

# Energy Security and Net Zero Committee

## Inquiry: Workforce planning to deliver clean, secure energy

**Evidence from EngineeringUK, January 2024**

### About EngineeringUK

EngineeringUK is a non-profit organisation that works with more than 400 [organisations](#) across engineering and technology-related sectors to inspire and enable young people from all backgrounds to progress into engineering and technology careers. We directly reach over 120,000 young people each year with activities such as the [Big Bang Programme](#), [Climate Schools Programme](#), and [Tomorrow's Engineers Week](#), which are designed to interest them in the variety of opportunities presented by a career in modern engineering and technology.

As an organisation, we pride ourselves on providing in-depth research and evidence-based recommendations on a range of themes, from STEM education in schools to apprenticeships and technical qualifications. For example, we have recently published reports on the [Net Zero workforce](#), [STEM careers provision in schools and colleges](#), [T Levels](#), and apprenticeships via our [Fit for the future inquiry](#), co-chaired by Lord Willetts and Lord Knight.

As part of our policy and research activity, we regularly gather and share policy insights from our corporate members, many of which operate in the energy sector, including industry leaders such as Drax, EDF, Orsted, National Grid, and RWE.

### Summary

EngineeringUK's policy interest lies in ensuring that the UK has the skilled engineering and technology workforce needed for the Government's clean energy mission to succeed. Our particular focus is on expanding routes into the engineering and technology sector for young people. Hence, whilst we signpost other organisations' work in other aspects of workforce development, such as re-skilling and mid-career training, we approach this submission primarily through the lens of improving educational, apprenticeship and training opportunities for young people.

### Responses

1. Does the Government have an appropriate understanding of the skill needs to deliver the Clean Energy Mission by 2030 as well as decarbonise homes and businesses?



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- 1.1. We have welcomed the Government's recognition of the centrality of addressing the skills crisis to achieving all five of its missions, not least kickstarting economic growth and turning Britain into a clean energy superpower. This is underlined by the identification of people and skills as a policy lever for creating a pro-business environment in the Industrial Strategy Green Paper, including for the clean energy industries as one of eight growth-driving sectors.
- 1.2. The creation of Skills England presents a once-in-a-generation opportunity to kickstart a skills revolution to meet the workforce needs of the Government's clean energy mission, working as part of the newly-formed 'quad' with the Migration Advisory Committee (in its expanded remit), the Department for Work and Pensions, and the Industrial Strategy Council, as well as the Office for Clean Energy Jobs. However, the success of Skills England will be contingent on its ability to work effectively across Government departments (particularly given its lack of autonomy as an executive agency within the Department for Education) and influence employer behaviour on skills and training provision; the latter can be achieved in part by engaging closely with key sector bodies such as (in engineering) the Professional Engineering Institutions. Moreover, the Government must be able to respond to the UK-wide need to grow the net zero workforce; whilst we understand that Skills England has met regularly with its devolved counterparts, it is not yet clear how skills development will be meaningfully co-ordinated across the UK.
- 1.3. The development of a 'sector skills plan' for the clean energy industries, led by Skills England for publication in early 2025, represents a critical juncture for meeting workforce demands. To ensure its success, it must have buy-in from DESNZ, via the Office for Clean Energy Jobs and Clean Energy Mission Control, along with financial backing from the Treasury in the forthcoming multi-year Spending Review. The sector skills plans must be developed in partnership with the devolved administrations, bringing in bodies such as Skills Development Scotland, to ensure cohesion in skills approaches across the UK.
- 1.4. EngineeringUK's meta-analysis of existing research on the net zero workforce identified an absence of a UK-level estimates on the number of engineers and technicians required to support the UK's net zero transition.<sup>1</sup> As part of a clean energy sector skills plan, therefore, we would like to see a breakdown of estimates of the engineering specialisms required to meet the 2030 target, for example the number of electrical, chemical or mechanical engineering graduates, higher-level apprentices

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<sup>1</sup> EngineeringUK, Net zero workforce: an analysis of existing research' (November 2023)



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and technicians. These estimates should also be extrapolated backwards further to assess the required number of A level and T level students and apprentices in STEM subjects each year to satisfy future engineering and technical needs and enable Government to assess whether workforce development is on track to meet its ambitions and take additional actions as needed.

1.5. It is also vital that the Government develop up-to-date skills taxonomies which can differentiate between ‘expansion’ and ‘replacement’ jobs, particularly in the clean energy industries, to track the demand for new talent as workers retire. For example, Energy and Utilities Skills has estimated that employers in the energy and utilities sector will have to attract and recruit 312,000 new people between 2024 and 2030, equating to nearly 50% of the current workforce; this includes 106,800 existing roles to replace workers who are set to retire over the period.<sup>2</sup> To ensure a complete picture of green skills requirements, therefore, Skills England must leverage the expertise of the former Unit for Future Skills to provide sector-level forecasts of retirements over the coming years. This is particularly pertinent given the ageing workforce of many clean energy sectors, such as engineering construction, where 38% of the workforce is aged over 50 and heat pumps with two-thirds of the installer base over 45.<sup>3</sup>

## **2. To what extent can the Clean Energy Mission and the retrofitting of homes and businesses be carried out by the existing workforce and to what extent will it require new entrants to the workforce?**

2.1. As outlined in a recent report by the National Engineering Policy Centre (NEPC), a partnership of 42 professional engineering organisations including EngineeringUK, an additional 200,000 workers are needed to meet expansion demand for clean power by 2030, on top of those required to replace the existing ageing workforce.<sup>4</sup> Meanwhile, the Climate Change Committee has estimated that “between 135,000 and 725,000 net new jobs could be created by 2030 in low-carbon sectors, such as buildings retrofit, renewable energy generation and the manufacture of electric vehicles”.<sup>5</sup> Meanwhile, the Construction Industry Training Board (CITB) has forecast that retrofitting will require the training of 45,000 technicians each year at its peak (in approximately 5 to 10 years’ time), comprised of 30,000 technicians in fabric

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<sup>2</sup> Energy and Utility Skills, ‘Workforce demand estimates – 2024 to 2030’ (September 2024)

<sup>3</sup> ECITB (2021) ECITB Workforce Census 2021; DESNZ (2023) Heating and cooling installer study

<sup>4</sup> NEPC, ‘Rapid Decarbonisation of the GB electricity system’ (July 2024). NB – This calculation is based on achieving 100% clean power by 2030, rather than the updated 95% target

<sup>5</sup> Climate Change Committee, ‘A net zero workforce’ (2023), p11

improvement and 15,000 in heat pump installation each year.<sup>6</sup> More broadly, Capital Economics has forecast that a minimum of 244,000 qualified construction apprentices will be required to plug the skills gap over the next 10 years.<sup>7</sup>

2.2. Re-skilling and retention initiatives will play a vital role in filling vacancies in the clean energy industries in the immediate term and up to 2030, particularly for workers in fossil-fuel intensive sectors. However, to ensure that we have the appropriately skilled workforce to drive this change in the medium to long-term and to avoid retirement bulges (with the associated challenges around the transfer of organisational expertise), we will need to encourage many more young people to pursue careers in these sectors. Apprenticeships are a vital pathway into the industry, though EngineeringUK analysis shows a sharp decline in starts in engineering and manufacturing technologies-based apprenticeships in recent years – dropping by 25% between 2017/18 and 2023/24. This has been a major constraint on the flow of new talent entering the sector. Indeed, this decline has been most concentrated in lower-level (Levels 2 and 3) apprenticeships, which typically provide entry routes into the sector for young people or low-skilled workers: since 2017/18, engineering and technology-related starts at Level 2 have decreased by over half (52%), whilst degree-level (Level 6) apprenticeship starts have increased by 72%. This has been accompanied by a decrease in engineering and technology-related apprenticeship starts among under 25s, with the proportion of starts by under-19s falling from 41% in 2017/18 to 36% in 2023/24.<sup>8</sup>

2.3. The Government has stated its intention to “re-balance the apprenticeship levy towards young people” through the proposed defunding of some Level 7 apprenticeships as well as the creation of new foundation and shorter apprenticeships, a measure which we strongly support as a means of opening up new pathways into green jobs. EngineeringUK has called on the Government to go a step further and directly fund apprenticeships for young people between the ages of 16 and 18, paid for through unallocated levy funding that would otherwise be returned to the Treasury (forecast to rise to over £800m in 2024/25).<sup>9</sup> This move is required to reverse the decline in uptake of engineering-related apprenticeships among young people, from 41,500 in 2017/18 to 35,000 in 2023/24, a trend that is mirrored across other sectors. We estimate that this will cost around £720 million per annum, based

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<sup>6</sup> Construction Industry Training Board, ‘Building Skills for Net Zero’ (2021)

<sup>7</sup> Capital Economics, ‘The UK Trade Skills Index 2023’ (2023)

<sup>8</sup> EngineeringUK, ‘Apprenticeship pathways into engineering’ (Nov 2024)

<sup>9</sup> The OBR’s Fiscal Outlook forecasts that apprenticeship levy receipts will total £4bn in FY2024/25, against the DfE-set budget of £2.7bn for England plus approximately £500m for the devolved nations



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on the total spent on 16- to 18-year-olds via the apprenticeship levy in the 2023/24 academic year. By extending the Robbins Principle from higher education to apprenticeships and further education (thereby ensuring that all qualified applicants are guaranteed an apprenticeship), a new stream of entrants to the clean energy sector would be unlocked, filling key workforce gaps; this will be particularly impactful for SMEs, which are often constrained by their reliance on levy transfers.<sup>10</sup> Moreover, along with other incentives and support for employers, funding 16- to 18-year-olds apprenticeships directly through an increased further education budget rather than via the levy will also have the effect of de-risking employing 16- to 18-year-olds and is therefore likely lead to more employers being willing to offer apprenticeships to this age group.<sup>11</sup>

2.4. Moreover, a central component of addressing clean energy workforce shortages must be improving the diversity of the workforce through better attraction, training and retention of under-represented groups, not least for women as the most under-represented demographic. Indeed, EngineeringUK's analysis has revealed that a recent decline in the proportion of women working in engineering and technology roles, from 16.5% in 2022 to 15.7% in 2023, was driven by a spike in women aged 35 to 44 leaving the sector (this trend is not reflected across the wider economy).<sup>12</sup> This is supported by the Institute for Employment Studies' finding that women leave the engineering sector at twice the rate of men within a decade (70% vs 35%), and the Engineering Council's registration data showing the average age of women leaving the engineering and technology sector is 17 years younger than men (43 vs 60).<sup>13</sup> Hence, it is vital that the Office for Clean Energy Jobs, working alongside Skills England, encourages the sector to address the retention crisis among female engineers through targeted employment support and training initiatives.

### **3. How might the Government ensure that the job market in clean energy roles is sustainable enough to incentivise private sector investment in training for 2030 and beyond?**

3.1. Spending on adult skills has declined significantly over the past 15 years, with the IFS finding that total spending is 23% lower than in 2010, a trend that has likely been

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<sup>10</sup> For more information on how this might work in practice, see: Richard Layard, Sandra McNally & Guglielmo Ventura, 'Applying the Robbins Principle to Further Education and Apprenticeships' (Resolution Foundation, October 2023)

<sup>11</sup> For more information, see: EngineeringUK, 'Fit for the future: A 5-point plan to grow and sustain engineering and technology apprenticeships for young people' (October 2023)

<sup>12</sup> EngineeringUK, 'Spike in women aged 35 to 44 leaving engineering' (May 2024)

<sup>13</sup> Engineering Council, 'Professional Registration Statistics 2023' (2024); Institute for Employment Studies and AtkinsRealis, 'Career Deflection' (2024)



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replicated in the energy sector.<sup>14</sup> Failure to reverse the accompanying trend of declining Government skills expenditure is likely to further deter employer investment in training. On the other hand, stability in policy initiatives, ideally through a long-term Government commitment to funding key education and skills programmes (such as BTECs or Skills Bootcamps) for the duration of the current Parliament and beyond, will incentivise employer investment.

#### **4. How can the new Office for Clean Energy jobs contribute to workforce planning in the energy sector?**

- 4.1. The new Office for Clean Energy Jobs should have a genuine cross-government focus, by being plugged into other taskforces and bodies across Whitehall. For example, it should work hand in glove with Skills England by identifying workforce trends and recommending policy solutions; these recommendations should not only be targeted at DESNZ, but other government departments, such as the Department for Education. Conversely, wider skills initiatives recommended by Skills England could be piloted in the clean energy sector through the Office for Clean Energy Jobs.
- 4.2. Given the devolution of skills and education policy, the Office for Clean Energy Jobs is likely to face particularly acute challenges in engaging with the devolved nations, particularly Scotland, where a high concentration of clean energy jobs will be based (as signalled by the Government's decision to base GB Energy in Aberdeen). Thus, it is essential that the Office for Clean Energy Jobs works closely with skills bodies in the devolved nations, such as Skills Development Scotland, to identify and address workforce planning challenges. There have already been promising signs of collaboration, such as through DESNZ's role as an official partner on the Energy Skills Passport programme; however, the Office for Clean Energy Jobs must deepen these links to foster a collaborative approach.
- 4.3. The Office for Clean Energy Jobs should also feed into the work of the Migration Advisory Committee (MAC), given its expanded remit to examine homegrown skills and its link to immigration. In particular, the Office for Clean Energy Jobs should actively contribute insights on the sector's workforce demands to the ongoing MAC review of engineering and IT visas, ahead of the review's publication date in May 2025.

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<sup>14</sup> IFS, 'Seventh annual report: Education Spending in England' (January 2025)





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**5. What more can the Department for Energy Security and Net Zero do to ensure the workforce is in place to deliver the Clean Energy Mission and accelerate the retrofitting of homes and businesses?**

5.1. A focus on improving diversity in the engineering and technology sectors and opening up more opportunities for underrepresented demographic groups, particularly women, to enter and remain in the sector in the longer run, will be essential to ensuring the workforce is in place to deliver the Clean Energy Mission. For example, women make up just 15.7% of the engineering and technology workforce, compared to 56.1% of all other occupations.<sup>15</sup> Whilst there has been significant progress in female employment in the sector over the past decade, with the number of women in engineering and technology occupations almost doubling between 2010 and 2022 (from 562,000 to 1.034 million), there remains significant unfulfilled potential.<sup>16</sup> If the proportion of women and other underrepresented demographics were present in engineering and technology at the same rates as the overall workforce, there would be over 2 million more workers available, many of whom would be available to fill vacancies in the clean energy industries.<sup>17</sup>

5.2. As part of the clean energy industries sector skills plan, DESNZ should set out its approach to promoting careers in the clean energy industries for people from groups under-represented in the sector, in partnership with the DfE and their equivalents in the devolved administrations. Any strategy to target underrepresented demographics should be bipartite, with one part identifying pathways into the sector via education, training and recruitment initiatives, and another outlining retention measures such as continuous professional development, employment support and efforts to support those who have left the profession to return. Specific demographics it should target include women (15.7% of the engineering and technology workforce vs 56% in other occupations), people from minority ethnic groups (12% vs 16%), disabled people (14% vs 18%), and people from lower socioeconomic backgrounds (24% vs 26%).<sup>18</sup> Increasing diversity would enhance productivity and innovation, whilst the UK would be much better positioned to achieve a just transition, with people from all demographic groups able to benefit from the high employability and salaries in this sector. It is integral that a representative cross-section of society is involved in the complex ethical decisions and trade-offs to be considered as part of the net zero transition.

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<sup>15</sup> EngineeringUK, Key stats infographic (Nov 2024)

<sup>16</sup> EngineeringUK, 'Trends in women in the engineering workforce between 2010 and 2021' (Feb 2023)

<sup>17</sup> EngineeringUK, 'Women in Engineering and Technology' (May 2024)

<sup>18</sup> EngineeringUK, Key stats infographic (Dec 2024)

5.3. It is essential that sector skills plans are cross-Government initiatives, drawing in various departments to ensure coherence across sectors, in recognition of the overlapping skills requirements and workforce transferability. For example, engineering and technology skills (particularly at basic levels, but also in some cases at more advanced levels)<sup>19</sup> cut across several of the priority sectors, such as the clean energy industries, advanced manufacturing, and defence – all these needs must be taken into account in workforce planning to avoid different government priorities competing for the same workforce. To provide oversight on this, EngineeringUK and the NEPC have called for the creation of a National Engineering and Technology Workforce Strategy under a new cross-departmental skills committee.

For further information, please contact James Gordon, Public Affairs Advisor – [jgordon@engineeringuk.com](mailto:jgordon@engineeringuk.com).

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<sup>19</sup> For example, high integrity pipe welding is a transferable skill that is in high demand across sectors ranging from the clean energy industries to advanced manufacturing, defence and more.