

Green Jobs Taskforce - (published July 2021) ¹

The Green Jobs Taskforce brought together industry, academia, trade unions and the skills sector, to independently advise the government, industry and the skills sector on how the UK can deliver the Government’s ambition to support two million green jobs in the UK by 2030 and support industries and workers in this transition.

The Taskforce use the term ‘green job’ to signify employment in an activity that directly contributes to - or indirectly supports - the achievement of the UK’s net zero emissions target and other environmental goals, such as nature restoration and mitigation against climate risks. The Taskforce identified ‘green sectors’ which prioritised sectors where change will be crucial to meeting net zero and on account of where the clearest and most evidence gathering has been conducted to able to draw concrete conclusions. These sectors are:

Sector Heading	Overview	Occupations, skills requirements and qualification levels ²
Power	Courses leading to jobs in renewable power, nuclear power, grid infrastructure, energy storage and smart systems technology	<p>Offshore Wind</p> <ul style="list-style-type: none"> Manufacturing (L2-6), electrical engineering (L3), welders (L3-4), engineering (L4-5), project managers (L4), product development managers (L5), offshore technicians and seamen. <p>Onshore wind:</p> <ul style="list-style-type: none"> Welders (L3-4), engineers (degree level) and construction workers (L1-3). <p>Solar</p> <ul style="list-style-type: none"> Electricians (L4), roofers (L2) and engineers (degree level) <p>Tidal</p> <ul style="list-style-type: none"> Manufacturing (L2-6), electrical engineering (L3), welders (L3-4), engineering (L4-5), project managers (L4), product development managers (L5), offshore technicians and seamen. <p>Nuclear Power</p> <ul style="list-style-type: none"> “Nuclear-specific skills’ (for example, nuclear engineers) as well as general skills (such as welders, construction workers, engineers) suitable for the nuclear sector. Illustrative examples of current skills shortages include: nuclear safety case authors (L5-6), radiation protection workers (L3-6), nuclear grade

¹ Green Jobs Taskforce, Report to Government, Industry and the Skills Sector (published July 2021): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1003570/gjtf-report.pdf

² Green Jobs Taskforce report: Annex, Report to Government, Industry and the Skills Sector: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1003569/gjtf-annex.pdf

		<p>welders (L3-4), non-destructive testing (L5-6), plutonium management specialists (L6+ including NVQ level), project planning and controls managers (L3 – 8), mechanical engineers (L5 – 6), control and instrumentation engineers (L3 – 6).</p> <p>Electricity Networks</p> <ul style="list-style-type: none"> Grid infrastructure operatives (L3-8), civil and mechanical engineers (L3-7), data analytics (L3-7), modellers and programmers (L4-8), cyber security (L4-8), environmental scientists (L3-7), overhead lines people and general grid electric system installers (L2-7), integration of electric vehicle charging / microgeneration / domestic storage / demand side response, smart metering (L3-8) <p>Smart systems</p> <p>Skill development will be needed in smart systems specific supply chains (for example energy storage, smart product design), plus in existing more mature supply chains including (energy assessors, housing retrofit, network infrastructure)</p> <ul style="list-style-type: none"> Electricians (L4), electrical engineering (L3), Data analytics (L3-7), modellers and programmers (L4-8), electronic engineering (L3-8), control engineering (L3-8), cyber security (L4-8), integration of electric vehicle charging / microgeneration / domestic storage / demand side response, smart metering (L3-8)
<p>Business & Industry</p>	<p>Courses leading to jobs in hydrogen production and industrial use, carbon capture, utilisation & storage (CCUS) and industrial decarbonisation</p>	<p>CCUS and hydrogen</p> <ul style="list-style-type: none"> As CCUS and hydrogen are both emerging sectors, evidence is limited. Further work is needed to understand the skills and qualification levels of these skills that will be required as the sectors evolve. For hydrogen, current views from industry suggest skills will be needed in: project structuring, design and manufacturing, health and safety, commercial financial and legal services, engineering, procurement, construction and maintenance. The offshore oil and gas industry is likely to provide a substantial source of skills to the sector with some re-skilling likely to be required. The established skills base of the oil and gas sector are expected to provide critical skills for CCUS development, particularly skills needed to develop a domestic carbon dioxide infrastructure network and export CCUS worldwide. <p>From Green Jobs Taskforce report (page 21): (The current) skill gaps could however be partly covered by the current energy workforce, such as those in oil and gas, which already have many of the key skills needed. For example, pipe fitters and designers, leak test technicians, and offshore barge operators in oil and gas could – with some retraining - move to CCUS. On the other hand, many of the roles that will be needed already exist in other sectors, and could easily be transferred (e.g. project managers, administrative functions, operations & maintenance, health & safety, and regulatory experts)</p>
<p>Homes & Buildings</p>	<p>Courses leading to jobs in retrofit, building new</p>	<p>New Home Build and Retrofit- Build Fabrication</p> <ul style="list-style-type: none"> Currently, there is a critical shortage of retrofit designers and co-ordinators. Decarbonising the UK’s buildings will require a highly qualified workforce and a broad scope of abilities incorporated in

	<p>energy-efficient homes, heat pumps, smart devices and controls, heat networks and hydrogen boilers</p>	<p>different construction occupations because, technically, it demands a fundamentally different approach from conventional construction methods. This requires a grounding in theoretical understanding of energy efficiency that cannot be gained wholly ‘on-the-job’. Workshop-based training in Germany and Belgium have proven more effective than apprenticeships.</p> <ul style="list-style-type: none"> • Within domestic buildings, skilled workers needed include energy efficiency installers and assessors (L2-4), retrofit co-ordinators (L5). For larger non-domestic buildings, higher level qualifications for design and sign-off, e.g. architects, chartered passive house designers, chartered surveyors, and building management systems installations qualifications (BEMS Level 3 NVQ) • Similar challenges exist in the new build homes sector as it delivers higher fabric standards through an incremental step before implementing the Future Homes Standards in 2025. Differing to the challenge for retrofit, new build homes also has requirements for the development and roll out of relevant training to sales and customer facing teams. <p>From Green Jobs Taskforce report (page 21):</p> <ul style="list-style-type: none"> • Specific low carbon training is required across all roles, with a focus on systems design and implementation, inter-trade issues, and competence and quality. This includes every part of the construction supply chain - from planners, architects, engineers, construction workers, supervisors and auditors, to occupiers. The emergence of new technologies may also impact the skills requirements across both new-build and retrofit. <p>Heat Pumps</p> <ul style="list-style-type: none"> • Given the installation ambition set by government in the Ten Point Plan, the Heat Pump Association estimate the need for 35,000 installers (levels 2-4) for domestic heat pump installation by 2028 to achieve this.³⁸ This is not an estimate of new jobs created as the sector transitions; rather it is an indication of the scale of upskilling required. <p>Heat Networks</p> <ul style="list-style-type: none"> • Specialist skills required for three stages of a heat network project. (1) Design: project management, design engineering and supporting professions (legal, financial, commercial). (2) Build: project management, construction and commissioning. (3) Operations & Maintenance: engineering, operator, and technician skills. “The sector appears to be ill-equipped to respond to the surge in demand for skills that will be required to meet the growth of the sector”.
<p>Transport</p>	<p>Courses leading to jobs in low or zero emission vehicles, aviation and maritime, rail, public</p>	<p>Automotive Sector</p> <ul style="list-style-type: none"> • Occupations and skills needed will include: charge point installers, operators, smart charging services, engineering, manufacturing, purchasing, material planning and logistics, vehicle scrappage and recycling, vehicle recovery operations, emergency services personnel, quality assurance and operations quality involved with batteries. <p>Aerospace</p>

	<p>transport and walking or cycling;</p>	<ul style="list-style-type: none"> The sector will have greater reliance on digitisation and automation in industrial systems and integration. Upskilling the workforce in digital skills, systems engineering, programme management and leadership will continue to be important to benefit from the opportunities green technologies could provide. The ATI estimate that, with the expected increase in investment in new technologies to decarbonise aviation and to meet the increased global passenger demand, there could be 45,000 new jobs in the sector by 2035, including a proportion in specialist roles <p>Maritime</p> <ul style="list-style-type: none"> The skills profile of the maritime sector will change significantly over the next 30 years. The focus of training (set at the International Maritime Organisation) will change as vessel subsystems, most notably propulsion, are adapted to the need to decarbonise and the skills required of crew, particularly marine engineers, will broaden to encompass this transition. The importance of science, technology, engineering, and mathematics (STEM) subjects will increase as jobs become more data driven in response to new technology. Industry roles will be multidisciplinary, potentially requiring the ability to create, operate and maintain autonomous and technological systems. Future UK seafarers will be expected to transition easily between sea and shore-based roles, using transferable IT based skills, and continuing professional development that allows them to update skills in line with technological advances. Qualified seafarers (L2-7) able to operate advanced fuel systems, both at junior rating (L2-4) and senior engineering (L4-7) will be needed. <p>Rail</p> <ul style="list-style-type: none"> Analysis by The National Skills Academy Rail estimates the current size of the UK rail workforce is approximately 250,000. Modelling forecasts that between 7,000 and 12,000 additional workers will be needed per year over the next 5-10 years, for a total of up to 120,000 additional people. The demand for skills in the rail sector is expected to peak in 2025, with the most prominent skills gaps at levels 3 and 5. The need for more workers is heightened given the age profile of the workforce: 28% are aged 51 or over and by 2025, the sector could see 15,000 people retire. In addition, the current rail workforce is 16% female and 84% male; “attracting new talent from a more diverse talent pool could help to plug these growing gaps”. Demand is expected to be highest for train drivers, maintenance operatives and customer service assistants. By 2025, it is forecasted that between 3,000 and 5,000 of these roles will be needed annually. Again by 2025, between 1,000 and 2,000 of the following occupations are forecasted to be needed annually: maintenance technicians, operators, engineers, operations managers, and project managers. <p>Green Public Transport</p> <ul style="list-style-type: none"> According to a Bicycle Association report of 2018, cycling contributes around £5.4 billion a year to the economy, with the larger share of this, £4.1bn, coming from wider impacts, particularly reductions in loss of life, and reduced pollution and congestion. Products associated with the cycling industry
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<p>Natural Resources</p>	<p>Course leading to jobs related to natural resources – including nature restoration, tree planting and decarbonising agriculture, waste management and recycling;</p>	<p>Forestry</p> <ul style="list-style-type: none"> • The government aims to treble woodland creation, reflecting England’s contribution to meeting the UK’s overall target of planting 30,000 hectares per year by the end of this Parliament. The England Tree Planting Programme will make sure that the right trees are planted in the right places, that trees and woodlands are better protected, that more green jobs are created in the forestry sector and that people have greater access to trees and woodlands. • The 2020 Annual Business Survey reported an average employment of 16,000 in the UK forestry sector in 2018.⁷⁸ The sector estimates a shortage over the next five years of over 2,000 people primarily employed in forestry or who require forestry skills but work in adjacent sectors such as farming. • Establishment and maintenance operatives (L2), harvesting operatives (L2), nursery crop technicians (L3), forest works supervisors (L4), forest managers (L5-6) as well as wider skills needed among land managers, surveyors and farmers to plan woodlands, plant and manage trees. <p>Agriculture</p> <ul style="list-style-type: none"> • The Sustainable Farming Incentive, the Local Nature Recovery scheme and the Landscape Recovery scheme will reward the delivery of environmental benefits by paying for sustainable farming practices, improving animal health and welfare, reducing carbon emissions, creating and preserving habitat, and making landscape-scale environmental changes. Between 2021 and 2024, the government will support farmers to manage their land sustainably and prepare to take part in environmental land management schemes. • Occupations, skills requirements and qualification levels Skills will be needed in the following areas; soil husbandry, carbon auditing and advice, tree and biomass management, conservation and biodiversity. <p>Nature Conservation and Restoration</p> <ul style="list-style-type: none"> • Restoration of habitats such as peatland, grasslands, saltmarsh and seagrass meadows will provide natural carbon sinks. • Occupations, skills requirements and qualification levels Significant expansion across environmental and conservation professionals, such as countryside rangers, forestry workers and horticultural tradespeople.

		<ul style="list-style-type: none"> • There are currently few existing training opportunities or qualifications in peatland or other restoration. There is a need to increase training schemes to meet the labour demand.
<p>Enabling Decarbonisation</p>	<p>Courses leading to jobs in science and innovation for climate change, green finance, circular economy and energy networks;</p>	<p>Waste/ circular economies</p> <ul style="list-style-type: none"> • A more circular model of economic activity will enable built assets, products and materials to be kept in use for longer through sharing, leasing, repair, remanufacture and refill. This will contribute to climate mitigation and adaptation efforts both in the UK and across the global supply chain. • Sorting and reprocessing (L1-3), repair and manufacturing (L3-6), circular economy business planning/development (masters level – engineers, material scientists, managers) plus lifelong learning building on existing business skills. <p>Science and innovation</p> <ul style="list-style-type: none"> • The PM’s Council on Science and Technology (CST) has recommended that government should bring together public sector funders to develop a bold, coherent, mission-driven programme of public sector research and innovation investment to achieve net zero. The CST has also emphasised the need to continuously evaluate the technology roadmaps to assess progress in research, development and deployment needs and act on this information to modify, amplify or reverse the trajectory of technological development. • Occupations, skills requirements and qualification levels: Skills supporting the UK’s climate resilience will likely be needed including scientific and technical skills such as modelling and interpreting climate change projections. Furthermore, a central theme of the Energy White Paper was to highlight the important of innovation in the engineering of effective low-carbon technologies such as clean hydrogen and CCUS, which will support change across the whole energy system. These endeavours will increase demand for highly skilled roles, which will be required at higher qualification levels. <p>Green finance</p> <ul style="list-style-type: none"> • As a component of the Ten Point Plan, green finance is essential to delivering the investment needed in innovation and deployment of low-carbon technologies. • Occupations, skills requirements and qualification levels: General professional qualifications for those working in finance e.g. CFA, CMA, ACA, CIMA, CII/Actuarial training etc. These institutions are actively working towards the inclusion of green finance related modules in each course through the Green Finance Education Charter. They are also encouraging more standalone green finance courses delivered by relevant professional bodies. This is in response to identified skills gaps for the industry. <p>Upstream oil and gas</p> <ul style="list-style-type: none"> • The North Sea and indigenous oil and gas supply have been at the heart of the UK’s energy and industrial strategy for over fifty years. The UK already has the capability and skills within the existing sector to lead in new and emerging energy technologies such as CCUS and the hydrogen economy as

		<p>well as to support the growth of new sectors such as offshore wind. If existing sector players are prepared to invest, it has the potential to play an important part in the energy transition and retain vital skills across key regional hubs around the country, supporting the CCUS and hydrogen ‘SuperPlaces’ clusters.</p> <ul style="list-style-type: none"> • Occupations, skills requirements and qualification levels: Prior to Covid-19, domestic oil and gas production, and its associated employment, was already declining from peak levels due to the maturity of the UK Continental Shelf and the general market instability for oil and gas prices.⁹³ This will be particularly felt in Scotland, where there remains a high reliance on the oil and gas industry (over 10% of workers in Aberdeen are directly employed by the sector).⁹⁴ It is also worth noting that currently around 44% of downstream oil sector employees and around 40% of chemicals sector employees hold a degree or equivalent level qualification (Levels 6 and 7+). Future demand for chemical engineers, technicians and specialist roles is expected to increase, but many are already included in the shortage occupations list. <p>The North Sea Transition Deal aims to support and anchor the expert supply chain that has built up around oil and gas in the UK, to both safeguard and create new high-quality jobs. The Deal will transform the sector in preparation for a net zero future and catalyse growth throughout the UK economy. The North Sea Transition Deal is expected to support up to 40,000 direct and indirect supply chain jobs in decarbonising UKCS production and supporting the CCUS and hydrogen sectors</p> <p>Coal</p> <ul style="list-style-type: none"> • Coal mines continue to close in the UK, ahead of the phase-out of unabated coal generation in Great Britain in 2024. • Occupations, skills requirements and qualification levels: Employment in coal mining within the UK peaked at just over one million workers in 1920; the size of the workforce has continued to decrease ever since. In more recent years, the coal mining workforce had fallen to less than 4,000 workers. <p>Steel</p> <ul style="list-style-type: none"> • To reach net zero, the UK’s two blast furnace (BF) sites will need to decarbonise; options include hydrogen direct reduced iron coupled with Electric Arc Furnace (EAF) production or deployment of CCUS. The majority of UK steel production by volume is currently produced by BF, accounting for 93% of the sector’s carbon emissions. The existing EAF production sites in the UK are already considered ‘green’. • Occupations, skills requirements and qualification levels: The UK finished steel industry currently directly employs c. 35,000 workers¹⁰⁰ and indirectly supports another 44,000 jobs.¹⁰¹ EAF production is less labour intensive than BF production. Therefore, a move towards more EAF production in the UK steel industry would likely lead to a fall in steel employment. It is also likely that adopting EAF
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		production would result in some change in the skills requirements of the steel workforce compared to today
Climate Adaptation	Courses leading to jobs in flood defences, retrofitting of buildings to be resilient to extreme weather/climate events, nature-based solutions to reduce climate impacts and civil and mechanical engineering for infrastructure adaptation	<p>Climate change adaptation</p> <ul style="list-style-type: none"> • A wide range of sectors will need to adapt to climate change (e.g. housing & built environment; local government; infrastructure; flood defences). • Occupations, skills requirements and qualification levels: Skills are needed to support adaptation measures in housing & built environment; local government; infrastructure; flood defences.