Shadow DSIT Policy Renewal Programme

Question 1. A global leader in science and technology is a country that fosters innovation, produces high value businesses, shapes international standards, attracts top talent and global investment, and has a sustainable eco-system. What is holding Britain back from becoming a global leader in science and technology?

Context

The engineering and technology workforce is pivotal to ensuring that Britain can become a global leader in science and technology.

Our latest data shows that 6.4 million people work in engineering and technology roles in the UK- around a fifth of the total workforce (19%). This reflects the scale of the engineering and technology sector in the UK. In their report, *Engineering Economy and Place*, the Royal Academy of Engineering (RAEng) note that the engineering and technology workforce spans nearly every economic sector and plays a vital role in fostering innovation within the UK's emerging sectors. In this report, RAEng also highlight how engineering roles encompass a wide spectrum of activities, from research and development (R&D) through to delivery and deployment. Notably, engineering businesses make up the majority in 80% of the emerging sectors that RAEng identified, such as quantum and space.[1]

Looking ahead, engineering and technology jobs are predicted to grow faster than other occupations in all UK regions between now and 2030, with research commissioned by EngineeringUK showing growth across the entire engineering footprint. It shows that engineering occupations are projected to grow by a further 2.8% by 2030, adding 173,000 net new jobs. This represents a faster rate of growth than that projected for the national average of all occupations (2.3%). Notably, the data illustrates that specialised engineering skills relating to cutting-edge technologies and emerging fields of science are growing the fastest. For example, between 2016/17 and 2021/22, the fastest-growing engineering skills subcategories were chemical and biomedical engineering, robotics and simulation/simulation software. Each of these saw their share of job postings within the engineering footprint grow by approximately 30%[2]

As the National Engineering Policy Centre (NEPC)[3] outlines in its submission to the government's Industrial Strategy green paper, global challenges and opportunities in science and technology are also

[1] Engineering Economy and Place, Royal Academy of Engineering, 2023
[2] Engineering skills needs – now and into the future, a report produced by Lightcast for EngineeringUK, 2023
[3] National Engineering Policy Centre – EngineeringUK is a member

placing greater demands on engineers.[4] This includes the transition to a low carbon economy and the rapid advancement of AI and digital technologies. Beyond specialised skills, engineers are also essential for developing the critical infrastructure needed to drive innovation across all sectors. This workforce is therefore essential not only for sustaining key sectors, but also for translating R&D success into economic impact and maintaining the UK's competitive edge within science and technology.

Skills and people shortages are a longstanding, challenging issue in the engineering & technology sectors.

In the face of growing demand, the UK continues to face a significant shortage of appropriately skilled engineers and technologists. Lightcast's research shows that engineering roles account for one in four job adverts (25%) even though these roles make up just one in five jobs (19%), implying high demand relative to supply.[5]

The Institution of Engineering and Technology (IET) reports a shortfall of over 173,000 workers in the STEM sectors- an average of 10 unfilled roles per UK business. Their skills survey identifies that half (49%) of engineering and technology businesses are experiencing difficulties in the skills available to them when trying to recruit."[6] The IET also notes that this shortage has persisted for over 15 years- "*longer than the time it takes for a primary aged child to complete their education*"- emphasising the longstanding nature of the issue.

An October 2024 House of Lords report, *Science and technology's contribution to the UK economy*, reinforces the concern, identifying the shortfall in available employees with STEM skills as an often-mentioned issue affecting the science and technology sector in the UK.[7] It also cites the Campaign for Science and Engineering's 2023 report, *The Skills Opportunity: Building a more innovative UK,* which warns: "The UK's science and engineering base is only as strong as the people who work within it […] Wider skills provision will be needed to meet the requirements of an expanding R&D sector, fill current skills gaps, and support skills that will be needed in the future. "[8]

As outlined earlier, demand is particularly strong for specialised engineering skills in cutting edge technologies and emerging fields of science. The UK's transition to net zero and advancements in technology are also driving increased demand for both specialised and foundational engineering skills. To meet this demand, and to position the UK as a global leader in science and technology, any

[4] Invest 2035: The UK's Modern Industrial Strategy- The National Engineering Policy Centre's response, NEPC, 2024
[5] Engineering skills needs – now and into the future, a report produced by Lightcast for EngineeringUK, 2023
[6] Engineering Kids' Futures, The Institution of Engineering and Technology, 2022
[7] Science and Technology's contribution to the UK economy, House of Lords library, 2024
[8] The skills opportunity: building a more innovative UK, CaSE, 2023

government will need to ensure sustained investment in educating and training future engineers to help address the persistent skills shortages.

In the remainder of this submission, EngineeringUK sets out some of the key drivers behind the persistent skills shortages in the engineering and technology workforce – shortages that hinder the UK's ambition to become a global leader in science and technology.

Governments must take a strategic approach to engineering and technology workforce planning to enable science and technological leadership.

The UK's ability to become a global leader in science and technology depends on a skilled and adaptable engineering and technology workforce. To achieve this, governments must take a coordinated approach to workforce planning, underpinned by a holistic view of STEM skills development across all sectors and education stages via a STEM education and skills strategy.

One of the most pressing demands on the engineering and technology workforce is the transition to a low carbon economy. The Climate Change Committee estimates that up to 725,000 net new jobs could be created by 2030 in low-carbon sectors alone. Their literature review suggests that many of these jobs are likely to fall within engineering industries.[9]

To meet demand, a cross-department National Engineering and Workforce Strategy is essential. This strategy must encompass all routes into engineering, encourage industry investment in skills, support lifelong learning and include a visa system that recruits global talent to fill shortage areas.

Engineering and technology skills (particularly in foundational levels, but also in some advanced roles) span multiple economic sectors. Effective workforce planning must therefore consider both current and future needs across all sectors to avoid different government priorities competing for the same pool of workers.

This strategy should therefore align with any existing sector plans, such as the forthcoming Industrial Strategy Workforce Strategies, and account for their skills and workforce implications. A joined-up approach will ensure harmony, not competition, between sectors seeking similar skills.

Furthermore, despite the anticipated demand, there is currently no UK-wide estimate of the number of engineers and technicians required to support future workforce needs. Nor is there a breakdown by specialism, such as the number of electrical, chemical or mechanical engineering graduates and higher-level apprentices or an assessment of the number of STEM students and apprentices in schools and colleges required each year across schools and colleges to meet future demands.[10]

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[9] A net zero workforce, Climate Change Committee, 2023
[10] Net zero workforce: an analysis of existing research, EngineeringUK, 2024

This lack of data makes long-term workforce planning difficult. While we know that Skills England is looking to address this, going forward, workforce planning must embed back-casting: estimating the future demand for engineering and technology skills and working backwards to determine how many STEM learners are needed at each education stage.

Finally, the skills component of sector plans must be developed in genuine partnership with the devolved administrations, engaging with organisations such as Skills Development Scotland. A cohesive, UK-wide approach to skills development should avoid fragmentation and ensure progress across all nations.

We recommend that any government:

- **Develops a cross-government National Engineering and Workforce Strategy, in collaboration with stakeholders.**
- **Supports this strategy with a holistic, UK-wide STEM and education skills plan aligned to future workforce needs.**
- **Embeds back-casting into workforce planning, using projected engineering and technology demands to estimate the number of STEM, technical, and engineering students needed at each education stage.**

Widening participation in STEM education and engineering careers.

There is a clear need to make STEM education more inclusive. The UK engineering and technology workforce does not reflect the diversity of the broader population – indicating under-used labour pools at a time of skills shortages.

Women remain particularly under-represented, making up just 16.9% of the engineering and technology workforce, compared to 56% in other occupations. Similarly, people from UK minority ethnic groups account for 14% of the engineering workforce, versus 18% in other occupations. Disabled people represent 14% of the engineering workforce, compared to 19% across other occupations.[11]

These individuals could not only help to fill current shortages but would also bring valuable diversity of thought and experience – both essential to drive innovation in science and technology.

The challenge begins at school. To meet growing workforce demand and to position the UK as a global leader in science and technology, we must inspire and enable more young people to pursue careers in STEM sectors. Concerningly, however, interest in school science has declined in recent years. Between

[11] The Engineering and Technology Workforce, EngineeringUK, 2025

2019 and 2024 interest in science among students in Years 7-9 declined from 76% to 71%. This decline is even more pronounced among girls- from 75% to 65%.[12]

Gender disparities in subject participation also begin to emerge at secondary school age. In England, Northern Ireland and Wales, girls make up half of those taking GCSE maths and physics[13] but only 37% A level maths and 23% of A level physics.[14] In Scotland, the decline is less pronounced but present: girls account for 29% of entries for National 5 physics and 50% for maths.[15] At Highers level, the figures are 27% and 46% respectively.[16]

In our recent submission to the independent Curriculum and Assessment Review in England, which we will expand on in the next section, we called for a broad and balanced curriculum, as well as teaching and assessment approach that promotes diversity in STEM.[17] Any future curriculum review should consider the importance of context and representation in addressing the diversity challenges particularly in STEM subjects such as physics, computer sciences and Design & Technology. Without this, too few young people- especially girls and under-represented groups- will progress into the engineering pipeline.

Gendered beliefs about careers also emerge at school. Just 16% of girls aged 11 to 18 believe engineering is for them, and only 29% are interested in an engineering career- compared with 63% of boys.[18] Without targeted action, we risk perpetuating gender disparities and missing out on a diverse, talented workforce. The education system must prioritise inclusive, high-quality STEM careers advice and meaningful work experiences to inspire all young people- especially girls- to see engineering as a viable and exciting career path. We do welcome some promising developments, notably the Careers & Enterprise Company's work on modern work experience and the equalex framework.[19]

We recommend that any government:

- **Ensures inclusivity is embedded into the updated curriculum and assessment structures, ensuring that lessons in STEM subjects speak to all students equitably.**
- **Fosters stronger collaboration between STEM employers, schools and further education providers, to deliver inclusive, high-quality career guidance and work experience.**

[12] Engineering facts and statistics, EngineeringUK, 2024
[13] GCSE and Scottish National 5 results, EngineeringUK, 2024
[14] A level and Scottish Highers results EngineeringUK, 2024
[15] GCSE and Scottish National 5 results, EngineeringUK, 2024
[16] A level and Scottish Highers results EngineeringUK, 2024
[17] Response to the independent Curriculum and Assessment Review, EngineeringUK, 2024
[18] Engineering facts and statistics, EngineeringUK, 2024
[19] Link to the Careers and Enterprise Company's webpage on the equalex framework (accessed 08/07/2025)

Reforming STEM education to ensure that it is fit for purpose.

To position the UK as a global leader in science and technology, we must start by reshaping our education system to both meet the needs of young people and address the urgent workforce demands in engineering and technology. EngineeringUK, alongside the National Engineering Policy Centre, believes that the UK's ambitions around decarbonisation, clean energy, and sustained economic growth cannot be achieved without a highly skilled STEM workforce.

A key part of this vision is a reformed, broad, and balanced curriculum that:

- imparts the knowledge and insight to comprehend the science, engineering and technology behind global challenges, such as climate change, biodiversity loss and sustainable energy supply, to enable young people to constructively engage with these issues.
- provides mathematical and data education that better prepares young people for the rapidly changing demands of an increasingly data-rich world.
- provides digital education that ensures that all future citizens can keep up with the pace of technological change so they can be effective, well-informed and safe.
- is inclusive and addresses gender imbalances in progression in subjects such as mathematics, computing and physics.
- equips young people with the understanding of the jobs available and the skills required to access those.

By modernising and aligning education with future workforce needs, the UK can build a pipeline of diverse, digitally capable, and globally competitive young people — making it a true global leader in science and technology.

We recommend that any government:

- Considers how current policies—such as the EBacc, academisation, and the nature of assessment at Key Stages 4 and 5—affect subject breadth and student choice.
- Reduces content overload in STEM subjects to allow more time for practical, hands-on learning.
- Ensure that teaching prioritises real-world applications to show how STEM links to engineering and other careers.
- Creates opportunities for students to demonstrate their knowledge and skills in more meaningful ways through a reformed assessment system.
- Ensure greater emphasis on digital skills and environmental education—particularly the causes and solutions to climate change—with explicit links to related careers.

- Fully embeds careers education throughout the STEM curriculum to ensure that all young people are aware of the opportunities ahead of them.

Securing a STEM teacher workforce that can inspire and prepare the next generation for careers in science, technology, engineering, and mathematics.

Specialist teacher shortages in STEM subjects present a growing challenge in this context and need to be addressed. Despite some signs of improvement, Department for Education data shows that recruitment targets in feeder subjects for engineering & technology are still a challenge; only 30% of the physics teacher recruitment target, 37% of the computing target and 40% for design and technology was met in 2024/2025[20]

EngineeringUK's recently published report *School Report: The challenge of STEM Teacher Recruitment and Retention*, 30% of the STEM teacher respondents in England reported a current vacancy in their department. Moreover, over a third said that they either did not see themselves (19%) or did not know if they saw themselves (19%) still teaching in 5 years' time.[21] This highlights persistent issues in both teacher recruitment and retention.

Evidence shows that these shortages can lead to a reliance on nonspecialist teachers to deliver STEM subjects with this being a cause for concern as the lack of specialist teachers has wide-ranging impacts on young people's learning experience. This includes impacting the school's ability to deliver STEM subject education and, in turn, pupils' motivation and engagement with science.[22]

Unless action is taken, the UK risks not having the teaching capacity needed to inspire the next generation of engineers, undermining national efforts to grow the science and technology workforce from the ground up.

We recommend that any government:

- Increases investment in recruiting and retaining teachers of STEM subjects.

[20] Initial Teacher Training Census, Department for Education, 2024
[21] School Report: The challenge of STEM Recruitment and Retention, EngineeringUK, to be published soon.
[22] Science Education Tracker, Royal Society and EngineeringUK, 2024