Department for Education

Skills England: Sector skills needs assessments

Clean Energy Industries

June 2025

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Summary

Clean energy jobs are a subset of broader green jobs and are essential to meeting the Clean Energy Superpower Mission which aims to deliver clean power by 2030 and accelerate to net zero.[1,2] Clean energy jobs span various industries including renewables, nuclear, hydrogen and Carbon Capture Usage and Storage (CCUS), heat and buildings, and industrial decarbonisation. Many of these industries share common occupations and skills which are most in demand, predominantly in STEM, skilled trades and managerial positions. In the coming months, DESNZ will be publishing a Clean Energy Workforce Strategy. It will set out an updated and more detailed assessment of the supply and demand of workers to enable more proactive workforce planning across the UK. It will signpost the existing government offer and highlight new actions to support building a skilled workforce in clean energy industries.

At the time of writing, definitions of the eight Industrial Strategy growth-driving sectors are still in development. Our analysis uses the best available definitions and evidence, setting out what we already know and where further work is needed to understand the skills landscape within these sectors. The forthcoming Industrial Strategy Sector Plans will set out analysis of the highest growth potential subsectors.

Priority jobs and skills

As of 2022, an estimated 272,400 people were directly employed in low carbon and renewable energy economy jobs, up 27% from 2020.[3] The clean energy workforce is expanding rapidly, growing more than five times faster than overall UK employment between 2020 and 2022.[4] Based on an assessment of external reviews, the Climate Change Committee estimated that the transition to net zero could create between 135,000-725,000 net new jobs in low carbon industries by 2030.[5]

ONS figures show that the direct oil and gas workforce decreased by around one third between 2014 (42,000) and 2023 (27,000).[6] In scenarios modelled by Robert Gordon University (RGU), the oil and gas workforce were forecast to decline from an estimated 120,000 in 2023 to between 60,000 – 87,000 by 2030. Workers from many carbon-intensive industries, such as oil and gas, possess skills that closely align with clean energy jobs including engineering, construction and project management.[7] Transitioning

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[1] Clean Power 2030 Action Plan: assessment of the clean energy skills challenge, DESNZ (2024)
[2] Make Britain a Clean Energy Superpower, Plan for Change, GOV.UK
[3] Low carbon and renewable energy economy, ONS (2024)
[4] Clean Power 2030 Action Plan: assessment of the clean energy skills challenge, DESNZ (2024)
[5] A Net Zero workforce, Climate Change Committee (2023)
[6] Business Register and Employment Survey by Industry, ONS (2023 (provisional) and 2014 (revised))
[7] Clean Power 2030 Action Plan: assessment of the clean energy skills challenge, DESNZ (2024)

these workers will be crucial to meeting demand, presenting a significant opportunity for reskilling and transferring expertise within the energy sector.

A highly skilled workforce is essential to drive the expansion of clean energy industries. Employer-led workforce assessments indicate overlapping occupation shortages and skills challenges across clean energy industries including specialist engineering skills, welding and mechanical trades, electrical trades, planners and managerial roles.[8] Further critical skills challenges anticipated include STEM, particularly across engineering and a range of science related roles, transferable skills such as leadership and management, digitisation, and specialist roles such as electrification and heat pump installation.[9]

Shortages of skilled workers are exacerbated by shared demand in clean energy industries and the broader economy. For example, the construction sector is critical for scaling up clean energy infrastructure but will also be required for the government's target of building 1.5 million homes in the next five years.[10] New houses are built with environmentally friendly methods and to very high energy-efficiency standards, meaning the housebuilding workforce require considerably more green skills. To mitigate cross-sectoral shortages, Skills England engagement [11] with the clean energy sector suggested employers should collaborate and convene with government to produce an adaptable workforce that can be transferred across sectors to meet current and future demands.

Skills and occupational shortages are further exacerbated by a lack of diversity in many clean energy industries across gender, ethnicity, disability, and socioeconomic background. For example, a 2022 survey of the offshore wind workforce estimated that women represent 21% of the workforce and people from ethnic minority backgrounds just 7%.[12] In comparison, around half of the UK population (16-64) are female and 16% are from ethnic minority backgrounds. In addition, women are further under-represented in related training routes. For instance, in 2023/24 only 18% of STEM apprenticeship starts were female compared to 66% of non-STEM apprenticeships.[13] This suggests the existing pipeline of entrants is unlikely to resolve diversity challenges and presents a key opportunity to widen access to clean energy jobs. In addition, many sources of data on workforce demographics are not representative of the whole workforce, and lack of clear evidence on workforce demographics further hampers efforts to increase diversity.

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[8] Further information on the workforce assessments and methodology can be found in the Clean Power Action Plan: Assessment of the clean energy skills challenge Clean Power Action Plan: assessment of the clean energy skills challenge, DESNZ (2024)

[9] Clean Power 2030 Action Plan: assessment of the clean energy skills challenge, DESNZ (2024)

[10] Our plan to build more homes, GOV.UK (2024)

[11] During this engagement process and the drafting of this publication, Skills England was set up in shadow form within the Department for Education (DfE). Skills England - GOV.UK

[12] Offshore Wind Skills Intelligence Report 2023, OWIC, (2023)

[13] Apprenticeships 2023/24, DfE (2024)

Shortages are likely to be further compounded as the workforce ages and many people with the required clean energy skills have already left the workforce or will retire soon.[14]

Between 2021 and 2024 job advert data indicates that clean energy jobs are spread across the country, with the highest proportion of job adverts in Scotland (16%) and the South West of England (14%).[15] It is expected that some clean energy industries will cluster in specific regions, for example, hydrogen and CCUS in the industrial heartlands, whereas others like heat pumps will be more evenly distributed across the country.[16] Although clean energy employment may be dispersed, our engagement with stakeholders suggested that some regions lack access to quality training centres or employer partnerships. A lack of training infrastructure and rapidly evolving skills needs in local areas may limit some industries' abilities to build a talent pipeline or upskill their current workforce in the right places.

Securing the future workforce

Both a pipeline of new entrants into clean energy, plus reskilling and reallocating the existing energy workforce will be essential to meet growing demand. It is estimated that 1 in 5 jobs will be influenced by the shift in demand for skills through the transition to net zero, with around 3 million workers requiring upskilling.[17] As outlined in the Office for Clean Energy Job's assessment of the clean energy skills challenge, clean energy industries encompass diverse roles in high demand with varying training requirements:[18]

- Specialist professions such as civil, mechanical, electrical, chemical, and environmental engineers, as well as occupations in design, are in demand in clean energy industries. These high demand occupations typically require a qualification at Level 6 or above.
- Welding and mechanical trades at Level 2 upwards will be in demand across multiple industries. Industry engagement highlighted welding roles as particularly difficult to recruit for, creating labour supply challenges.
- Electrical trades across all levels are crucial for decarbonisation targets and in high demand, from electrical fitters and trades at Levels 2 to 4, to senior electrical roles.
- More planning workers are needed to accelerate clean power planning decisions. The current planning system cannot meet the pace of clean energy project applications, posing investment and supply chain risks.

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[14] Clean Power 2030 Action Plan: assessment of the clean energy skills challenge, DESNZ (2024)

[15] Clean Power 2030 Action Plan: assessment of the clean energy skills challenge, DESNZ (2024)

[16] Clean Power 2030 Action Plan: assessment of the clean energy skills challenge, DESNZ (2024)

[17] Tracking local employment in the green economy: The PCAN Just Transition Jobs Tracker | Place Based Climate Action Network, PCAN (2021)

[18] Clean Power 2030 Action Plan: assessment of the clean energy skills challenge, DESNZ (2024)

- Managerial roles from Level 3 to 8 will be in demand across industries including project managers, corporate managers and directors, and corporate services. Demand for construction project managers will be particularly high, including new specialised roles, such as retrofit coordinator.

Policy and regulatory certainty are crucial for promoting investment in skills training and ensuring its ongoing demand. Transparency around the future of the clean energy sector and swift funding decisions can mitigate risks around uncertainty.[19]

Employers reported additional challenges attracting young people to some clean energy industries due to low visibility of opportunities and career pathways.[20] A survey of 1,162 young people aged 16-24 found that almost two-thirds (63%) had never heard of green skills and did not know what they were.[21]

Further barriers to training and upskilling provision include a shortage of teachers and staff to adequately facilitate training programmes.[22] Nascent industries struggle to find experienced trainers, for example, there is a lack of expertise to curate and teach a hydrogen curriculum.

Feedback from clean energy industries and wider research indicates that some SMEs face barriers to engaging with the skills systems. Research with employers suggests barriers including limited human resource functions to engage with workforce offers, perceived lack of time and resource to spend on training, and finding the skills systems complex to navigate.[23,24,25] Additional challenges during the clean energy transition, such as policy uncertainty, may disproportionately limit SME investment in skills training and the subsequent development of the talent pipeline in key industries.

Our engagement highlighted a need to facilitate collaboration between employers, education and training providers, and the government to align efforts with future workforce needs.

Key gaps in provision

DESNZ has been working with a number of partner organisations to support workers to reskill and move more easily into roles in clean energy industries. For example, through accelerating delivery of an industry led Energy Skills Passport initiative which launched for public beta in January 2025, and through a series of Regional Skills Pilots in several

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[19] Clean Power 2030 | National Energy System Operator, NESO (2024)
[20] Clean Power 2030 Action Plan: assessment of the clean energy skills challenge, DESNZ (2024)
[21] GreenSkillsReport-2022_v3b.pdf, World Skills UK (2022)
[22] Clean Power 2030 Action Plan: assessment of the clean energy skills challenge, DESNZ (2024)
[23] Clean Power 2030 Action Plan: assessment of the clean energy skills challenge, DESNZ (2024)
[24] IfATE Big Conversation Research Report - March 2023, IfATE (2023)
[25] SME-Apprenticeships-and-Skills-Report-May21.pdf, The St Martin's Group (2021)

regions across the country which were identified as key to delivering the ambitions of the Clean Energy Mission.

However, there will be a need to go further. To support the transition, industry evidence and our engagement with clean energy stakeholders highlighted the need for flexible training options, particularly modular or short training courses to rapidly equip people with the right skills.[26,27] Transitioning the workforce will be supported by the Energy Skills Passport which recognises existing skills and qualifications across industries.[28]

Our engagement highlighted further education and skills training as key entry routes into clean energy industries. However, feedback from stakeholders highlighted three areas of concern regarding the current further education and skills system:

- There are areas of misalignment between the training provided and skills, both technical and transferable, required by industries. For example, in the heat networks industry, new entrants often lack whole systems knowledge, and project delivery managers and control systems specialists typically lack relevant experience in procurement for the industry. Skills mismatches are likely exacerbated by rapid technological advancements and the nascency of some clean energy industries, meaning industry demands are outpacing training programs.
- Certain industries such as hydrogen, nuclear and CCUS operate in high hazard environments, restricting access to workers under 18. Consequently, 16-19 routes such as T Levels are limited, making it challenging to attract younger entrants.
- Feedback from stakeholders indicated that they felt that existing funding bands for some apprenticeships does not meet the cost of delivery – particularly at Levels 2 and 3 - leading to a scale back of programmes. At the same time, other apprenticeships are oversubscribed, highlighting the need to expand capacity in these apprenticeships, and/or develop additional, alternative, training routes into clean energy jobs.

[26] Review of Net Zero GOV.UK, DESNZ and BEIS (2022)

[27] Green Jobs Taskforce report, Green Jobs Taskforce (2021)

[28] Delivering a skills passport for the Clean Energy Transition - GOV.UK (2024)

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