHS and its increasingly important role in the health system. It examines clinical outcomes, patient satisfaction, and system pressures, alongside challenges such as digital access, caregiver support, and cost-effectiveness. The briefing also considers policy and regulatory implications for scaling this model of care.

QUANTUM COMPUTING, SENSING AND COMMUNICATIONS

POSTnote, published 22 April 2025

Get an introduction to quantum technologies and their potential to transform sectors including healthcare, cybersecurity and finance. Our briefing outlines UK investment in the technology, global positioning, and the need for responsible innovation, as well as exploring risks such as data security and the importance of interdisciplinary skills and adaptable regulation.

CONSUMER WEARABLE DEVICES AND DISEASE PREVENTION

POSTnote, published 17 April 2025

This briefing examines the role of consumer wearables, such as fitness trackers and glucose monitors, in disease prevention. It reviews evidence on health benefits, risks of false positives, and challenges around access, regulation and data privacy. The briefing also considers how wearables could support the NHS's shift towards preventative care.

CULTIVATED MEAT

POSTnote, published 11 April 2025

Between 2020 and 2024, the UK invested £75 million of public funds in alternative protein research, including cultivated meat. Our briefing explores the production, regulation and potential impacts of cultivated meat in the UK. It considers environmental and animal welfare benefits, barriers to commercialisation, and uncertainties around public acceptance and rural economies. The briefing also highlights the UK's research strengths and early market developments.

20 MPH SPEED LIMITS AND ZONES: PUBLIC HEALTH IMPACTS

POSTbrief, published 31 March 2025

This POSTbrief reviews the evidence on the public health impacts of 20 mph speed limits and zones. It considers effects on road safety, active travel, air quality and noise, alongside challenges in evaluating outcomes. The briefing also discusses policy considerations including cost-effectiveness, public attitudes and compliance.

HORIZON SCANNING

POST carries out horizon scanning research to help parliamentarians identify and understand emerging issues which parliament may need to address in the next five years. Our quick-read articles cover a huge range of topics, with recent publications including:

- Sustaining the health and adult social care workforce
- National governance strategies and initiatives for net zero
- Transport planning to harness emerging transport technologies
- Climate and health: health and care systems' preparedness for the changing climate
- Housing: demographic and environmental trends
- The circular economy and sustainable manufacturing
- Delivering low-carbon energy infrastructure for a net zero transition
- Special educational needs and disabilities
- Addressing climate transition challenges and opportunities

Go to **post.parliament.uk/post-horizon-scanning** to browse all horizon scanning articles.

UPCOMING RESEARCH

Keep an eye out for exciting new POST research being published over the next few months, on topics including:

- Personalised medicines for Sickle Cell and Thalassemia
- Security of UK technology infrastructure
- Nutrient trading markets
- Regional differences in health life expectancy
- Winter mortality
- Multifunctional land use decisions: What role could collaborative governance models play?
- Defending UK airspace
- Electronic warfare
- Violence against women and girls in schools and among children and young people

If you'd like to be notified when new POST research is published on topics you care about, sign up for POST email updates at **post.parliament.uk/subscribe**.

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House of Commons Library

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You can receive the latest research updates from the Commons Library, on the topics you care about, with alerts sent straight to your email inbox. Sign up at **commonslibrary.parliament.uk/subscribe**.

NEW COMMONS LIBRARY RESEARCH

We publish a range of topical and business-related research online each month. Read about our latest research on science, health, the environment and technology below – you can find more recent research, as well as the full briefings for everything in this article, on our website at **commonslibrary.parliament.uk/scienceinparliament**.

Infected blood inquiry: recommendations for recognition, healthcare and patient safety

Research Briefing CBP 10081
last updated 5 June 2025

This briefing outlines the recommendations made by the Infected Blood Inquiry to improve patient safety and care following the historic use of contaminated blood products. It covers proposed changes to the statutory duty of candour, support for affected communities and ongoing monitoring of infected patients, and the response from the UK and devolved governments.

Battery energy storage systems (BESS)

Research Briefing CBP 7621
published 3 June 2025

Battery energy storage systems (BESS) are used to store electricity for later use and are important to a low-carbon power system in the UK. This briefing looks at how BESSs work, safety concerns such as fire risks, planning requirements, safety regulations, and barriers to further deployment, including supply chain issues and grid constraints.

Childhood Immunisation Statistics

Research Briefing CBP 8556
published 23 May 2025

Find UK and international data on routine childhood vaccination rates, including the MMR and 6-in-1 vaccines. Our briefing highlights recent declines in uptake across the UK and outlines how coverage varies by region. It also includes analysis of past trends and the impact of changes in public confidence about the safety of vaccines.

Planning for solar farms

Research Briefing CBP 7434
published 13 May 2025

Our paper explains how planning policy applies to solar farms across the UK. It outlines the different consent routes for large- and small-scale developments, and explains government targets to expand solar capacity in line with net zero ambitions. The briefing also examines tensions over land use and explores the main barriers to further deployment, such as access to the National Grid.

Future water resources

Research Briefing CBP 10248
published 23 April 2025

The Environment Agency has projected that England could face a daily shortfall of nearly 5 billion litres of water by 2050. This research briefing explores the causes of pressure on water supply, including population growth, infrastructure challenges and climate change. It outlines planned policy responses, supply and demand-side measures, and the role of water companies and regional groups in long-term planning.

Sewage discharges

Research Briefing CBP 10027
published 15 April 2025

This briefing looks at why sewage discharges occur, particularly through storm overflows, and their impact on the environmental and public health. Find out how discharges are monitored, recent trends in data, and what actions are being taken to reduce their frequency and impact. Our paper also discusses legislation and enforcement, including the government's Storm Overflows Discharge Reduction Plan and the Water (Special Measures) Act 2025.

AI in UK government departments

Research Briefing CBP 10236
published 4 April 2025

How is artificial intelligence being used across government? This briefing gives an overview of AI applications in central departments – from fraud detection to document processing – and outlines the government's "test and learn" approach to adopting new technologies. It also looks at current policy, guidance, and parliamentary scrutiny of AI use across Whitehall.

Autism policy and services: Health and social care

Research Briefing CBP 10232
published 2 April 2025

This briefing explores health and social care services for autistic people, including policies on diagnosis, mental health support, and staff training. It discusses responsibilities of integrated care boards, the 2021–2026 autism strategy, and concerns around long waiting times. The briefing also covers recent policy and legislative developments related to adult and children's social care.

The UK Space Industry

Research Briefing CBP 9202
published 27 March 2025

This briefing provides an overview of the UK space sector, covering its economic contribution, workforce, and range of activities, from satellite communications to launch services. It outlines government investment, regulation under the Space Industry Act 2018, and key strategic aims, including growing the UK's role in global space markets. The paper also explores international partnerships and industry feedback on current policy.

BRIEFINGS ON LEGISLATION

Our legislative briefings help you understand the content and journey of bills as they pass through parliament. Latest updates include:

Sustainable Aviation Fuel Bill 2024-25

Research Briefing CBP 10279
last updated 9 June 2025

This bill would enable the creation of a revenue certainty mechanism to support UK production of sustainable aviation fuel (SAF), providing long-term contracts and a guaranteed price. It includes powers to designate a government-owned counterparty and impose a levy on fuel suppliers. The aim is to encourage investment SAF and support the UK's decarbonisation goals.

Water Bill 2024-25

Research Briefing CBP 10211
last updated 16 April 2025

A Private Member's Bill introduced by Clive Lewis MP, which would require the Secretary of State to set objectives and targets for water regulation related to climate change, clean water, affordability, and governance. It would establish a Commission on Water and mandate the creation of a Citizens' Assembly on water ownership. The bill also proposes an alternative model for water sector governance, developed through wide public and expert engagement.

Planning and Infrastructure Bill 2024-25

Research Briefing CBP 10216
last updated 21 March 2025

If passed, the bill would make a range of changes to provision on planning and infrastructure, touching on areas including housing, electricity infrastructure, nature protections, transport and flood preparedness. This is aimed to support ambitions in the government's Plan for Change, which includes delivering 1.5 million homes while also delivering for nature and deciding 150 nationally significant infrastructure projects (NSIPs) before the end of the 2024 parliament.

DATA DASHBOARDS

The Library also produces a range of interactive data dashboards, helping you find data at constituency, regional and national levels. Our most recently-updated dashboards are:

Local area data: fuel poverty

Data last updated 9 June 2025

Fuel poverty is a devolved policy area. Our interactive dashboard lets you explore data on fuel poverty for constituencies in England and local authorities in Scotland, Wales and Northern Ireland.

Constituency data: Energy efficiency

Data last updated 14 May 2025

Explore figures relating to energy efficiency in the UK, which include Energy Performance Certificates (EPCs) in England and Wales and Energy Company Obligations (ECO) measures in Great Britain.

Constituency data: Sewage discharges in England

Data last updated 15 April 2025

Sewage discharges are the release of raw, untreated sewage into waterbodies, such as rivers. Browse data on sewage discharges in England, by constituency, river, and water company.

Constituency data: Households off the gas grid

Data last updated 7 March 2025

Accessing the mains gas grid is the most common way in England, Wales, and Scotland to heat a home, however some homes rely on alternative sources of fuel such as heating oil, electric heating, or liquefied petroleum gas (LPG). Our interactive dashboard lets you explore data for off-grid homes by constituency and compare with the rest of the region/country.

GET REAL-TIME RESEARCH UPDATES FOR PARLIAMENTARY DEBATES

The Commons Library and POST have launched a new WhatsApp channel, bringing you impartial, curated research for the day's debates an hour before the Chamber sits.

Go to **ukparlresearch.info/whatsapp** on a browser or your mobile device to follow the channel, and make sure to click the bell icon to be notified when we share helpful research.

FORTHCOMING BOOK PUBLICATION Dr Bryan Hanley

Secondary Natural Products in Foods and Food Systems

- Non-nutritive chemicals from foods
- Reductionism of chemistry meets the complexity of living systems
- Changes to natural products by food systems

Publisher: Springer Cham
https://link.springer.com/book/9783032002914

This book covers secondary natural products in foods and food systems. It presents their production (biosynthesis and storage), biological function in the producing organism, biological availability and effect on consuming organisms.

Chapters will also cover the analysis of molecules, the measurement of clinical outcomes (particularly the use of biomarkers to assess impact), synergistic effects of natural products, processing and the impact of secondary products on food systems. Specific examples of natural products and classes of natural products are used to illustrate key points.

Since chemistry is an empirical discipline, each chapter will contain a food recipe that makes use of specific ingredients that will be a practical starting point to highlight the principles discussed in the chapter. This does not mean the book can be considered a 'recipe' or 'cook' book. It is, at its core, a book by and for chemists with chemistry-based practical examples.

UK Research and Innovation

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Big challenges demand big thinkers – those who can unlock the answers and further our understanding of the important issues of our time. Our work encompasses everything from the physical, biological and social sciences, to innovation, engineering, medicine, the environment and the cultural impact of the arts and humanities. In all of these areas, our role is to bring together the people who can innovate and change the world for the better.

We work with the government to invest over £7 billion a year in research and innovation by partnering with academia and industry to make the impossible, possible. Through the UK's nine leading academic and industrial funding councils, we create knowledge with impact.

Arts and Humanities Research Council

Website: www.ahrc.ukri.org

AHRC funds outstanding original research across the whole range of the arts and humanities. This research provides economic, social and cultural benefits to the UK, and contributes to the culture and welfare of societies around the globe.

Biotechnology and Biological Sciences Research Council

Website: www.bbsrc.ukri.org

BBSRC invests in world-class bioscience research and training. This research is helping society to meet major challenges, including food security, green energy and healthier, longer lives and underpinning important UK economic sectors, such as farming, food, industrial biotechnology and pharmaceuticals.

Economic and Social Research Council

Website: www.esrc.ukri.org

ESRC is the UK's largest funder of research on the social and economic questions facing us today. This research shapes public policy and contributes to making the economy more competitive, as well as giving people a better understanding of 21st century society.

Engineering and Physical Sciences Research Council

Website: www.epsrc.ukri.org

EPSRC invests in world-leading research and postgraduate training across the engineering and physical sciences. This research builds the knowledge and skills base needed to address scientific and technological challenges and provides a platform for future UK prosperity by contributing to a healthy, connected, resilient, productive nation.

Innovate UK

Website: www.ukri.org/councils/innovate-uk

Innovate UK drives productivity and economic growth by supporting businesses to develop and realise the potential of new ideas, including those from the UK's world-class research base. They connect businesses to the partners, customers and investors that can help them turn these ideas into commercially successful products and services, and business growth.

Medical Research Council

Website: www.mrc.ukri.org

MRC is at the forefront of scientific discovery to improve human health. Its scientists tackle some of the greatest health problems facing humanity in the 21st century, from the rising tide of chronic diseases associated with ageing to the threats posed by rapidly mutating micro-organisms.

Natural Environment Research Council

Website: www.nerc.ukri.org

NERC is the driving force of investment in environmental science. Its leading research, skills and infrastructure help solve major issues and bring benefits to the UK, such as affordable clean energy, air pollution, and resilience of our infrastructure.

Research England

Website: www.re.ukri.org

Research England creates and sustains the conditions for a healthy and dynamic research and knowledge exchange system in English universities. Working to understand their strategies, capabilities and capacity; supporting and challenging universities to create new knowledge, strengthen the economy, and enrich society.

Science and Technology Facilities Council

Website: www.stfc.ukri.org

STFC is a world-leading multi-disciplinary science organisation. Its research seeks to understand the Universe from the largest astronomical scales to the tiniest constituents of matter, and creates impact on a very tangible, human scale.

SCIENCE DIRECTORY

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AIRTO, the Association of Innovation, Research and Technology Organisations, comprises approximately sixty principal organisations operating in the UK's Innovation, Research and Technology (IRT) sector. The IRT sector has a combined turnover of £6.9bn, employs over 57,000 people and contributes £34bn to UK GVA. AIRTO's members work at the interface between academia and industry, for both private and public sector clients. Members include independent Research and Technology Organisations, Catapult Centres, Public Sector Research Establishments, National Laboratories, some university Technology Transfer Offices and some privately held innovation companies.

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Applied Microbiology International believes that global challenges need to be solved by global, interdisciplinary experts who apply their diverse experience and unique voices to achieve a common goal. Because of this, we're a truly inclusive, international organisation.

With a strong focus on influencing international policy, we are organised around seven goals which align with core UN Sustainable Development Goals and encourage partnership between industry and academia to increase our impact. We publish the leading industry magazine, *The Microbiologist*, and in partnership with Wiley and Oxford University Press, publish six internationally acclaimed journals.

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For over 70 years, AWE has supported the UK Government's nuclear defence strategy and Continuous At Sea Deterrence.

On behalf of the Ministry of Defence, AWE manufactures, maintains and develops the UK's nuclear warheads, and applies its unique expertise to support nuclear threat reduction and to protect national security.

The company provides guidance to UK military and police counter-terrorism teams, as well as emergency response in the event of nuclear or radiological incidents.

British In Vitro Diagnostics Association

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BIVDA is the UK industry association representing companies who manufacture and/or distribute the diagnostics tests and equipment to diagnose, monitor and manage disease largely through the NHS pathology services.

Increasingly diagnostics are used outside the laboratory in community settings and also to identify those patients who would benefit from specific drug treatment particularly for cancer.

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The British Pharmacological Society is a charity with a mission to promote and advance the whole spectrum of pharmacology. It is the primary UK learned society concerned with drugs and the way they work, and leads the way in the research and application of pharmacology around the world. Founded in 1931, the Society champions pharmacology in all its forms, across academia, industry, regulatory agencies and the health service. With over 3,500 members from over 60 countries worldwide, the Society is a friendly and collaborative community. Enquiries about the discovery, development and application of drugs are welcome.

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BSAC is a learned society whose members are among the world's leading infectious disease physicians, pharmacists, microbiologists, and nurses. With more than 45 years of leadership in antibiotic research and education, BSAC is dedicated to saving lives by fighting infection. It does this by supporting a global network of experts via workshops, conferences, evidence-based guidelines, e-learning courses, and its own high-impact international journal. BSAC also provides national surveillance and susceptibility testing programmes, an outpatient parenteral antimicrobial therapy (OPAT) initiative, research and development grants, and the secretariat for the All-Party Parliamentary Group on Antibiotics. BSAC has members in 40 nations and active learners in more than 135 countries.

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The British Society for Immunology is the leading UK charity representing scientists and clinicians who study the immune system in humans and animals.

As a membership organisation, we act as a focal hub for the immunology community, supporting and empowering immunologists working in academic, industry and clinical settings to drive forward scientific discovery and application. We aim to harness the knowledge generated by our membership to ensure society is aware of and can gain from the health benefits that immunology research can deliver.

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The British Society of Animal Science (BSAS), the principal body for animal science in the UK, was established in 1944.

We work globally with members and partners to shape the future of animal science, supporting the advancement of responsible, environmentally and economically sustainable animal production, addressing issues such as the role of animal science in resolving the world's food crisis.

BSAS disseminates research findings to ensure practical and beneficial application of positive outcomes to include livestock, animal health and welfare, the care of equine, companion, and zoo animals.

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The British Society of Soil Science (BSSS) was founded in 1947 and is an established international membership organisation and charity committed to the study of soil in its widest aspects.

The society brings together those working within academia, practitioners implementing soil science in industry and all those working with, or with an interest in soils. We promote research and education, both academically and in practice, and build collaborative partnerships to help safeguard our soil for the future. This includes hosting the World Congress of Soil Science 2022 in Glasgow, where those with an interest in soil science met to discuss the critical global issues relating to soil.

SCIENCE DIRECTORY

Brunel University London

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Brunel University London is an international research active university with 3 leading research institutes: Institute of Energy Futures: Led by Professor Savvas Tassou, the main themes of the Institute are Advanced Engines and Biofuels, Energy Efficient and Sustainable Technologies, Smart Power Networks, and Resource Efficient Future Cities. Institute of Materials and Manufacturing: The main themes of research are Design for Sustainable Manufacturing, Liquid Metal Engineering, Materials Characterisation and Processing, Micro-Nano Manufacturing, and Structural Integrity. The Institute is led by Professor Luiz Wrobel. Institute of Environment, Health and Societies: Professor Susan Jobling leads this pioneering research institute whose themes are Health and Environment, Healthy Ageing, Health Economics Synthetic Biology, Biomedical Engineering and Healthcare Technologies, and Social Sciences and Health. Brunel University London offers a wide range of expertise and knowledge, and prides itself on having academic excellence at the core of its offer, and was ranked in the recent REF as 33rd in the UK for Research Power (average quality rating by number of submissions) and described by The Times Higher Education as one of the real winners of the REF 2014.

Cavendish Laboratory

UNIVERSITY OF CAMBRIDGE

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The Cavendish Laboratory houses the Department of Physics of the University of Cambridge. The research programme covers the breadth of contemporary physics.

Extreme Universe: astrophysics, cosmology and high energy physics

Quantum Universe: cold atoms, condensed matter theory, scientific computing, quantum matter and semiconductor physics

Materials Universe: optoelectronics, nanophotonics, detector physics, thin film magnetism, surface physics and the Winton programme for the physics of sustainability

Biological Universe: physics of medicine, biological systems and soft matter. The Laboratory has world-wide collaborations with other universities and industry

CIPA THE CHARTERED INSTITUTE OF PATENT ATTORNEYS

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CIPA represents virtually all of the UK's 2,600 registered patent attorneys in industry and private practice. We are the UK's largest intellectual property organisation with over 4,700 members, including 1,100 trainee patent attorneys.

It is our members that support British SMEs, universities and large companies in protecting their innovative technology worldwide. The reputation of the UK for IP advice draws work from around the world; only 11% of European patent applications by British representatives are for UK applicants. Consequently, the profession generates around £1 billion for the economy in gross value added and approaching £750 million in exports.

The Cosmetic Toiletry & Perfumery Association | ctpa

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CTPA is the UK trade association representing manufacturers of cosmetic products and suppliers to the cosmetic products industry. 'Cosmetic products' are legally defined and subject to stringent EU safety laws.

CTPA is the authoritative public voice of a vibrant and responsible UK industry trusted to act for the consumer; ensuring the science behind cosmetics is fully understood.

CLIFTON SCIENTIFIC Trust

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We bring school students and their teachers to:
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- add real-life meaning and motivation, from primary to post-16
- internationally build global awareness and experience science as a cultural bridge
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- Primary; our local Meet-a-Medic Programme since 2005

Clifton Scientific Trust Ltd is registered charity in England and Wales 1086933

The Council for the Mathematical Sciences

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The Council for the Mathematical Sciences is an authoritative and objective body that works to develop, influence and respond to UK policy issues affecting mathematical sciences in higher education and research, and therefore the UK economy and society by:

- providing expert advice;
- engaging with government, funding agencies and other decision makers;
- raising public awareness; and
- facilitating communication between the mathematical sciences community and other stakeholders

THE FRANCIS CRICK INSTITUTE

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The Francis Crick Institute is an independent charity, established to be a UK flagship for discovery research in biomedicine. The Crick's mission is discovery without boundaries. We don't limit the direction our research takes. We want to understand more about how living things work to help improve treatment, diagnosis and prevention of human disease, and generate economic opportunities for the UK. In our institute more than 2,000 staff and students use their wide-ranging knowledge and expertise to work across disciplines and explore biology at all levels, from molecules through cells to entire organisms.

Daphne Jackson TRUST

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Founded in 1992 in memory of the UK's first female Professor of Physics, the Trust is the UK's leading charity dedicated to realising the potential of scientists and engineers returning to research after career breaks for family, caring and health reasons. Recently, we have expanded our remit to incorporate the social sciences and arts & humanities. Our Fellowship programme, working in partnership with universities, UKRI, charities, learned societies and industry, enables individuals to undertake part- time research in universities and research institutes. Fellowships comprise a research project alongside an individually tailored retraining programme, with additional mentoring and support, enabling recipients to re-establish their research credentials, update skills and redevelop confidence, in a suitably supportive environment.

EngineeringUK

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EngineeringUK is an independent organisation that promotes the vital role of engineers, engineering and technology in our society.

EngineeringUK partners business and industry, Government and the wider science and technology community: producing evidence on the state of engineering; sharing knowledge within engineering, and inspiring young people to choose a career in engineering, matching employers' demand for skills.

SCIENCE DIRECTORY

The Geological Society

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The Geological Society of London is the UK's national society for geoscience, providing support to 12,000 Fellows (members) worldwide.

The Fellowship encompasses those working in industry, academia and government, with a wide range of expertise on policy-relevant science, and the Society is a leading communicator of this science to government bodies and other non-technical audiences.

The Society aims to be an inclusive and thriving Earth science community advancing knowledge, addressing global challenges, and inspiring future generations.

IBMS Institute of Biomedical Science

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Advancing knowledge and setting standards in biomedical science
With over 20,000 members in 61 countries, IBMS is the leading professional body for scientists, support staff and students in the field of biomedical science. Since 1912 we have been dedicated to the promotion, development and delivery of excellence in biomedical science within all aspects of healthcare, and to providing the highest standards of service to patients and the public. By supporting our members in their practice, we set quality standards for the profession through training, education, assessments, examinations and continuous professional development.

IKE

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IKE is the UK's professional body for innovators. It accredits and certificates innovation practices. We influence the inter-relationship between education, business, and government through research and collaborative networks.

Our Innovation Manifesto highlights our commitment to support the development of innovative people and organisations. IKE runs think-tanks, conducts research, develops new business models and tools and supports organisations to benchmark their innovation capabilities.

Institute of Measurement and Control

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The InstMC is a professional engineering institution and learned society dedicated to the science and application of measurement and control technology for the public benefit. The Institute has a comprehensive range of membership grades for individuals engaged in both technical and non-technical occupations. Also, it is licensed by the Engineering Council to assess and register individuals as Chartered Engineers (CEng), Incorporated Engineers (IEng) and Engineering Technicians (EngTech). The InstMC works to develop the knowledge and skills of individual engineers, fostering communication and advancing the science and practices within the industry.

IOP Institute of Physics

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The Institute of Physics (IOP) is the professional body and learned society for physics in the UK and Ireland.

The IOP's mission is to raise public awareness and understanding of physics, inspire people to develop their knowledge, understanding and enjoyment of physics and support the development of a diverse and inclusive physics community.

As a charity, the IOP seeks to ensure that physics delivers on its exceptional potential to benefit society.

IPEM Institute of Physics and Engineering in Medicine

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The Institute of Physics and Engineering in Medicine (IPEM) is the professional body for Medical Physicists, Clinical Engineers and Clinical Technologists working across healthcare, academia and industry.

We are a charity with a mission of Improving Health through Physics and Engineering in Medicine. Our vision is one in which professionalism drives improvements in diagnosis, treatment and care, transforming the lives of patients.

IPEM is licensed by the Science Council to award CSci, RSci and RSciTech, and by the Engineering Council to award CEng, IEng and EngTech.

IChemE

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The Institution of Chemical Engineers (IChemE) is the UK based and internationally recognised qualifying body and learned society for chemical, biochemical and process engineers.

We advance chemical engineering's contribution for the benefit of society, facilitate the development of chemical engineering professionals across a wide range of sectors including energy, water, food and health, and provide connections to a powerful network of over 30,000 members in more than 100 countries.

IET The Institution of Engineering and Technology

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The IET is a world leading professional organisation, sharing and advancing knowledge to promote science, engineering and technology across the world.

Dating back to 1871, the IET has over 163,000 members in 127 countries with offices in Europe, North America, and Asia-Pacific. .

LGC

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LGC is a leading global life science tools company, providing genomics and quality assurance solutions into high growth application areas within human healthcare and applied market segments. Our core purpose is Science for a Safer World.

Our 180 years of scientific heritage, combined with a focus on innovation and value-enhancing acquisitions, has enabled us to build a highly valued product portfolio, and to closely collaborate with our customers, partners and the global scientific community.

As the UK Government Chemist www.gov.uk/government/ organisations/government-chemist, LGC acts as the referee analyst and advises Government and the wider analytical community on analytical measurement matters for policy, standards and regulation.

LGC is also the UK's National Measurement Laboratory for chemical and bio-measurement, finding solutions to fundamental and emerging measurement challenges, driving innovation, productivity and economic growth.

SCIENCE DIRECTORY

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As the world's oldest active biological society, the Linnean Society is an essential forum and meeting point for those interested in the natural world. The Society holds regular public lectures and events, publishes three peer-reviewed journals, and promotes the study of the natural world with several educational initiatives. The Society is home to a world famous library and collection of natural history specimens. The Society's Fellows have a considerable range of biological expertise that can be harnessed to inform and advise on scientific and public policy issues.

A Forum for Natural History

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The Institution provides politicians and civil servants with information, expertise and advice on a diverse range of subjects, focusing on manufacturing, energy, environment, transport and education policy.

We regularly publish policy statements and host political briefings and policy events to establish a working relationship between the engineering profession and parliament.

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The Met Office doesn't just forecast the weather on television.

Our forecasts and warnings protect UK communities and infrastructure from severe weather and environmental hazards every day – they save lives and money.

Our Climate Programme delivers evidence to underpin Government policy through the Met Office Hadley Centre.

Our Mobile Meteorological Unit supports the Armed Forces around the world.

We build capacity overseas in support of international development. All of this built on world-class environmental science.

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The Microbiology Society is a membership charity for scientists interested in microbes, their effects and their practical uses. It has a worldwide membership based in universities, industry, hospitals, research institutes, schools, and other organisations. Our members have a unique depth and breadth of knowledge about the discipline.

The Society's role is to help unlock and harness the potential of that knowledge. Our principal goal is to strengthen our culture of being a community-driven Society by amplifying our members' voices, wherever they are in the world, and empowering them to embed the benefits of microbiology within wider society.

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The National Physical Laboratory (NPL) is the United Kingdom's national measurement institute, an internationally respected and independent centre of excellence in research, development and knowledge transfer in measurement and materials science.

For more than a century, NPL has developed and maintained the nation's primary measurement standards - the heart of an infrastructure designed to ensure accuracy, consistency and innovation in physical measurement.

Advancing the science of nature

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We challenge the way people think about the natural world – its past, present and future We use our unique collection and unrivalled expertise to tackle the biggest challenges facing the world today. We are leaders in the scientific understanding of the origin of our planet, life on it and can predict the impact of future change. We study the diversity of life and the delicate balance of ecosystems to ensure the survival of our planet. We help enable food security, eradicate disease and manage resource scarcity. We inspire people to engage with science to solve major societal challenges.

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The University of Northampton is an institution committed to science education through initial teacher training, a STEM Ambassador network which works within the community and teaching and research to doctoral level.

We are an Ashoka U 'Changemaker Campus' status university recognising our commitment to social innovation and entrepreneurship.

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With 43,000 students and campuses in Nottingham, China and Malaysia, The University of Nottingham is 'the nearest Britain has to a truly global university'.

With more than 97 per cent of research at the University recognised internationally according to the Research Excellence Framework 2014, the University is ranked in the top 1% of the world's universities by the QS World University Rankings.

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The Nutrition Society, formed in 1941, is a diverse community with the independence and courage to challenge, question and progress the field of nutrition.

Through a progressive approach that champions collaboration and breaking down research silos, we welcome members from around the world, regardless of their level of expertise. They must however have a genuine interest in pushing forward the field of nutrition for the benefit of people, animals while balancing the health of our planet too.

SCIENCE DIRECTORY

The Physiological Society

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As the largest network of physiologists in Europe, with academic journals of global reach, we continue our 140-year tradition of being at the forefront of the life sciences.

We bring together scientists from over 60 countries, and our Members have included numerous Nobel Prize winners from Ivan Pavlov to John O'Keefe.

Quadram Institute

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The £75m Quadram Institute opened in 2019 and is focused on fundamental and translational research into the interfaces between the gut microbiome, food, and human health.

The Quadram Institute combines leading-edge bioscience capabilities with NHS endoscopy, clinical trials and biobank facilities.

The Quadram Institute is a partnership between the Norfolk and Norwich University Hospital, University of East Anglia, Quadram Institute Bioscience and BBSRC.

Royal Academy of Engineering

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As the UK's national academy for engineering, we bring together the most successful and talented engineers for a shared purpose: to advance and promote excellence in engineering.

We have four strategic challenges:

- Drive faster and more balanced economic growth
- Foster better education and skills
- Lead the profession
- Promote engineering at the heart of society.

Kew

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RBG Kew is a centre of global scientific expertise in plant and fungal diversity, conservation, and sustainable use, housed in two world-class gardens. Our scientific vision is to document and understand global plant and fungal diversity and its uses, bringing authoritative expertise to bear on the critical challenges facing humanity today. Kew's strategic priorities for science are: (1) To document and conduct research into global plant and fungal diversity and its uses for humanity. (2) To curate and provide data-rich evidence from Kew's unrivalled collections as a global asset for scientific research. (3) To disseminate our scientific knowledge of plants and fungi, maximising its impact in science, education, conservation policy and management. These priorities enable us to curate, use, enhance, explore and share Kew's global resource, providing robust data and a strong evidence base for our UK and global stakeholders. Kew is a non-departmental government body with exempt charitable status, partially funded by Defra.

The Royal Society

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The Royal Society is the academy of science in the UK and the Commonwealth comprising 1400 outstanding individuals representing the sciences, engineering and medicine. The Society has played a part in some of the most fundamental, significant and life-changing discoveries in scientific history and Royal Society scientists continue to make outstanding contributions to science across the wide breadth of research areas. Through its Fellowship and permanent staff, it seeks to ensure that its contribution to shaping the future of science in the UK and beyond has a deep and enduring impact, supporting excellence in science and encouraging the development and use of science for the benefit of humanity.

Royal Society of Biology

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The Royal Society of Biology is a single unified voice, representing a diverse membership of individuals, learned societies and other organisations.

The RSB has a central role in facilitating scientific knowledge exchange and in harnessing the expertise of our community to advise policy-makers on key bioscience issues of national and global significance.

Our vision is a world that values biology's contribution to understanding and improving life for all.

Royal Society of Chemistry

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The Royal Society of Chemistry is the world's leading chemistry community, advancing excellence in the chemical sciences.

With over 50,000 members and a knowledge business that spans the globe, we are the UK's professional body for chemical scientists; a not-for-profit organisation with 170 years of history and an international vision of the future.

We promote, support and celebrate chemistry. We work to shape the future of the chemical sciences – for the benefit of science and humanity.

Society for Underwater Technology

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The SUT is a multidisciplinary learned society that brings together individuals and organisations with a common interest in underwater technology, ocean science, and offshore/subsea engineering.

The society was founded in 1966 and has members from over 40 countries, including engineers, scientists, other professionals and students working in these areas.

Society of Chemical Industry

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Established by Royal Charter in 1881, SCI is a unique multi-disciplinary community. Set up by a prominent group of forward thinking scientists, inventors and entrepreneurs, SCI continues to be a multi-science and industry network based around chemistry and related sciences. Our charitable objective is to promote links between science and industry for the benefit of society. Our passion is invention and creation. We deliver our charitable objective by:

- Supporting the commercial application of science into industry
- Tackling global challenges across Agrifood, Energy, Environment, Health and Materials.

SCIENCE DIRECTORY

Society of Cosmetic Scientists

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Advancing the science of cosmetics is the primary objective of the SCS. Cosmetic science covers a wide range of disciplines from organic and physical chemistry to biology and photo-biology, dermatology, microbiology, physical sciences and psychology.

Members are scientists and the SCS helps them progress their careers and the science of cosmetics ethically and responsibly. Services include publications, educational courses and scientific meetings.

The Society for Radiological Protection

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The Society for Radiological Protection is the principal independent professional body for radiation protection in the UK.

Its members operate in the fields of medicine, the nuclear power cycle and other industries, research, and teaching.

We offer a profession-wide view to regulators and are involved in training and educational outreach. We ensure that professional standards are maintained at the highest levels.

UK INNOVATION & SCIENCE SEED FUND

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The UK Innovation & Science Seed Fund is a leading patient capital investor with more than £330 million private investment leveraged to date.

The Fund works to build technology companies from the earliest stage by working closely with its partners led by STFC, BBSRC, NERC and Dstl, with the National Research and Innovation Campuses they support, and with entrepreneurial science-led teams.

The Fund is also closely aligned with the Catapults and InnovateUK, helping to commercialise key technological advances in industrial biotech, agricultural technology, healthcare, medicine, clean energy, materials, artificial intelligence, software and space.

University of Essex

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Established in 1964, the University of Essex is ranked highly in the Research Excellence Framework, with 100% of its research impact deemed internationally excellent or world-leading for 10 subjects, and is awarded Silver in the Teaching Excellence Framework.

It is home to world-leading expertise in analytics and data science, with research peaks spanning the social sciences, sciences, and humanities. Pioneers of quantitative methods and AI techniques, Essex is also in the UK top 10 for Knowledge Transfer Partnerships – working with businesses to embed innovation into operations, knowledge exchange and contract research.

Universities Federation for Animal Welfare

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Registered in England Charity No: 207996

The Universities Federation for Animal Welfare (UFAW) is an international independent scientific and educational animal welfare charity and membership society. UFAW's vision is a world where the welfare of all animals affected by humans is maximised through a scientific understanding of their needs and how to meet them. We promote an evidence-based approach to animal welfare by funding scientific research, helping develop the next generation of animal welfare scientists and sharing animal welfare science knowledge with both experts and the wider public.

STEM for BRITAIN

CALL FOR POSTERS

THE PARLIAMENTARY & SCIENTIFIC COMMITTEE'S STEM FOR BRITAIN 2026

Applications are invited from early-career research scientists, engineers, technologists and mathematicians who wish to exhibit posters in one of the following areas:

- Biological and Biomedical Sciences
- Chemistry
- Engineering
- Mathematics
- Physics

Prizes will be awarded for the posters presented in each discipline which best communicates high level science, engineering or mathematics to a lay audience.

The Westminster Medal will be awarded to the overall winner at a P&SC event in Parliament in April 2026, following online judging.

Monday 8 September 2025
Applications open.

Full details of the competition and exhibition including the application form will be on the STEM for Britain website: www.stemforbritain.org.uk

Monday 24 November 2025
Closing date for applications.

Tuesday 17 March 2026
Exhibition event in the House of Commons.

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