



ENERGY &
UTILITY SKILLS

Skills for a greener world

Workforce assessment for the power and networks sector

Evidence of changing workforce demand and opportunities



December 2024



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1 Introduction

In Summer 2023, an industry-led Task and Finish group was established to complete detailed assessments on the current and expected future workforce and skills needs to deliver net-zero and environmental improvements. Subsequent, sub-groups were created, with Energy & Utility Skills leading the Power and Networks initiative that served as a template for other sectors. Energy & Utility Skills supported a range of other subgroups and orchestrated additional engagement with the Water sector and DEFRA.

Through extensive industry collaboration with several hundred energy organisations and their supply chains, **Energy & Utility Skills** (electricity networks), **CITB** (construction), **ECITB** (engineering construction), **RenewableUK** (offshore wind) and **EDF Energy** (as the only UK nuclear developer), led contributory elements of the **Power & Networks** research through a joint **Working Group. The Group** identified the size, locations and timescale of each skill set needed to deliver net-zero and was aligned to 2030 time horizon and planning assumptions of the **British Energy Security Strategy**.

This employer verified workforce and skills report provides a clear view of the **labour market challenges, projected labour supply and demand, workforce gaps** and their drivers. The evidence was developed using a range of approaches, including industry surveys, data modelling, workshops, employer interviews and desk-based research. The research was tested extensively with industry, with agreement on key themes, further consolidating the **evidence that should be used by Government and skills and wider workforce system to inform the transition to net-zero**.

These findings provide a detailed understanding of the workforce and skills challenges, through continued collaboration by Sectors Bodies and employers. As Government continue to evolve the Mission Led approach, contributing parties encourage:

- the **Office for Clean Energy Jobs** to work closely with employers and skills bodies to understand the scale of the workforce challenge required to **support the transition to net-zero**;
- **Skills England, Mayoral Combined Authorities** and **devolved administrations** to ensure that the funding is available to enable the delivery of a **safe, skilled and sustainable workforce**, drawing on this research to understand the scale of the challenge, and focus efforts on **developing targeted solutions**; and
- **DWP** to consider how best to provide opportunities, particularly for NEET individuals, given the scale of the challenge Drawing on the routes to competence work being conducted by Energy & Utility Skills, fellow skills bodies and employer groups.

2 Overview of occupational demand in the power and networks sector

This workforce assessment highlights the reliance of the power and networks sector on a highly skilled workforce to drive forward and enable the expansion of key green industries across the UK. While this brings opportunities in some occupations, it comes with a challenge of labour supply. Some examples of key occupational demand opportunities include¹:

Figure 1: Estimated demand for critical occupations in the power and networks sector by 2030

Skill Level	Occupation	Estimated requirement by 2030
Level 2-4	Electrical Trades	c15,000
Level 2-4	Mechanical Trades	c13,500
Level 3-7	Project Controls Technicians	c8,000
Level 3-4	Quality Assurance & Control	c7,500
Level 2-4	Welders	c6,500
Level 4-7	Commissioning Engineers	c4,000
Level 6-7	Welders	c2,600

These occupations are critical for the delivery of net zero, and there is competition between sectors for many of these roles. Our analysis reflects that the current skills system will not support the increased provision needed to deliver government policy without rapid and targeted intervention.

¹ Further information on qualification levels can be found [here](#) for England, Wales, and Northern Ireland, and [here](#) for Scotland.

² Power and Networks – Engineering Construction Workforce Assessment

2.1.1 Engineering

Opportunities for engineers (level 6 and above – typically requiring a degree which can be achieved through university or a degree apprenticeship (therefore taking a significant time to achieve)) are reported across most green sectors. This includes high demand for Civil Engineering in sectors such as nuclear and construction, while demand for Mechanical Engineers and Electrical Engineers is expected to increase in sectors such as Offshore Wind, Nuclear, Advanced Manufacturing, and Engineering Construction. Other types of engineers reported as being critical include Design Engineers, Chemical Engineers, and Environmental Engineers – demonstrating a key opportunity for STEM skills across the sector.

2.1.2 Metal forming, welding, and related trades

Significant opportunities exist out to 2030 for Welding trades in sectors such as Nuclear, Engineering Construction, Hydrogen, Advanced Manufacturing, and Offshore wind. These include various welding specialisms, such as structural/support welders, pipe welders and multi-coded welders.

These Welding trades, and level 2 to 4 Mechanical Trades are also reported as having a high perceived difficulty to recruit. This suggests that while there are many opportunities in these occupations, there may be short-term labour supply challenges.

2.1.3 Electrical trades

Demand for levels 2 to 4 Electricians and Electrical Fitters are reported in Construction, Offshore Wind, Electricity Networks, and Engineering Construction.

Demand for levels 2 to 4 Electrical Trades is expected to increase by almost 30% by 2030 in Engineering Construction², presenting a large opportunity for this occupation within the sector.

2.1.4 Managerial roles

Demand for Managerial roles across the sector, ranging from Project Managers to Corporate Managers and Directors is also expected. For example, demand for Construction Project Managers within is expected to reach 86,400 by 2030, up from estimated demand of 15,600 in 2025³.

This includes new specialised roles, such as Retrofit Co-ordinators, which will require the upskilling of existing construction workers so they fully understand the retrofit process to meet energy efficiency requirements in the existing building stock.

The sector reports a high skills gap and high demand for Managerial roles, ranging from levels 3 to 8. This presents a large opportunity for managers in other sectors if the economy at a range of skill levels to take up managerial roles in the power sector. These roles may require a mix of transferable skills from non-green sectors such as planning and project management, as well as specific green sector knowledge, such as knowledge of energy systems, which may require additional training.

2.1.5 Other professional roles

Across the sector there is a mix of other professional roles that are required, which are not traditional trades based. These include roles in legal, financial, procurement, and corporate services. Some roles may require specialist power sector knowledge as well as transferable skills from other sectors. These roles will have competition from non-green sectors in the wider economy but present an opportunity of those working in these occupations to move into the growing power sector.

Analysis of online job vacancy data finds that science, engineering, and technology jobs accounted for approximately 30% of green jobs advertised in 2022. Relative to carbon-intensive jobs, defined as those in fossil fuel and adjacent industries, demand for engineering workers was particularly elevated across the green sectors.

3 The power and networks sector

This section contains detailed analysis of the workforce supply and demand challenges facing several aspects of the UK power sector:

- Offshore Wind
- Nuclear
- Electricity Networks
- Construction
- Engineering Construction

It is drawn together from a range of existing labour market intelligence (LMI) produced by the relevant sectoral skills bodies (namely, ECITB, CITB, Energy & Utility Skills, Nuclear Skills Strategy Group (through EDF Energy) and RenewableUK).

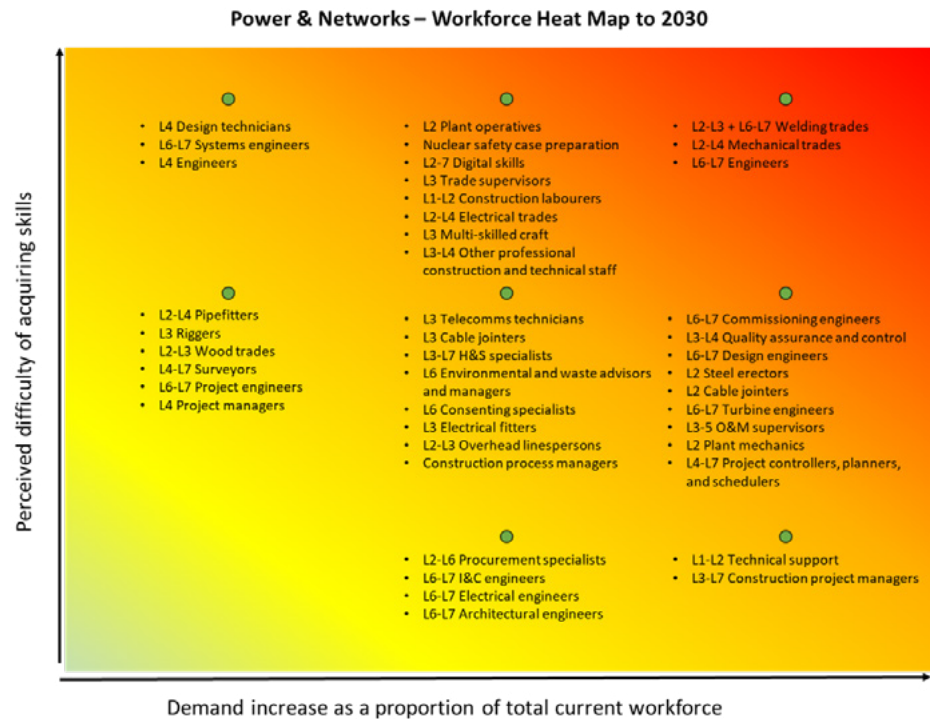
As these organisations approach LMI gathering and analysis in slightly differing ways, an aggregation process was employed and the findings are presented on a series of heat maps which demonstrate criticality through demand increase (x-axis) against difficulty to obtain (y-axis).

- The (horizontal) x-axis of the heat maps is based on quantitative data and reflects total annual demand (including expansion and replacement demand) for skills as a percentage of the total workforce
- The (vertical) y-axis reflects the perceived difficulty in acquiring the required skills for each occupation, based on industry knowledge of market recruitment issues and is validated by industry.

Therefore, the closer the occupation is to the top right of the heatmap, the larger the workforce gap is expected to be.

The aggregated heatmap for the power sector, see below, suggests that levels 2 to 4 mechanical trades, levels 2 to 3 welding trades, levels 6 to 7 welding trades, and levels 6 to 7 engineers will be the most difficult occupations to fill as the sector moves towards 2030⁴.

Figure 2: Aggregated heatmap of occupations facing medium-term (by 2030) workforce gaps across the Power and Networks sectors



The following sections provide more detail of the workforce demands within each aspect of the power sector.

3.1 Construction and Engineering Construction

3.1.1 Construction

The Construction and Engineering Construction industries are critical for scaling up green infrastructure across the sector.

The construction industry has a very high proportion of SMEs and self-employed, and is a very mobile workforce, which makes both recruitment and upskilling difficult as it hampers planning over the long-term for fluctuating workloads.

Nearly 25% of manual construction workers are over 55 years old and are therefore likely to leave the industry in the next decade⁵. This loss of experience, alongside increasingly complex projects, leads construction firms to rely on sub-contractors which increases project costs.

A lack of diversity and poor mental health and wellbeing across the construction workforce, coupled with false perceptions of construction as low-skilled and low paid and negative views of vocational training, dissuades young people from starting a construction career.

Apprenticeship completions in England fell between 2017/18 and 2020/21, with annual falls in the number of construction apprenticeship starts amounting to a cumulative decline of 12%. Only 23% of construction employers, compared with an average of 38% across the economy⁶, offered any type of work placement. Construction employers, more than any others, find many young recruits are poorly prepared for work.

Decarbonising the construction process requires skills such as collecting data and calculating environmental performance, and skills related to improving efficiency, productivity and eliminating waste. Construction is a significant user of industrial Non-Road Mobile Machinery (NRMM). There will also be greater use of telematics and broader digitalisation to improve fuel efficiency in this area.

4 This heatmap covers Wind, Nuclear, Electricity Networks, Construction, and Engineering Construction.

5 Labour Force Survey

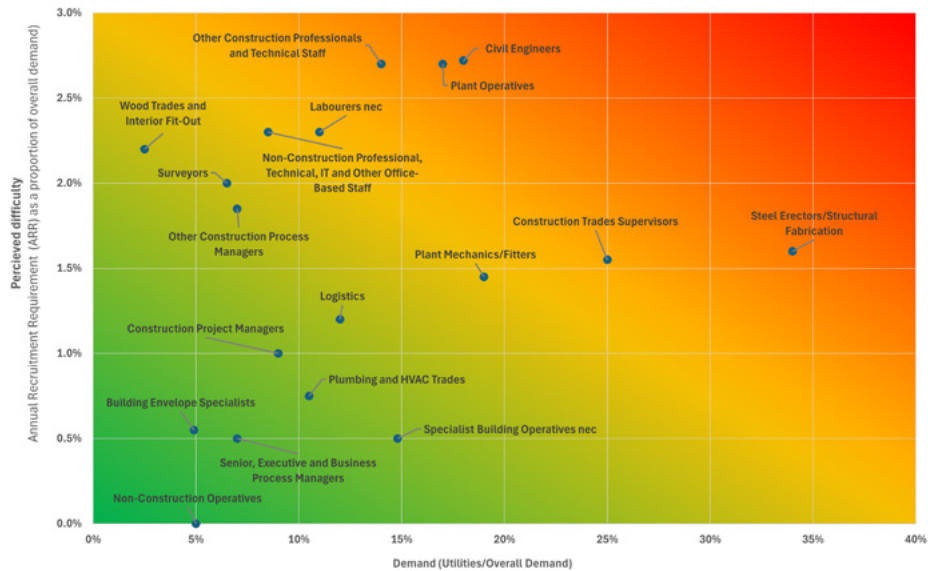
6 CITB – Construction Workforce Assessment

Key occupations with the biggest gaps in the heatmap shown below include:

- Steel erectors / structural fabrication workers
- Construction trades supervisors
- Civil engineers

These gaps are driven by high demand relative to total employment in that occupation with Construction as well as a high perceived difficulty to recruit.

Figure 3: Construction heatmap



3.1.2 Engineering Construction

Engineering construction is a specialised industry that underpins the delivery, maintenance and decommissioning of much of the UK’s critical infrastructure. It operates across the oil and gas, nuclear and renewables sectors, as well as other process industries, such as chemicals, pharmaceuticals, food processing, water and waste treatment.

The share of workers over 60 increased to 14.7%, up from 11.6% in 2021. Meanwhile, the share of workers under 30 rose from 14.7% to 16.8%, indicating progress but underscoring the need for succession planning as senior workers approach retirement. Certain roles, such as welders and pipefitters, have a significant portion of workers nearing and beyond retirement age, raising concerns about the industry’s ability to effectively transfer skills between generations. Women now represent nearly 17% of the workforce, up from 13.8% in 2021, although some roles remain highly gendered⁷.

Hiring challenges have intensified, with 71% of employers reporting difficulties in 2024, up from 53% in 2021. The primary challenges cited include a shortage of qualifications and skills, a mismatch between candidate expectations and what employers can offer, a limited applicant volume, mobility and location issues, and increased competition among employers and other engineering sectors⁸.

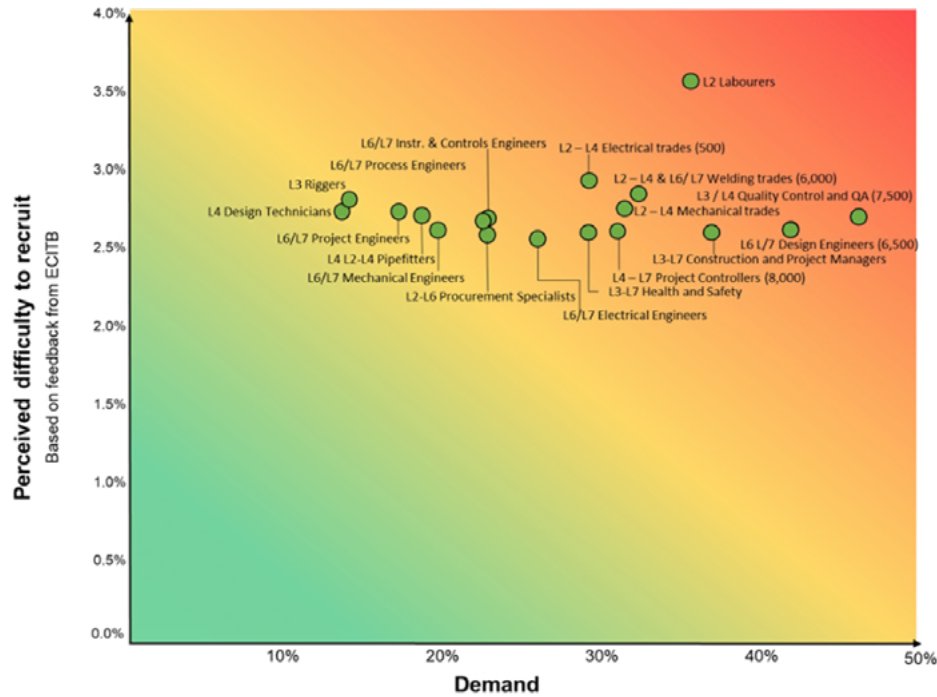
The heatmap below illustrates the demand increase to 2030 in different occupations against their perceived difficulty to recruit. The biggest gaps are likely to be in:

- Levels 3 to 4 Quality control
- Levels 6 to 7 Design Engineers
- Levels 3 to 7 Construction and Project Managers
- Level 2 Labourers

7 ECITB 2024 Workforce Census.

8 ECITB 2024 Workforce Census.

Figure 4: Engineering Construction heatmap

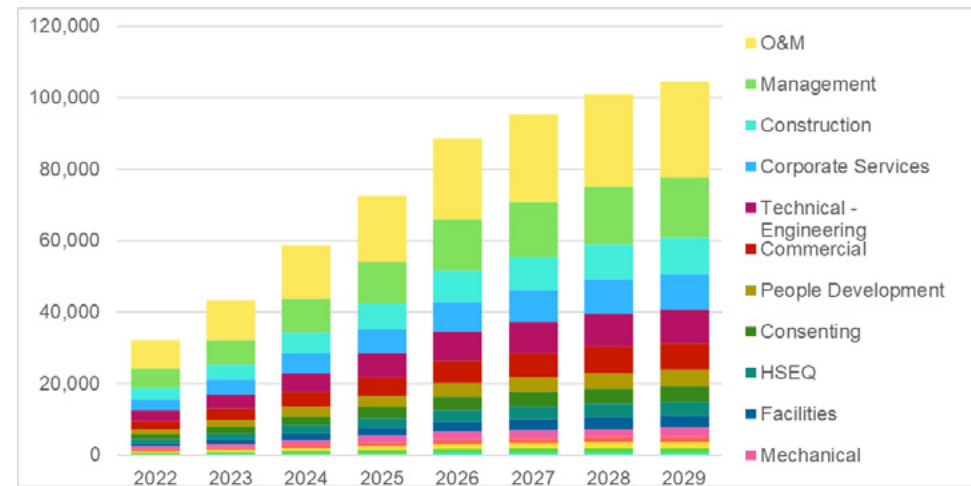


3.2 Offshore Wind

To meet our world-leading ambition to deploy up to 50GW of offshore wind by 2030, including up to 5GW of floating offshore wind, industry forecasts the workforce will need to increase from around 32,000 in 2022 to over 104,000 by 2030, with the fastest increase expected to 2026 due to the nature of project phases⁹.

To meet the 50GW ambition, industry anticipates the sector needs to attract and retain around 10,000 people every year, with around 40% of roles expected to be in operations & maintenance (O&M) and management^{10, 11}.

Figure 5: Estimated UK workforce demand in the Offshore Wind sector, 2022-2029



⁹ OWIC (2023) 'Skills Intelligence Report'

¹⁰ OWIC (2023) 'Skills Intelligence Report'

¹¹ HSEQ = Health, Safety, Environmental and Quality

Skills gaps and shortages have also been identified, with issues persisting in high-level electrical skills, digital skills, consenting skills and Marine & Port orientated skills. Over the longer-term, shortages are expected for electrical, technical and engineering skills, project management high level digital specialisms, on and offshore logistics and construction resource for floating wind projects¹².

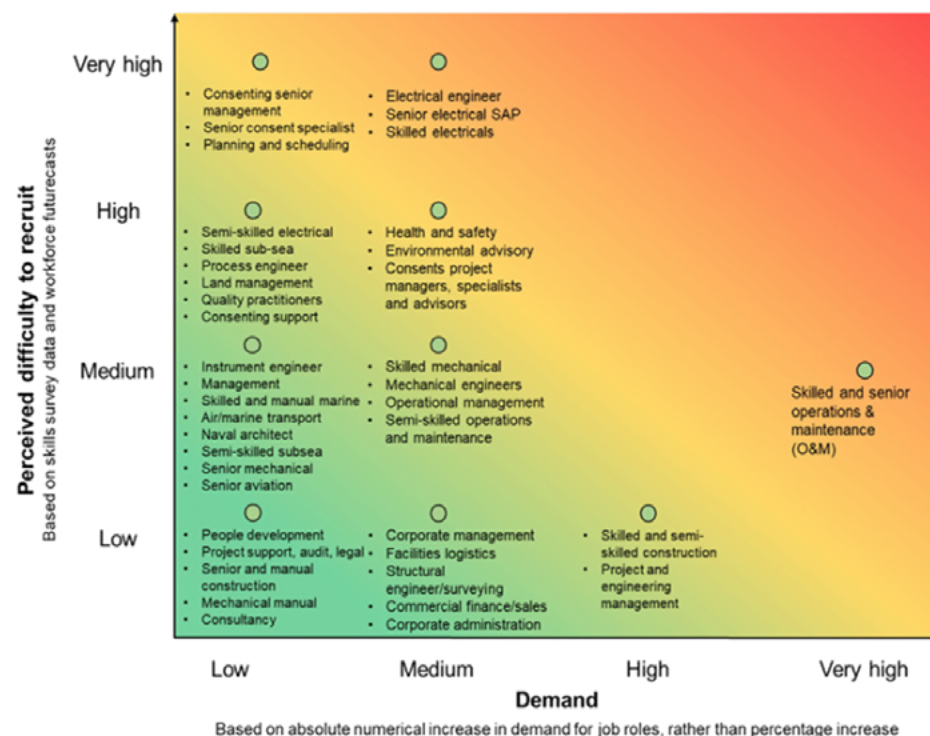
The Offshore Wind Industry Council (OWIC) is a senior government and industry forum driving the development of offshore wind in the UK. OWIC supported the Power and Networks Task and Finish group to produce this heatmap to identify which roles are expected to be most difficult to fill. With the occupation groups that are anticipated to be most in demand on the x-axis, the heatmap also considers the difficulty to recruit them along the y-axis, which suggests consenting and electrical roles will be the most at risk.

The sector has already achieved one of its targets – the Offshore Wind Sector Deal target of 2.5% of the workforce being recruited through apprenticeship programmes, with apprenticeships now representing 2.6%¹³. However, there is further to go to reach other sector deal targets of 33% female and 9% ethnic minority by 2030. The sector currently lacks diversity, with 20.6% of the workforce being female and 7% from ethnic minorities in 2022 - although this has risen from 3.8% in 2021¹⁴.

Employment is already and will continue to be clustered around offshore sites and projects, with Scotland accounting for almost 30% of the workforce; followed by Humber with 16% and London with 15%¹⁵.

Some of the oil and gas workforce are expected to move to other offshore energies as a result of the net zero transition, including offshore wind. Over 90% of the UK’s oil and gas workforce possess skills that have medium to high transferability to the offshore renewables sector, while government analysis of job adverts has identified a [high] degree of skills transferability between the sectors¹⁶.

Figure 6: Offshore wind heatmap



12 OWIC (2023) 'Skills Intelligence Report'

13 OWIC (2023) 'Skills Intelligence Report'

14 OWIC (2023) 'Skills Intelligence Report'

15 OWIC (2023) 'Skills Intelligence Report'

16 Gordon University (2023) 'Powering up the workforce'

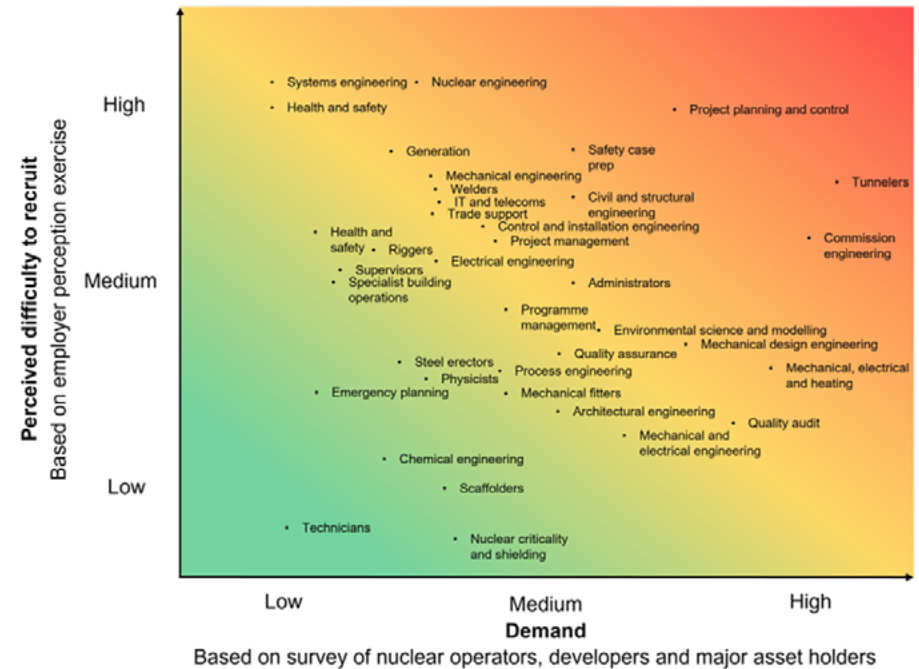
3.3 Nuclear

To meet the UK’s ambition for up to 24 GW of nuclear capacity by 2050, industry forecasts the workforce will need to increase from around 83,000 in 2023 to between around 150,000 and 180,000 by 2043¹⁷.

Civil demand is currently higher than defence, due to the construction of Hinkley Point C, but this will change as we expect rapid growth in defence especially with the recent agreement between the US, UK and Australian Governments to collaborate on construction of nuclear submarines (AUKUS).

The Nuclear Skills Strategy Group’s (NSSG) findings below were current as at the end of 2023 and are not expected to have changed as there have been no recent announcements on civil nuclear.

Figure 7: Nuclear heatmap



Alongside shortages in highly skilled nuclear specialists, including health and safety specialists and safety case engineers, there is also a shortage in the pipeline of new entrants for those with the wider skills for nuclear, such as project planners and welders with higher skill levels and knowledge of industry quality requirements. This covers all welding requirements (pipe, secondary and structural welding).

Within NSSG’s modelling, the two types of roles particular at-risk are engineers and project controllers. However, to meet our ambition, the sector will need to consider action to increase a broad range of skills, including higher technical skills (maintained through research and development); nuclear skills (engineers and scientists); alpha skills (for those employed in the safe conduct and management of Alpha materials like Plutonium); and transferable skills for nuclear (commercial, projects and finance).

¹⁷ NSSG’s latest modelling, from employer data.

A further challenge to the sector is workforce demographics as 10% of the workforce are aged 60 or above and are moving closer to retirement. The percentage of women in nuclear is around 21.4% with industry committing to reach 40% by 2030¹⁸.

The Civil Nuclear sector has a strong regional dimension to it as jobs in operation and decommissioning are centred around nuclear power stations and Nuclear Decommissioning Authority (NDA) sites, such as Sellafield. There are 17 NDA sites located across the UK, the majority of which are in the North-West and South-West of England, with others located across Scotland, Wales, and the East of England¹⁹. Jobs in nuclear new build will have a regional, national and international workforce.

3.4 Electricity Networks

Reinforcing Great Britain's onshore electricity network to meet net zero could directly support an additional 50,000-130,000 FTE jobs by 2050²⁰. Up to 20,000 new jobs could be created in load-related reinforcement projects in the electricity networks sector by 2035²¹.

When considering the expected demand and perceived difficulty to recruit occupations, the roles anticipated to have the greatest workforce gaps are L6 Specialist/Engineer, L6 Managerial and L3 Multi-skilled Craftsperson.

The major challenges facing the networks relate to:

- (i) the industry being regulated on five-year price control periods means that workforce planning is focussed firmly in the short-term (limiting the use of longer-term solutions such as apprenticeships)
- (ii) the visibility of the industry – or lack of – to potential new entrants (power sector careers information, where it exists, often focuses in on generation technologies)
- (iii) the development and roll-out of smart networks which need to facilitate the two-way flow of electricity between a growing number of distributed generating sites and customer properties (including the move from being network operators to becoming system operators)

¹⁸ NSSG (2023) 'Nuclear Workforce Assessment'

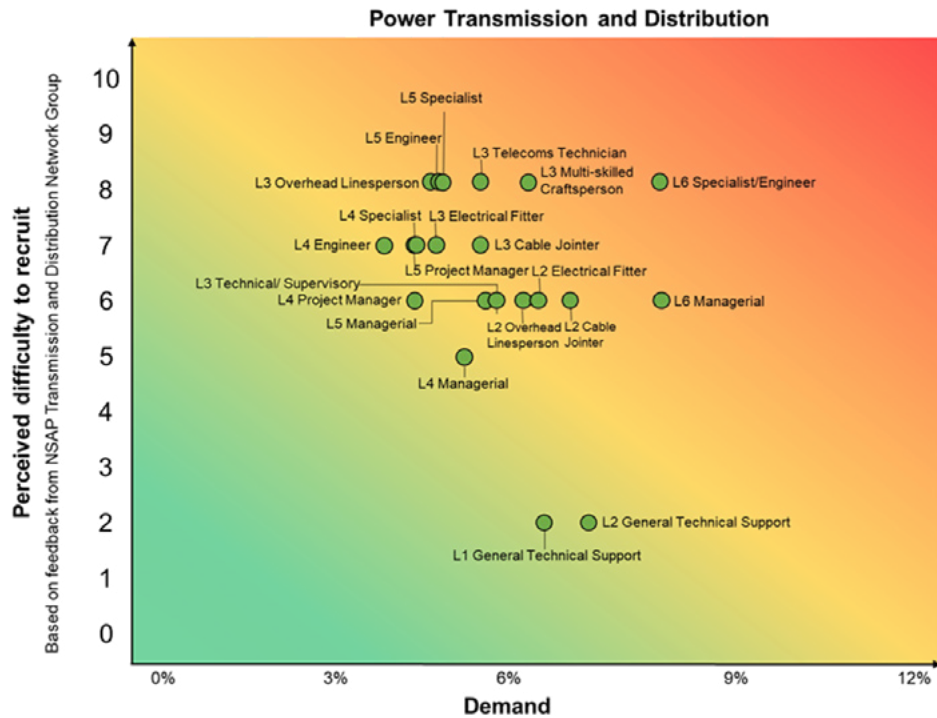
¹⁹ <https://www.gov.uk/government/organisations/nuclear-decommissioning-authority/about>

²⁰ Electricity Networks Strategic Framework, 2022

²¹ Electricity Networks Strategic Framework, 2022

Evidence suggests retirement ages within the sector are increasing due to (i) a lower proportion of the workforce being on final salary pension schemes and (ii) many foreseeing the economic necessity of working to 67 (state pension age). If this occurs, we could see a delaying of retirements currently predicted for the mid-2020s – thereby increasing demand for new workers in the later 2020s.

Figure 8: Electricity Networks heatmap



4 Summary

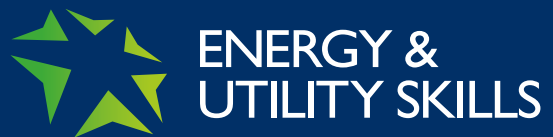
This report reflects the size and scope of the skills and workforce challenge in delivering the Government’s clean energy mission. Drawing together Labour Market Intelligence (LMI) of industry bodies and employers, the means of collecting and collating data in this sector is well established and operating effectively.

Against this backdrop, we welcome the first Skills England report and the associated announcements from the Prime Minister at the Labour Party Conference. Together they provide the building blocks of a change to the skills system that is urgently needed if we are to achieve Government ambitions for Net Zero and environmental improvement described in this analysis.

But we need pace if we are to deliver the skills and workforce needed by 2030, the detail of which has been clearly defined. This clear and granular understanding of the size and scale of the skills challenge in the sector allows for targeted action and we need to focus on solutions. In doing so, we have the opportunity to increase economic growth and broaden opportunity, particularly for the 946,000 young people²² not in education, employment or training (NEET). For example, we believe that unlocking the skills system, particularly vocational pathways at level 2, will provide a significant cohort of young people access to well-paid, sustainable careers and providing the sector with the skilled workforce it needs to deliver the UK’s net zero future.

In summary, we understand the size and scale of the workforce challenge and opportunity associated with delivering the Government’s clean energy mission. We are committed to working closely with Government to draw on this existing and extensive LMI to inform early interventions to begin to address this challenge.

²² Office for National Statistics 21 November 2024



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