NATIONAL ENGINEERING POLICY CENTRE

Royal Academy of Engineering

Six engineering ambitions for the UK Spending Review

The National Engineering Policy Centre's submission to the 2021 Spending Review

September 2021

The National Engineering Policy Centre sets out six priorities for investment at this year's Spending Review, that are necessary if the government is to deliver its ambitions to 'build back better'[1].

Achieving a thriving, low-carbon economy and reaching the 2050 net zero target is an unprecedented challenge – in the scale and pace of policy change, action and investment that is required. Whether achieving the skills, digitalisation, infrastructure or research and innovation needed for the future, all are shaped by the need to achieve net zero.

The UK's path to net zero, and its ability to decarbonise at sufficient speed and scale, is contingent on urgent decisions made by the government now, and in the years that immediately follow – as reflected in the actions set out here. This must be in parallel with development of a far-reaching and comprehensive transition plan.

As engineers, we build and maintain the national infrastructure, built environment and the supporting systems on which society and the economy depend. Engineers have a vital role to play in creating systems and solutions to address the climate crisis and support sustainable use and management of natural resources. We innovate, design and create new products and services to improve the quality of life, and the safety, security, health, and wellbeing of the public. Our priorities come from that practical perspective.

Engineers and the professional engineering institutions to which we belong are ready and willing to support delivery of these priorities.




National Engineering Policy Centre

We are a unified voice for **42 professional engineering organisations**, representing **450,000** engineers, a partnership led by the Royal Academy of Engineering.

1.

Follow through on the commitment to invest £22 billion in R&D by 2024/25, setting out substantial increases for the intervening years and prioritising measures that encourage businesses to invest in R&D in the UK and in achieving the net zero target.

Public investment in R&D is £14.9 billion for 2021/22, therefore, to reach the £22 billion target by 2024/25 requires a significant increase in investment. This increase needs to start ramping up now, not only to help universities and business build back better, but also to sustainably grow the capability and capacity of the R&D system to ensure this and future investment delivers the best returns for the economy and society.

The private sector contributes approximately two thirds of the UK's R&D investment, and much of this will be for late-stage R&D – from prototype to commercialisation. For UK industry to keep step with the government's promised increase in R&D investment, businesses will be expected to invest a lot more. The Innovation Strategy[2] is a step in the right direction, but the scale of the challenge should not be underestimated, and government investment should address this[3].

For net zero, we must prioritise scaling up deployment of proven technologies as fast as possible and investing in research, demonstration and testing of low-carbon technologies so they are ready to be deployed in the future.

2.

Accelerate decision-making and investment in low regrets actions that are needed now for decarbonisation, including:

- **low-carbon retrofit and refurbishment of the existing building stock, prioritising low-carbon heat including establishing a programme of training and competence in retrofit, low-carbon heat**
- **scaling up of the battery electric vehicle (BEV) charging network**
- **demonstration of the effectiveness of low-carbon technologies so they are ready to be deployed in the future**
- **supporting difficult-to-decarbonise sectors in their transition to the low-carbon and resource-efficient world.**

Low regrets decisions are urgent decisions that must and can be made now to have a significant impact on decarbonisation. Making low regrets decisions typically unlocks pathways towards the net zero target, rather than blocking off options. They can build flexibility, reduce costs for the future, have social, economic and environmental co-benefits, and prioritise the use of limited resources.

Given the short timescales available, decisions need to be made urgently and investment committed before uncertainties are fully resolved.

See the National Engineering Policy Centre's forthcoming publication *Low Regrets Framework for achieving decarbonisation – rapid decision-making tool for net zero policy* for more information.

3.

Establish a net zero delivery body to drive and coordinate progress across government and industry, provide systems-level analysis, share learnings about what works, and build a clear, evidence-based vision for a net zero UK[4,5,6].

Development of a far-reaching and comprehensive transition plan is necessary for large-scale policies, as well as near-term low regrets actions.

The 2050 net zero target is ambitious, and the nation is currently not on track for it[7]. It will require clear vision, good governance and a rigorous systems approach to implementation to realise these ambitions and ensure that costs and benefits are distributed equitably and avoid any undesirable unintended consequences.

4.

Urgently invest in an ambitious net zero skills plan that will enable rapid and affordable reskilling and up-skilling opportunities for the existing workforce to meet the short-term skills needs for transition to net zero, as well as longer-term skills needs, including:

- **additional funding for the further education sector to support upskilling**
- **development of approved micro-qualifications and short-duration training**
- **financial support for employers to undertake future skills development**
- **an integrated approach to skills and workforce planning, informed by insight and intelligence on emerging net zero skills needs.**

There is an urgent need to address the current skills shortfall if the UK is going to be able to enact the immediate actions needed now to progress towards the net zero target. For the government's forthcoming net zero strategy to succeed it must be underpinned by a clear net zero skills plan. With the rapid pace of technological change and the transition of existing jobs, it is vital to scale up existing capacity and develop new programmes immediately, as recognised by the Green Jobs Taskforce[8].

A transformation in skills is necessary across many sectors to ensure the UK has the capability to deliver the required infrastructure, digitalisation, and technology installation and decommissioning. As one example, the UK's energy sector will need hundreds of thousands of people to fill 400,000 roles in the net zero energy workforce. Of this, 260,000 will be in new roles, while 140,000 will be replacing those who have left the workforce[9].

5.

Invest in a long-term STEM education strategy that covers:

- **a guarantee that all pupils receive high-quality, up-to-date STEM careers advice and guidance, supported by additional funding of £40 million annually to support careers activities in schools[10]**
- **boosting STEM teacher recruitment so that pupils in all regions are taught by subject specialists**
- **raising and maintaining teaching standards by providing ringfenced STEM subject specific Continuing Professional Development for primary and secondary teachers**
- **accelerate the expansion of technical education provision and higher technical qualifications**
- **promote high-quality engineering apprenticeship opportunities to all young people with a focus on improving addressing under-representation.**

The UK's ambitions on innovation, net zero, infrastructure and digitalisation are threatened if we do not have the number and diversity of people with engineering and technical skills needed to deliver them.

The pandemic has exacerbated inequalities in school-age education, hugely disrupted further and higher education, and risks reducing the diversity of young people going into engineering. The UK must now plan for its long-term engineering and technical skills need, with an education system fit for the future.

A long-term STEM education strategy, informed by strategic workforce planning and evidence of what works, must target key challenges in STEM skills including increased pupil attainment and progression in STEM subjects, high-quality STEM careers advice and guidance, teacher recruitment and retention and targeted support for delivery of technical qualifications.

6.

Embed long-term demand drivers into decision-making on infrastructure investment to build back better with low-carbon, resource-efficient and resilient infrastructure.

High-performing infrastructure is a central pillar of any world-class economy, and investing in infrastructure improves productivity, collective wellbeing, social inclusivity, healthy lifestyle choices, and safety, security and resilience.

Following the pandemic there will be many competing demands for infrastructure investment. Greater weight should be given to achieving long-term challenges and opportunities such as the Sustainable Development Goals and Paris Climate Agreement.

Integrating a focus on both as part of the decision-making on the next National Infrastructure Assessment and Strategy and future investment to achieve levelling-up will help to pivot the UK towards a more sustainable and net-zero future. Front-loaded investment and action will also help to deliver sustainable public finances over the long term.

References

1 Build Back Better: our plan for growth, HMG, 2021

2 UK Innovation Strategy, HMG, 2021

3 Late-stage R&D: business perspectives, National Engineering Policy Centre, 2021

4 Net Zero: A systems perspective on the climate challenge, National Engineering Policy Centre

5 A Systems Approach to Delivering Net Zero: Recommendations from the Prime Minister's Council for Science and Technology, Council for Science and Technology, 2020

6 Prime Minister's response to CST letter on A Systems Approach to Delivering Net Zero, 2020

7 Reducing UK emissions – 2019 Progress Report to Parliament, Committee on Climate Change, 2019 [Accessed March 2020]

8 Green Jobs Taskforce, HMG, 2021

9 Building the net zero energy workforce, National Grid, 2020.

10 Securing the future: STEM careers provision in schools and colleges in England, co-authored by EngineeringUK, Careers England, CaSE, CDI, ICE, IET, IMechE and the Royal Academy of Engineering, 2021.

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We are a unified voice for 42 professional engineering organisations, representing 450,000 engineers, a partnership led by the Royal Academy of Engineering.

We give policymakers a single route to advice from across the engineering profession.

We inform and respond to policy issues of national importance, for the benefit of society.

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