We work at the heart of the chemical sciences community to create a future that is more open, more green, and more equal. Together, we're helping chemistry to change the world.

We enable exciting progress that would be otherwise impossible. As an independent catalyst for change, we connect people and ideas through partnerships, conferences, events and networks that span the globe.

We publish scientists' discoveries and insights so they can be used to improve our health, environment and lifestyles. And we're transforming how we do that with a commitment to open access: everyone, everywhere, should have the same potential to read and share knowledge.

We care about protecting our natural environment, about tackling discrimination to build a truly inclusive world, and about making cutting-edge chemistry accessible wherever it's needed for the good of society.

It's all built upon and lifted up by our diverse global membership, with every one of those 60,000 members bringing a unique and valuable perspective. The chemical science community has the knowledge, skills and passion to make those a reality – together, we're changing the world.

www.rsc.org

Our policy, evidence and advocacy work draws on insights from our scientific community and its work, to show how Governments, Parliaments and other decision-makers can enable chemical scientists to make the world a better place and draw on the insights from their work to achieve economic, social and environmental benefits.

Chemistry underpins several of the UK's growth sectors, e.g. advanced manufacturing, clean energy industries and life sciences, and as such makes a significant contribution to the UK economy. Research by Cambridge Econometrics for the RSC in 2020 showed that over the period 2013-19:

- The chemistry sector contributed an average of £83 billion per annum to UK GDP
- It contributed an average of £39 billion per year of GVA.[1]

This contribution is driven by a strong chemical sciences workforce that is projected to grow faster than the workforce overall in the coming decade.

- Research by Lightcast for the RSC in 2023, showed that the current chemical sciences workforce numbers over 314,000 workers across many roles and industries and underpins an additional 1.4m related jobs in chemistry-centred

- It further showed that this workforce is projected to grow by around 6.5% in the coming decade, compared to 5% for the wider UK economy. This translates into at least 12,000 new jobs in core chemistry occupations and approximately 100,000 new jobs in chemistry-centred industries.

We would be pleased to meet with you and talk through these research findings and the rest of our evidence base. If you have any questions about our submission, or would like to discuss any in more detail, please contact our Public Affairs Manager Matt Davies on daviesm@rsc.org.

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Research, development and innovation drive productivity, economic growth and raise living standards, benefitting individuals and communities across the UK. Long-term investment in R&D will create good jobs in all nations and regions, ensuring that the UK is equipped to meet challenges such as mitigating and adapting to climate change, becoming a clean energy superpower, improving human health and tackling other emerging global challenges like improving the UK's food and energy security.

To maximise the benefits that research, development and innovation bring, we call on the Government to:

- Provide to give private and public sector partners, including international investors, the confidence to make their own long-term R&D investment decisions.
- Ensure the , including the digital and sustainability skills science requires.
- Enable the UK to , through an and by supporting .

Below, we set out how these asks can be achieved.

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We were pleased to see the importance of R&D recognised in the Autumn Budget with the commitment to maintain real-term uplifts to R&D budgets in the short term. In the longer term, we encourage the government to be ambitious,

and to

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We welcome the establishment of 10-year funding cycles, which will enable private and public sector partners to plan strategically and be confident in their funding decisions. These funding cycles need to be developed with the sector and sit alongside a suite of different funding mechanisms which support the diversity of organisations in the R&D sector. This includes:

- . Quality-related research (QR) funding (and equivalents in the devolved nations) is a vital mechanism to enable curiosity-driven research in the UK. As a major source of non-ringfenced funding for universities, it can be used flexibly to drive new ideas and respond to emerging challenges, and often goes on to underpin the innovations of the future. It further enables universities to make long-term investments in the talent pipeline and infrastructure.

  In recent years QR funding has been under increasing pressure as universities are needing to use it to cover the full economic cost of research. Recent reports from the Office for Students TRAC data indicate that the proportion of costs recovered from UKRI councils has decreased to 68.9%[3] and at the same time, UUK analysis shows that in England, there has been a 15% drop in real-terms QR funding, and an even bigger drop in the devolved nations. We urge the Government to reverse the real-terms decline in QR funding and aim for a higher cost recovery of publicly funded research.

- by continuing to fund and support participation in international funding schemes such as the €95 billion Horizon Europe research and innovation programme and its successor, Framework Programme 10 (FP10). The Government's position paper on FP10 was a very welcome step in this direction. Providing certainty demonstrates the Government's commitment to creating a long-term, stable policy and funding environment for research and innovation in the UK as well as resetting EU-UK relations.

- , particularly at the scale-up stage, to maximise economic growth and allow for SMEs to thrive. This is often the point of business development at which foreign investment takes the firm overseas, meaning UK PLC can miss out on the economic returns of technology developed here.[4] Research by the Enterprise Research Centre commission by the RSC in 2022[5] indicated a number of

[3] Office for Students, Annual TRAC 2022-23, June 2024. See

mechanisms, particularly relevant to deep tech chemistry SMEs (a subset of businesses that are using chemistry as the core of disruptive technologies), which can help these businesses to succeed. These include:

- Ensuring access to the appropriate public funding opportunities. These should be facilitated through online portals, clearly signposted, and supported as a public good.
- Securing access to funds that enable deep tech start-ups to undertake proof of concept research which is often crucial to securing further funding.
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Chemistry UK group held in 2021 indicate that many university chemistry departments have insufficient resource to maintain or upgrade equipment and facilities or maintain technical expertise. This could affect what research can be carried out, impact the sector's ability to develop and apply frontier techniques, hamper industry-university collaborations and inhibit the sector's ability to remain internationally competitive. The need for additional investment to address disconnects between capital investment and funding for operational costs, including to maintain infrastructure (sometimes referred to as the "batteries not included" problem), has also been highlighted out by the Royal Society[7] and Russell Group[8].

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To attract and retain the best talented researchers and innovators, the government must develop an immigration system that works for the research and innovation sector. This needs to recognise that:

- Scientific research and innovation need frontier knowledge and skills that are often scarce and part of a limited and global talent pool;
- international collaboration is vital to science, and
- that high-skilled and internationally competitive roles are not always afforded a commensurate salary, particularly in academia and start-up businesses.

High-Skilled and Global Talent routes must reduce financial barriers. This requires visa schemes that are internationally competitive and:

- , appropriate to attracting the best scientists, researchers, technicians, teachers, innovators, students and entrepreneurs to the UK;
- ; and
- and recognise their contribution to local universities and economies.

Royal Society analysis shows the UK immigration costs are up to 17 times higher than the average of other leading science nations[9]. Expensive up-front costs are the most significant barrier for many individuals to come to the UK, especially if accompanied by their family.

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[7] The Royal Society, Royal Society response to the House of Commons Business, Innovation and Skills Committee inquiry into the Government's Industrial Strategy, p3, September 2016. See https://royalsociety.org/-/media/policy/publications/2016/09-30-16-industrial-strategy.pdf

[8] Russell Group, Strong foundations for UK research, innovation and education, p3, February 2024. See https://russellgroup.ac.uk/media/6201/briefing-investing-in-capital-feb-24.pdf

to ensure policy and messaging support parity of esteem between academic and vocational routes

- , so that higher education in chemistry is accessible locally to all potential students.

Education is a leading determinant of economic growth, productivity, employment, and earnings. Investing in school level chemistry and science education is key to breaking down barriers to opportunity and guaranteeing an effective labour pipeline to maintain the strength of the chemical sciences.

- Practical chemistry is an essential part of the chemistry discipline because it supports the understanding of the subject as an empirical science and is core to understanding the question ‘How do we do chemistry?’. The skills developed through practical work can be used by young people in their future studies and careers in the sciences and beyond.
- We believe that all learners should have access to relevant and regular practical chemistry activities. However, our research has shown that teachers in England are finding it increasingly difficult to run them. In our science teacher survey 2023, cost of

To deliver a world-class chemistry education for all students, teachers must have appropriate subject expertise for the classes they are required to teach. Longstanding chemistry teacher shortages and a lack of access to effective subject-specific CPD is hindering this ambition.

Chemistry ITT targets have frequently been missed for over a decade and attrition rates remain high.[14] 39% of respondents in our 2024 Science Teaching Survey said that their school was understaffed for chemistry teachers.[15]

A combination of policy interventions will be needed to reach the Government's overall target of 6,500 more teachers.[16]

The UK chemicals and materials sector has high economic growth potential, with an opportunity to secure and grow a significant number of jobs. If supported in the right way, the chemical industry alone could generate upwards of £544 billion annually for the UK economy by 2050[1].

However, to compete internationally, be sustainable and align with the UK's Net Zero ambitions, the sector must become more circular and transition away from fossil-derived feedstocks, replacing them with biomass, chemical recycling, and utilising captured carbon where these alternatives are more sustainable.

chemicals regulation regime. To support this effort, the RSC has outlined a range of options towards improving the regulatory regime for chemicals in this recent report.

Cross-governmental department budgets need to enable the necessary bespoke training and upskilling regulatory professionals in the skills and competencies needed to deliver high quality regulatory regimes for chemicals.

There is a need to identify a departmental policy lead on chemicals regulation in order to clarify and streamline the chemicals regulation regime. Increased cross-governmental coordination could increase the speed and efficiency of regulatory decision-

Monitoring is essential to understanding the scale of pollution, identifying hot spots and assessing long term trends.

- Implement a stronger ‘ by making additional treatment to mandatory. This could be funded via extended producer responsibility of major polluters of CECs (e.g. industries that produce or use problematic CECs) that consequently end up in wastewater streams
- Commit to and the other of CECs in waterbodies, such as pollution from road run-off, waste emissions and agriculture.

Poor air quality is the largest environmental risk to public health in the UK, contributing to an estimated 29,000 to 43,000 deaths a year in the UK.[8]