THE ROYAL SOCIETY

February 2023

Royal Society representations to the 2023 Spring Budget

The Royal Society is the UK's national academy of science. Our fundamental purpose is to recognise, promote, and support excellence in science and to encourage the development and use of science for the benefit of humanity. This submission draws on existing work and ongoing projects commissioned by the Society. It outlines how our policy work can support the Government's 'Science Superpower' and 'Innovation Nation' agenda, as well as the long-term growth and prosperity vision outlined by the Prime Minister and Chancellor in their new year speeches.

Key recommendations:

- Ensure Government spending on R&D keeps pace with other nations, and establish a long-term strategy for science, research and innovation that commands cross party support.
- Mirror progress on the Northern Ireland protocol by preparing the ground to secure Horizon Europe association at the earliest opportunity.
- Reduce work and study visa fees in line with other leading science nations.
- Reconsider proposed cuts to the SME R&D tax credit scheme, which risk disincentivising innovation among smaller companies.
- Introduce an evidence-led UK technology roadmap to guide investment to fledgling sectors and technologies that will be critical for delivering net zero.
- Establish data informed, cross departmental land use frameworks to manage land use trade-offs.
- Pursue a major review of the secondary and post-16 education systems in England, including exploring alternatives to the current narrow A-level examinations.

1. Context: creating opportunity through the delivery of sustainable futures

Living sustainably is the greatest challenge of the 21st century, uniting the central missions of mitigating climate change, tackling over exploitation of the biosphere, and balancing practical land management trade-offs between food, biodiversity, and carbon management against a growing population.

But these challenges also translate into opportunity, most notably through the enormous innovation, growth and skilled jobs potential created by the development of new technologies and delivering low carbon, sustainable futures. Policy urgently needs to drive this transition, capitalising on the UK's vast potential and positioning ourselves as a destination for leading edge R&D investment in forward leaning sectors.

2. A long-term vision for science, driving innovation, prosperity and security across the UK

The Society strongly supports the sustained increase in government R&D spending to £20 billion per year by 2024/25, as confirmed by the Chancellor in the 2022 Autumn Statement. This creates the opportunity to pursue big ideas, discoveries and innovations that deliver long-term prosperity across all the UK's nations and regions. It also creates a stable environment for pulling in private R&D investment.

Importantly, the UK is not alone is seeking to grow its domestic R&D capabilities. China, for example, is increasing its R&D spend by 7% every year until 2026, while the USA has committed an additional $250 billion to core science and technology budgets. France meanwhile is trebling the budget of its National Research Agency**.** Maintaining a long-term commitment to science, research and innovation as critical national capabilities will ensure the UK can compete with other science nations and maximise the economic and societal benefits.

Policy recommendations:

- In an increasingly competitive global environment for R&D talent and investment, it is crucial that Government spending on R&D keeps pace with other nations and is supported by a long-term strategy for science, research and innovation that commands cross party support. This should look across departmental silos at how the science system works, including the role of education and skills in the supply of future talent.

- The proposed cuts to the SME R&D tax credit scheme outlined in the 2022 Autumn Statement will disincentivise innovation among smaller companies. The Government should instead consider policy alternatives to combat tax relief fraud.

To create an evidence-based vision and a structured basis for future reviews, the Royal Society will undertake a large-scale public and private sector engagement project to set out a UK science vision to 2040 identifying areas of agreed direction and exposing areas of disagreement.

3. Tackling barriers to international collaboration

The UK's success as a leading science nation depends on being open to the rest of the world. Urgent action is needed to remove barriers to international collaboration including securing the UK's association to European science programmes as a priority.

Policy recommendations:

- The Government's efforts to secure the UK's association to Horizon Europe, Copernicus and Euratom, and the continued extension of the Horizon Europe Guarantee scheme will provide some reassurance to the R&D sector during the ongoing period of uncertainty. Working proactively with the sector to promote the opportunity to apply for programmes backed by the Horizon guarantee will help to boost participation and maximise the UK's returns.
- Now that a deal with the EU on the Northern Ireland protocol appears within reach, the Government should work with others to encourage the European Commission to smooth the passage to UK association at the earliest opportunity.
- The Government should also maintain the £2 billion per year ringfence for research and innovation funding covering association to Horizon and other European programmes or alternatives should they be necessary.
- While association is by far the best outcome, the Society understands that it is both sensible and responsible to explore alternative options for UK R&D. To engage effectively with the research and innovation community on alternative arrangements, the Government should publish its Plan B prospectus at the time of the Spring Budget in March or sooner.
- The Government should immediately implement the transition package as outlined in its July 2022 policy paper.
- The UK continues to be outcompeted on the upfront costs of work and study visas, which are up to six times higher than the average fees of other leading science nations. The Government should reduce visa fees in line with other leading science nations.

4. Productivity gains through pro-innovation regulation of emerging technologies

In delivering its regulatory reform agenda on new and emerging technologies, the Government should be transparent about how and why priority areas are selected, including how they relate to the UK's economic strengths or can address societal needs.

Opportunities for pro-innovation regulation include the following:

- To support the development of innovative neurotechnology within the UK, and ensure that patients can benefit, a regulatory sandbox programme for neurotechnology devices should be established. This would involve creating a controlled environment with relatively low regulation for innovators and regulators alike to experiment.
- As currently drafted the Genetic Technology (Precision Breeding) Bill will leave Genetically Modified Organisms (GMOs) in a regulatory system that has proven to be a deterrent to investment and prices SMEs out of developing new technology. It also perpetuates a technology-based approach to regulating new plant varieties and animal breeds, which leads to delay and uncertainty when new breeding technologies emerge. To foster innovation and flexibility the Government should instead adopt an outcome-based approach, where the focus would be the characteristics of the organism.
- To foster pro-active regulatory initiatives in digitalisation and data across government that support the green transition, the UK Government should establish a cross-departmental and cross-sector taskforce,

with regulatory representation and voice, devoted to the digitalisation of net zero. See 2019 Royal Society report on 'Digital Technology and the Planet' .

5. Delivering *'Mission Zero'*

The Society calls on the Government to work with the research and innovation sector to fully deliver the recommendations made by Chris Skidmore's independent review of net zero. Not only do the benefits of delivering net zero outweigh the costs of inaction, this could also be the 'economic opportunity of the 21st Century'. A wealth of subsidiary benefits and considerations will be created, including protecting biodiversity and enhancing wider natural capital.

Policy recommendations:

- Urgently increase the scale and pace of net zero delivery, and ensure the different stands of delivery are integrated across all economic sectors and government departments.
- Bring forward an evidence-led UK technology roadmap to accelerate the rate of decarbonisation and guide investment to fledgling sectors and technologies that will be critical for delivering net zero by 2050. Look outward and build on international partnerships to drive research, build supply chains that underpin net zero technologies and galvanise public and private investment to limit further warming and protect nature.

6. Getting the most from the UK's land

The UK does not have enough land for any of it to be non-productive. The Society's new report, *Multifunctional Landscapes: Informing a long-term vision for managing the UK's land*, sets out how science and innovation can help get the most out of land. At the heart of this is a drive towards more sophisticated, data-drive measurements of the multiple benefits land provides; from marketable outputs, like food and timber, to essential public goods, like recreation, carbon capture and biodiversity,

Policy recommendations:

- Develop a shared and accessible evidence base incorporating a full range of information necessary to supporting robust land use decisions (including data from both natural and social sciences).
- Establish evidence-led, cross departmental land use frameworks to join up policy and help manage trade-offs between multiple different land uses – and support policy coherence across the four UK nations.
- Reform financial support to explicitly incentivise the delivery of non-marketable benefits such as biodiversity.
- Invest in skills, research transitions and tech to maximise the combination of benefits land is delivering, drive up productivity and enable land managers to capitalise on new income streams.
- Engage with the sector on the development of a Land Use Framework for England, as committed to in the Food Strategy, and in Parliament.

7. Skills for productivity and future career resilience

As acknowledged by the Chancellor in his speech on 27 January, education is an essential component in unlocking our national potential and driving future productivity, growth and competitiveness. The Prime Minister has said that having a good education system is "the best economic, moral, and social policy any country can have".

The problem-solvers of tomorrow, working across the UK's research & innovation landscape on global issues such as net zero, will need a solid foundation in science, maths, digital and data skills necessary for an adaptive economy.

Policy recommendations:

- The Government should pursue a major and long-overdue review of the secondary and post-16 education systems in England, including exploring alternatives to the current narrow A-level examinations. This would ensure that young people experience a more expansive education equivalent to that experienced by their counterparts in other high-performing economies, including an opportunity to combine technical education and academic options for some.
- To support the delivery of the Prime Minister's welcome pledge to extend the study of mathematics in some form to age 18, the Government should guarantee funding to ensure that all schools and colleges can offer a Core Maths qualification**.** This qualification is designed to provide students with the mathematical, statistics and data skills that they will need for further study in most subjects and for future employment.
- Extending mathematical study must be met with accelerated teacher continuous professional development (CPD) to give young people the world-leading education they deserve. The Government should guarantee teachers 35 hours of subject specific CPD annually, along with the establishment of an independent expert body to oversee its coordination and resourcing. In addition to ensuring that science teachers can keep up with developments, evidence suggests it would help to address the very high rate of science teacher attrition.

For further information or queries, please contact public.affairs@royalsociety.org