

## EngineeringUK response: The Net Zero Review

October 2022

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### Who we are

1. [EngineeringUK](#) is a not-for-profit organisation which works in partnership with the engineering community to inspire tomorrow's engineers. Our mission is to increase the number and diversity of young people choosing academic and vocational pathways into engineering. We aim to do this via programmes designed to excite young people about the variety and opportunity presented by a career in modern engineering. EngineeringUK want to grow the collective impact of work across the sector to help young people understand what engineering is, how to get into it, and be motivated and able to access the educational and training opportunities on the way.
2. We also undertake research and work with partners in the engineering sector to guide government thinking in relation to educational pathways into engineering. Our expertise is in understanding the systems, structures and funding that need to be in place to enable all young people to decide whether a career in engineering is for them.

### About this response

3. This response focuses on one of the overarching questions only: '2. What challenges and obstacles have you identified to decarbonisation?'
4. We note that there is a distinct lack of focus in the review on skills, which is a concern, and we will be using this question to highlight what we understand is a key challenge for many engineering and technology businesses, generally and in relation to Net Zero.

### Skills shortages in the engineering sector

5. Engineers will be vital in the UK's endeavour to move to Net Zero as they are central to developing many of the solutions and adaptations needed to combat climate change, such as wind farms, battery technology, EVs, hydrogen, carbon capture and storage, low-carbon steel – this list is endless. EngineeringUK analysis, pre-pandemic, projected shortfalls of between 37,000 to 59,000 in meeting an annual demand for 124,000 core engineering roles requiring Level 3+ skills, including an expected graduate-level shortfall of at least 22,000 per year.<sup>1</sup> However, the pandemic, the UK's decision to leave the EU and recent government policy such as the British Energy Security Strategy will undoubtedly have had an impact on skills supply and demand. While it is too early to ascertain the true scale of the challenge, we can safely suggest that the demand for engineering skills is growing, with digitalisation, the move to Net Zero and the need for innovative technologies undoubtedly being a driving force.
6. As a result, businesses are currently unable to recruit sufficient engineers and technicians and this situation is predicted to worsen. The Institute of Engineering and Technology's '2021 Skills Survey'<sup>2</sup> found that almost half of engineering employers report skills shortages in recruitment to the external market, along with 44% reporting skills gaps internally. The greatest level of reported skills shortages is within 'advanced skilled' roles (A-Level, advanced apprenticeships,

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<sup>1</sup> <https://www.engineeringuk.com/media/232298/engineering-uk-report-2020.pdf>

<sup>2</sup> <https://www.theiet.org/media/9234/2021-skills-survey.pdf>

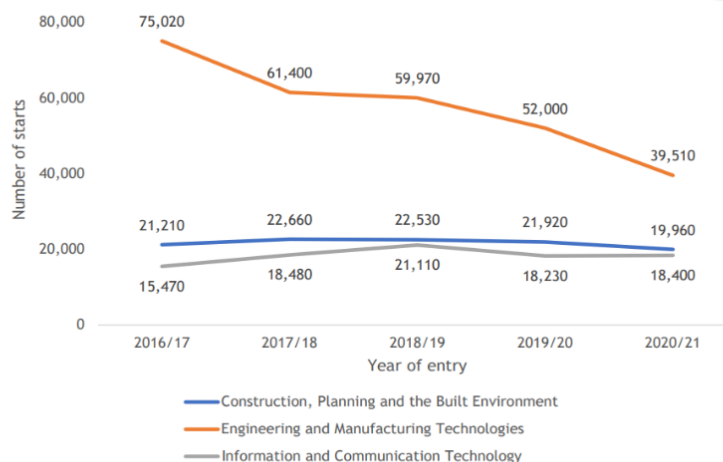
and other Level 3 qualifications), followed closely by ‘highly skilled’ roles (Bachelor’s degree (level 6) and higher).<sup>3</sup>

### Growing demand for engineering skills

7. A recent EngineeringUK report analysed a number of industry reports trying to understand the skills challenges associated with the move towards a Net Zero economy for their particular sectors.<sup>4</sup> Outlined below are some of the key findings. What this analysis shows is that despite different timeframes for the projections as well as differing methodologies used for calculating these numbers, the message is one of growth in demand for engineering skills in those sectors particularly impacted by Net Zero.
8. This insight is in line with the government’s 2021 Green Jobs Taskforce report<sup>5</sup>, which estimated that around 500,000 jobs will be supported to meet Net Zero challenges by 2050 in sectors such as offshore wind, national grid infrastructure upgrades, new nuclear, building retrofit, electrification of vehicles – and associate charging infrastructure, domestic heating and cooling and hydrogen supply.

### Pathways into engineering: falling apprenticeships numbers

Figure 5: Trend in the number of engineering-related apprenticeship starts by sector, 2016/17 to 2020/21, England



Source: DfE, 'Apprenticeships subject and levels - learner demographics 2021/22', 2022.

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9. Against this backdrop of growing demand on engineering skills and long-standing skills shortages, we also observe a decline in the number of apprenticeships starts in the engineering sector. The apprenticeships route is an important pathway into engineering careers, but reforms

<sup>3</sup> <https://www.theiet.org/membership/member-news/member-news-2021/iet-member-news-q4-2021/iet-skills-and-demand-in-industry-2021-survey/>

<sup>4</sup> [https://www.engineeringuk.com/media/318292/net-zero-workforce\\_engineeringuk\\_2022.pdf](https://www.engineeringuk.com/media/318292/net-zero-workforce_engineeringuk_2022.pdf)

<sup>5</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1003570/gjtf-report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1003570/gjtf-report.pdf)

in recent years have impacted the numbers of apprenticeship starts. Overall, the number of apprenticeship starts decreased from 2018/19 in each nation – across all sector subjects areas and in engineering-related subjects<sup>6</sup>. There were 77,870 starts in engineering-related apprenticeships in 2020/21, which represented a 15.5% decrease since 2019/20, a 24.8% decrease since 2018/19, and a 30.3% decrease since 2016/17. Most of this decrease came from lower-level apprenticeships, with a 61.1% decrease in ‘intermediate’ apprenticeships between 2016/17 and 2020/21.<sup>7</sup>

### Pathways into engineering: concerns over T Levels

10. Launched in 2020, T Levels are one of the central pillars of the government’s education and skills offer to young people aged 16-18, alongside apprenticeships and A Levels. As part of the T Level qualification, young people need to undertake an industry placement. The T Level industry placement component offers a chance for young people to experience the workforce first hand, develop vital new skills and build a relationship with employers in their chosen field. However, there has been some concern that young people will struggle to access industry placements as part of their T Levels in the engineering and manufacturing sectors as challenges remain for employers and providers to offer and secure these placements.
11. EngineeringUK and Make UK recently estimated that there will need to be a minimum of 30,000, and up to 43,500 placements by 2024/2025 in the engineering and manufacturing sector alone, taking into account those likely to be displaced by the proposed defunding of equivalent vocational qualifications.<sup>8</sup> As it stands, this will require large upscaling of the number of industry placements currently offered. However, a recent survey with engineering and manufacturing employers highlighted that there is a lot of work to do to ensure that enough employers are willing to offer such industry placements. Only 9% of the employers we surveyed currently provide T Level placements and only 12% are planning to over the coming year.<sup>9</sup>
12. In addition to concerns over the number of industry placements coming online, many of the employers surveyed highlighted concerns over progression routes from T Levels to apprenticeships, capacity issues, financial constraints as well as concerns over the age of T Level students. Whilst most manufacturing and engineering employers had heard of T Levels, most did not yet understand them, and few were clear, for example, about where they sit in the full range of options available for young people, how T Levels could knit together with other qualifications, or what the different progression routes are.<sup>10</sup>

### Pathways into engineering: Lack of awareness of different pathways into engineering

13. More needs to be done to increase young people’s awareness and understanding of vocational pathways, including apprenticeships and T levels. Recent insights from EngineeringUK’s Engineering Brand Monitor highlight that, for example, less than half of young people across the UK aged 11 to 19 (43%) said they knew about the apprenticeship options available to them and only 37% of young people in England (aged 11 to 19) know what T levels are.

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<sup>6</sup> We define ‘engineering-related apprenticeships’ as follows: apprenticeships in the ‘construction, planning and built environment’, ‘engineering and manufacturing technologies’, and ‘information, communication and technology’ (ICT) sector subject areas.

<sup>7</sup> <https://www.engineeringuk.com/media/318395/chapter-3-fe-and-apprenticeships-summary.pdf>

<sup>8</sup> <https://www.engineeringuk.com/media/318632/unlocking-talent-ensuring-t-level-deliver-the-workforce-of-the-future-final.pdf>

<sup>9</sup> Ibid.

<sup>10</sup> More detail of the different issues and concerns raised by engineering and manufacturing employers as part of the research on industry placements for T Levels can be found in the report: ‘Unlocking Talent: Ensuring T Levels deliver the workforce of the future’ (see link in footnote 8).

14. In addition, young people's knowledge of pathways into engineering differs by region. For example, knowledge of the subjects needed (among 7- to 13-year-olds) was only 25% in the South-East, lower than any other region, and about half of that in the North-East and North-West (47%). Furthermore, only 30% of young people (aged 13 to 19) in the West Midlands know what subjects they need to take to become an engineer compared with 60% for London.

### Recommendations


















15. Skills shortages in the engineering sector pose a real threat to the UK's decarbonisation efforts and must be addressed to ensure that the UK can meet its commitments in relation to Net Zero as well as ensure sustainable long-term economic growth and success. To do so, we recommend that as part of this review, the government looks to address the concerns outlined in this response in relation to the pathways into engineering.

16. In light of this, we recommend that the government:

- strengthen the Unit for Future Skills to become the hub guiding government on workforce issues. The Unit should provide:
  - a regular national labour market forecast, ensuring it applies a holistic 'systems approach' that recognises the interdependencies between different industries
  - publicly available forecast data so that industries wishing to undertake more granular sector-level analysis can do so
  - regular 'back-casting' to identify the number of technical and engineering students needed to be entering STEM subjects from A level, T level and advanced apprenticeship level onwards
  - insights into the needs for reskilling and upskilling across different sectors of the UK economy
  - early warnings to government on anticipated skills shortages, together with policy recommendations as to how such shortages might be addressed
- use the information collated by the Unit for Future Skills to develop an approach to STEM education and skills (a STEM education and skills strategy) that will ensure that these student numbers, and ultimately workforce needs, are met.
- address the concerns outlined in EngineeringUK's and Make UK's report '[Unlocking Talent: Ensuring T Levels deliver the workforce of the future](#)'.
- work with the sector to identify the reasons for the decline in engineering apprenticeships and develop solutions to address this decline.
- invest in a long-term STEM education & skills strategy that among other things provides 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 and ensures that there is a truly joint-up approach to STEM education and skills leaving young people inspired to move into an engineering/ technology career.

**For further information or to discuss this response in more detail, please contact Beatrice Barleon, Head of Policy & Public Affairs, [bbarleon@engineeringuk.com](mailto:bbarleon@engineeringuk.com).**

## Appendix

TRANSPORTATION			Source report date
Electric vehicles		Number: 78,000 new jobs by 2040 (but loss of 28,000 jobs) Location: No data Skills: 60% at Qualification Levels 1 to 3, 20% Level 3 to 5, 15% Level 6+	Mar 2020
Rail		Number: 7,000 to 12,000 additional each year 2020 to 2030 Location: No data Skills: Qual Levels 3 and 5; Maintenance operative, engineer	Nov 2020
Aviation		Number: Up to 5,200 in sustainable aviation fuel Location: No data Skills: No data	Nov 2020
Shipping		No jobs forecasts found. (‘Maritime 2050’ (HM Government, 2019) foresees ‘new, highly-skilled jobs’ but does not quantify this forecast)	
Public transport & active travel		Number: 3,000 by 2025 Location: No data Skills: No data	Nov 2020
ENERGY & POWER			
Wind Power		Number: 41,000 more direct jobs by 2026, 90,000 by 2030 Location: Predominately Scotland and east coast of England Skills: 52% at Qualification Levels 5 to 7+	Feb 2021 Apr 2022
Solar PV		Number: 64,000 by 2035 Location: ‘...spread across the whole UK.’ Skills: Various	Mar 2020
Wave & tidal		No jobs forecasts found. (However, The British energy security strategy’ HM Government, 2022, commits to ‘...aggressively explore... opportunities afforded by... tidal...’)	
Hydro-power		No jobs forecasts found. (The ‘British energy security strategy’ 2022 did not include any reference to hydropower.)	
Nuclear		Number: 10,000 construction jobs (peak, per plant), 130,000 O&M jobs in 2030 to 35 Location: Coastal Skills: No data	Nov 2020 Apr 2022 Q4 2020
Hydrogen	H <sub>2</sub>	Number: 44,000 jobs across value chain by 2030 Location: North east (for 16,700 production jobs) Skills: No data	Nov 2021
Grid infrastructure		Number: 260,000 new and 140,000 replacement jobs, by 2050 Location: Across the UK, though 25% in north of England Skills: Skilled scientists and engineers in designing: data, new tech (CCUS, H2), renewables. Skilled technicians in installation and maintenance of clean energy.	Jan 2020
BUILT ENVIRONMENT			
Retrofit		Number: Heat pump installers: 12,400 by 2025, 50,200 by 2030, 70,000 by 2035 - Hydrogen boiler technicians: additional 200 to 1,500 per year- Fabric insulation install: Train 12,000 to 30,000 annually Location: Nationwide Skills: See above + Heat pump installers	Jun 2020 2021
Climate adaptation		No jobs forecasts found.	
Engineering construction		Number: 120,000 replacement jobs by 2026 Location: Nationwide Skills: CCUS-related, Incl. hydrogen storage and ammonia cracking	2020
OTHER			
Energy efficient products		Number: No significant increase Location: No data Skills: Highly skilled NVQ level 4+ in software engineering	Jun 2020
Circular economy		No recent jobs forecasts found.	
CO2 removal (BECCS/DAC)		No recent jobs forecasts found.	