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Centre for Sectoral Economic Performance

Downstream Chemicals Sector Strategy for the UK



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Foreword

The context for this report is the recognition that downstream chemicals are essential for the manufacture of a huge proportion of valuable products ranging from pharmaceutical medicines, packaging, automotive, aerospace, electronics & appliances, coatings and adhesives, textiles and fibres and beyond. Although the chemical industry is not one of the identified eight high priority growth sectors of the government's Modern Industrial Strategy, it is explicitly mentioned in the strategy and is a critical foundation platform providing raw materials and building blocks for several of the selected priorities. With the increasing geopolitical turmoil, it is clear that the previously well-established system of free trade and globalisation no longer exists. This increases the importance of domestic supply chains, and this paper provides an excellent analysis and important conclusions and recommendations.

Over the last two decades there has been a significant decrease in chemical manufacturing activity within the United Kingdom and Europe and energy costs, in comparison to the USA and the Middle East, have been a significant driver. The most noticeable casualties and closures have been large-scale plants but conversely there has been some growth in the higher value downstream segments which gives some cause for optimism.

The CSEP steering team strongly support the findings and recommendations of this report and believe that a **Chemistry Council** must be formed to work collaboratively with government to ensure that the sector can grow profitably and sustainably to underpin all important downstream high growth and high value sectors. This Chemistry Council would be composed of senior executive representatives of major companies, industry bodies, unions, learned societies and professional institutions and chaired by a very experienced and respected business leader. In my view it is desirable that, were a Chemistry Council or similar body to be formed, it should be in the context of a sector deal-type agreement with the Government so that the Council had a real implementation purpose rather than simply being a vehicle for consultation.

It is evident from this report that significant growth opportunities exist, and it is strongly believed that a **Chemistry Council working in collaboration with government** could support a vision to deliver an additional £10 billion GVA with an additional 35,000 highly skilled jobs over the next decade from a world competitive **Downstream Chemicals Sector**.

This would be achieved by close collaboration with government on a Five-Point Plan:

- **Science Parks as Cluster Hubs** - These will be best placed on former industrial sites used by major companies that have since exited in the northwest and northeast of England and the central region of Scotland. This supports the governments priority of regional economic growth.
- **Energy Pricing and Security** – This is critical to the high volume products necessary for the supply chain as well as the downstream production streams and these must be based on cost effective energy and cost effective basic raw materials from well invested economically efficient manufacturing facilities.
- **Investment Support and Stimulation** - to move forward at pace will necessitate industry investing in new and expanding cost effective facilities, and government, working with the Chemistry Council, can introduce incentives to stimulate the necessary investment which is often halted due to a poor geo-political environment and uncertain government policy.
- **Regulatory Framework** - with the complexities of Brexit and a diversity of regulation from different government departments there are major obstacles to rapid investment in growth and development. A collaboration between government and the Chemistry Council should simplify and rectify this without compromising health, safety or environmental risks whilst ensuring valuable economic growth can be accelerated.
- **Skills Diversity** - we need to have a properly integrated combination of skills from technician level through apprenticeships to graduate and postgraduate level. This needs to be particularly effective and present around Science Parks and areas of re-industrialisation and new industrial growth.

The Centre for Sectoral Economic Performance believes this sector to be pivotal for the growth ambitions of many downstream sectors that must have world competitive supply chains to supply and support substantial economic growth, across the whole nation. This will result from implementation of the **Five-Point Plan**.



The Rt Hon Greg Clark
Executive Chair | Warwick Innovation District | The University of Warwick
Chair of Trustees, Society of Chemical Industry (SCI)

Headlines

1. The UK chemicals industry consists of an integrated number of supply chains, stretching from basic, or upstream, chemicals through to complex, often high value, chemicals which form a vital part of many high growth sectors.
2. It is strongly enabled by the UK university and research capability, which provides a stream of highly qualified chemistry, biology and engineering personnel and innovative ideas.
3. It is under pressure from global competition, which can undercut its prices, and from an increasingly challenging ecosystem in the UK, which increases its costs and slows its ability to innovate.
4. Many of the global markets it supplies are large, growing faster than average and demanding new and innovative products.
5. The move from fossil carbon feedstocks to renewable carbon feedstocks is widely recognised as desirable and increasingly driven by governments and consumer expectations but requires the implementation and scaling of new technologies over a long timescale – this will require the consistent investment of money!
6. Coordinating the industry and government actions could enable a vibrant UK based chemistry industry with strong global growth, an important contribution to the UK economy and that also upholds the national resilience.

People do not buy chemicals, they buy what chemicals do for them.

Executive Summary

We cannot live, let alone prosper, without chemicals

The chemicals supply chain is a vital and integral part of the UK economy. Few products do not rely on a chemical step somewhere in their production. It is embedded into the manufacturing infrastructure of the UK both economically and geographically. It relies on chemistry, biology and engineering to build chemicals of value to society across many markets. The headline figures – a direct GVA of just under £30bn for the core industry, 137,000 employed directly by around 4,000 chemical companies, and about 327,500 people employed in chemistry-related roles[1,2,3] – do not really measure the importance of this sector to the overall economy.

That spread and diversity of markets means that there are significant growth opportunities for the chemistry based sector to supply innovative products to the industries that use chemistry in their supply chains. The specific sectors which offer the highest growth include healthcare (pharmaceuticals and nutrition), home and personal care products, agricultural chemicals (fertilisers and pesticides), electronic chemicals (use in digital and communications), paints, coatings, inks, adhesives and sealants (use in aerospace, automotive and construction) and energy transition technologies (batteries, photovoltaics and wind turbines) – many of which are part of the Modern Industrial Strategy[4]. All of these sectors have growth rates significantly above average and could double the contribution of the chemicals sector to UK GVA and jobs over the next 10-15 years.

Things to address

However, the chemicals sector in the UK currently faces several critical challenges, some national and some global, that need to be addressed to realise this potential.

The barriers that make even surviving hard

There are immediate issues that increase the costs and slow the delivery of making chemicals in the UK. The high cost of energy, the complexity of regulatory frameworks and the slow speed of their implementation affect almost all of the manufacturing base. Having a registration system for chemicals separate from Europe (under REACH) results in duplicated costs or denying UK companies access to key feedstocks. These are particularly damaging in the context of the current global chemicals overcapacity, which is largely driven by China. Europe has already recognised this global challenge and is beginning to address these issues[5,6,7], but the UK is likely to fall behind without prompt action[8].

The general business environment

These barriers, combined with insufficient Government support for the chemicals sector over the last 30 years makes the UK-based chemicals industry unattractive. This has led to inadequate investment in both existing assets and new companies, with some global corporations moving operations out of the UK and many start-ups migrating to Europe for the scale-up stage. This not only threatens current chemistry-based operations but weakens the argument for investment in the future chemicals industry in the UK.

The challenge that is an opportunity

The petrochemicals sector consumes about 3 billion tonnes of carbon dioxide equivalent fossil carbon a year as its feedstock[9]. This will mostly end up as carbon dioxide at end-of-life and contribute to climate change. The science of replacing these fossil feedstocks with renewable or circular carbon is well advanced but needs reducing to practice at scale. This defossilisation transition will drive a change in the sector and offers an opportunity for the UK to establish a differentiated position in the next generation of chemical production – but it must move quickly to address the current barriers and invest in the next generation of chemical plants if it is to compete.

[1] CEFIC - UK Chemicals Industry Snapshot (https://cefic.org/landscape-of-the-industry/united-kingdom/)
[2] The Contribution of Chemistry RSC 2026
[3] CIA - The Chemicals Industry (https://www.cia.org.uk/the-chemical-industry)
[4] The UK's Modern Industrial Strategy 2025 - GOV.UK (https://www.gov.uk/government/collections/the-uks-modern-industrial-strategy-2025)
[5] The Antwerp Declaration for a European Industrial Deal (https://antwerp-declaration.eu/)
[6] European Chemical Closures & Investments Radar 2022-2025 (https://cefic.org/resources/european-chemical-closures-investments-radar-2022-2025/)
[7] The European Chemicals Industry Action Plan
[8] CEFIC Facts and Figures 2025 (https://cefic.org/news/cefic-launches-2025-facts-figures-report/)
[9] Flue2Chem Final Report (https://cefic.org/news/cefic-launches-2025-facts-figures-report/)

For the companies involved in the sector to survive and prosper, the UK must move both to address the disincentives that affect the wider industry and focus on high value products so that industry can make them at a cost and scale that would make these products commercially competitive. The data suggest that this process has already begun but needs to be recognised and supported.

Contrasting Futures for Upstream and Downstream Chemicals

The huge scale of the commodity chemicals produced at the beginning of the petrochemicals supply chain makes them the focus of many global players, often with direct support from their governments[10]. This means that it will be difficult for the UK to be commercially competitive in fossil fuel derived commodities – but since these chemicals are the bedrock of the rest of many supply chains, we will need sufficient fossil carbon capacity in the UK through the transition to renewable carbon sources. This will avoid dependence on imports that might threaten the commercial viability of the targeted high value products. It will also enable us to continue to supply the existing downstream industries that underpin the UK's resilience.

As the chemistry gets more complicated, the value inherent in the molecule increases – as a rough guide the value of a carbon atom in a generic drug is about 10 times higher than a carbon atom in polyethylene. These complex chemicals are the stage of high value, low to medium volume chemistry where the analysis suggests the UK could continue to build on its historic industry positions to consolidate a long-term commercially competitive industry.

To support and drive this high value chemicals sector requires that the whole chemicals sector is recognised as part of UK's critical national infrastructure, and crucial to anchor the chemistry needed to support the downstream industries identified in the UK government's industrial strategy. A concerted programme of policy interventions and support should include addressing the barriers to investment already identified, and supporting the resources necessary to ensure companies will choose to build scale-up and early stage commercial plant in the UK.

All pulling in the same direction

One issue that consistently arose during engagement with stakeholders across industry, trade associations, learned societies and government departments was the challenge of dealing with the complexity and interconnectedness of the sector.

The industry is complex and varied, so the 4000 or so companies that make up the sector have different priorities depending on the market that is their focus, their technology base, their scale, or their position in the supply chain. They need to agree shared goals that will maintain the commercial viability of the whole sector through the transition and then act in concert.

Within government, the Department for Business, Innovation, Science and Trade (DBIST) is responsible for supporting the commercial and export aspects of the sector, the Department for Energy Security and Net Zero (DESNZ) is responsible for setting energy costs, the Department for the Environment, Food and Rural Affairs (DEFRA) is responsible for the definition and implementation of regulations and specifically for the Registration, Evaluation, Authorisation, and Restriction of Chemicals (REACH), and the money is provided by the Treasury. It is vital that these departments work together to recognise the economic significance of the sector and understand the economic and societal impact of losing key supply chains would have on the rest of the manufacturing supply chain in the UK.

Other sectors (aerospace, automotive and the life sciences) have mechanisms that ensure regular coordinated interaction between the companies and the government. Instituting such a mechanism for the chemicals sector would enable companies across the sector to work more effectively with government to realise the potential to make high value chemicals that will underpin many future global products in the UK and manage the transition away from the use of virgin fossil carbon as a source of carbon.

[10] OECD MAGIC Database of Industrial Subsidies

Introduction

The Centre for Sectoral Economic Performance is a joint initiative between Imperial's Faculty of Engineering and Imperial College Business School and supported by the Imperial Policy Forum and focuses on the UK's existing and emerging high-value industries across engineering, life sciences, and data science. They work to translate rigorous research into industry sector strategies that address both company-level and national competitiveness, working with companies across different sectors and their supply chains, alongside government. The work is carried out in three stages:

1. Establish the current state of the industry and set out a vision for its future[11]

2. To work with industry and relevant stakeholders to validate the vision, and then set out a route and steps to achieve it

3. Work with industry and other stakeholders to agree actions and timelines to implement the strategy

This report is the output of stage two.

A Downstream Chemicals Vision

Through the UK's world leading position in scientific discovery and excellence in advanced engineering we can create a future in sustainable, novel chemistry that meets society's needs. The chemicals sector can flourish serving the growing demand areas of healthcare, cosmetics and home and personal care, agriculture, electronics, paints, coatings, inks, adhesives and composites and the evolving new market driven by the energy transition. Simultaneously we must reduce our reliance on fossil fuels and build resilient supply chains that will provide greater security of supply to the nation. The chemicals sector serves the UK Government's current Industrial Strategy, providing the ingredients necessary to the "high potential" Industrial Strategy sectors.

To achieve these goals, the UK must provide an attractive environment for business investment in these new opportunities with clear policies that support the industry and create a globally competitive ecosystem. We must minimize barriers and costs on exports and imports through regulatory alignment with other nations. We must speed up planning and permitting of new sustainable process plants as a source of comparative advantage by simplifying regulation and adequately resourcing and aligning regulators at the national and regional levels. We must urgently address the high energy costs to industry and move any carbon taxes to end product consumption.

Building support for a sustainable chemicals future will be critical at a national level, and considerable effort will be required to build societal understanding and support of the need for chemicals in our everyday lives, for jobs and wealth, and for our security as a society.

Finally, to succeed we must innovate at pace to retain competitiveness in the global markets. This means we need to invest in a system where new first-of-a-kind sustainable processes can be rapidly developed to operate at lower cost, so that the country's leading entrepreneurial firms can compete globally. We must also provide funding for these demonstration plants – currently there is a major funding gap in the UK's innovation program for the chemicals sector. Our continued support for the activities that find new commercially viable and scalable ways of reducing our reliance on fossil fuels as feedstocks for the products we consume in our daily lives must continue to address climate change.

History

It is not as though global competition, the mismatch between capacity and market size, the impact of new technologies and geopolitics affecting the chemicals sector is new! 100 years ago, the British based chemicals industry was facing massive global competition from their counterparts in Germany and America. To counter this, Imperial Chemical Industry (ICI) was put together by combining the assets and expertise of four major UK chemical firms, Brunner, Mond & Company (Alkalis and Nitrates), Nobel Industries (Explosives), United Alkali Company (General chemicals) and British Dyestuffs Corporation (Dyes and synthetics). It continued for just over 80 years as an innovation powerhouse providing the ingredients that other companies turned into products that underpin our society and we now take for granted[12]. Once again, we are facing global competition, and the UK must decide what we do this time!

[11] CSEP Fine Chemicals Phase 1 Report (https://doi.org/10.25560/127810)
[12] ICI: The Company That Changed Our Lives: **ISBN-13:** 978-0091673000

Understanding the Ubiquity and Accepting the Complexity

From the moment we wake up, chemistry is part of our daily lives. The toothpaste on the bathroom shelf, the shampoo in the shower, the coffee cup lining that keeps our drink warm, the phone in our pocket, the medicines we rely on, the paint on our walls and even the packaging that protects our food, all depend on products and processes enabled by the chemicals sector. While often invisible, chemistry underpins many of the everyday goods and services that people across the UK depend on.

This makes the chemicals supply chain one of the foundations of the UK economy. Few products reach consumers without a chemical step somewhere in their journey from raw materials to finished goods. The sector is deeply embedded in the UK's manufacturing base, supporting jobs, investment and economic activity in communities across the country.

The breadth of industries that rely on chemistry also creates significant opportunities for growth. The chemicals sector supplies essential inputs to high-growth markets including healthcare and pharmaceuticals, nutrition, home and personal care products, agriculture, digital and communications technologies, advanced materials, aerospace, automotive manufacturing, construction and energy transition technologies such as batteries, solar panels and wind turbines. Many of these sectors sit at the heart of the UK's Modern Industrial Strategy.

As demand for these industries continues to grow, so too does the opportunity for the UK chemicals industry to innovate, expand and create skilled jobs. With the right conditions, the sector could help drive a new wave of industrial growth, strengthening domestic supply chains, supporting regional prosperity and potentially doubling its contribution to UK GVA and employment over the next 10–15 years.

However, the ubiquity and underpinning nature of the chemicals industry means that it is often overlooked. It is also something most people do not deal with directly. At the start of most chemical supply chains come the platform or upstream chemicals which come from the refineries. These are reacted into increasingly complex chemical structures with defined properties that are tailored to fit their end applications (there is no widely agreed term for these, but they are often referred to as Speciality, Fine or Downstream Chemicals). At this stage, the cost/price of the chemical is often quite high, and it is produced to high quality and consistency standards at (comparatively) low tonnages. It is also where new, innovative chemistry can enable better end-use properties and so earn a premium in the market.

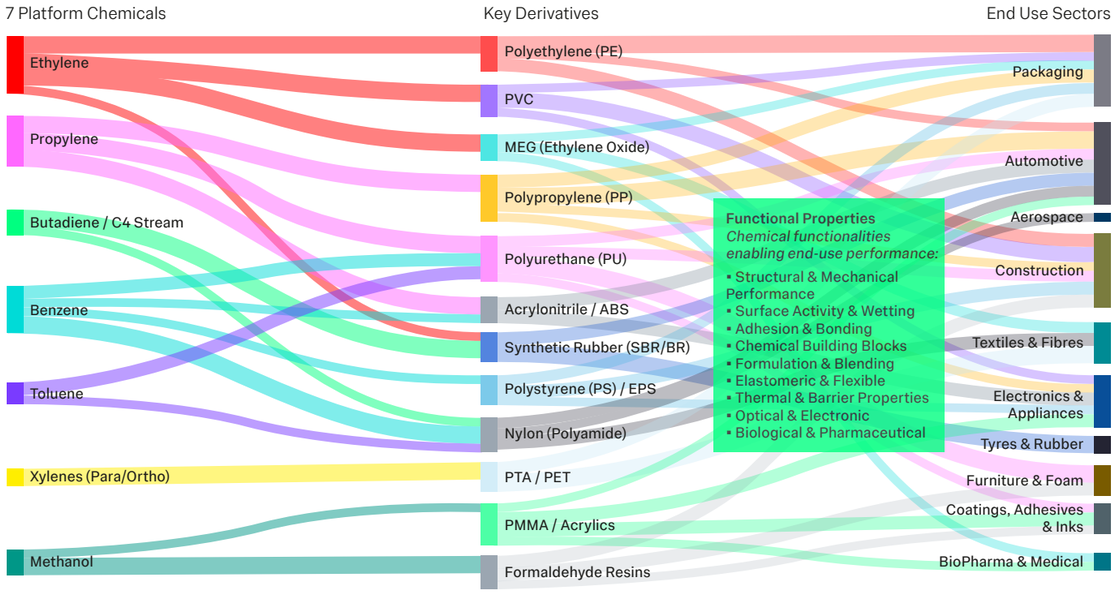


Fig.1 Showing flow of chemicals from refinery output to market applications – sadly there is no classification based on properties!

Global Context

Structural Overcapacity and the Chinese Challenge
The main structural force currently reshaping the global chemicals industry is China's extraordinary, decades-long expansion of production capacity. As an example, China is about 2/3 through an ambitious programme[13] to build 36 coal-to-olefins (CTO) plants targeting more than 24 million tonnes per year of new olefins capacity (about 6% of global capacity but more than Europe). The economics of these plants decouple Chinese chemical production from oil and gas prices, delivering an estimated cost advantage of approximately £158 per tonne[7] compared with oil-based production routes (where average prices range between £800 and £1000 per tonne[14]). This feedstock advantage is being scaled rapidly and represents an existential threat to cost-competitive commodity production in Europe and the UK.

China's strategy is not confined to bulk chemicals. It has, with strategic foresight, positioned itself as the global leader in key markets of the energy transition – battery materials, copper, aluminium, rare earths, solar cells and electronics — sectors that are both significant users of chemicals and future growth markets. As China moves its focus downstream, it both relies less on exports from the European chemical industry and increasingly competes directly in the downstream high-value segments.

The scale of European deindustrialisation resulting from these dynamics is stark[6]:

a) 9% of European chemical capacity has been lost since 2022

b) 6% net reduction in steam cracking capacity across Europe

c) New investment has collapsed by 86%, falling from €7.6 billion in 2022 to €1.5 billion in 2025

d) The UK has lost 4.5 million tonnes of capacity (about 40%) since 2022, against only 0.3 million tonnes of confirmed new investment

Recent high-profile UK closures — SABIC on Teesside, CF Fertilisers at Ince and Billingham, Tata Steel's Port Talbot operations (with their cascading chemical co-product operations), and various pharmaceutical manufacturing rationalisations — reflect this global trend bearing down on the UK's domestic industrial base.

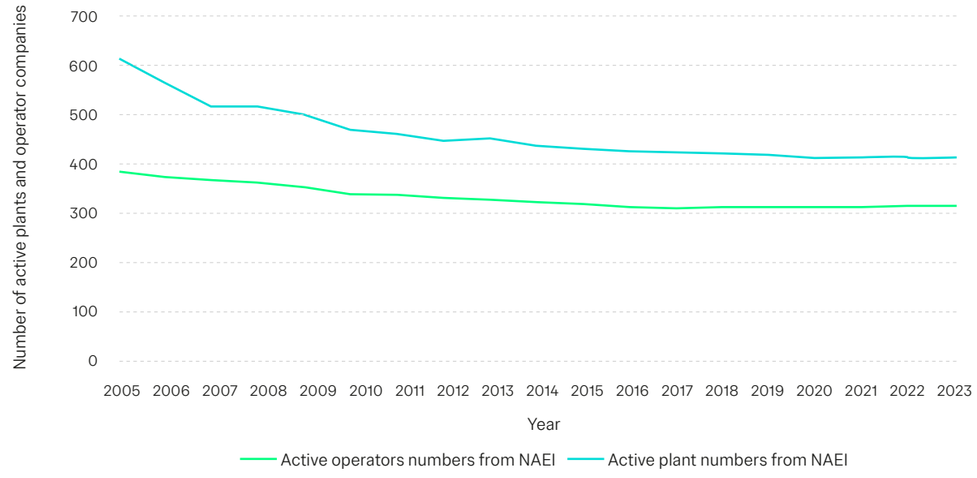


Fig.2 Data from National Atmospheric Emissions Inventory (NAEI[15]) showing the number of active chemical companies and plants (licensed) over the last 20 years. This is different from the overall number of companies cited as being part of the chemicals industry – which includes formulators, logistics and others

[13] https://www.scmp.com/news/china/science/article/3339629/china-planning-dozens-plants-use-coal-instead-oil-make-plastics
[14] https://www.imarcgroup.com/ethylene-pricing-report
[15] National Atmospheric Emissions Inventory (https://naei.energysecurity.gov.uk/)

The United States: Shale Advantage and IRA Support
Meanwhile, the US retains strong competitiveness in several chemical segments, underpinned by access to abundant, low-cost shale gas (both as feedstock and fuel), a deep domestic capital market, and – since 2022 – substantial Inflation Reduction Act (IRA) subsidies for clean energy and industrial investment. US electricity prices have remained relatively stable and at historically low levels throughout the period of European energy crisis. The US is now also deploying aggressive trade barriers (tariffs) to protect its industrial base from Chinese overcapacity, creating an even more fragmented global trading environment. This could adversely impact the UK and Europe as Chinese producers trying to place more capacity on the European market, but it could also open opportunities for UK exports as US downstream manufacturers look to diversify their geographic sourcing.

India: An Emerging Competitor
To add to the challenge, India has announced an ambition to double its share of global chemical production to 6% by 2030[16] (the EU currently holds approximately 14% of the global market) and to build the market to $1 trillion by 2040[17]. Supported by Production Linked Incentive (PLI) schemes and Remission of Duties and Taxes on Exported Products (RoDTEP), India attracted $844 million in overseas investment into chemicals and petrochemicals in 2023. While India's current capability in the downstream, high-value chemicals is more limited than China's, the trajectory of capability development is clear (as demonstrated by its capabilities to produce Active Pharmaceutical Ingredient (APIs) for generic drugs of which it supplies 30% of the World's needs, the other 70% comes from China), and the UK will face sustained competitive pressure from both Asian manufacturing giants over the next few decades.

Europe's Policy Response
The challenge facing European competitiveness was clearly highlighted in a detailed joint report by the European Chemical trade association (CEFIC) and Advancy[2]. As a response to this report and vocal representation by industry, including the Antwerp declaration[5], the European Commission published its European Chemicals Industry Action Plan on 8 July 2025[7]. This comprehensive response to competitive pressures includes:

a) Immediate measures to reduce energy costs through tax credits and network tariff reductions.

b) Launch of EU Innovation and Substitution Hubs under Safe and Sustainable by Design principles.

c) Increased Horizon Europe funding (€120 million for deployment)

d) A "Critical Chemicals Alliance" to prevent further strategically important capacity closures that would impact resilience.

e) Omnibus VI simplification package to reduce administrative burden

f) The Advanced Materials Act (from 2026)

g) An Industrial Decarbonisation Bank (targeting €100bn in funds) to finance the transition

The EU's response is targeted, coordinated and resourced.

The UK, by contrast, lacks a dedicated chemicals sector strategy. Multiple policy initiatives in the 2025 UK Industrial Strategy touch on relevant themes, but without the sector-specific coordination or financial instruments that Europe is mobilising. This asymmetry is itself a competitive disadvantage for inward investment decisions, where EU locations offer a clearer, more supportive policy environment alongside the single market's commercial scale.

On the positive side, although government interventions in the sector remain limited, the recent announcement of the £350 million Critical Chemicals Resilience Fund (21 May 2026) represents a significant step towards strengthening the resilience of UK chemical supply chains and supporting strategically important chemical production in the UK.

Regional Context

The distribution of historical chemical clusters provides a basis for planning a future. In the 19th Century companies grew up close to naturally occurring raw materials (such as coal and salt), to materials companies that used their products and transport (initially canals and railways but later deep water ports). Subsequent investment tended to follow these early clusters, and the UK now has a lot of its chemical and chemistry using companies based in the North-West and North-East of England, the Humber Estuary and in Grangemouth in Scotland. And infrastructure was also built up around them – pipelines, training colleges/universities and logistics. They are weakened by the current state of the sector, but would still provide a strong basis upon which a new industry could be built.

[16] Catalyzing growth: India's chemicals and petrochemicals drive growth | EY - India (https://www.ey.com/en_in/insights/chemicals/catalyzing-growth-india-s-chemicals-and-petrochemicals-drive-growth)
[17] https://chemicals.economictimes.indiatimes.com/news/industry-and-market/india-sets-2040-chemicals-sector-goal-of-1-trillion/133532830

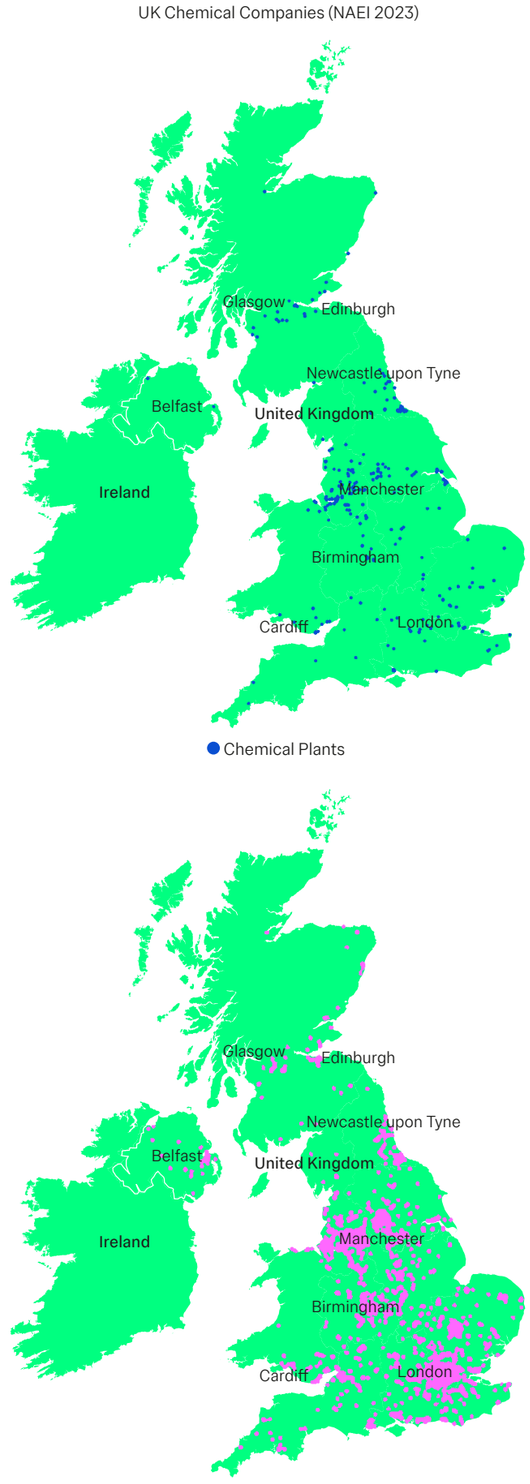


Fig. 3 a) shows the distribution of companies registered as having a licence to operate plants.
b) shows the distribution of all companies registered under SIC code 20

It’s not all gloom

However, close analysis of the UK industry shows some cause for optimism. Although the closure of large-scale plants upstream in the supply chain get the headlines, the overall employment and GVA patterns suggest that many companies are moving into the high value segment that sits downstream and supplies the user-facing companies. Here there are more, higher-paid jobs because success depends on quality, service and innovation.

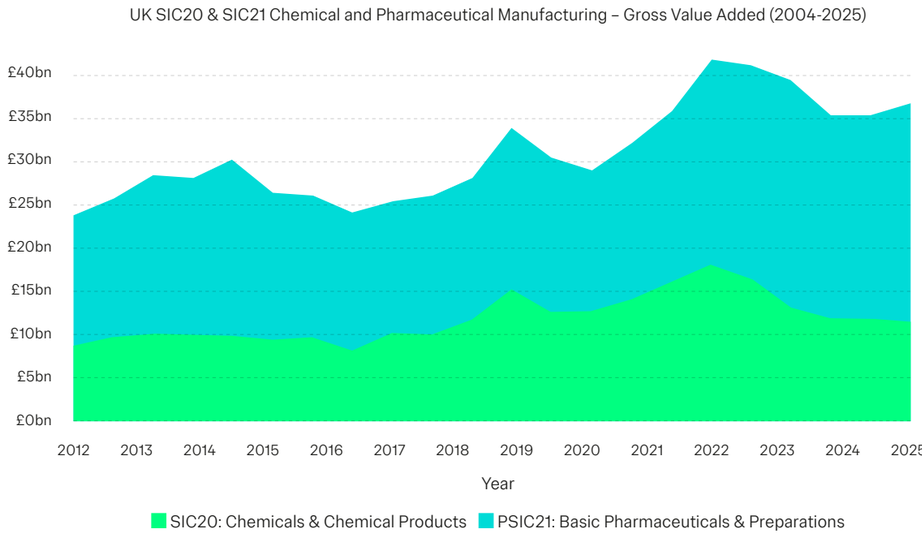


Fig 4. Shows that GVA for the “chemicals” industry (which contains both upstream and downstream operations – SIC Code 20) and the pharmaceuticals industry (which sells downstream chemicals used to treat illnesses – SIC Code 21). This graph demonstrates both the extra value derived from being closer to the end market that uses chemicals for their properties, and – since some downstream chemicals are included in the Standard Industry Classification Code (SIC) 20 – the difficulty of analysis based on this outdated classification scheme.

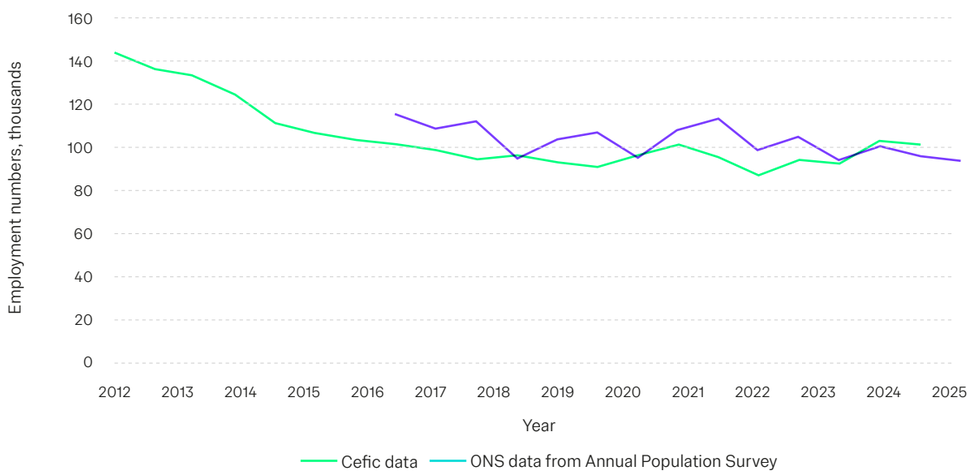


Fig 5. The loss of jobs in the 2000s seems to have been arrested – are there more jobs in satisfying higher value markets? Data from CEFIC and ONS

Opportunity

The UK Chemicals Industry is made up of over 4000 companies employing 137,000 people directly and having a turnover of about £65bn with a GVA of £29bn[3]. But its impact on the UK economy is much larger!

The UK is also a globally recognised centre for the sciences that underpin the sector. In chemistry it produces around 5000 undergraduates and 2700 postgraduates a year (about 300 UK and 1100 overseas taught courses (MScs) and 600 UK research and 700 overseas research (PhDs)). For chemical engineering, the numbers are around 2500 undergraduates and about 2600 postgraduates. For biology the numbers are higher, but there are a wider variety of career options – about 24,000 undergraduates and 11,000-14,000 postgraduates a year (between 8,500 and 11,000 taught courses and about 2750 research

So, where is the global chemistry industry going? Which markets are large and growing fastest and what chemicals will they need to deliver value to THEIR customers?

Healthcare – Pharmaceuticals and Nutraceuticals

With an overall global market size of 2.365 trillion USD in 2025 and a growth rate of 6.9% per year, this is a very attractive market[18,19]. It has been the UK’s single most important chemistry-based segment (see Figure 3) with a GVA of about £17.6bn, but with the closure and offshoring of manufacturing by several of the key players, this is fragile as an area of strategic priority. The UK pharmaceutical industry — anchored by GSK, AstraZeneca, and a world-class Contract Research Organization (CRO) and Contract Development and Manufacturing Organization (CDMO) ecosystem — is a global leader, providing a substantial, sophisticated and growing demand for the products based on fine chemical intermediates and active pharmaceutical ingredients (API’s). As the market shifts to more complex biologics and potent speciality small molecules, and driven by post-COVID supply chain reshoring objectives, there is an opportunity for UK contract manufacturers.

An often unconsidered part of the process of bringing new therapies to market is the role of CRO/CDMO ecosystem.

Any new drug must progress through sequential, highly structured phases. Each phase acts as a strict filtering mechanism before regulatory submission:

a) Phase 1 Evaluates safety, safe dosage range, and side effects. It usually involves 20 to 100 healthy volunteers.

b) Phase 2 Measures efficacy and further assesses safety. This requires several hundred people living with the specific condition.

c) Phase 3 Confirms effectiveness, monitors side effects, and compares the drug to standard treatments. This involves hundreds to thousands of patients worldwide.

d) Phase 4 Conducted after market approval to track long-term risks, benefits, and optimal real-world usage. Covers diverse, real-world patient populations.

The UK has a track record in running these trials – and although it went through a downturn post COVID, it is recovering well.

This expertise in bringing new therapies to market, combined with NHS purchasing power which, if systematically deployed through “buy British” procurement standards for pharmaceutical inputs, could be a powerful demand lever and provide increased supply chain resilience.

The segment’s forecast CAGR of 7–9% (higher than the chemicals average) and the UK’s existing strengths would make this segment attractive under a coordinated strategy.

[18] GrandView - Pharmaceutical Market Report (https://www.grandviewresearch.com/industry-analysis/pharmaceutical-market-report)
[19] The Business Research Company - Nutraceuticals Global Market Report (https://www.thebusinessresearchcompany.com/report/nutraceuticals-global-market-report)

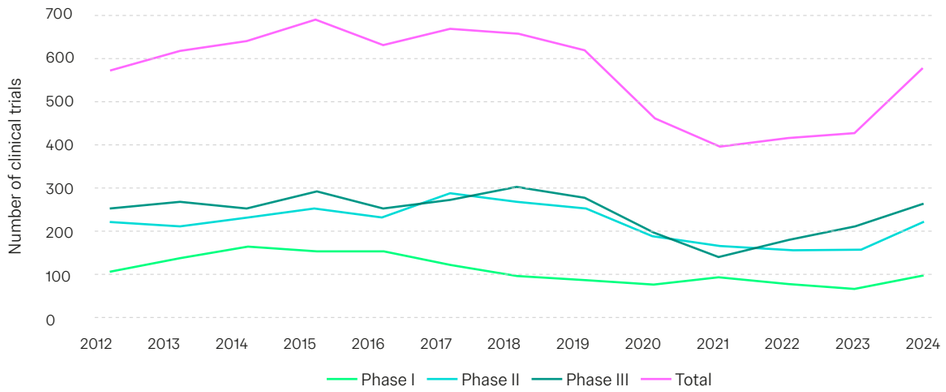


Fig 6. The number of clinical trials in the UK over the last 13 years[20]

Cosmetics and Home/Personal Care

With an overall global market size of 750 billion USD in 2025 and a growth rate of 5.8% per year and a UK GVA of £28.5bn, this is also a lucrative market[21]. The UK is home to several multinational home and personal care companies (Unilever, P&G and Reckitt), several private label manufacturers (McBride, THG, Herrco and Orean) and a thriving speciality sector (Elemis, Molton Brown, The White Company and Baylis and Harding). This provides a strong local market and the opportunity for coordination. The global cosmetics and H&PC market is large and growing steadily at over 6% per year. Demand for sustainable, bio-based actives and ingredients is creating new premium sub-segments where UK innovation capabilities can compete. The value chain structure of this segment is highly favourable for the UK: the most margin-rich activity is the formulation and application engineering step, not the synthesis of raw intermediates, and UK companies have demonstrated excellence at precisely that level. The challenge is to ensure that the innovation activity already taking place in UK universities, industry and start-up companies (for example, in encapsulation technologies, bio-based surfactants and waterless formulations) is captured in UK manufacturing scale-up rather than being licensed or transferred to overseas producers.

Agricultural Chemicals

With an overall global market size of over 298 billion USD, a growth rate of 4.9% per year and a UK GVA of around £500m, where resilience considerations reinforce the commercial case[22]. There is one global company (Syngenta) and several smaller, often toll manufacturing, companies in the market (Nufarm, Bradford Grotech, Actiken and Gemini Agriculture). The UK's food security depends critically on access to fertilisers, effective crop protection chemistry, and the disruption of global agrochemical supply chains (driven by Chinese overcapacity in some molecules, India's growing ambition in generics, and Brexit-related registration complexity) creates a strong case for maintaining domestic formulation and synthesis capability. The path to growth lies in higher-value crop protection molecules, biological controls and precision agriculture chemistry rather than generic commodity actives and could take advantage of UK's strength in the underpinning science.

Electronic Chemicals

With an overall global markets size of about 495 billion USD in 2025 and a growth rate of 8.3% per year and a UK GVA of £7.5 bn, this is a very fast-growing, attractive market[23]. Electronic chemicals represent the segment with the highest global market growth forecast, driven by semiconductor expansion, energy storage and advanced displays). While the UK's activities in this segment are led by Arm, there are another 210 companies operating within the UK. The government's semiconductor strategy[24] and investment in compound semiconductor clusters (particularly in Wales and South-West England) creates a potential anchor for domestic electronic chemicals demand. Electronic chemicals include ultra-high purity solvents and acids for semiconductor fabrication, speciality photoresists and etchants for lithography, chemical vapour deposition (CVD) precursors, and battery electrolyte solvents and salts. These are technically demanding products, often requiring 99.99%+ purity, proprietary intellectual property in synthesis routes, and close technical collaboration with customers whose manufacturing processes are highly sensitive to impurity profiles. The barriers to entry are high, the margins are attractive, and the geopolitical argument for domestic supply security is increasingly compelling. The UK's compound semiconductor cluster (III-V semiconductor devices, GaN and SiC power electronics) is already of global significance, but fragile since it currently sources most of its chemical inputs from outside the UK. Developing a domestic electronic chemical supply alongside this cluster would create a virtuous feedback loop. The semiconductor manufacturer provides a sophisticated, demanding customer. That customer pull drives innovation and the resulting chemical capability attracts further semiconductor investment. This is a segment where strategic investment in capability could yield a disproportionate return, given high barriers to entry and strong margins.

Paints, Coatings, Inks, Adhesives and Composites

The global market for paints, coatings, inks, adhesives and composites (which share many similar technologies) is estimated at approximately USD 228 billion in 2025 and growing at 4.4% CAGR[25]. Speciality chemicals are embedded throughout the value chain as resins, reactive diluents, UV-cure monomers, pigment dispersants, corrosion inhibitors, and bio-based alkyd precursors. The UK has an established coatings and composites industry (a GVA of about £4bn), with companies like Akzo Nobel, PPG, Crown, Sherwin Williams, Scott Bader, Hexcel, Arkema and HMG leading the market but many smaller specialists operating across decorative, automotive, industrial and marine coatings sub-segments. The strategic opportunity lies in sustainable coatings and composites chemistry, water-borne and UV-cured systems replacing solvent-borne coatings, bio-based resin systems, and functional coatings for anti-ice, anti-fouling and anti-corrosion applications for offshore wind and defence infrastructure. These high-performance applications command premium pricing and require the kind of close customer collaboration and process know-how at which UK companies excel. The UK's offshore wind manufacturing and maintenance ecosystem — the largest in Europe — provides a particularly distinctive demand anchor for corrosion protection and speciality marine coatings chemistry.

The Energy Transition

The preceding markets have been in existence for a long time and are following fairly predictable trajectories. But there is a new market, with still evolving needs and a size which is as much driven by geopolitics as it is by commercial values. It is also a composite market, made up of different interlocking markets – the greater use of renewable energy sources is limited by the development of grid flexibility, the effectiveness of solar is constrained by energy storage, of which batteries are a major player, the very existence of electric vehicles has been dependent on the fast evolution and differentiation of batteries and light-weighting technologies, and so on[26].

IEA data[27] shows that investment in the materials and technologies necessary to make the energy transition has increased over the last 10 years and predict it will continue to grow at rates significantly above average.

Solar $142m (2015) to £441m (2025) – CAGR 12%

The future photovoltaic (PV) market will be driven by the pursuit of higher efficiencies, lower costs, and enhanced sustainability. The active semiconductors at the heart of the systems (perovskites, and kesterites) are still being developed, but the wider system needs novel conductors and insulators, packaging and commercially viable routes for recycling the active materials to make them "circular". And research is still ongoing into next-generation light-absorbing semiconductors that may offer disruptive improvements.

Wind $143m (2015) to £242m (2025) – CAGR 5.4%

There is a need for stronger, lighter composites structures, more durable paints and adhesives, generator lubricants and bio-derived resins. Perhaps the biggest prize here is a route to make the composite turbine blades recyclable. It is a stated ambition of the Industrial Strategy to manufacture turbine blades in the UK – this will need a supply chain.

Grid Management $331m (2015) to £413m (2025) – CAGR 2.24% (this is widely recognised as not enough to meet demands).

Traditional transformers need copper, electrical steels, insulators, high dielectric constant oils and solid state systems will need GaAs and SiC processing technologies.

Battery Storage $1m (2015) to £66m (2025) – CAGR 52%

[20] https://www.abpi.org.uk/publications/uk-industry-clinical-trials-translating-actions-into-impact
[21] https://www.ctpa.org.uk/market-statistics
[22] https://www.imarcgroup.com/agrochemicals-market
[23] https://www.semiconductors.org/data-resources/market-data/
[24] National semiconductor strategy - GOV.UK (https://www.gov.uk/government/publications/national-semiconductor-strategy/national-semiconductor-strategy)
[25] https://www.grandviewresearch.com/industry-analysis/industrial-coatings-market
[26] Clean Energies Sector Plan (https://assets.publishing.service.gov.uk/media/68920c9066bdd4490c610990/industrial_strategy_clean_energy_industries_sector_plan_accessible.pdf)
[27] https://www.iea.org/reports/energy-technology-perspectives-2024

As batteries evolve from the early NMC's used in the first electric vehicles towards LFP, Sodium ion, lithium sulphur and redox flow systems the electrodes, separators and packaging will all need constant innovation. It is a stated ambition of the Industrial Strategy to have a complete battery supply in the UK.

Most reports predict that these growth rates will have to be maintained or increased over the next 10-15 years

And there is an important driver for all of these markets

What is not widely understood is that the "petrochemical" supply chains currently all start with fossil carbon feedstocks – the industry currently consumes about 6-7% of all the carbon extracted every year – about 3 bn tonnes of carbon dioxide equivalent, and about 80% of that ends up in the products[28]. Its extraction, refining and end-of-life treatment generate substantial greenhouse gas emissions that make a significant contribution towards climate change. The chemical industry will have to replace these fossil-based feedstocks with renewable carbon alternatives if any form of Net Zero targets are to be met.

Technology exists today that can capture and convert renewable carbon sources into usable feedstocks for the chemical industry, but these are largely yet to achieve scale. Innovative new technologies are in development. Challenges exist in making these technologies commercially viable, as existing fossil materials are cheap, consistent (aside from during wars!), readily available and optimised over decades of use. It is likely that demand side interventions that build in the cost of climate impacts made by fossil-based materials may be necessary to redress this balance.

The exact need for renewable carbon as a feedstock in the UK is difficult to estimate, but since the UK is usually about 1% of global numbers, a simplistic estimate would be 24 million tonnes of carbon dioxide equivalent (80% of the 30 million tonnes of carbon dioxide equivalent that goes into our 1% of the petrochemicals supply chain) or just over 6 million tonnes of carbon.

Looking at the three sources currently under investigation in the UK context.

a) Recycling of carbon already extracted (and contained in existing products) by pyrolysis and gasification. Only a certain fraction of the carbon-based materials can be collected (such as plastics used for packaging, some furniture and clothing and heavy oils). The UK produces about 2.5 million tonnes of plastic waste a year – equivalent to about 7 million tonnes of carbon dioxide equivalent. There are two challenges – the first of which is collection. The British Plastics Federation (BPF) estimates that no more than 400,000 tonnes of plastic will be recycled in this way by 2035[29]. The second is that pyrolysis produces a mixtures of compounds analogous to naptha, which will need cracking and refining into usable feedstocks.

b) Biomass – humans cultivate about 25% of the biomass that grows annually – primarily for food (both directly and via animals). Globally there are enough waste materials to supply a significant part of the need, and several routes are being developed. In the UK we produce over 30 million tonnes of edible crops (of which about 40% is not eaten and could be classed as "inedible" and therefore used as a source of carbon) and around 5-10 million tonnes of biomass aimed at the energy market[30]. This equates to about 35-40 million tonnes of carbon dioxide equivalent. Once again, the logistics of collection need to be addressed and the new processes need to be dramatically scaled up, but this is also viable.

c) Carbon Capture and Utilisation – starting from carbon dioxide adds large thermodynamic challenges and so there are cost implications to this route. We will continue to use fossil fuels through the transition, and flue gases contain about 20% carbon dioxide. There are a number of underground stores of 100% carbon dioxide created by CCS operations. And there are the extra 1 trillion tonnes we have added to the atmosphere over the past 100 years (at a concentration of 0.04%) which will have to be addressed at some point to mitigate or reverse the effects of climate change.

Each of these routes adds cost to the materials it produces and is currently being carried out at the small to medium scale. It is likely costs will decrease as the technologies are developed and scaled. The national configuration is also being thought about. The logistical challenges with both waste and biomass might make smaller local plants that carry out the first stage of chemicals conversion feeding into larger plants that manufacture the final products a more optimal structure. The initially higher costs will probably mean these routes will probably be used to feed the higher value chemicals already identified as suitable target markets for a resurrected UK chemicals industry. And it will require the type of science-based innovation we could be globally competitive at.

A significant number of the downstream industries are already embracing customer concerns and governmental plans about this and asking for chemicals based on alternative sustainable feedstocks. In order that any company reaches their scope 3 targets (and we as society achieve net zero) then a phase out of fossil carbon feedstocks is necessary. This is underway and will be driven by Product Carbon Footprints and data exchange and requirements under Science Based Targets Initiative[31] and other reporting requirements but whether this occurs within the UK supply chain or moves overseas is not clear.

[28] Renewable Carbon – Key to a Sustainable and Future-Oriented Chemical and Plastic Industry (https://renewable-carbon.eu/publications/)
[29] BPF Recycling Roadmap
[30] Summary of Official Statistics - DEFRA (https://www.gov.uk/government/statistics/agriculture-in-the-united-kingdom-2025/summary)
[31] Science Based Targets Initiative (https://sciencebasedtargets.org/)

So, What is the Problem?

Wide consultation and analysis has shown that very little in this area is revelatory or novel. What is needed is a coordinated approach by industry and government to move towards a UK-based industry that has sufficient competitive advantage to build winning commercial offerings in the growing global markets identified. This work has clarified that the actions need to come in three groupings over different timeframes:

Removing the Barriers	Creating a Comparative Advantage for the UK chemicals sector	Supporting the Industry as it grows
Reduce high and volatile Energy Costs by direct renewable supply pricing and modifying energy tax structures	Develop a financial or market advantage for manufacture in the UK	Invest in Chemical Parks designed to scale innovations rapidly
Adopt or mirror EU REACH and single registration	Build an environment in the UK that values sustainable chemicals	Provide capital support to build innovative assets in the UK
Rapid permitting (simplification, adequate staffing, governed for execution)		Create “one voice” for the sector / strong coordination between industry and government
These factors increase costs and uncertainty and so discourage investment	**A clearly defined and supported transition pathway would encourage investment in the UK**	**To accelerate path to sustainable competitive advantage and GVA growth**

Removing the Barriers

There are factors which are directly affecting operating costs of existing companies and provide huge disincentives for investment in growing either existing or setting up new companies.

Energy Costs

The UK’s electricity is expensive for two reasons.

The wholesale price is calculated by the marginal pricing system. Under this system, the final and most expensive source of energy needed to meet demand sets the price for all electricity generated. Because the UK remains reliant on gas-fired power plants to fill gaps, expensive gas often sets the price even when the grid is predominantly running on cheaper wind or solar. This is compounded by our reliance on imported gas and our limited gas storage capacity. The UK is therefore highly exposed to global liquefied natural gas (LNG) markets, making domestic prices extremely volatile during international crises. Everyone knows this is a problem.

In addition, and unlike European neighbours and most other countries, the UK adds social and environmental policy costs directly onto electricity bills rather than general taxation. The UK funds renewable energy subsidies (such as feed-in tariffs) and social/warm home programs directly through electricity bills. Other countries fund many of these green and social policy initiatives out of general taxation.

The UK government is addressing the high energy costs with a suite of measures:

a) British Industrial Competitiveness Scheme set up by DBIST[32] is intended to lower electricity bills by up to 25% for over 10,000 UK manufacturers. Originally this was to start in April 2027 but was then augmented with a one-off additional payment in 2027 rolled out to an extra 3,000 businesses (primarily automotive and aerospace, steel, and pharmaceuticals) to cover the support firms would have received from April 2026.

b) Network Cost Exemptions for Energy-Intensive Industries: Around 500 of the UK’s most energy-intensive firms (such as steel, chemicals, glass and paper industries) will benefit from a discount on electricity network charges for businesses in their sectors from 60 percent to 90 percent. In total this will save the 500 companies up to £420m a year.

c) Electricity Market Reforms: The government is promising to implement structural reforms that break the link between international gas markets and electricity prices. They intend to do this by moving more renewables and nuclear to long-term, fixed-price contracts in order to make prices consistent as well as competitive.

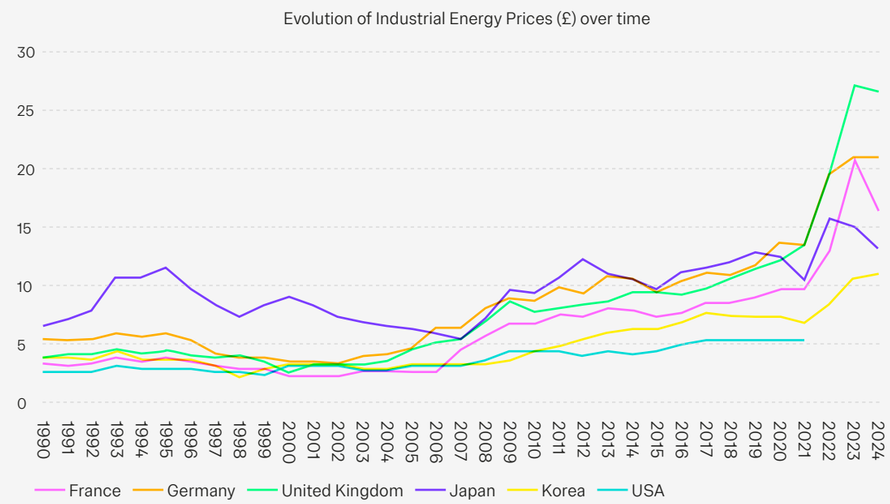


Fig 7. This shows that the UK’s cost of electricity has moved from “competitive” to “high” to “very high” over the last 30 years.

[32] British Industrial Competitiveness Scheme (https://www.gov.uk/government/collections/british-industrial-competitiveness-scheme)

d) Industrial Strategy and Grid Access: The government has also introduced the Connections Accelerator Service[33] to speed grid access for strategic manufacturing and clean energy projects. This will require speeding up permitting!

The general opinion in business is that most of this is not being implemented soon enough to make a real difference! It is also a clear example of the introduction of additional complexity in the regulatory space with a mechanism that may or may not be continued as political cycles evolve. The reliefs also do not directly address the energy costs that small to medium sized chemical companies face which still represent a significant percentage of their cost base. These companies, which are often the innovators, also need to maintain competitiveness. This complexity doesn't create any certainty in the context of investment decisions and hence may not address the long-term challenge.

Chemical Registration (REACH)

Chemicals are the same no matter where they are made, and if the molecules are the same, so is the bulk material, and its properties. There are over 100 different national regulatory systems around the world, although the 15 largest groupings all recognise one another in some way. However, having to register the same chemical separately in different countries, particularly neighbouring trading partners, with a similar regulatory approach costs time and money and makes no sense.

The decision to separate from the European process for registering chemicals (known as *Registration, Evaluation, Authorisation and Restriction of Chemicals* – REACH) as part of Brexit was initially predicted to raise costs by £2 billion by 2030 (for the required duplicate registrations needed) for UK companies[34] but this figure has subsequently been reduced[35].

It also created some barriers that didn't previously exist. For medium volume additives produced by EU based companies and used in downstream formulations, the UK market may be too small to justify the registration investment. This results in a reduced choice of chemicals for formulators in the target growth areas. For multinational businesses, all things being equal, new molecules will probably be registered in Europe to access the larger market first and hence providing competitive advantage for EU formulators and users of downstream chemicals.

The "evaluation" part of REACH was also affected by separation from Europe. The UK was advanced in its thinking about replacing animals for testing, having banned animal testing for cosmetics in 1998[36]. It did not apply to pharmaceuticals and chemicals because of the recognised complexity of modelling whole system effects, and although the underlying science that would address these issues has developed fast[37], regulation has failed to keep up[38].

Regulations and Permitting

Regulations and how they are implemented through permits is often cited as a problem. It is worth unpacking why this is, and how it could be addressed.

The reason we have regulations is "to correct market failures, protect public health and safety, promote fair competition, and ensure essential services remain accessible". It is the second of those intents that REACH, planning and process permits cover – to ensure that people and the environment are not harmed by unthinking use of a new chemical, process or other related activity.

The pathway for getting a new product or process to market (generally referred to as innovation) is one of managing risks. Towards the end of that pathway, it is necessary to scale the manufacturing process to a level that satisfies the market needs at a cost that the market will accept. This step does something that has never been done before and therefore needs approval before it can be carried out. This is achieved through a system of planning and permits.

However, when regulations stop or significantly delay the development of new products and processes which might end up giving more benefit to people both economic and social, the process needs to be less inhibiting than it is widely seen to be. The recently established Regulatory Innovation Office (RIO)[39] characterises the impact of any regulation under 3 headings

a) whether they perform a necessary service to society (i.e. do we need them),

b) whether they are written clearly and unambiguously so that the intent is delivered without collateral impact (sometimes the complexity is there to stop companies "gaming" the regulations for competitive advantage), and

c) whether there is sufficient resource to implement them efficiently and effectively.

Most case studies of problems with regulation fall into the second and (mainly) third category. The time required to obtain a permit delays the validation and development of the innovation and therefore delays its commercial implementation and potentially its commercial viability. This is not a new problem and has been reported over decades.

There could be a quick solution – prioritising current regulations for their negative impact on innovation.

And there ought to be a permanent solution – redrafting the regulations or properly resourcing their implementation. This is not difficult but probably costly and time-consuming.

[33] Connections Accelerator Service (https://www.gov.uk/government/consultations/accelerating-electricity-network-connections-for-strategic-demand/accelerating-electricity-network-connections-for-strategic-demand-accessible-webpage)
[34] https://commonsbusiness.parliament.uk/Document/105725/Pdf?subType=Standard
[35] https://www.solvents.org.uk/regulatory/aca-response-to-uk-reach/
[36] https://edm.parliament.uk/early-day-motion/14247/ban-on-cosmetic-testing-on-animals
[37] https://pharmaceutical-journal.com/article/feature/the-long-road-to-replacing-animals-in-pharmaceutical-research
[38] https://www.hse.gov.uk/reach/animal-testing/index.htm
[39] Regulatory Innovation Office (https://www.gov.uk/government/organisations/regulatory-innovation-office)

Creating a Comparative Advantage for the UK Chemicals Sector

Although the cost of energy and the complexity of regulation have done enormous damage to the credibility of the UK to support growth, addressing them will not unlock the UK chemicals sector without other factors being addressed.

Finance

Europe's chemical industry is at its lowest point in the capital cycle in more than 25 years[40] . The estimated investment required to transition the global chemical industry to net zero approaches €2.2 trillion, yet it is being made at a time of historically weak cash returns and rising operating costs. The UK's record of investment is negligible – only 0.3 million tonnes of confirmed new UK chemical capacity against 4.5 million tonnes of closures since 2022 — a net reduction that compounds year on year.

There appear to be significant structural barriers to UK chemical investment:

a) Short-cycle capital preferences. The majority of venture capital and private equity firms seem to prefer software-style investment cycles (3–5 years), not the 20–30-year investment horizons needed for chemical plants

b) No equivalent to the IRA or InvestEU. The US and EU offer substantial, targeted financial incentives for industrial investment. The UK offers only the general Innovate UK grant ecosystem, which is insufficiently resourced and not calibrated for capital-intensive scale-up. It is well recognised that different countries subsidise various industries to be able to compete globally[6].

c) Scale-up infrastructure gap[41]: the "missing middle" between early-stage R&D (TRL 3–5) and full commercial production (TRL 8–9) is almost entirely absent in UK chemistry, driving promising companies to seek infrastructure abroad

There needs to be a wider suite of finance options to support innovative processes and product implementation.

The various government "banks" need to be mandated to operate over a longer term, supplying "patient capital" for those industries (including chemicals) that require longer development times. Promises to do this in the past have not been delivered.

The government has over the last few decades been bailing out industries close to failure in what looks like an ad hoc approach. Within a coherent long term Industrial Strategy, they need to operate the types of grants, low cost loans and even equity investment in a consistent, coherent, strategic and transparent way to enable the sectors identified directly in the strategy – and those in their supply chains that will be needed to ensure resilience.

A good example is the way they have supported the battery sector, initially focusing on just the Gigafactories, but embracing the need to manage and support the necessary supply chains with significant amounts of support (>£1.5 billion)

The next generation sustainability industry

Feedback from customer facing companies show that willingness to pay for green premiums is limited and context-dependent[42]. Most customers will not voluntarily pay substantially more (>10%) for sustainable chemicals unless regulatory requirements, contractual mandates, downstream brand commitments or procurement standards compel it. Consultations all show that the conditions under which "greener products must also be cheaper, or at least cost-neutral" are slowly evolving to recognise the logic behind change. However, it is hard for unoptimized sustainable manufacturing to compete with fossil-based supply chains that have been optimised for 100 years.

This has important implications for strategy – but more importantly a coordinated plan for the transition that takes account of the actions of other countries, the decisions made by multinational companies and the ability of innovation to open up new opportunities. Supply-side innovation support (grants, R&D funding, scale-up infrastructure) is necessary but insufficient on its own to drive commercial uptake of sustainable chemistry.

[40] 2026 Chemical Industry Outlook | Deloitte Insights (https://www.deloitte.com/us/en/insights/industry/chemicals-and-specialty-materials/chemical-industry-outlook.html)
[41] https://publications.parliament.uk/pa/ld5901/ldselect/ldsctech/192/19202.htm as an example
[42] Consumers willing to pay 9.7% sustainability premium, even as cost-of-living and inflationary concerns weigh: PwC 2024 Voice of the Consumer Survey | PwC (www.pwc.com/gx/en/news-room/press-releases/2024/pwc-2024-voice-of-consumer-survey.html)

Without demand-side interventions, cost reductions from innovation will be absorbed by customers as margin rather than generating volume growth and investment returns for UK producers. If this transition is to be successful there will need to be demand-side interventions — including public procurement requirements, recycled content mandates, EPR scheme design and green standards — as essential complements to supply-side support, these would also have the added benefit of creating demand for tracking and auditing services needs to boost the Professional and Business Services sector. In summary, the sector needs a clearly defined transition pathway that will build investor confidence and accelerate the transition to a sustainable, globally competitive industry.

A good exemplar here is the EU's food contact plastic regulation requiring a minimum of 30% recycled content by 2030, which directly triggered INEOS's €550 million investment at its Lavera cracker (supported by a €550 million French government grant under the ADEME GPID scheme) to produce recycled-content polymers certified under ISCC PLUS[43]. A similar approach — combining regulatory mandate with targeted public co-investment — could unlock equivalent transformative investment in UK sustainable chemical production.

[43] https://www.ineos.com/news/shared-news/ineos-olefins-polymers-europe-launches-new-advanced-recycled-plastic-production-at-its-lavera-site-in-southern-france/

Supporting the Industry as it Grows

Once the barriers have been taken away, and a vision for what a future UK chemistry-based industry will be, has been articulated and accepted, the transition will need to be supported for the long term – essentially viewing the chemistry-based sectors as part of the critical national infrastructure.

Scale Up Support

Because the output is mostly hidden in other products, and the supply chains often multi-step and interdependent, it is difficult to comprehend the scale and impact of the chemicals industry. The output from the global scale plants at the start of the supply chain can end up in over 6000 different products. Even small plants often need to make 10's of thousands of tonnes a year. Taking a new process (or new product made through an existing process) from the laboratory takes a number of steps and multiple years of investment. The UK is not well served for this part of the innovation journey. There are several regional facilities but all sized well below even semi-commercial scale. The only national resource (part of the High Value Manufacturing Catapult) is run under a business model which makes them more expensive than many of their European competitors, which is a contributory factor to why many of the SMEs are going overseas to establish their first commercial facility.

In fact, there are 76 "chemical parks" listed on the European Chemical Site Promotion Platform[44].

Chemical parks are of recognised value in Germany, Netherlands, France, and Belgium as they offer a range of shared services and infrastructure that impact the reliability and resilience of chemical production and enable their tenants to reduce costs, co-locate with downstream users and get products to market faster. These services include energy supply, logistics, waste disposal, water treatment, emergency response and importantly a pool of skilled labour. They are often rejuvenated sites which used to belong to large international corporations, where many shared services are left over. This is a model we could use in the UK, with obvious candidate sites in the North-West, North-East, Humberside and Scotland.

In a similar way to the construction of R&D facilities within the Cambridge, Oxford, London triangle facilitated the spin-out of early-stage R&D businesses, it would also help to accelerate the scale up of chemical processes. If production buildings within the Chemical Park envelope were available to lease for demo-scale production and larger it would reduce the capital outlay and build time (which are both key issues for investment). This would make them attractive locations for scaling innovations, directly connecting globally recognised innovation hubs to the UK's industrial heartlands.

It is important to recognise that this type of scale up support requires investments in the £100's of millions if not billions for the First of a Kind plants. The government offers these levels of support in other sectors (e.g. Fusion with STEP, and the Automotive Transformation Fund (ATF), so why not chemicals given their significance to the economy and potential to contribute significantly to GVA?

Engagement between the chemistry using industries and government

For many years now, the UK has rightly boasted of punching above its weight in basic science and engineering. But the evidence also shows its lack of success in scaling the ideas generated from this science into commercially successful businesses.

The core UK chemicals industry owns physical assets worth about £50 billion, from which it extracts revenues worth over £60 billion[1] and generates a gross value added of between £20-30 billion. Along with the other "foundation" industries it is highly capitalised and plants often last 30-50 years (albeit with upgrades and maintenance costs along the way). It therefore requires a level of investment if is going to transition to a sustainable long term position of billions of pounds. The key is to use government intervention and financial support to build investor confidence and secure private investment to fund this transition. Some other industrial areas have had that level of support – the automotive sector has had support for basic research £610m through the Faraday Institute, for development over £1500m through the Advanced Propulsion Centre and Automotive Transformation Fund and for deployment Infrastructure Grants of around £600m, (including £380m to Agratas).

However, the complexity of the supply chains means that many activities based on chemistry are not named as such – pharmaceuticals is an obvious case, but most cleaning products, personal care, packaging, fertilisers, crop protection products, adhesives, coatings, lubricants are all dependent on their chemistry for the properties which make them of value. As such the chemical industry can't be identified by one big product application such as automotive, or one big project such as fusion or even one big theme such as renewables – but it underpins all of them. This diffusion results in the importance of the industry in driving downstream innovation being under-recognised by government and society and therefore under-funded.

And "Chemicals" (as this ill-defined sector is known) is obviously represented in government by the Department of Business, Innovation, Science and Trade (DBIST), although recent changes should mean better coordination with the innovation which is all important as the sector bids to remain globally competitive. Many of the regulations it must operate under fall within the remit of the Department of the Environment, Food and Rural Affairs (DEFRA). And because it uses energy and produces carbon dioxide, it also needs to pay attention to what the Department for Energy Security and Net Zero (DESNZ) think is important. And they all have to persuade the Treasury that their priorities deserve investment!

Most smaller companies cannot cope with this complexity and lack an effective voice. At the same time the sector is blessed with a large number of trade associations and other representative bodies which lack alignment of focus. This results in both a diffuse industry dealing with a government that lacks clear coordination. In sharp contrast, Europe has one dominant trade association (CEFIC) representing all the national associations and directly lobbies the European parliament. This has allowed the 27 nations of Europe to implement a fully resourced chemical industry strategy at an accelerated pace in response to the global challenges, leaving the UK to play catch-up.

It is noteworthy that the UK government has developed mechanisms in other areas to simplify the engagement of industry and government.

The Office of Life Sciences is (according to its website[45]) responsible for championing research, innovation and the use of technology to transform health and care service. It is joint between DBIST and the Department of Health and Social Care. The underlying science in this area has developed a lot over the last 20 years and staying competitive has meant serious investment in the innovation/translation of that science into products and services.

On a smaller scale the Office for Low Emissions Vehicles exists to support the early market for ultra-low emission vehicles. It is joint between DBIST, DESNZ and the Department for Transport. It is worth noting that this sector also has the Advanced Propulsion Centre, which is jointly funded by DBIST, Innovate UK (part of DBIST) and the automotive industry. A lot of this was driven by the realisation that the move of internal combustion engine powered cars to electric vehicles would offer the opportunity to the UK car industry to pivot and try to retain its position in the global economy.

If we are to retain a globally relevant chemical industry in the UK, supporting innovative future technologies, it seems logical that there should be an equivalent body in government to enable effective engagement.

This sort of integrated approach would enable a more coherent and consistent approach from government across this complex industry and potentially build new supply chains between the companies, and therefore strengthen the resilience of the UK economy,

Skills

In general, the UK has a well-educated workforce, although it is a recognised issue that young people leave education not well equipped for work. It is also recognised that certain skills, especially high-level practical skills, are in limited supply and companies struggle to attract the next generation of employees to maintain a flow of skills and know-how. The Royal Society of Chemistry (RSC) has published a recent report that sets out the importance of chemistry training (Future workforce and educational pathways)[46] and a report by the Institution of Chemical Engineers (IChemE), Institute of Materials, Minerals and Mining (IOM3) and the RSC (Skills shortages threaten circular economy progress)[47] highlights the skills gaps in critical areas such as metallurgy, mineral extraction and sustainable manufacturing facilitating the transition to a circular economy. The report highlights the ageing workforce with specialist skills and the constraints on international hiring post Brexit especially for small and medium sized organisations.

To capture the opportunities of the future, action needs to be taken to build the skills base of the future, especially in a time when technical skills are in increasing demand the UK could face a shortage of key capabilities that could impact the ability of the UK to remain competitive.

[44] https://chemicalparks.eu/parks/

[45] Office for Life Sciences - GOV.UK

[46] Future workforce and educational pathways (https://www.rsc.org/policy-and-campaigning/discovery-and-innovation/future-workforce-and-educational-pathways)

[47] Skills shortages threaten circular economy progress (https://www.rsc.org/news/new-report-warns-skills-shortages-threaten-circular-economy-progress)

Actions

1. Restructure Industrial Energy Pricing

More a political than economic or commercial decision! Most would prefer reforming the electricity wholesale pricing mechanism to decouple industrial prices from gas marginal pricing. In the short term, accelerating the BICS from April 2027 with additional relief for energy-intensive SMEs and exploring direct Power Purchase Agreement frameworks for chemical clusters to access renewable energy at cost-reflective prices and ensure that the benefits of increased renewable energy generation flow through to industrial users.

Refocus energy taxes so they take effect at the end product. This will incentivise OEMs to drive supply chain change and equalise the playing field, whilst freeing up capital for the UK chemical industry to invest (potentially linked to action 5).

Companies could also be incentivised to invest in their own energy generation, providing further energy and cost resilience for these companies as well as reducing demand on the grid during a period of significant growth in electricity demand.

Owner: DESNZ / HM Treasury

Timeline: Emergency review and commitment within 6 months. Structural reform within 2–4 years

2. Align UK REACH with EU REACH

Again, more a political decision than an economic one, but a vital one if the UK is to have a chemicals industry in future. The simplest approach would be to abandon the idea of a separate UK REACH and rejoin EU REACH, but there are multiple barriers to this, so it will not happen.

As a first step, the Alliance of Chemical Associations (ACA) is recommending that the UK unilaterally recognises EU Registration. This would eliminate the requirement for duplicate registration of chemicals already approved under EU REACH, and solve a lot of the problem.

But there needs to be a more integrated solution, since after 10 years, the uncertainty is adding to the non-attractiveness of the UK for investment.!

Owner: DBIST / DEFRA / HSE, in conjunction with CIA and ACA as industry advocates

Timeline: Policy commitment within 12 months; full recognition within 2 years

3. Reform for Rapid Planning and Permitting

This barrier is shared with the wider manufacturing sector and could be dealt with by increasing the Local Governments' planning resources and the Environment Agency's permitting budget and staffing for industrial operations – specifically chemical ones. This could also be regionally focused to support chemical hubs. It needs to be recognised that UK companies are in a global competition, and other countries can complete this process in less than 12 months for full environmental permits and 6 months for permit variations. As a first step, the piloting of a dedicated fast-track pathway for scale-up and first-of-kind industrial investments in the suggested Chemical Enterprise Zones (action 6) might prove the value of such an approach.

Owner: DEFRA / Environment Agency / Local Government

Timeline: Emergency resourcing commitment within 6 months and turnaround targets implemented within 18 months

4. Financial Attractiveness

The UK needs to be seen as a competitive location for investment in the chemical industry. Many of the actions set-out in this report will go some way towards addressing specific concerns but what Europe has done very clearly is to declare through the Chemical Action Plan[48] how important the chemical industry is to the European economy, the transition to net-zero and society as a whole. To reinforce this, they have committed significant funds (albeit the majority in the form of loans) to support the industry.

The chemical industry is often portrayed as a throwback Industry making corrosive and toxic materials that we do not need in the modern world. This is far from the reality. Highly reactive materials are still made, because they are still necessary to manufacture modern materials, however the industry is the innovative force that will allow us to reinvent and make materials of the future in a sustainable way. Industry, the trade associations, learned bodies and government need to work together to explain the importance of the industry, why it needs investment for future competitiveness, why it offers attractive careers at all levels and why it will be the major factor in society being able to live in a sustainable way.

When companies select investment destinations for manufacturing plants that will endure for 30 years or more, they look at the market potential, the capital costs, how this can be best funded and the long-term business environment. The UK needs to be seen as a welcoming option, with the industry being seen as a fundamental part of the UK future economy with long-term policy actions and financial support to streamline regulations, accelerate the ability to scale and transition and generate GVA growth for the benefit of all.

All parties should become much more vocal on the importance of the industry and align on a statement of support and appropriate positioning that is consistent with the industry's economic value and importance in developing the products of the future

Specific funding support mechanisms need to be announced that represent sufficient funds to fuel the required transition. Competitive loan structures would unlock significant opportunities, and it should be remembered that Europe has already announced such funding at scale.

Owner: DBIST / Treasury along with associations and learned bodies

Timeline: Initiate communication campaign within 6 months; set-out scaled funding mechanisms within 12 months

5. Driving and Supplying Sustainable Market Demand

a) The basic requirement is a plan for the transition to sustainable feedstocks, coordinated by industry and government. It should include the development of new technologies and the scaling of existing ones to a scale commensurate with the evolving market demand. This needs to be overseen by a sub group of the "Chemistry Council"

b) On the market side, a start would be introducing minimum recycled/bio-based content requirements for key product categories (packaging, construction materials, textiles) where UK chemical producers can supply the ingredients. Use NHS, MoD and infrastructure procurement to create guaranteed markets for UK-produced sustainable chemicals

   At the moment end users can pick supply chains with no taxes on them by buying from overseas and particularly for an industry that generates significant exports and overseas customers that can easily switch suppliers. Introducing CBAM (as currently configured) will just move the problem down the supply chain. Therefore, logically, the only place for a fair tax is on the end product.

   How can industry actively participate? It could set its own self-certification system to aid Government e.g. Forestry Stewardship Council (for FSC certification), Marine Stewardship Council (for MSC certification), Responsible Jewellery Council (for non-conflict and sustainable materials sourcing for jewellery), the Aluminium Stewardship Council (ASC) etc.

Owner: DBIST / DEFRA / DESNZ / Cabinet Office Procurement / "Chemistry Council"

Timeline: Procurement standards within 12 months; content requirements legislation within 3 years; Innovation and Scale-up Plan within 2 years

6. Scale-Up Infrastructure and Chemical Enterprise Zones

Establish at least 4 Chemical Enterprise Zones in collaboration with combined authorities and devolved governments, prioritising existing cluster locations for infrastructure-intensive manufacturing scale-up and dispersed hotspots for SME-oriented shared services. Each Zone should provide simplified/single-window permitting, shared infrastructure (energy, water, waste, logistics), connected scale-up facilities (flexible reactors, pilot plant capacity), skills provision partnerships with FE colleges and universities, access to patient capital and pre-built production sheds for demo and first-of-a-kind production facilities. Probably pilot the first with national and government backing but move to build in commercial funding as soon as possible.

Owner: DBIST / Combined Authorities / Devolved Governments / Businesses need to commit to using them and have skin in the game or they become "white elephants"

Timeline: Pilot Zone designations within 18 months; 3 zones operational within 5 years

7. Matched Investment Model for Chemical Innovation

Establish an Advanced Chemistry Centre (ACC) — modelled on the Advanced Propulsion Centre — providing matched industry–government funding for innovation from TRL 5 (scale-up) through to TRL 8 (first commercial production). Initial capitalisation of £1 billion over 10 years, but it is anticipated that it will need to rise based on success! It should focus on the first-of a kind (FOAK) funding for TRL7-8 as this is the most critical gap, and we need to ensure a sensible level of funding per FOAK project. Also we need to explore the 3 funding types covered by the OECD Magic report[6], and we need all three; i.e. grants, below market borrowings (including Government Equity Stakes), and tax concessions.

Owner: DBIST / Innovate UK / "Chemistry Council"

[48] European Chemicals Industry Action Plan - Internal Market, Industry, Entrepreneurship and SMEs (https://single-market-economy.ec.europa.eu/publications/european-chemicals-industry-action-plan_en)

Timeline: Business case within 12 months; ACC operational within 3 years

8. Set up a body that coordinates industry and government activity

The industry is complex and the drivers at different stages of the supply chain are different. Different Government Departments control different aspects of the interaction with industry. It all needs better coordination – and over time.

Options:

a) Office of Chemicals Innovation (akin to OLS and OLEV)

Within government, consideration should be given to a joint Office, led by DBIST, but with strong involvement of DHSC and MoD (as customers for a range of products), and DESNZ and DEFRA (to ensure alignment of regulatory environments). This has worked with the Office of Life Sciences.

b) Chemistry Council (akin to Automotive Council[49])

The complexity of the end-to-end chemicals supply chains will mean that this body will have to be carefully structured. The "upstream" businesses need to compete in a challenging global market whilst managing the transition from fossil fuel feedstocks to more renewable ones in a commercially viable manner over time. The "downstream" businesses will need to focus on innovation driven export growth, but they will need access to the renewable feedstocks as they become available to add differentiation in the market. Balancing out these very different needs will be critical to overall success.

Finance will be vital to support these parallel and complementary transitions. The goal is that the whole transition is commercially driven, with government contributing to a favourable environment for chemistry and biology based companies in the UK, but the bulk of the investment being private.

There will also need to be a programme to ensure the right skills in the workforce – a combination of science and technology, and the ability to use the latest automation and artificial intelligence tools.

It will also need to implement some sort of reputational promotion both with the UK and into the global markets.

Specific Actions

a) Agreeing a Plan
Once assembled, the "Chemistry Council" will need to move quickly to devise and communicate a plan to address the issues captured in this report. The plan should have defined deliverables and a timescale that will enable UK-based companies to develop at a pace that enables them to build the necessary upstream resilience and to grow the competitive advantage that will enable them to compete globally in the fast growing applications that rely on chemistry for their properties.

i) Monitor actions of Government to address the impact of energy pricing and regulatory inhibition of innovation – and their impact on sectors' global competitiveness.

ii) Review funding for the sector – both for early stage research and later stage innovation – covering UKRI, DBIST and private funding.

iii) This should include a defined programme to underpin the move to renewable feedstocks.

iv) Devise a "reputation" plan for the UK-based sector, highlighting the actions taken by the "Chemistry Council" and promoting the logic of investing in the UK industry.

Owner: DBIST / DEFRA / DESNZ / "Chemistry Council"

Timeline: Plan agreed and published within 12 months

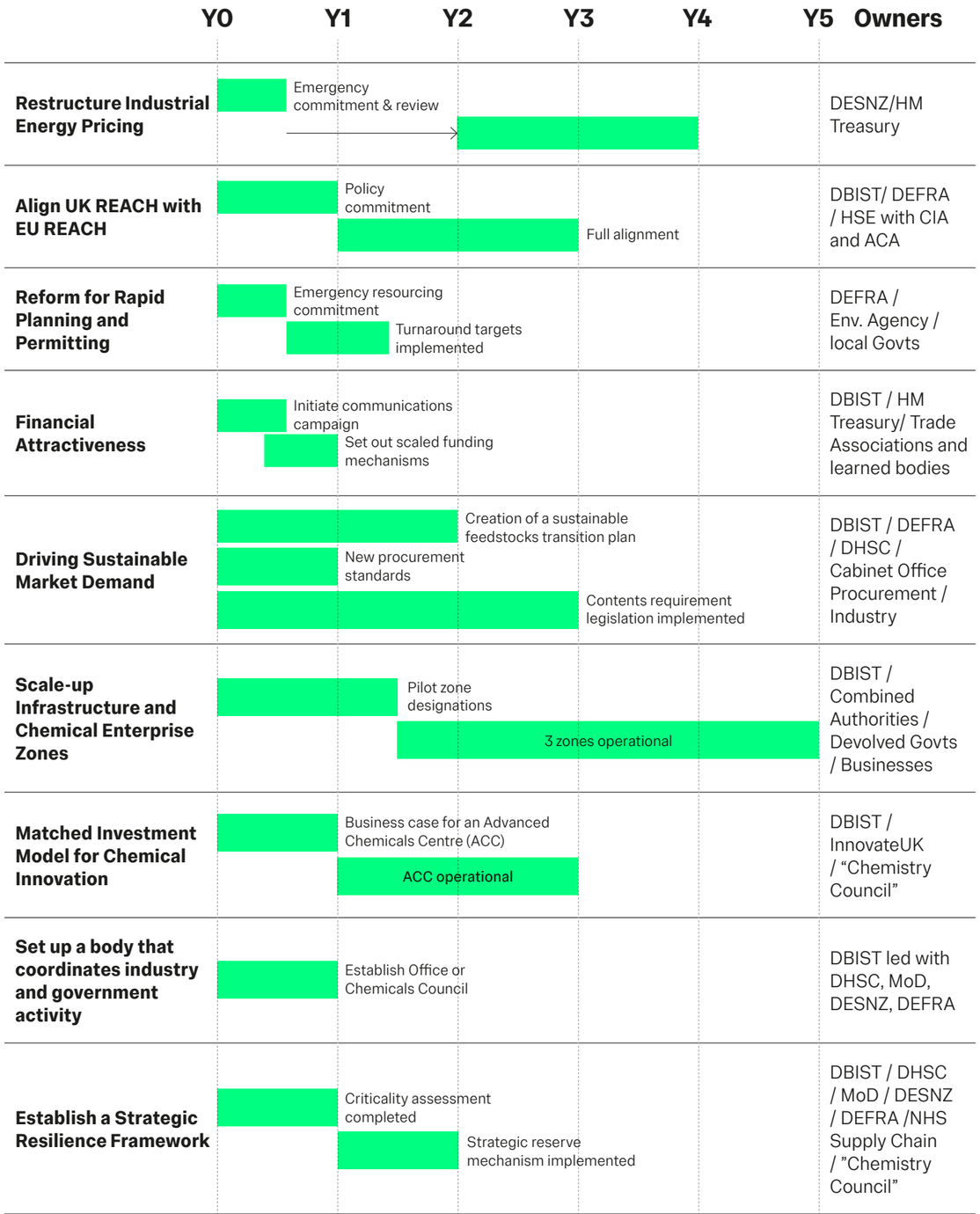
b) Agreeing a Critical Chemicals List for the UK
Government has undertaken analysis to identify strategically important chemicals and production capabilities across the UK economy. This work informed the design of the Critical Chemicals Resilience Fund, which will support chemical producers that underpin the resilience of UK supply chains and the wider economy. Building on this work, mechanisms should be established to ensure the long-term viability of strategically important domestic production capabilities where these are essential to national resilience but may face commercial pressures.

Owner: DBIST / MoD / DEFRA / NHS Supply Chain / "Chemistry Council"

Timeline: Update criticality assessment within 12 months; strategic reserve mechanism within 2 years

[49] https://www.automotivecouncil.co.uk

Delivery Plan



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Caveat

Wherever possible we have tried to base this report on data. However, a lot of historical data seems to have many values depending on who is supplying it. Or it is compromised by the data collection method or the assumptions underlying the classification. And a lot of predictions appear to be coloured by the message the predictor wants to promote. Please read the report with these reservations in mind

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- HMT
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Appendix 1: Segment Opportunity Analysis and Prioritisation

(All value figures in USD Billions)

Segment	Sector size 2025	Sector Size 2035	CAGR%	Fine Chemicals Use 2025
Pharmaceuticals and Nutraceuticals	$2,365.6	$4,611.5	6.9	$123,134.1
Personal Care and Cleaning Products	$749.5	$1,312.0	5.8	$11,341.5
Plastics	$691.0	$1,054.3	4.4	$4,916.3
Electronic components	$495.0	$1,063.9	8.3	$1,307.1
Agrochemicals	$298.2	$485.2	4.9	$39,463.9
Paints and Inks	$227.9	$350.2	4.4	$8,786.0
Lubricants	$60.6	$213.1	3.2	$2,517.4
Food additives	$99.2	$164.6	5.3	$5,803.2
Construction Chemicals	$57.6	$101.2	5.7	$6,372.9
Textile Chemicals	$29.4	$ 45.4	4.4	$ 1,847.7

Table 1: Opportunity Analysis

Segment	Sector Size 2025	Sector Size 2035	CAGR% Growth Rate	Chemicals Usage 2025	Total
Pharmaceuticals and nutraceuticals	10	10	9	10	39
Cosmetics and H&PC	9	9	8	8	34
Agricultural Chemicals	6	6	5	9	26
Electronics	7	8	10	1	26
Paints and Coatings	5	5	4	7	21
Petrochemicals and plastics	8	7	2	4	21
Building and Construction	2	2	7	6	17
Food and beverage	3	3	6	5	17
Lubricants and oil	4	4	1	3	12
Textiles	1	1	3	2	7

Table 2: Opportunity Prioritisation

Methodology

Segments were selected based on the taxonomy developed within the earlier CSEP Fine Chemicals report[11].

Market Size and Growth Rate was found in publicly available data across multiple market studies. In some segments, a decision was taken relating to absolute market versus relevant market segment (e.g. Food and Beverage (total) versus Food Additives). In other segments a full picture was built up using multiple market sub-segments (e.g. Home and personal care = Cleaning Products + Beauty & Personal Care).

In each segment, data was taken from >5 market studies per segment/sub-segment and an average value taken across these market studies. Due to variability in start and end dates, all data was re-based to 2025 and 2035 respectively using stated CAGR% and assumed linearity. Data was averaged to give average CAGR%, Market Size 2025, Market Size 2035. All value figures in USD Billions.

Prioritisation of segments was carried out by ranking each segment for market size, growth rate and use of chemicals[50], where largest = 10 and smallest = 1. Overall ranking was determined by the total score per segment.

[11] CSEP Fine Chemicals Phase 1 Report (https://doi.org/10.25560/127810

[50] FMI. Global Fine Chemicals Market: Industry Analysis. 2018-2022 and Forecast 2023-2033, May 2023. 2023 1-505. (https://www.futuremarketinsights.com/reports/fine-chemicals-market)

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