CHEMICAL INDUSTRIES ASSOCIATION

Chemical Industries Association Response to Invest 35

The UK's modern industrial strategy

24 November 2024

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The Chemical Industries Association (CIA) represents and advises chemical and pharmaceutical companies across the United Kingdom. We have a membership of 110 companies which includes major multinationals as well as SMEs.

Chemical manufacturing is an extremely broad sector that encompasses numerous types of products, including: petrochemicals, biofuels, cleaning products, dyes, active ingredients for pharmaceutical manufacturing, and cosmetics.

The chemical sector is perhaps uniquely placed to support the new Government's stated missions of driving economic growth and becoming a clean energy superpower, and is fundamental to the UK economy in three main ways:

1) **The direct contributions of the sector and its economic impact**

Graphic 1 in the appendix shows some key statistics of the UK chemical industry in 2024. Our sector directly employs 138,000 people with salaries 21% higher than the manufacturing average and 27% higher than the economic average. Thanks to the high value of our products, our gross value added per employee is also strongly above manufacturing average. Moreover, we are the second sector for value of exported goods making up 15% of all UK exports and generating £61bn in 2023.

Our regional distribution - in Graphic 2 in the appendix –shows that we are a key employer in all areas of the country bringing highly paid jobs to areas with generally lower employment and wages.

2) **Ensuring security and resilience for critical infrastructure**

A study from petrochemicals europe[1] shows that chemicals are present in over 95% of all manufactured goods. Additionally, data from input-output tables from the ONS

[1] Available at: https://www.petrochemistry.eu/wp-content/uploads/2023/08/Petrochemistry-FlowChart_V102023_HQ-withoutFolds-1.pdf

show that over 43% of UK chemicals are purchased by other manufacturing sectors making us an essential component in ensuring secure and resilient supply chains.

Chemicals also form part of the country's critical national infrastructure (CNI), whilst also underpinning other CNI sectors such as Defence, Energy, Health, and Water:

- Some of the chemical compounds produced in the UK and essential for the UK defence infrastructure include: ammonium nitrate and nitrocellulose which are key raw materials used in the formulation of explosives, whilst carbon fibres are increasingly being used in aircraft manufacturing.
- Chemical businesses are at the core of research around the production of green and blue hydrogen as well as producing key materials for solar panels, wind turbines, and energy storage/transportation.
- Modern health systems are based on the use of chemicals both within pharmaceutical products and healthcare goods. We provide key ingredients for pharmaceuticals (including the COVID vaccine), hydrogen peroxide used in sanitisers, latex for surgical gloves, and chemicals used in laboratory testing.
- Water treatment facilities rely on the use of chemicals for coagulation, flocculation, and disinfection processes key to water purification. Some of the chemicals used in these processes are: chlorine, chloramine, aluminium salt and iron salt[2].

3) Chemicals at the core of the energy transition

UK chemical business, as well as providing materials crucial for any type of manufactured good, also play a role in providing materials for the net zero transition.

- Transport:
    - Road – batteries, biofuels (including E10), synthetic 'e-fuels', and lightweight materials for transport manufacturing
    - Shipping – methanol and low-carbon ammonia

[2] How Water Treatment Works; Centre for Disease control and prevention. Available at: https://www.cdc.gov/drinking-water/about/how-water-treatment-works.html?CDC_AAref_Val=https://www.cdc.gov/healthywater/drinking/public/water_treatment.html

    - Aviation – Sustainable aviation fuels, hydrogen, and lightweight materials
- Power:
    - Generation – solar panels (ethylene-vinyl acetate), wind turbine blades (carbon fibre reinforced polymers), carbon capture technologies for gas (absorbents like: monoethanolamide, ionic liquids, calcium and sodium carbonates) and biomass fired power stations
    - Electricity transmission and distribution – wires are protected by layers of chemical insulation
    - Storage – batteries and hydrogen
- Buildings:
    - Heating – Heat pumps, insulation, double glazing

The nature of the chemical industry is cyclical but since 2022 we have lost 21.5% of our global market share and we are seeing some restructuring in the country and on the European continent. The main driver behind this shrinking trend of our industry resides in the competitiveness of the UK compared to other regions. The main factors that CIA has identified driving this relative disadvantage of conducting business in the UK compared to other regions are:

- Uncompetitive feedstock prices and supply – analysis from the Department for Energy Security and Net Zero (DESNZ[3]) shows that in 2023 UK industrial electricity prices were 43% above the International Energy Agency (IEA) average and about 4 times higher than in the US. Industrial gas prices in the UK are slightly more competitive, being 7% lower than the IEA average, but remain 4 times higher than in the US.
- Global competition for investment coupled with divergence from a level playing field in terms of government support for industries are recurring themes within our submission.

[3] These figures come from the latest release (26 September 2024) of 'International industrial energy prices' from the Department for Energy Security and Net Zero and refer to prices including taxes. Available at:
International industrial energy prices - GOV.UK

- Higher operating costs related to labour and raw materials as well as regulation and taxation (employment and business rates).
- Historical under-investment in critical infrastructure.

Question 1

How should the UK government identify the most important subsectors for delivering our objectives?

We suggest this is broadened to cover the subsectors which sit below the eight identified Sectors, as well as the key enabling (horizontal) sectors which support the Industrial Strategy objectives of a number of the identified (vertical) Sectors. The Chemicals sector is one of these horizontal enablers since, as outlined in question 3, the Industrial Strategy net zero and growth objectives of the Advanced Manufacturing, Clean Energy Industries, Defence, and Life Sciences Sectors cannot be met without the extensive support (and transformation towards net zero) from the Chemicals sector.

Question 3

How should the UK government incorporate foundational sectors and value chains into this analysis?

Together with being in over 95% of all manufactured goods, chemicals have also been identified as an essential to the critical minerals supply needed in modern society.

We are also a horizontal component of the whole industrial strategy – a point increasingly recognised within Europe and beyond.

When conceiving an Industrial Strategy, it is essential to consider individual sectors as well as apply a ‘system thinking’ approach by linking the eight vertical growth sectors identified in the Green Paper with their supply chains and ‘horizontal’ criticalities such as skills, innovation, productivity, and energy.

One of the great solution-providers to the challenges of society in the 2020s is the chemical industry, evidenced by its contribution to the provision of economic security, regional growth and net zero gains. Through increased recognition of chemistry within supply chains we can strengthen this position further. To incorporate foundational sectors and value chains within government analysis, government needs to map with more detail the value chains supporting top tier sectors.

Together with more detailed mapping of supply chains, Government should engage widely with key partners who are representing employers such as trade associations and collaborative organisations such as the National Manufacturing Skills Task Force (NMST) which has 20 members and covers the breadth of manufacturing. Trade associations provide a direct route into the supply chain at both a national and regional/local level. Task Force members such as The UK Metals Council (UKMC) were established to bring together a number of smaller associations all with a common focus on metals, the Equipment and Machinery Alliance (EAMA) brings together 13 associations, all of whom represent members manufacturing equipment and machinery for use across sectors.

Question 4

What are the most important subsectors and technologies that the UK government should focus on and why?

In our answer to this question, we again consider both subsectors and key enabling horizontals – with the principal horizontals being the chemical industry and the critical minerals sector.

Chemicals are present in over 95% of all manufactured products and technologies, so a strong domestic chemical sector can deliver secure and resilient supply chains – and moving this sector towards net zero is essential to enable other sectors, including Advanced Manufacturing, Clean Energy Industries, Defence, and Life Sciences to decarbonise. For these reasons we believe Chemicals should be

regarded as a critical enabler of the Industrial Strategy, and regarded as a "horizontal" enabler across the "vertical" Sectors (especially Advanced Manufacturing, Clean Energy Industries, Defence, and Life Sciences). Sustainable chemicals and fuels are critical to the future evolution of the world as it moves through the clean energy transition towards net zero, and the export potential of the products, technologies, know-how (e.g. IP) etc in this area is substantial. The UK has some global leaders in the technologies needed to drive this transformation.

Sustainable fuels are essential to drive the decarbonisation of those transport sectors that direct electrification will not reach, such as long-haul trucking, aviation, and marine. These all represent massive global markets, with the potential for substantial UK-derived GVA. Hydrogen is seen as the sustainable fuel for the long-haul trucking sector. However, for the marine and aviation sectors, liquid-based sustainable fuels will dominate in a net zero world – and together these sectors account for 4% to 5% of global GHG emissions today[4]. The chemical industry has the know-how to convert municipal solid waste, biomass, recycled plastics, and captured CO2 (along with clean hydrogen) into Sustainable Aviation Fuel (SAF). Mandates and targets on SAF use are already in place across many important aviation markets, such as the UK, EU and US. The UK has one of the most ambitious SAF mandates in the world, and we believe we should be building UK supply chains today to ensure that the UK is a major global producer of SAF, and that the vast majority of SAF used at UK airports is made in the UK through a strong and resilient UK supply base. We have a definite and huge incoming market, driven by airlines, public opinion and regulation, and the UK has the opportunity to develop and deploy the technologies to become a world leader. This objective can be supported by the Industrial Strategy through support for the UK chemical sector.

Securing access to critical minerals is absolutely fundamental to enabling the UK to play a major role in the clean energy transition. The UK recently developed a

[4] In 2022 aviation accounted for 2% of global GHG emissions – information from the International Energy Agency. Available at:
https://www.iea.org/energy-system/transport/aviation
In 2022 international shipping accounted for 2% of global GHG emissions – information from the International Energy Agency. Available at:
https://www.iea.org/energy-system/transport/international-shipping

Critical Minerals Strategy which is very useful, but has the limitation that it is focused on the materials the UK needs today, not those it will need as the world moves through the clean energy transition.

Question 5

What are the UK's strengths and capabilities in these sub sectors?

Our industry is a vital solution provider, but due to its reliance on energy it is often conceived as a problem by policy-makers. Whilst energy is the biggest ongoing challenge for our sector and chemical policy, the chemical sector is a critical foundation industry which supports the wider manufacturing base whilst being one of the key players in the development of net zero technologies essential for the clean energy transition.

We addressed in the introduction the three areas that should be considered when assessing the impact of the chemical industry on the UK economy[5].

The key strengths and capabilities that we have identified for our sector are:

- Skills: we provide high paying skilled jobs across the country and we are able to attract international skills into the country. Moreover, numerous companies take advantage of existing upskilling programmes and grants ensuring that their workforce remains at the forefront of scientific innovation.
- Historical know-how: for more than 30 years the UK was a leader in chemical manufacturing and, thanks our highly skilled workers, historical know-how is extremely developed and has been at the core of numerous recent investments in the sector. Similarly, during COVID, the development of the vaccine and the ability of our sector to manufacture the required doses was only possible thanks to extensive experience within industry.
- Innovation and R&D: strong investment within our sector enable us to be an industry leader in terms of R&D and specialty chemicals. Moreover, thanks to

[5] Three main ways of contributing to the economy: 1) direct contributions, 2) role in supply chains and ensuring security and resilience for key infrastructures, and 3) role within the energy transition. Page 2

the strong economic base of our industries, we are able to invest both in Research and Development of new products (including ones with environmental benefits) and in developing innovative production processes in line with the net zero target.

    - Within R&D it is also essential to mention the academic excellence provided by our universities and the collaboration possibilities between industry and universities.

- Our contribution to net zero: in terms of what we can deliver to the UK, unlike other industries, the chemical industry is also at the heart of developing solutions for net zero. Over the past three decades our industry has reduced its greenhouse gas footprint by over 80% through fuel-switching, emission abatements, and energy efficiency[6]. Whilst our members continue to invest and develop ways to reduce their environmental impact, we are also developing key materials essential for the net zero transition[7].
- Closeness to key market and high demand market: the chemical sector is highly reliant on international trade as we export over 33% of all our production[8]. Our biggest single market for export is the US as it is the destination of 24% of all our chemical exports, the EU is also a critical international player for us as 50% of UK chemical exports are to EU member states.
- Closeness to logistic hubs is a great advantage for a lot of the UK sector. Numerous chemical businesses in the UK are close to logistic hubs essential for transportation of raw materials and products.
- High production standards: due to tight chemical regulation, both in terms of health and safety during production and high standards of products, British chemical companies are recognised across the world for their high production standards.
- Substantial investment from the industry: Protel Association LTD – an association that focuses on capex projects – found that in the UK there are

[6] A net Zero transition that creates UK business opportunities; Chemical Industries Association, 2024. Available at: https://www.cia.org.uk/our-focus/net-zero
[7] See page 2
[8] Data available at: https://www.ons.gov.uk/economy/nationalaccounts/supplyandusetables/datasets/inputoutputsupplyandusetables

over 205 active capital expenditure projects from the chemical sector which have an estimated combined value in excess of £15.2bn[9].

Question 6

What are the key enablers and barriers to growth in these subsectors and how could the UK government address them?

The focus here is on how best to enable the transition of the UK chemical industry to net zero. This is partly to drive the decarbonisation across UK manufacturing necessary to meet our net zero targets, and also to drive growth in exports (via products, IP, licensing, skills, etc) from being a leader in net zero technologies to enabling the clean energy transition. There are numerous challenges and enablers for this, including:

- Access to competitive power and gas prices: availability and cost of green energy strongly impacts long-term investment decisions. As discussed in the introduction, industrial energy prices are internationally uncompetitive. Thanks to price caps and part-subsidisation, the government has been mitigating the cost of energy for the past two years, but prices remain double pre-pandemic levels.
- Long-term and stable carbon market policies: this is essential to give clarity to industry over the long term, so we can invest with confidence at the right time. These long-term carbon market policies need to be coupled with effective carbon leakage mitigation measures.
- Access to sustainable carbon (from biomass, recycled plastics, captured CO2) and clean hydrogen.
- Accessible carbon capture usage and storage across the UK: this is needed in part to provide sustainable carbon feedstock, and also to enable industrial facilities with unavoidable CO2 emissions to capture them for subsequent

[9] Chemical sector analysis from Protel Association LTD. Available at: https://www.protelprojects.com/sectors/chemical/

storage or use. An integral part of this is a CO2 connectivity/transport plan to move captured CO2 around from release sites to storage and demand locations - this is needed both for facilities within major industrial clusters and those that are more dispersed and remote (see answer to questions 26, 27, and 29 – place).

- Accelerated grid connectivity: we need a grid connectivity upgrade plan – we can't have advanced manufacturing sites waiting seven years for grid connections to enable their net zero ambitions. Planning bottlenecks need to be identified and removed, and the whole process needs to be accelerated.
- Simplified and enhanced net zero transition funding support.

As outlined above, the UK can't get the Advanced Manufacturing, Clean Energy Industries, Defence, and Life Sciences sectors (four of the eight sectors named in the Industrial Strategy) to net zero without getting the chemical industry to net zero – so chemicals play a critical horizontal role within the Industrial Strategy across these key sectors. In view of this criticality, we suggest the formation of a joint Government/chemical industry net zero roadmap partnership to develop and deploy a roadmap to take the chemical industry to net zero.

This roadmap needs to be an essential part of the Industrial Strategy and will be fully integrated with the key sectors that chemicals serve. A roadmap is required because we need to weave together a number of key and complex inputs – such as those outlined above – across a complex and diverse industry, and the outputs need to be clearly aligned to the sustainable materials/chemicals/fuels needs of the major Sectors within the Industrial Strategy.

Question 7

What are the most significant barriers to investment? Do they vary across the growth-driving sectors? What evidence can you share to illustrate this?

Across the economy the UK has been good at setting common goals or missions but these lack being backed by setting clear plans and/or followed up with joined up

policy actions. For example, regulatory burden or cost continues to be added onto business but without appropriate measures to incentivise investment, resulting in little or no business case to bring inward investment to the UK. With this in mind, the Industrial Strategy should look to target the following barriers:

- Addressing international competition: for the UK chemical industry which underpins not only growth-driving sectors but a wider resilient, green industrial economy, this means (i) having access to competitive energy and feedstock and (ii) a favourable and stable policy environment.
- Ensuring resilient supply chains for both our growth sectors and critical national infrastructure. This means having secure and dependable building blocks to underpin a resilient and thriving green industrial economy. For example, to help deliver our clean energy goals, there is and will be a growing need in composites for wind turbines, acetyls for solar panels, silicones to help improve battery capacity, provide high voltage cable insulation and flexible LED headlighting. Both green ammonia and hydrogen can play a strategic role in the UK energy mix to fuel transport and as an energy storage. Furthermore, sitting within the regional CCS cluster projects, chemical sites across the country can provide key materials for both existing and new CCS technology.
- Building skills for future industries and supporting upskilling of current workforce. With Brexit and COVID, numerous industries have noted skills shortages within their employees and in the labour market. To ensure that the UK remains at the forefront of industrial innovation it is essential that our industries have access to individuals with the skills needed during this Third Industrial Revolution. Whilst some of the skills that will be necessary in the future already exist within our workforce, it is essential that the Industrial Strategy supports both employees and employers with upskilling programmes, such as apprenticeships levy, and an academic curriculum in line with industrial needs.
- Establishing modern infrastructure that matches industrial needs and demand through cooperation between Government and Industry. After years of under-investment, UK infrastructure has lagged behind competitor countries due to regional disparities, scarce maintenance, and incompatibility with net zero

needs. Especially in terms of net zero, it is essential to also deliver a resilient power grid able to withstand and respond to major power disruptions whilst being compatible with industrial needs.

Questions 8 and 9 – People and Skills

Where you identified barriers in response to Question 7 which relate to people and skills (including issues such as delivery of employment support, careers, and skills provision), what UK government policy solutions could best address these?

What more could be done to achieve a step change in employer investment in training in the growth-driving sectors?

The chemical sector employs around 138,000 highly skilled people with salaries 21% above manufacturing average.

Thanks to historical know-how and high requirements dictated by the high quality of our products, our workforce has numerous transferrable skills that will prove crucial in the transition to net zero. Nevertheless, due to COVID and Brexit our members have started encountering higher barriers to employ people with the right experience and skill set whilst also seeing a higher number of retirements, in fact our workforce has diminished by 8% over the past five years. The ageing population trends noticed in the UK, EU, and US are also starting to impact the British labour market, which, coupled with cheaper availability of workers in ‘developing’ countries, are hindering current and future competitiveness of our industries.

To ensure that the UK chemical industry continues to deliver the necessary foundations for our economy, some upskilling is required to equip the current workforce with the necessary skills. The industry agrees that the Industrial Strategy should encompass the following:

- Increase the flexibility of apprenticeship levy by covering courses of various lengths and types. The added flexibility would allow more companies and workers to take advantage of this scheme.
    - Also look into developing a modular system of training using, for example, the outputs of Workforce Skills Foresighting and linked to occupational standards to allow development of a sector curriculum that can be delivered locally. This would facilitate upskilling of the existing workforce and reduce reliance on full apprenticeships.
- Consider introducing a Government backed scheme for apprenticeships in key trades that we see shortages in today but that are also required for the energy transition (e.g. insulators, painters, scaffolders, welders, riggers)
- Establish new skills partnerships between industry, academia, government, and trade unions to rewrite educational and working life of the UK population. In order to properly address future skills it is essential to focus on the educational system and ensure that graduates have skills-sets compatible with industrial needs. Some examples of necessary introduction are: promotion of STEM careers and subjects at primary and secondary educational levels; increase support for students (and companies) taking part in placement years[10]; support of further learning after entering the workforce, such as participation in Apprenticeships.
- Expansion of existing Government-funded cross-sector initiatives such as the Electrifications Skills Network and the Hydrogen Skills Alliance which bring together interested parties including employers, training providers, central and local government to identify, challenges, barriers and potential solutions against the Skills Value Chain framework.
- Introduce Tax credits on training spending to incentivise employers to prioritise spending on skills and training.

Another key element, ensuring that the UK chemical sector remains at the forefront of industrial innovation, is establishing a globally competitive and affable immigration system. This could be achieved through a reduction of visa costs and processing times as well as a revision of the Migration Advisory Committee (MAC) shortage

[10] A recent survey conducted by ChemTalent noticed that the majority of young professionals that pursued a career within the Chemical Industry had gained experienced during the placement year.

occupation list. In a globalised world where six of the 10 best universities are outside the UK and with implications from an ageing population, it is essential that Government enables our industries to attract international talent.

CIA, in line with suggestions from other non-government organisation, believes that there should be a bi- or tri-annual skill review of the country's industrial needs. Cogent Skills' work indicates that these skills review should include the forecasting of future manufacturing - and adjacent sectors e.g. defence and clean energy - skill needs. This review should also take into account the supply of training and education to meet those skills needs.

Questions 10 and 11 – Innovation

Where you identified barriers in response to Question 7 which relate to RDI and technology adoption and diffusion, what policy solutions could best address these?

What are the barriers to R&D commercialisation that the UK government should be considering?

The OECD average for percentage of GDP reinvested into R&D through government spending is 2.9%, this share is higher for most G7 countries: the US invests 3.6% of GDP, Japan 3.4%, and Germany 3.1%[11]. Latest data show that R&D spending in the UK is about 2.8% of GDP[12]. Additionally, a study from the National Centre for Universities and Business (NCUB) estimates that "in the UK each £1 of public R&D stimulates between £0.6 to £1.1 of private R&D investment in the short term, and

[11] Gross domestic spending on R&D, 2022; OECD, 2024. Available at: https://www.oecd.org/en/data/indicators/gross-domestic-spending-on-r-d.html?oecdcontrol-8027380c62-var3=2022

[12] Gross domestic expenditure on research and development, UK:2022; ONS, 2024. Available at: https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/bulletins/ukgrossdomesticexpenditureonresearchanddevelopment/2022#:~:text=Based%20on%20our%20latest%20available,included%20in%20the%202019%20release.

between £3.09 to £4.02 in the long term"[13], stressing the importance of government spending in R&D stimuli for innovation.

The estimates from the NCUB are in line with what the Rhodium Group has observed in the US after the establishment of the Inflation Reduction Act (IRA). Their 2024 report[14] on Clean Investment found that since the IRA was announced in 2022 actual business and consumer investment increased by 71% compared to the previous two-year period. Similarly, actual investment in manufacturing and deploying clean technologies have increased to nearly half a trillion dollars ($493bn from $288bn between 2020 and 2022) and actual clean investment in manufacturing increased from $4bn in Q2 2022 to $19bn in Q2 2024.

Since the announcement of the IRA, CIA has noticed that several member companies with production facilities also in the US have missed out on investment from their headquarters due to lower competitiveness of the UK compared to the US.

The previously mentioned researches show that higher government spending in R&D (and support to manufacturing) generate additional investment from the private sector and incentivise international investment in the country.

Together with increasing Government spending in R&D as a share of GDP to be more in line with the US, Germany, and Japan, other introductions that would support the UK chemical industry are:

- Continue to support innovation ecosystems such as Catapult Networks and centres of excellence such as the Centre for Process Innovation (CPI). These catalysts are proven to aid investment and innovation from SMEs.
- With skills at the core of innovation and R&D it is essential that the Industrial Strategy provides adequate support for upskilling programmes; partnerships between universities, industry, government, and trade unions; and a competitive visa system as per our answer to questions 8 and 9.

[13] Unlocking growth: The impact of public R&D spending on private sector investment in the UK; National Centre for Universities and Business, 2024. Available at: https://www.ncub.co.uk/wp-content/uploads/2021/07/Unlocking-Growth-NCUB-2.pdf

[14] Clean Investment Monitor: Tallying the Two-Year Impact of the Inflation Reduction Act; Rhodium Group, 2024. Available at: https://rhg.com/research/clean-investment-monitor-tallying-the-two-year-impact-of-the-inflation-reduction-act/

- Slow bureaucracy and different bodies in charge of interdependent regulations increases cost and complicates application processes for industries. To obviate these barriers to innovation and industrial production, streamlining regulations and providing clear guidance on compliance, as per our answer to question 20 would be essential.

- With Intellectual Property at the core of R&D, it is essential that current and future FTAs ensure strong IP protection.

- De-risking deploying new technologies. Certain support mechanisms (e.g. Low Carbon Hydrogen Agreement) drive investors away from new technologies due to high financial risks[15]. In order to support UK R&D and commercialisation of R&D in the country, Government should provide financial assistance/investment to lower these financial risks.

- Another challenge that some of our members have identified in terms of R&D is related to 'second use' in patents. Current UK legislation only allows patents to be obtained for a 'second use' of known chemistry in the pharmaceutical / medical space, but there are instances where known chemistries may be effective in new applications outside of this space. This regulatory position deters 'repurposing' of existing chemistries and forces innovator companies to develop new chemistry increasing cost and time to market. For this reason, broadening 'second use' patents outside of medicine, in line with EU regulations, would increase the competitiveness of UK R&D.

In the third quarter of 2023, a survey of membership from CIA highlighted that the main barriers to R&D commercialisation in the UK are:

- High operating costs: energy, labour, and raw materials
- Lack of tangible government support
- Uncompetitive regulation costs, legislative burden, and taxation
- Trade barriers and Brexit impacting closeness to market
- Skills shortages

[15] Can UK green hydrogen contract for difference (CfD) match the cost-saving success of renewable electricity?; The Oxford Institute for Energy Studies, 2024. Available at: https://www.oxfordenergy.org/wpcms/wp-content/uploads/2024/10/ET39-Can-UK-green-hydrogen-contract-for-difference-CfD-match-the-cost-saving-success-of-renewable-electricity-final.pdf

Questions 16 and 17 – Energy

What are the barriers to competitive industrial activity and increased electrification, beyond those set out in response to the UK government's recent Call for Evidence on industrial electrification?

What examples of international best practice to support businesses on energy, for example Purchase Power Agreements, would you recommend to increase investment and growth?

The businesses we represent want to help rebuild the UK's industrial economy, by unleashing investment in clean and circular manufacturing, and creating high wage, high skill jobs in regions and clusters across the UK. We can do this if the Government designs and aligns policies that bolster the competitiveness of our existing assets, and in parallel builds on that base to attract new investment. It is well worth noting that the pro-business conditions for investment in our sector will be reflected across manufacturing in each of the Government's growth-driving sectors. The key changes that we suggest in these regards are:

- The widespread electrification of industrial heating will require UK electricity prices that compare favourably, not only with the price of natural gas here in the UK, but with electricity prices elsewhere. We therefore welcome current efforts to revise the Industrial Decarbonisation Strategy which gives us an opportunity to put competitiveness at the heart of the energy transition. Critical to this will be:
    - The maintenance and strengthening of existing policy cost relief schemes for trade and energy intensive industries. The industry welcomed the Climate Change Levy (CCL) extension to 2033 but acknowledges that more competitive energy prices are needed to promote electrification.
    - The further removal of non-wholesale cost from the electricity bill is a necessary step in manufacturing's transition and must be prioritised. For

example, the Carbon Price Support (CPS) levied on fossil-fired generators is passed through to consumers (domestic and industrial) in our electricity bill and now provides little additional policy incentive alongside the carbon market.

  - Foster network upgrade and investment in grids to support industrial electrification, tackling grid connection delays and high industrial electricity prices.

- Calibrate UK's carbon pricing approach, including clear, effective and long term carbon leakage mitigation measures (free allocation and Carbon Border Adjustment Mechanisms - CBAMs), reflecting the sector's net zero transition pathway and earmarking ETS revenue to support the decarbonisation of energy and trade intensive sectors.
- Industrial Energy Transformation Fund (IETF) needs momentum from the new Government, with delayed application windows opened as soon as possible.
  - Furthermore, industry tends to have long investment cycles and so would be able to take better advantage of the IETF if it was more flexible.
- The National Wealth Fund must provide continuous access (unbroken by phases and application windows) to internationally competitive grant-based support for net zero industry projects.
- Cluster decarbonisation projects (based on hydrogen and carbon capture) must be progressed to final investment decision, in all six industrial clusters, as early as possible.
- Planning and permitting must support innovative net zero projects, accommodating the greater risk from first of a kind green investment and able to learn from deployment of new technologies. This also includes simplifying and streamlining the permitting and administrative processes to accelerate renewables deployment.
- Create favourable conditions that harness North Sea industry's existing capabilities and infrastructure, to crowd in private investment for the energy transition.
- Since not all EIIs can be fully electrified, and even less by 2035, it is essential to reinforce system integration (hydrogen, CCUS and electricity), storage, and

demand flexibility, to keep total costs low as we deploy new sources of intermittent and dispersed renewable electricity to the grid.

The UK has moved further and faster than its major industrial competitors in decarbonising our power sector, which has made electricity more expensive for our industrial base. Consequently, the electrification of industrial heat in the UK is more expensive than in competing nations, meaning it is difficult to compare and contrast with others facing the same challenges as us. However, as shown by Table 1 in the appendix, other countries and regions are putting more money towards supporting clean and circular industrial investment than the UK.

Whilst chemical manufacturing does require a proportion of virgin fossil-based inputs even in the long term, feedstock diversification offers an opportunity to take the lead and supply cleaner feedstocks. Some of these diversification projects include low-carbon feedstock available from advanced and mechanical recycling, clean hydrogen (and ammonia) and possibly wider biomass processing.

CCUS is fundamental to our net zero transition: CCS to reduce our carbon footprint, and CCU to use CO2 as feedstock.

The UK has a global leading geological advantage, greatest CO2 storage potentials of any country in the world and accounting for approximately 25% of Europe's CO2 storage potential – safely storing roughly 78 billion tonnes of CO2[16].

CCU has yet to be deployed at scale in complex industrial clusters anywhere in the world. This represents a strategic opportunity for the UK and its supply chain. Government analysis indicates the global market could be worth £260 billion by 2050[17].

Question 20 – Regulation

[16] Overview of Carbon capture, usage and storage; UK government. Available at: https://www.great.gov.uk/international/investment/sectors/carbon-capture-usage-and-storage/
[17] Overview of Carbon capture, usage and storage; UK government. Available at: https://www.great.gov.uk/international/investment/sectors/carbon-capture-usage-and-storage/

Do you have suggestions on where regulation can be reformed or introduced to encourage growth and innovation, including addressing any barriers you identified in Question 7?

Used in the right way, regulation is one of the many tools that can be used to encourage growth and innovation. However, as highlighted in Q7, Government's own data indicates the increasing cost of regulation to business with a consequence impact on both innovation and investment.

First and foremost, the UK needs to combine multiple regulation and avoid conflicting goals. For example, within industrial energy and carbon space, there are at least a dozen different reporting schemes. Often these overlapping polices are increasing cost and complexity for industry and Government, can create perverse incentives and undermine the case for innovation and investment in the UK. To address these, there is a need to ensure that each regulatory tool is meeting a common goal or objective across the UK. The UK can also go further and consider a single reporting channel that would relieve burden from business, in particular for SMEs.

Regulatory tax must be coupled with incentives to innovate or invest: Simply introducing regulation that creates cost without parallel tools to support business to move towards a stated objective creates a 'transition gap'; that cannot only stifle growth and innovation but ultimately result in closures and - with them - job losses. For example, in recent years, the current end-of-life recycling rate has seen marginal improvements (in most cases less than 1%), which mainly comes from mechanical recycling. This suggests that despite recent policy measures such as the plastics packaging tax cannot drive recycling rates alone, reduce export of waste and deliver net zero by 2050. Instead, it is vital that there is investment in all recycling technologies, including chemical–based recycling. Chemical recycling is a complementary, not competitive, technology to mechanical recycling which can tackle traditionally hard to recycle materials, like plastics, but the polices to incentivise investment such as acceptance of mass balance, appropriate end of waste definitions and existing waste related taxes being directed towards developing better recycling structure, remain unavailable in the UK. The Government should consider making use of some of its increased revenues associated with the UK ETS

and Plastic Packaging Tax, to support solutions like chemical recycling, that would help to make the UK a secure and circular economy.

Ensure long term certainty around regulation: In some areas of regulation, business continues to wait for a long-term outcome. Most important to our sector is the future of carbon pricing and with it effective carbon leakage measures as a means to provide a level playing field, a cost effective and workable GB REACH, as well as key regulations impacting our sector's license to operate conditions through UK BAT (Best Available Techniques). Each one comes with significant compliance or investment costs, but businesses are unable to take long term decisions for their UK assets or markets until certainty is provided.

Regulators to collaborate with operators: The Health and Safety Executive (HSE) is improving their collaboration "by establishing networks and strategic partnerships with industry, academia, international research institutes, and co-regulates to pool resources, share knowledge and, as a result, be more effective in [its] ability to improve health and safety outcomes for all"[18]. Operators, in this case industry, are experienced at prioritising spending to the areas of greatest impact and know their processes better than most regulators, hence can provide essential insight to how businesses operate and which policies/grants/regulations can be most effective. For this reason we suggest that all regulators foster networks and partnerships, similar to the ones established by HSE, for all environmental regulations. We also believe that regulators should be sufficiently resourced to perform key regulatory responsibilities, including site inspections, timely permitting and permissioning. Some improvements have been made here, but challenges remain in terms of recruitment and competence-building.

Question 21 – Crowding in Investment

[18] Available at: https://solutions.hse.gov.uk/about-us/collaborations#:~:text=Effective%20collaboration%20is%20crucial%20to,and%20safety%20outcomes%20for%20all.

What are the main factors that influence businesses' investment decisions? Do these differ for the growth-driving sectors and based on the nature of the investment (e.g. buildings, machinery & equipment, vehicles, software, RDI, workforce skills) and types of firms (large, small, domestic, international, across different regions)?

When talking about investment, particularly foreign investment, Government often refers to Foreign Direct Investment (FDI) "**stock**", for which the UK ranked second among the 38 OECD countries in 2023. Whilst FDI stock is a good measure for historic investment, FDI "**flow**" shows transactions recorded within a given period, hence it captures annual levels of investment. In respect to FDI flow the UK has dropped from 5th place in 2013 to 37th in 2023[19]. We have also noted a divergence in investment location from the UK. Most chemical manufacturing companies operating in this country have foreign headquarters and - as we mentioned in our answer to questions 10 and 11 – several have recently reported losing investment to other regions. This is a feature of a global industry, with headquarters, wherever they are, having the opportunity to compare the whole project costs between different locations and seeing better government support, clearer long term policies, cheaper operating costs, and/or more resilient supply chains in other nations.

If we want to secure higher foreign investment, it is crucial to understand what drives investment in each sector. In the chemical sector – as for most other manufacturing sectors - the main factors that impact investment decisions include:

- Market size/closeness to market and growth potential
- Cost and availability of raw materials and labour
- Energy supply both in terms of security and cost
- Openness (ease of doing business)
- Distance and infrastructure critical for highly regulated sectors
- Fiscal incentives as investment in manufacturing is capital intensive and long term

[19] Data from the OECD available at: https://www.oecd.org/en/data/indicators/fdi-flows.html?oecdcontrol-39c7959dfd-var3=2023&oecdcontrol-39c7959dfd-var5=A

- Stable policies and clear future pathways
- Other factors:
    - Corporate tax rates
    - Labour availability and flexibility

Due to the long-term nature of chemical investment, exchange rates are not a key factor as there will doubtless be fluctuation over the period of the investment cycle. A degree of stability in fiscal rules remains desirable but clarity and certainty in policy areas impacting on the operating environment remain paramount.

The importance of a stable policy environment is largely related with establishing the competitiveness of the UK. We have recently seen new and significant chemical investments into the US due to inducements available under the Inflation Reduction Act and into the EU under the European Green Deal which was approved in 2020. In the Autumn 2024 Budget the UK Government indicated £2 billion of funding towards 11 Green Hydrogen projects across England, Scotland and Wales. CIA welcomes the move to unlock funding and planning approvals as we did the earlier Government support for Hynet (NW) and the East Coast Cluster carbon capture projects which aim to decarbonise industry in the regions, but the scale of these introductions is minimal compared to comparable international projects[20]. In Europe 'The future of European Competitiveness' report from Mario Draghi advised that the EU needed to increase investment by €800bn each year just to keep up with the US and China[21]. This report, and some of its wider findings, will contribute to the European Commission's work on a new plan for Europe's sustainable prosperity and competitiveness.

Other policy decisions that would clarify the operating environment for business and have the potential to unlock investment include:

- Securing a long-term and stable carbon market policy, coupled with effective carbon leakage mitigation measures to allow UK manufacturing to compete and ultimately invest in the UK's transition to net zero.

[20] See Table 1 in the appendix
[21] Available at: https://commission.europa.eu/topics/strengthening-european-competitiveness/eu-competitiveness-looking-ahead_en

- Focus on existing infrastructure and industries rather than on solely modernising assets. This type of approach risks to push away key manufacturing sectors to developing and more supporting geographies hindering UK supply chains and possibilities for Net Zero
- Create favourable policy conditions for advance circular recycling technologies, including a clear approach to account for recycled material – the so called 'mass balance approach', now embraced by the Government in its recent budget statement.
- Deliver on the long-awaited post-Brexit GB REACH regulation through a workable, protective and cost-effective alternative to the current regime to ensure UK manufacturers across supply chains are not at a disadvantage in a global marketplace.
- Implement a UK Chemicals Strategy with a clear roadmap that enables and supports innovation, and accelerates circular, low carbon solutions for the planet and people.
- Establishing flexible funds and grants to match investment life cycles as per our answers to questions 16, 17, 26, 27, and 29.
- Support companies upskilling their workforce and deliver a competitive immigration system to attract international talent as per our answer to questions 8 and 9.
- Ensure a competitive environment in terms of energy supply, regulations, innovation, and general business operating conditions as per our answers to questions 7, 10, 11, 16, 17, 20, 22, and 23.

Questions 22 and 23 – Mobilising Capital

What are the main barriers faced by companies who are seeking finance to scale up in the UK or by investors who are seeking to deploy capital,

and do those barriers vary for the growth-driving sectors? How can addressing these barriers enable more global players in the UK?

The UK government currently seeks to support growth through a range of financial instruments including grants, loans, guarantees and equity. Are there additional instruments of which you have experience in other jurisdictions, which could encourage strategic investment?

The strong contraction in FDI flow that we noted in the answer to question 21, clearly shows that over the past decade the UK has been struggling to attract and foster investment. This challenge was noted also by Lord Harrington under the previous government which led the Harrington Review of Foreign Direct Investment. With this in mind, CIA suggests that Government takes action based on his findings and recommendations.

Another key Government consultation for our sector, the outcome of which could unlock investment for SMEs and start-ups, is 'Access to finance for advanced manufacturing scale-ups'.

Questions 24 and 25 – Trade and International Partnerships

How can international partnerships (government-to-government or government-to-business) support the Industrial Strategy?

Which international markets do you see as the greatest opportunity for the growth-driving sectors and how does it differ by sector?

Yearly UK chemical exports are quoted at around £61bn, as over 33% of all chemicals produced in the UK are exported. Our main market is the EU as exports to EU member states amount at roughly 50% of all chemical exports. Whilst the UK is a prominent exporter of chemicals, we also rely on chemical imports and roughly 66% of all chemicals imported to the UK originate from the EU. For this reason, it is

essential that the UK/EU Trade and Cooperation Agreement is improved wherever possible or -at the very least- that existing facilitations are fully implemented.

Currently the UK does not enjoy free trade agreements with the US – our biggest single market (about 24% of all chemical exports). In the circumstance of a favourable trade agreement with the US not being pursued, the UK Government should strive to mitigate the impact of both potential tariff increases on US bound trade or trade deflection where Chinese products look for an alternative market due to US barriers being erected.

Two key countries for chemical trade are China, as it is responsible for producing 33.6% of all chemicals in the world, and India – 3.7% of global chemical market share but forecasted to grow to 4.4% in the next 4 years[22]. India is a particularly relevant market when considering access to critical minerals. Whilst the UK does not have FTAs in place with these two countries, trade exists, in fact many of the barriers observed within the sector are non-tariff barriers including various market access and regulatory based barriers to new business.

Chemical products attract lower tariffs than other manufacturing sectors, the average being less than 5%. While this is low, the industry operates on narrow margins and we remain advocates of free and fair trade. Consequently, we encourage the UK Government to actively pursue the liberalisation of tariffs on a reciprocal basis wherever possible. We welcome the progress being made on a GCC agreement and hope that India talks resume in 2025 – international partnerships are essential at ensuring current and future access to critical minerals.

With the US being the biggest single market for UK chemicals, CIA is hopeful that a new Administration in the US looks favourably on picking up the progress that was made on FTA talks under the first Trump Presidency.

Current anti-dumping processes take long to be approved by Government and may result in companies being exposed to dumping for several years before potential action is carried forwards. Government should also take action against ‘dumping’ with far more rapid response.

[22] Forecasts from Oxford Economics

Questions 26, 27, and 29 - Place

Do you agree with this characterisation of clusters? Are there any additional characteristics of dimensions of cluster definition and strength we should consider, such as the difference between services clusters and manufacturing clusters?

What public and private sector interventions are needed to make strategic industrial sites 'investment-ready'? How should we determine which sites across the UK are most critical for unlocking this investment?

How should the Industrial Strategy align with devolved government economic strategies and support the sectoral strengths of Scotland, Wales, and Northern Ireland?

CIA agrees with the definition of clusters from the Green Paper and we agree in the criticality of clusters for suppliers or feedstocks and buyers of finished goods. The six main clusters for the chemical industry are around South Wales, the Solent, The Humber, Teesside, Runcorn, and Grangemouth.

The highly capital-intensive nature of existing plants discourage transfer to tax efficient freeport or investment zones. Moreover, CIA is conscious that over investment in clusters, might put sites that are not located within a cluster at a competitive disadvantage running the risk of closure or offshoring of manufacturing.

CIA is extremely supporting of the recently announced £21.7bn investment for the two initial CCUS/Hydrogen industrial clusters, but we recognise the need for a plan to enable other industrial hubs, and more isolated facilities, to access CCS/CCUS to mitigate their CO2 emissions.

Similarly to requests made in our answer to questions 16 and 17 on Energy, the five to 10 year time limits on tax and planning advantages within investment zones does

not match the life cycle of chemical (and manufacturing) investment. For this reason, we encourage Government extend benefits in line with investment cycles.

The Industrial Strategy should also provide better recognition of devolved administrations as they are an actual existing driver of economic opportunities. Government should prioritise the review and potential strengthening of existing structures before creating new ones.

Questions 30, 31, and 32 – Partnerships and Institutions

How can the Industrial Strategy Council best support the UK government to deliver and monitor the Industrial Strategy?

How should the Industrial Strategy Council interact with key non-government institutions and organisations?

How can we improve the interface between the Industrial Strategy Council and government, business, local leaders and trade unions?

CIA's view on the structure of the Industrial Strategy Council is represented in the bullets below:

- Membership of, and participation in, the Council from government, business, local leaders and trade unions will be important.
- Limit the number of Council members and Council membership terms of office, to ensure representation from a wide scope of industries. E.g. 3 years.
    - Since the council aims to represent all industries, we believe membership should include manufacturing representation, also informed through a supporting Advanced Manufacturing Sector Council.
- The Council should have clear remit/terms of references, similar to the OBR and the Treasury.

- The Council should invite input to its considerations and allow representations – even if not directly to the Council, then to civil servants.
- The Council should provide regular outputs and comment.
- Consider good practice from both the UK and internationally – for example the Vaccines Task Force and the Singapore approach to attract investment.
- Industry will be committed to engage if there is: a focus on delivering tangible change in terms of Government/public sector competence and commitment; sectoral/regional productivity improvement; policy stability and competitive funding. All measured over an ambitious timeframe.
- The Industrial Strategy Council should have a key role in identifying emerging growth sectors and influence Industrial Strategy.

Appendix

Graph 1 – UK CHEMICAL INDUSTRY, 2024 in numbers

Graph 2 – MADE IN THE UK, Sold across the world

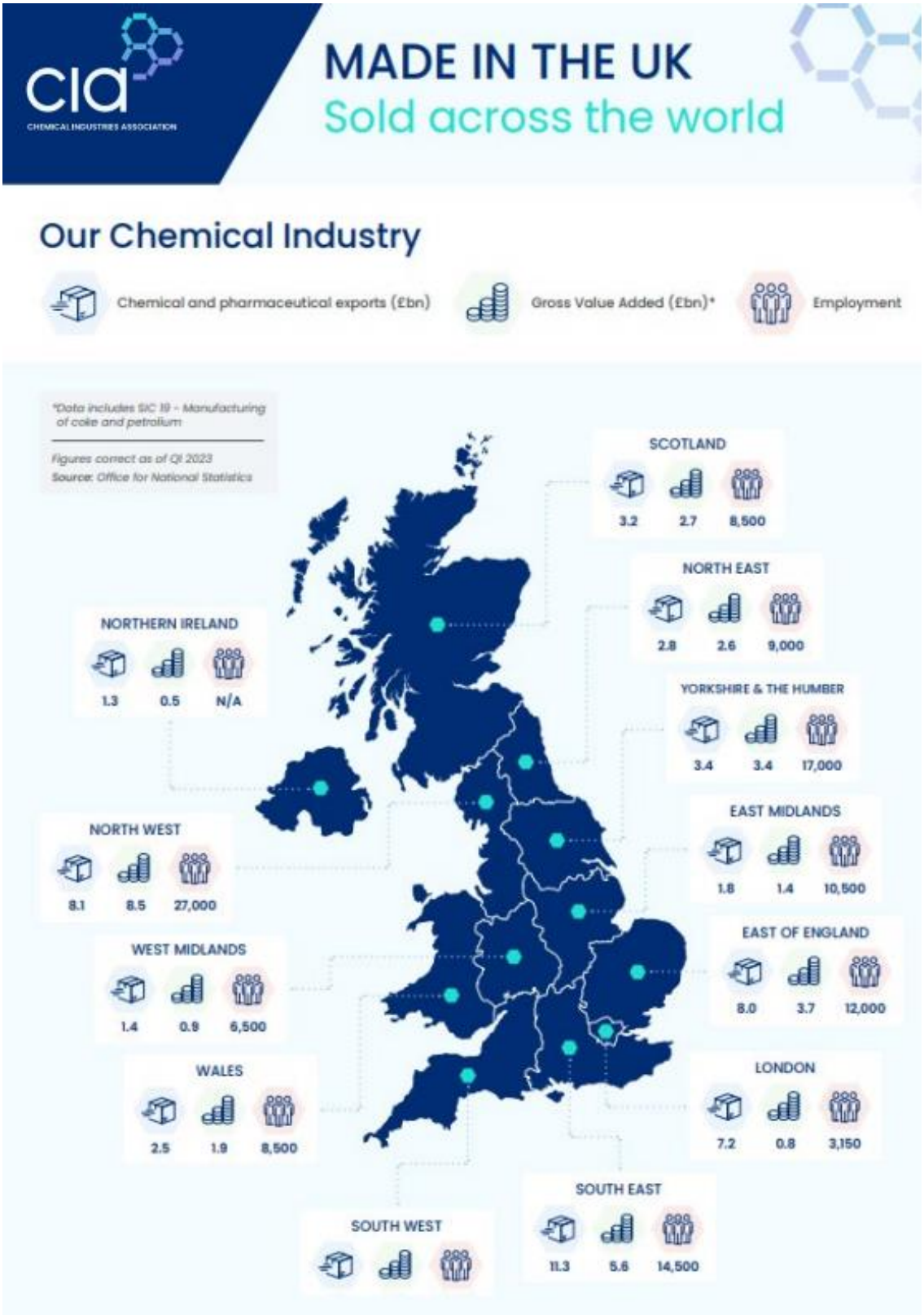

Table 1 –Funding packages - tracked by CIA - that are supporting decarbonisation elsewhere.

Region	Package	Detail	Status
Canada	Subsidies for carbon capture and net-zero energy projects	$20bn over 5 years	Announcement expected in November 23
EU	Strategic Technologies for Europe Platform (STEP)	An extra €10bn directed towards science and innovation programmes to "stimulate investments in critical technologies". STEP will bring together existing funds such as InvestEU, Innovation Fund, Horizon Europe, EU4Health, Digital Europe Programme, European Defence Fund, Recovery and Resilience Facility, and cohesion policy funds	Announced in June 23
EU	Temporary Crisis and Transition Framework	Suspension of state aid requirements to foster support for net zero technologies	Adopted 9 March 23 until 31 December 25
EU	EU ETS Innovation Fund	Supports clean industrial projects. €800m for Hydrogen Bank. €3bn for batteries	
EU	REPowerEU	€20bn for saving energy, diversifying energy supply and accelerating renewable roll-out. Included in renewables is commercial rooftop solar, biomethane and hydrogen production. Money to be raised from auction EUAs	
EU	European Hydrogen Bank	€800mn auction fund drawn from the ETS Innovation Fund. Provides subsidy in form of fixed price per kg hydrogen produced for up to 10 years. Bids must be for >5MW of new electrolyser in one location, with a ceiling price of €4.50/ kg. Pilot auction started November 23, bids must be in by February 24, followed by annual auctions if interest is high	Announced August 23
EU	European Wind Power Package	Changes to auctions, permitting and grids.	Adoption March/ April 24

Region	Package	Detail	Status
EU	Projects of Common Interest	€9.9bn for projects deemed as crucial to the bloc's energy security and decarbonisation goals. Hydrogen projects strongly represented	Decision in February 24
EU	Clean Hydrogen Partnership	€113.5m for projects across hydrogen value chain	Announced January 24
EU	Connecting Europe Facility	€594m included cross-border CO2 capture and transport infrastructure	Announced January 24
EU	EU ETS Free Allocation	Green hydrogen producers will get the same free allocation as fossil H2 production	Announced January 24
EU	Decarbonised Gases and Hydrogen package	A new five-year pilot mechanism collect, process and give access to information on demand and supply for renewable, low-carbon hydrogen and derivatives. This will allow European off-takers to match with both European and foreign suppliers.	Announced June 24
France	Green Industry Bill	€20bn worth of tax credits for renewables and low carbon investments, by 2030 (2.5bn per year)	Announced in May 23
France	CfD for low carbon hydrogen	€4bn subsidy package to support low-carbon hydrogen projects through 15-year CfD will cover difference between low carbon and fossil derived hydrogen, from 2024. Part of France's hydrogen strategy launched in 2020 to support 6.5GW electrolysers by 2030, with €9bn.	Announced in September 23
Germany	Climate Protection Contracts (CfDs)	€4bn for 15-year contracts covering difference between clean production vs traditional	Announced in February 24
Germany	Climate and Transformation Fund	€3.53bn for green H2 and its derivatives between 2027 and 2036	Announced February 24
Germany	State aid for fuel switching	€2.2bn in direct grants to support fuel switching of industry to electricity, H2 or H2 derived fuels. Projects must lead to a 40% reduction in emissions and take ETS sites below their current benchmark. Funds to be granted by the end of 2025, latest.	Announced April 24

Region	Package	Detail	Status
Japan	Hydrogen Society Promotion Act	15-year subsidy for Japanese-produced and imported low-carbon hydrogen (stackable with other subsidies for producers - suggests flat rate per kg)	Announced May 24
Netherlands	SDE++		
Netherlands	€998m green hydrogen subsidy auction (October 24)	80% of upfront cost and variable premium over five to 10 years.	Announced August 24
US	IRA	Uncapped tax credits	
US	Bipartisan Infrastructure Law	$7bn for seven regional clean hydrogen hubs	Announced October 23
US	Industrial Efficiency and Decarbonisation Office	$254m for innovative decarbonisation tech, including $83m for EIIs (6 in chemicals)	Announced January 24
US	US Energy Department Loans	$710m for EV technology companies (batteries)	Announced February 24
US	Advanced Manufacturing and Recycling Grant Program	$425m for producing and recycling clean energy products	Announced March 24
US	Bipartisan Infrastructure Law	$750m to 52 hydrogen projects to advance electrolysis and fuel cells.	Announced March 24
US	Inflation Reduction Act/ Bipartisan Infrastructure Law	$6b to 33 industrial decarbonisation projects; 7 chemical projects to receive $1.1b	Announced March 24
US	DOE's Office of Fossil Energy and Carbon Management support for CO2 capture	$127.5m to support CO2 capture, removal, conversion test centres	Announced August 24

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