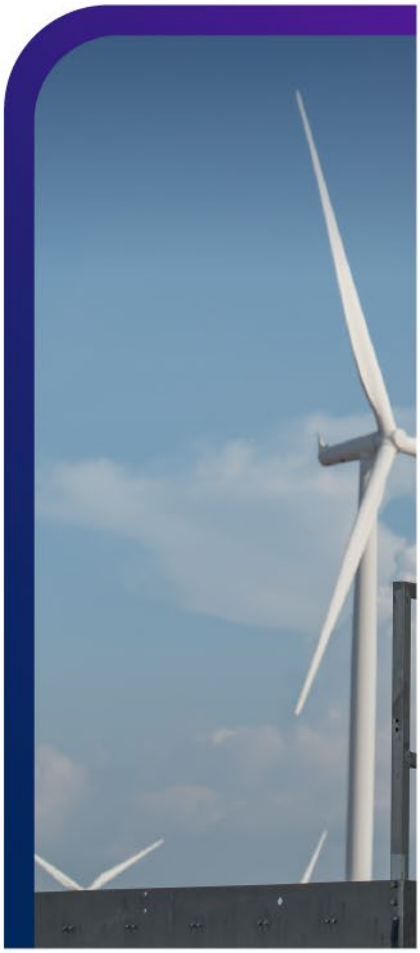
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Green Advantage

Technical annex: Methodology, data & analytical approach

Energy & Climate INTELLIGENCE UNIT

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Methodology

AI framework

Overview

This section sets out how we assign an AI category, low exposure, high exposure with high complementarity, and high exposure with low complementarity, to each standard occupational classification unit group. The AI-exposure measures used within this report provide useful information about which occupations are likely to be affected by technological change, but they should not be interpreted as forecasts of future employment declines.

Two quantities describe each occupation. The first is exposure, which captures how far the abilities an occupation draws on overlap with what AI applications can do. The second is complementarity, which captures how far the social, physical and regulatory features of an occupation are likely to keep a human worker involved rather than allow AI to operate unsupervised. Exposure is measured by the AI Occupational Exposure index (AIOE) of Felten, Raj and Seamans (2021).[1] Complementarity is measured by the parameter theta introduced by Pizzinelli et al. (2023).[2] The two are combined into the Complementarity-Adjusted AIOE (C-AIOE), the continuous headline measure, while the two underlying measures drive the categorisation.

Exposure and complementarity are conceptually separate. A high exposure score signals that AI could plausibly perform parts of the work, but it says nothing about whether AI would replace the worker or assist them. Complementarity supplies that second dimension. Holding exposure fixed, higher complementarity points towards augmentation and lower complementarity points towards substitution.

The AI Occupational Exposure (AIOE) metric

Our measure of occupational exposure to artificial intelligence is based on the AI Occupational Exposure (AIOE) measure developed by Felten, Raj and Seamans (2021). AIOE measures the extent to which advances in AI are relevant to the abilities required within an occupation. It should be interpreted as a measure of exposure to AI, rather than the probability of automation or job displacement.

[1] **Occupational, industry, and geographic exposure to artificial intelligence: A novel dataset and its potential uses**

[2] **Labor Market Exposure to AI: Cross-country Differences and Distributional Implications**

Felten et al. begin by identifying ten applications of AI that had experienced meaningful technological progress. These applications are then linked to the 52 occupational abilities contained within the US O*NET occupational database. These are provided in **Table 1** below.

Table 1: AI applications used to inform exposure

AI application	Description
Abstract strategy games	Playing games requiring complex strategy and reasoning, such as chess or Go
Real-time video games	Performing in real-time video games of increasing complexity
Image recognition	Identifying objects present within a still image
Visual question answering	Recognising events, relationships and context within an image
Image generation	Creating complex images
Reading comprehension	Answering reasoning questions based on an understanding of text
Language modelling	Modelling, predicting or mimicking human language
Translation	Translating words or text between languages
Speech recognition	Recognising spoken language and converting it into text
Instrumental track recognition	Recognising instrumental musical tracks

Source: Felten et al. (2021)

The AIOE score for occupation i combines how capable AI is across a set of human abilities with how central each ability is to the occupation:

$$\text{AIOE}_i = \frac{\sum_{j=1}^{52} A_j \; L_{ji} \, I_{ji}}{\sum_{j=1}^{52} L_{ji} \; I_{ji}}$$

where *j* indexes the 52 O*NET occupational abilities. The term $A_j$is the AI relevance of ability *j*, calculated as the sum of crowdsourced relatedness scores between that ability and each of the ten AI applications recorded by the Electronic Frontier Foundation, then standardised to lie between 0 and 1. The weights $L_{ji}$and $I_{ji}$are the rescaled proficiency level and importance of ability *j* within occupation *i*, drawn from O*NET and each rescaled to lie between 0 and 1.

The complementary parameter (θ)

The complementarity parameter captures where human oversight is likely to persist, measuring the degree to which AI is likely to complement rather than substitute workers in occupation i, following Pizzinelli et al. (2023). It is built from two parts of O*NET. The first is eleven selected work context variables, grouped into five components. The second is job zone scores, which proxy the training and experience an occupation requires. The reasoning is that occupations carrying high-stakes decisions, unpredictable environments or supervisory duty are less amenable to unsupervised AI, and that workers in occupations with long training are better placed to fold AI into their skill set as a supporting tool.

The six components and their constituent variables are set out below.

Table 2: Components used to inform the level of AI-complementarity.

Component	Work context variables
Communication	Face-to-face contact, public speaking
Responsibility	Responsibility for outcomes, responsibility for others' health
Physical conditions	Exposure to outdoor environments, physical proximity to others
Criticality	Consequence of errors, freedom to make decisions, frequency of decision-making
Routine	Degree of automation, structured versus unstructured work
Skills	Job zones

Source: Pizzinelli (2023)

Each work context variable takes a value from 0 to 100. The degree of automation is inverted, so that occupations already highly automated receive lower complementarity, reflecting their greater substitution risk as AI advances. Job zones carry an ordered value from 1 to 5, multiplied by 20 to convert to a 20 to 100 scale. Each component score is the arithmetic mean of its constituent variables, and θ itself is the arithmetic mean of the six component scores divided by 100, which bounds it between 0 and 1.

Mapping to UK SOC codes

AIOE and θ are both constructed on O*NET occupations, which use the US Standard Occupational Classification, so both measures need to be mapped onto UK SOC 2020 before they can be applied to this report's occupation list. That mapping runs through the International Standard Classification of Occupations (ISCO-08). Pizzinelli kindly provided us with their results across ISCO-08 codes and the ONS maintains the equivalent link on the UK side by mapping SOC 2020 to ISCO-08. Combining the two gives a workable, if indirect, route from O*NET occupations to UK SOC 2020.

Job titles sitting within a single SOC 2020 unit group are often split across several ISCO-08 unit groups, and the reverse happens too. We use a mapping developed by the Office for National Statistics (ONS) using the Computer Assisted Structured Coding Tool (CASCOT), a text-matching program built for coding occupational descriptions against a target classification.[3] This job-title-level, ISCO-08-linked SOC 2020 index is the practical basis for reconciling O*NET occupations, and therefore AIOE and θ, with UK SOC 2020 in this report.

Occupational Categorisation

Each occupation is sorted into one of three categories. The rule is applied in a fixed order, testing exposure before complementarity, which reflects the point in Pizzinelli et al. (2023) that complementarity only bears on labour demand once an occupation is meaningfully exposed. Below the exposure threshold there is limited scope for AI to reshape the work, so the complementarity dimension is not consulted. Let τ_A denote the exposure threshold and τ_θ the complementarity threshold, both defined in the next section.

- Low exposure. Occupations with $\text{AIOE}_i < \tau_A$. The overlap between the occupation's abilities and current AI capabilities is low, so AI has limited scope to alter the work whatever its complementarity. These occupations are not divided further.
- High exposure, high complementarity. Occupations with $\text{AIOE}_i \geq \tau_A$ and $\theta_i \geq \tau_\theta$. Exposure is high, but the occupation carries features such as high-stakes decisions, physical adaptability, or long training that favour a continuing human role. AI is more likely to augment than to replace.
- High exposure, low complementarity. Occupations with $\text{AIOE}_i \geq \tau_A$ and $\theta_i < \tau_\theta$. Exposure is high and few features would keep a human in the loop, so these occupations have the highest potential for AI substitution. This reflects occupational exposure and potential technological substitution of tasks, not a forecast of job losses or an assessment of the risk to any individual job.

[3] See **Classifying the Standard Occupational Classification 2020 (SOC 2020) to the International Standard Classification of Occupations (ISCO-08) - Office for National Statistics**

Thresholds are drawn from the full occupational distribution

The two thresholds are the medians of AIOE and θ. Because the report positions green occupations against the wider labour market rather than against one another, the medians are computed over the full set of UK SOC 2020 four-digit occupations, not over the green subset. A threshold taken from the green subset alone would shift with the composition of that subset and could reclassify an occupation purely because of the comparison group, which would not be meaningful for a report about potential for AI substitution relative to the economy as a whole. Each four-digit occupation counts once in setting the median, so the cut points describe the occupational distribution independently of how many people work in each occupation.

Limitations

- The measures provide a snapshot of exposure based on the occupational structure of employment in a single survey year. They describe where AI could interact with work, but say nothing about when or how quickly this will happen. Because the analysis is partial equilibrium, it also abstracts from wider economic adjustments such as changes in wages, prices, demand for output and the movement of workers between occupations, all of which would shape the eventual labour market outcome.
- The complementarity index is an average of six components, and the AIOE treats each of its 10 AI applications as equally relevant. This is a cautious choice given the limited evidence on which factors matter most, but it is unlikely to reflect reality for every occupation.
- AIOE and C-AIOE rank occupations against each other and are best interpreted as indicating which workers are more or less exposed. The scores have no natural unit and do not map onto a probability of displacement or a share of tasks that could be automated. As a result, they cannot support statements about how many jobs are at risk in absolute terms.
- The AIOE is based on a defined set of AI applications such as image recognition, translation and text generation, which rely on finding patterns in data to make predictions. This includes generative AI but excludes general AI capable of acting autonomously, as well as AI embedded in robotics and physical automation. The underlying mapping also reflects the state of AI capabilities at the time it was constructed, and may understate exposure in areas where capabilities have since advanced rapidly.
- The framework measures how existing occupations overlap with AI capabilities, but cannot anticipate the new tasks, roles and industries that AI may generate. Historically, new technologies have created substantial new work alongside the tasks they displaced, and this has been an important source of employment growth over time.

Green apprenticeships

This analysis estimates the distribution of young people enrolled in green apprenticeships across different categories of occupational exposure to AI. It combines Skills England definitions of green apprenticeships with Department for Education (DfE) apprenticeship enrolment data and an occupation-level AI exposure framework.

The analysis is conducted at the four-digit SOC 2020 level, allowing apprenticeship enrolments to be linked to the AI exposure and complementarity characteristics of the occupations for which apprentices are training.

Mapping apprenticeship standards to occupations

We first constructed a mapping between apprenticeship standards and occupations using the Skills England Occupational Maps. These provide apprenticeship standard (ST) codes and information on the occupations associated with each standard, including corresponding four-digit SOC 2020 codes.

Where an apprenticeship standard could not be assigned a SOC 2020 code using the Skills England mapping, we supplemented the mapping using the ONS SOC 2020 English Apprenticeship Standards mapping[4]. This provides a crosswalk between apprenticeship standards and SOC 2020 occupations and enabled additional apprenticeship standards to be assigned to an occupational classification. Where available, the Skills England mapping was therefore used as the primary source, with the ONS mapping used to fill gaps.

Identifying green apprenticeships

The resulting apprenticeship-to-SOC mapping was filtered using Skills England's classification of green apprenticeships. The analysis focuses on apprenticeship standards identified as either 'dark green' or 'mid green', allowing these groups to be analysed separately as well as collectively with the broader green apprenticeship definition.

[4] SOC 2020 English apprenticeship standards - Office for National Statistics

Linking apprenticeship enrolments

Apprenticeship enrolment data were obtained from the Department for Education's Explore Education Statistics apprenticeship data, which reports enrolments by apprenticeship standard, including the corresponding ST code. The analysis uses 2024/25, the latest complete academic year available at the time of analysis, and is restricted to 16–24-year-olds. This age restriction ensures that the results describe the occupational composition and AI exposure of green apprenticeships undertaken by young people.

The use of enrolments means that the analysis captures the stock of young people undertaking an apprenticeship during 2024/25, rather than simply the number of apprenticeship standards listed as available or the number of new apprenticeships starts during the year.

Allocating enrolments across occupations

DfE enrolment data were matched to the green apprenticeship dataset using the apprenticeship ST code. In most cases, an ST code could be linked directly to a single occupational classification. However, some apprenticeship standards are associated with more than one occupation and, consequently, more than one four-digit SOC 2020 code.

DfE enrolment data are not sufficiently granular to identify how learners within an individual ST code are distributed between these underlying occupations. Where an ST code mapped to multiple distinct SOC codes, we therefore allocated its enrolments equally across the associated SOC codes. For example, where an apprenticeship standard had 1,000 enrolments and mapped to two distinct SOC 2020 occupations, 500 enrolments were allocated to each occupation. This ensures that the total number of enrolments is preserved while allowing standards covering multiple occupations to be incorporated into the occupation-level analysis.

This equal allocation represents a simplifying assumption necessitated by the absence of enrolment information below the ST-code level. Results for standards spanning multiple SOC codes should therefore be interpreted as estimates of their occupational distribution rather than observed allocations of apprentices between occupations which we make note to in the report.

Linking apprenticeships to AI exposure

The estimated apprenticeship enrolments were linked to the AI exposure framework using their associated four-digit SOC 2020 codes. Each occupation was assigned to the relevant AI exposure and complementarity category. Apprenticeship enrolments were then used as weights to estimate the proportion of young people enrolled in green apprenticeships associated with each AI category. This means that the resulting percentages represent the share of 16–24-year-old green apprenticeship enrolments, rather than the share of apprenticeship standards. A large apprenticeship standard therefore contributes proportionately more to the overall results than a standard with relatively few enrolments.

The resulting analysis provides an estimate of the extent to which young people undertaking green apprenticeships are training for occupations that are relatively exposed to AI, and whether that exposure is expected to be more complementary to workers or potentially substitutive of their tasks.

Limitations

- The results in this section relate to apprenticeship participation in England. The DfE dataset does not cover apprenticeship systems in Scotland, Wales or Northern Ireland, and the estimates should not be treated as UK-wide. Equivalent analysis for the devolved nations would require their apprenticeship programmes to be mapped separately to occupations and to the AI framework.
- The Skills England definition is occupation-based rather than employer- or industry-based. Participation on a green-classified standard does not establish that every apprentice is currently working for a green employer or on an explicitly green activity. Mid-green standards in particular can support employment across both green and non-green parts of the economy.
- Participation measures the number of learners undertaking a programme during the year. It does not measure completions, progression into sustained employment or the proportion who ultimately work in the green economy. Nor does it show whether the existing number of places is sufficient to meet projected demand.
- The AI categories are assigned at occupational level. Individual apprentices may perform different tasks within the same occupation, and the content of apprenticeship standards will evolve as technologies and employer requirements change.

These limitations affect how the results should be interpreted, but they do not alter the central finding. The apprenticeship routes currently associated with green occupations are overwhelmingly concentrated in work that is either relatively unexposed to AI or supported by characteristics that make AI more likely to complement human labour.

Green jobs

Defining green employment

There are multiple ways to define and measure green employment. The Office for National Statistics (ONS) defines a green job as employment in an activity that contributes to protecting or restoring the environment, including activities that mitigate or support adaptation to climate change. Its headline, industry-based approach draws primarily on two sources: the Low Carbon and Renewable Energy Economy (LCREE) estimates and the Environmental Goods and Services Sector (EGSS) accounts, supplemented by other sources including the Business Register and Employment Survey (BRES) for particular activities.

LCREE and EGSS capture different parts of the environmental economy. LCREE measures activity across 17 low-carbon and renewable-energy sectors, while EGSS measures 17 activities producing goods and services for environmental protection and resource-management purposes. Both report employment on a full-time-equivalent (FTE) basis, but their different scopes mean that they should not be interpreted as alternative estimates of exactly the same population.

This analysis therefore estimates the occupational composition of LCREE and EGSS separately, before applying the same AI exposure and complementarity framework to each. Using both measures allows the analysis to test whether the occupational pattern identified within low-carbon and renewable-energy activity is also evident across the different mix of environmental activity captured by EGSS.

Within LCREE, the analysis also separately examines renewable energy and low-carbon transport, constructed from the relevant LCREE sectors, to explore the occupational and AI profiles of two important components of the low-carbon economy.



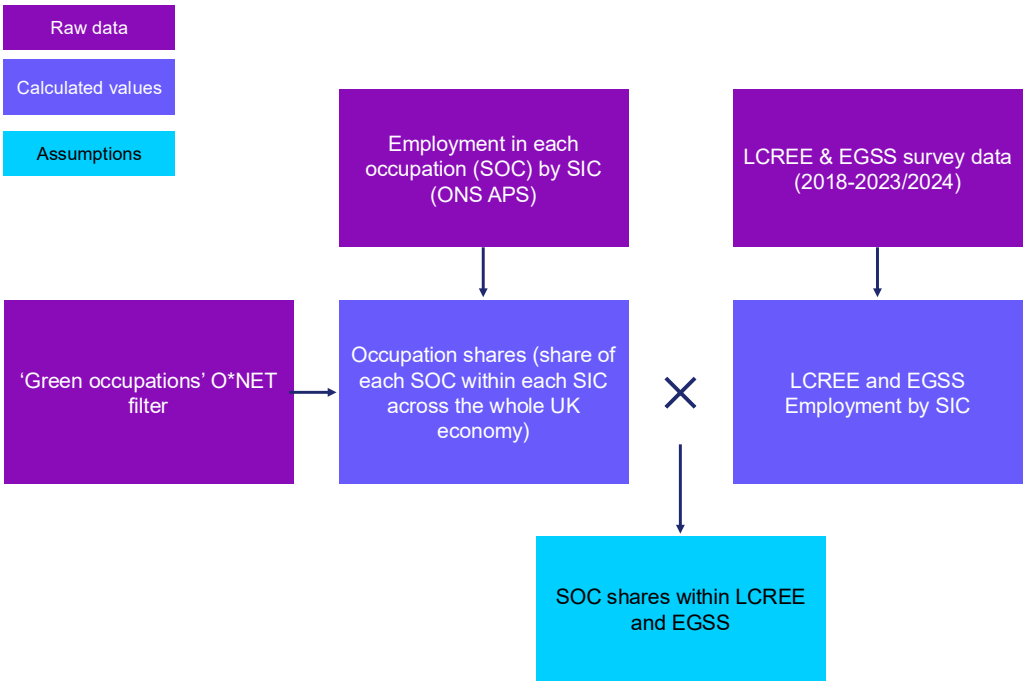
Estimating green employment occupational composition

The approach follows a methodology similar to that used in the Clean Energy Jobs Plan[5]. For LCREE and EGSS, the distribution of employment across Standard Industrial Classification (SIC) industries is combined with data from the Annual Population Survey (APS), which provides Standard Occupational Classification (SOC) employment by industry. The analysis uses LCREE data for 2018 to 2024 and the latest available EGSS data for 2023. Within LCREE, the same approach is applied separately to the renewable energy and low-carbon transport groupings, both of which comprise multiple LCREE sectors.

Our analysis extends the Clean Energy Jobs Plan methodology in one respect. An additional occupational filter is applied using the O*NET green occupations taxonomy, mapped to UK SOC codes by Skills Development Scotland[6]. This restricts the occupational profile within each industry to occupations considered relevant to green economic activity. Combining the industry and occupational distributions makes it possible to estimate the occupational composition of employment captured by LCREE and EGSS, as well as the renewable energy and low-carbon transport groupings within LCREE.

An overview of the approach is provided below, adapted from the Clean Energy Jobs Plan.

Figure 1: Adapted clean energy jobs plan experimental methodology for disaggregating clean energy workforce estimations by workforce.



[5] Clean energy jobs plan: technical annex (HTML) - GOV.UK

[6] Green Jobs in Scotland - Skills Development Scotland

Distribution of green employment across industries

Both LCREE and EGSS report employment on a full-time equivalent (FTE) basis. For LCREE, some cells in the published industry tables are suppressed for confidentiality where a small number of large employers dominate an industry. Suppression does not mean the underlying value is small, so suppressed cells cannot simply be treated as zero without understating totals. To address this, each LCREE sector's industry profile is constructed from the average of its annual industry shares over 2018 to 2024, using only years in which a figure is published. Averaging across several years reduces the effect of year-to-year suppression, since an industry need only be published in some years to contribute. Negligible entries are treated as zero, and each sector's profile is then scaled to its published sector total, producing a complete and internally consistent distribution of employment across industries.

For EGSS, the corresponding industry distribution is constructed using the latest available 2023 employment estimates. The resulting LCREE and EGSS industry distributions provide the weights used to estimate occupational composition. Within LCREE, separate industry distributions are also constructed for the renewable energy and low-carbon transport groupings from their constituent LCREE sectors.

Green occupational composition within each industry

The second input is the occupational composition of each industry, drawn from the Annual Population Survey, which records employment by occupation within industry.

Within each industry, employment is restricted to green occupations identified using the O*NET green occupations taxonomy mapped to the UK Standard Occupational Classification. These are occupations considered relevant to green economic activity rather than occupations that are necessarily intrinsically green in every context. The filter retains occupations likely to contribute to the activities captured by LCREE and EGSS and excludes occupations unlikely to form part of the direct green workforce.

For each industry, each retained occupation's share of employment across the filtered occupational set is then calculated. The same occupational distribution is used when disaggregating LCREE and EGSS employment, ensuring that differences between the resulting occupational profiles reflect, in part, the different industry compositions of the two measures.

Combining the two distributions

The occupational distribution of green employment is obtained by weighting each industry's green occupational composition by that industry's share of green employment, then summing across industries. For a given occupation s:

$$P(SOC = s \mid LCREE/EGSS) = \sum_i P(SOC = s \mid i) \, x \, P(i \mid LCREE/EGSS)$$

where i indexes industries. This is a weighted average of the within-industry green occupational shares, using the industry shares of green employment as the weights.

Box 1- Disaggregating estimates by occupation: a worked example

(Numbers are illustrative only)

In offshore wind, LCREE employment is concentrated in 'SIC 71 - Architectural and engineering activities; technical testing and analysis'.

- There were 4,000 FTEs employed in Offshore Wind in this SIC 71 in 2023
- 10% of jobs in this SIC (across the economy) are in 'SOC 2451- architects'
- Therefore, modelling estimates that there were 400 FTEs employed as architects in 2023 in offshore wind within SIC 71.

4,000 [LCREE FTEs] **x 0.1** [SIC/SOC share] **= 400**

These calculations are run for all SIC codes to obtain SOC shares for each LCREE sector. The same approach is applied to EGSS using the corresponding EGSS FTE employment distribution by industry.

The method is applied separately to LCREE and EGSS, and to the renewable energy and low-carbon transport groupings within LCREE. The result is an estimated occupational distribution across the 172 four-digit SOC occupations retained by the green occupation filter for each measure. These occupational distributions are subsequently linked to the AI exposure and complementarity classifications used in the main analysis.

Source: Adapted from the Clean Energy Jobs Plan Technical Annex, DESNZ (2025)

Limitations

- The occupational mix of green activity within an industry is assumed to match the occupational mix identified for that industry after applying the green occupation filter. This is necessary because neither LCREE nor EGSS directly observes employment simultaneously by detailed green activity, industry and occupation. It is the main source of uncertainty in the occupational estimates and may overstate occupations common across an industry while understating occupations particularly concentrated in green activity.
- Industry and occupational profiles are assumed to be broadly stable over the periods used. For LCREE, averaging several years of industry data helps smooth year-to-year volatility and the effects of suppressed observations. EGSS uses the latest available 2023 industry distribution and therefore does not benefit from the same multi-year averaging. Survey- and model-based estimates for smaller activities and industries may be more uncertain, while the level of available industry detail means variation within SIC groups is not captured.
- LCREE and EGSS capture different parts of the green economy and should not be added together or interpreted as directly comparable estimates of the same employment population. The methodology estimates their occupational composition separately and applies the same AI exposure framework to each.
- The analysis estimates direct employment captured by LCREE and EGSS rather than the wider employment supported through supply chains or induced economic activity. The results therefore describe the occupational composition of employment within the scope of each measure rather than the full employment footprint supported by the green economy.

Adzuna regional analysis

To complement the employment-based analysis, we use Adzuna Intelligence job postings data to examine the geographic distribution of employer demand for roles associated with specific areas of the green economy. Whereas the LCREE analysis provides estimates of employment associated with low-carbon activities, online job postings provide a more timely, demand-side indication of where employers are recruiting workers with relevant skills and knowledge.

The Adzuna analysis should therefore be interpreted as a proxy for the geographic distribution of recruitment demand, rather than as a direct measure of employment in renewable energy or low-carbon transport.

Identifying relevant job postings

Adzuna Intelligence contains information on online job advertisements, including the occupation associated with each vacancy and the skills and knowledge requirements referenced within the posting. We use these characteristics to identify vacancies associated with the two areas considered in our regional deep dives: renewable energy and low-carbon transport.

For the renewable-energy analysis, we identify job postings containing references to "renewable energy" within their identified skill or knowledge requirements. For the low-carbon transport analysis, we similarly identify postings containing references to "EV", as a proxy for demand associated with electric vehicles.

This approach allows us to identify vacancies where employers explicitly signal demand for these areas of knowledge or expertise. However, it does not provide a comprehensive measure of all recruitment associated with either sector. Relevant vacancies may not explicitly reference these terms, while the terms may also appear in vacancies whose connection to the green economy is relatively indirect. The estimates should consequently be interpreted as an experimental indicator of recruitment demand associated with these activities, rather than a complete measure of green vacancies.

Restricting the analysis to green occupations

Each Adzuna job posting is assigned an occupational classification, allowing vacancies to be linked to Standard Occupational Classification (SOC) codes. To maintain consistency with the wider occupational analysis, we apply our existing green occupation classification to the Adzuna data. Only job postings associated with occupations identified as green are retained. This additional restriction is intended to improve the precision of the keyword-based approach. References to terms such as "renewable energy" or "EV" can occur in vacancies that have only a peripheral relationship with the activities we are seeking to measure. Requiring vacancies to both reference the relevant skill or knowledge area and fall within a green occupation reduces the likelihood that unrelated vacancies are included. We aggregate job postings across 2018–2024, consistent with the period used in the corresponding LCREE analysis.

Limitations

- Online vacancies capture recruitment activity rather than the existing stock of employment, and not all vacancies are advertised online. A single job posting may also represent more than one vacancy, while repeated advertisements could result in some jobs being observed more than once depending on the treatment of duplicate postings within the underlying data.
- The identification of renewable-energy and EV vacancies relies on explicit references within job postings. Relevant jobs that do not mention the selected terms will therefore not be captured, while some postings containing these terms may only be indirectly related to the activity of interest. Applying the green occupation filter helps mitigate the latter issue but does not remove it entirely.



Tables

Appendix Table A.1: ONS classification of low carbon and renewable energy economy (LCREE) sectors and environmental goods and services sector (EGSS) activities, UK

LCREE sector	EGSS activity
Offshore wind	Energy saving and sustainable energy systems
Onshore wind	Environmental charities
Solar	Environmental consultancy and engineering services
Hydropower	Environmental construction
Other renewable electricity	Environmental education
Bioenergy	Environmental low emissions vehicles, carbon capture and inspection and control
Alternative fuels	In-house environmental activities
Renewable heat	Insulation activities
Renewable combined heat and power	Management of forest ecosystems
Energy efficient lighting	Managerial activities of government bodies
Energy efficient products	Organic agriculture
Energy monitoring, saving or control systems	Production of industrial environmental equipment
Low carbon consultancy, advisory and offsetting services	Production of renewable energy
Low emission vehicles and infrastructure	Recycling
Carbon capture and storage	Waste
Nuclear power	Wastewater
Fuel cells and energy storage systems	Water quantity management

Notes: LCREE and EGSS are separate ONS classifications and are not directly comparable; businesses and activities may appear in more than one LCREE sector. The two columns list each classification independently; rows are not paired.

Sources: ONS, Low Carbon and Renewable Energy Economy (LCREE) Survey; ONS, UK Environmental Goods and Services Sector (EGSS) quality and methodology information.

Appendix Table A.2: List of dark-green apprenticeships (Skills England)

Green apprenticeship enrolments and AI exposure, dark green apprenticeship standards, England: 2024/25

Apprenticeship standard	SOC 2020 code	AI exposure category
ST0018: Crop technician - Soil Based Systems Crop Technician	5112	Low exposure
ST0092: Community energy specialist	3541	High exposure, high complementarity
ST0158: Dual fuel smart meter installer	5241	Low exposure
ST0161: Energy manager	3541	High exposure, high complementarity
ST0223: Arborist	5119	Low exposure
ST0225: Horticulture or landscape construction operative - Horticulture operative	5113	Low exposure
ST0225: Horticulture or landscape construction operative - Landscape construction operative	5113	Low exposure
ST0226: Horticulture or landscaping supervisor - Horticulture Supervisor	5113	Low exposure
ST0226: Horticulture or landscaping supervisor - Landscaping Supervisor	5113	Low exposure
ST0290: Nuclear health physics monitor	3111	Low exposure
ST0291: Nuclear operative	8133	Low exposure
ST0408: Countryside worker	5119	Low exposure
ST0507: Metal recycling general operative - end-of-life vehicles operative	9225	Low exposure
ST0507: Metal recycling general operative - material classification operative	9225	Low exposure
ST0507: Metal recycling general operative - material handler (specialist equipment) operative	9225	Low exposure
ST0507: Metal recycling general operative - waste electrical and electronic equipment operative	9225	Low exposure
ST0507: Metal recycling general operative - weighbridge operative	9225	Low exposure
ST0528: High speed rail and infrastructure technician - Civil Engineering Advanced Technician	3114	Low exposure
ST0528: High speed rail and infrastructure technician - Command, Control and Communications (CCC) Advanced Technician	3114	Low exposure
ST0528: High speed rail and infrastructure technician - Operations Advanced Technician	3114	Low exposure
ST0528: High speed rail and infrastructure technician - Power Advanced Technician	3114	Low exposure
ST0528: High speed rail and infrastructure technician - Rolling Stock Advanced Technician	3114	Low exposure

Apprenticeship standard	SOC 2020 code	AI exposure category
ST0528: High speed rail and infrastructure technician - Systems Engineering Advanced Technician	3114	Low exposure
ST0528: High speed rail and infrastructure technician - Track Advanced Technician	3114	Low exposure
ST0577: Ecologist (integrated degree) - Consultant ecologist	2151	High exposure, high complementarity
ST0577: Ecologist (integrated degree) - Ecological scientist	2151	High exposure, high complementarity
ST0577: Ecologist (integrated degree) - Landscape ecologist	2151	High exposure, high complementarity
ST0682: Digital device repair technician	5244	Low exposure
ST0714: Environmental health practitioner (integrated degree)	2483	High exposure, high complementarity
ST0741: Landscape technician	5113	Low exposure
ST0748: Sustainability business specialist (integrated degree)	2152	High exposure, high complementarity
ST0767: Water environment worker - Maintaining & Working with Heritage Assets in the Water Environment	2151	High exposure, high complementarity
ST0767: Water environment worker - Managing Assets & Responding to Major Incidents in the Water Environment	2151	High exposure, high complementarity
ST0767: Water environment worker - Water Level Management, Flood Risk and Drainage in the Water Environment	2151	High exposure, high complementarity
ST0767: Water environment worker - Working with Volunteers in the Water Environment	2151	High exposure, high complementarity
ST0778: Environmental practitioner (Degree)	2152	High exposure, high complementarity
ST0921: Arboriculturist	5119	Low exposure
ST0922: Professional arboriculturist	5119	Low exposure
ST0923: Professional forester (integrated degree)	1212	Low exposure
ST0924: Horticulture and landscaping technical manager	1211	Low exposure
ST0926: Countryside ranger	5119	Low exposure
ST0934: Corporate responsibility and sustainability practitioner	3549	High exposure, low complementarity
ST1020: Low carbon heating technician	5315	Low exposure
ST1308: Heat network maintenance technician - Heat network distribution systems specialist	5315	Low exposure
ST1308: Heat network maintenance technician - Heat network residential systems specialist	5315	Low exposure
ST1321: Forest craftsperson - Forest establishment and maintenance craftsperson	9112	Low exposure
ST1321: Forest craftsperson - Forest harvesting craftsperson	9112	Low exposure

Apprenticeship standard	SOC 2020 code	AI exposure category
ST1362: Soil scientist	2112	High exposure, high complementarity
ST1375: Retrofit coordinator	4159	High exposure, low complementarity
ST1399: Hydrogeologist (integrated degree)	2114	High exposure, high complementarity
ST1427: Forestry works manager	1212	Low exposure

Notes: Enrolments are 16–24-year-old starts in the 2024/25 academic year

Sources: Skills England Occupational Maps; Department for Education, CBI Economics analysis.

Appendix Table A.3: List of mid-green apprenticeships (Skills England)

Green apprenticeship enrolments and AI exposure, mid-green apprenticeship standards, England: 2024/25

Apprenticeship standard	SOC 2020 code	AI exposure category
ST0010: Aerospace engineer	2126	High exposure, low complementarity
ST0013: High integrity software engineer	2134	High exposure, low complementarity
ST0018: Crop technician - Container Based Systems Crop Technician	5112	Low exposure
ST0023: Control systems engineer (degree)	2129	High exposure, high complementarity
ST0024: Electrical or electronic technical support engineer (degree)	2123	High exposure, low complementarity
ST0025: Manufacturing engineer (degree)	2125	High exposure, high complementarity
ST0027: Product design and development engineer (degree)	3429	High exposure, low complementarity
ST0033: Motor vehicle service and maintenance technician - light vehicle	5231	Low exposure
ST0041: Building services engineering senior technician	3114	Low exposure
ST0043: Construction design and build technician	3114	Low exposure
ST0044: Design and construction management (degree)	2455	High exposure, high complementarity
ST0045: Construction quantity surveyor (degree)	2453	High exposure, high complementarity
ST0046: Civil engineering senior technician	3114	Low exposure
ST0047: Construction site management (degree)	2455	High exposure, high complementarity
ST0048: Construction site supervisor	5330	Low exposure

Apprenticeship standard	SOC 2020 code	AI exposure category
ST0049: Construction quantity surveying technician	3114	Low exposure
ST0051: Highway electrical maintenance and installation operative	5241	Low exposure
ST0052: Highways electrician or service operative	5241	Low exposure
ST0056: Bid and proposal co-ordinator	4129	High exposure, low complementarity
ST0061: Building services engineering service and maintenance engineer	3113	Low exposure
ST0062: Building services engineering craftsperson	3114	Low exposure
ST0063: Building services engineering technician 2022	5241	Low exposure
ST0065: Building services engineering installer	5241	Low exposure
ST0067: Bus and coach engineering technician - Coach Builder	5231	Low exposure
ST0067: Bus and coach engineering technician - Electrical	5231	Low exposure
ST0067: Bus and coach engineering technician - Mechanical	5231	Low exposure
ST0067: Bus and coach engineering technician - Mechelec	5231	Low exposure
ST0068: Heavy vehicle service and maintenance technician	5231	Low exposure
ST0091: Civil engineering technician	3114	Low exposure
ST0094: Composites technician	3119	Low exposure
ST0107: Systems engineer (degree)	2129	High exposure, high complementarity
ST0149: Learning and skills teacher	2312	High exposure, high complementarity
ST0150: Electrical, electronic product service and installation engineer	5241	Low exposure
ST0151: Embedded electronic systems design and development engineer (degree)	2124	High exposure, low complementarity
ST0152: Installation and maintenance electrician	5241	Low exposure
ST0154: Maintenance and operations engineering technician - Control & Instrumentation Technician	2125	High exposure, high complementarity
ST0154: Maintenance and operations engineering technician - Electrical System & Process Control Technician	5241	Low exposure
ST0154: Maintenance and operations engineering technician - Electrical Technician	5241	Low exposure
ST0154: Maintenance and operations engineering technician - Electromechanical Technician	5241	Low exposure
ST0154: Maintenance and operations engineering technician - Mechanical Technician	5223	Low exposure
ST0154: Maintenance and operations engineering technician - Plant Operations Technician	8133	Low exposure
ST0154: Maintenance and operations engineering technician - Wind Turbine Technician	3113	Low exposure

Apprenticeship standard	SOC 2020 code	AI exposure category
ST0155: Gas engineering operative	5315	Low exposure
ST0157: Electrical power protection and plant commissioning engineer	3113	Low exposure
ST0162: Engineering construction pipefitter	5214	Low exposure
ST0163: Project controls technician	3116	Low exposure
ST0164: Engineering design technician - Control and instrumentation design technician	3120	High exposure, low complementarity
ST0164: Engineering design technician - Electrical power design technician	3120	High exposure, low complementarity
ST0164: Engineering design technician - Mechanical design technician	3120	High exposure, low complementarity
ST0164: Engineering design technician - Piping design technician	3120	High exposure, low complementarity
ST0164: Engineering design technician - Structural design technician	3120	High exposure, low complementarity
ST0171: Property maintenance operative	8159	Low exposure
ST0192: Improvement practitioner	3549	High exposure, low complementarity
ST0195: Food and drink maintenance engineer	5223	Low exposure
ST0197: Food industry technical professional (integrated degree)	2129	High exposure, high complementarity
ST0204: Gas network operative	5315	Low exposure
ST0205: Gas network craftsperson - Emergency Response Craftsperson	5315	Low exposure
ST0205: Gas network craftsperson - Network Maintenance Craftsperson (Electrical & Instrumentation)	5315	Low exposure
ST0205: Gas network craftsperson - Network Maintenance Craftsperson (Pressure Management)	5315	Low exposure
ST0205: Gas network craftsperson - Network Pipelines Maintenance Craftsperson	5315	Low exposure
ST0234: Housing and property management	3223	High exposure, high complementarity
ST0235: Housing and property management assistant	4159	High exposure, low complementarity
ST0236: Senior housing and property management	1251	High exposure, high complementarity
ST0242: Land-based service engineer	5223	Low exposure
ST0243: Land-based service engineering technician	5223	Low exposure
ST0265: Construction assembly and installation operative - Concrete	8119	Low exposure
ST0265: Construction assembly and installation operative - Permanent modular	8149	Low exposure

Apprenticeship standard	SOC 2020 code	AI exposure category
ST0265: Construction assembly and installation operative - Relocateable modular and portable	8149	Low exposure
ST0265: Construction assembly and installation operative - Timber	8149	Low exposure
ST0267: Lifting technician - Crawler Crane Operator	8221	Low exposure
ST0267: Lifting technician - Mobile Crane Operator	8221	Low exposure
ST0267: Lifting technician - Tower Crane Operator	8221	Low exposure
ST0270: Roofer - Roof sheeter and cladder	5314	Low exposure
ST0270: Roofer - Roof slater and tiler	5314	Low exposure
ST0270: Roofer - Waterproof membranes installer	5314	Low exposure
ST0271: Steel fixer	5319	Low exposure
ST0276: Maritime mechanical and electrical mechanic	5246	Low exposure
ST0282: Metrology technician	3119	Low exposure
ST0283: Senior metrology technician	3119	Low exposure
ST0288: Non-destructive technologies technician	3112	Low exposure
ST0289: Nuclear scientist and nuclear engineer (integrated degree)	2129	High exposure, high complementarity
ST0292: Nuclear welding inspection technician	3115	High exposure, high complementarity
ST0303: Plumbing and domestic heating technician - Domestic air source heat pumps & solar thermal systems technician	5315	Low exposure
ST0303: Plumbing and domestic heating technician - Domestic gas fired hot water heating appliances technician	5315	Low exposure
ST0303: Plumbing and domestic heating technician - Non-domestic plumbing technician	5315	Low exposure
ST0315: Railway engineering design technician	3133	High exposure, low complementarity
ST0316: Rail engineering advanced technician - Electrification Advanced Technician	3113	Low exposure
ST0316: Rail engineering advanced technician - Overhead Lines Advanced Technician	3113	Low exposure
ST0316: Rail engineering advanced technician - Rail Systems Advanced Technician	3113	Low exposure
ST0316: Rail engineering advanced technician - Signalling Advanced Technician	5249	Low exposure
ST0316: Rail engineering advanced technician - Telecoms Advanced Technician	5242	Low exposure
ST0316: Rail engineering advanced technician - Track Advanced Technician	3113	Low exposure
ST0316: Rail engineering advanced technician - Traction & Rolling Stock Advanced Technician	5236	Low exposure
ST0317: Rail engineering operative - Infrastructure operative	8153	Low exposure

Apprenticeship standard	SOC 2020 code	AI exposure category
ST0317: Rail engineering operative - Operations operative	5249	Low exposure
ST0318: Rail engineering technician - Electrification	5249	Low exposure
ST0318: Rail engineering technician - Overhead Lines	5249	Low exposure
ST0318: Rail engineering technician - Rail Systems	8153	Low exposure
ST0318: Rail engineering technician - Signalling	5249	Low exposure
ST0318: Rail engineering technician - Telecoms	5242	Low exposure
ST0318: Rail engineering technician - Track	8153	Low exposure
ST0318: Rail engineering technician - Traction & Rolling Stock	5236	Low exposure
ST0322: Refrigeration air conditioning and heat pump engineering technician	5225	Low exposure
ST0331: Chartered surveyor (degree) - Building Surveying	2454	Low exposure
ST0331: Chartered surveyor (degree) - Property	2454	Low exposure
ST0331: Chartered surveyor (degree) - Quantity Surveying & Project Management	2454	Low exposure
ST0332: Surveying technician - Building surveying	3114	Low exposure
ST0332: Surveying technician - Commercial property surveying	3114	Low exposure
ST0332: Surveying technician - Consultant (professional) project management	3114	Low exposure
ST0332: Surveying technician - Consultant (professional) quantity surveying	3114	Low exposure
ST0332: Surveying technician - Land surveying (including rural, minerals and waste management and planning and development)	3114	Low exposure
ST0332: Surveying technician - Residential property surveying	3114	Low exposure
ST0332: Surveying technician - Valuation surveying	3114	Low exposure
ST0333: Commercial thermal insulation operative	8159	Low exposure
ST0336: Transport planning technician	2455	High exposure, high complementarity
ST0337: Passenger transport operations manager	1241	High exposure, high complementarity
ST0338: Passenger transport driver - bus and coach or tram - Bus and coach driver	8212	Low exposure
ST0338: Passenger transport driver - bus and coach or tram - Tram Driver	8231	Low exposure
ST0349: Welder	5213	Low exposure
ST0358: Non-destructive testing (NDT) operator	8143	Low exposure
ST0364: Marine engineer	3512	High exposure, high complementarity
ST0369: Non-destructive testing engineer (degree)	2129	High exposure, high complementarity

Apprenticeship standard	SOC 2020 code	AI exposure category
ST0372: Building services engineer	2121	High exposure, high complementarity
ST0376: Motorcycle technician (repair and maintenance)	5231	Low exposure
ST0380: Nuclear technician	2129	High exposure, high complementarity
ST0387: Lift truck and powered access engineering technician	5223	Low exposure
ST0396: Cultural learning and participation officer	3221	High exposure, high complementarity
ST0400: Small commercial vessel crewmember	8232	Low exposure
ST0405: Vehicle damage mechanical, electrical and trim (MET) technician	5231	Low exposure
ST0409: Cyber security technical professional (integrated degree)	2135	High exposure, low complementarity
ST0412: Underkeeper	5119	Low exposure
ST0417: Civil engineer	3114	Low exposure
ST0420: Lean manufacturing operative - Inspection/Quality	8143	Low exposure
ST0420: Lean manufacturing operative - Logistics/Material	8149	Low exposure
ST0420: Lean manufacturing operative - Production Processing/Finishing	8149	Low exposure
ST0420: Lean manufacturing operative - Production/Assembly	8149	Low exposure
ST0422: Science manufacturing process operative	8160	Low exposure
ST0427: Marine pilot	3512	High exposure, high complementarity
ST0432: Engineering fitter	5241	Low exposure
ST0433: Engineering construction erector rigger - Engineering construction erector	8151	Low exposure
ST0433: Engineering construction erector rigger - Engineering construction rigger	8151	Low exposure
ST0453: Water treatment technician - Legionella Risk Assessor	8134	Low exposure
ST0453: Water treatment technician - Water Treatment Equipment Technician	8134	Low exposure
ST0453: Water treatment technician - Water Treatment Operations Supervisor	8134	Low exposure
ST0453: Water treatment technician - Water Treatment Technician	8134	Low exposure
ST0456: Post graduate engineer - Decommissioning/Disposal Engineer	2125	High exposure, high complementarity
ST0456: Post graduate engineer - Design and Development Engineer	2125	High exposure, high complementarity
ST0456: Post graduate engineer - Engineering Business Manager	2440	High exposure, high complementarity

Apprenticeship standard	SOC 2020 code	AI exposure category
ST0456: Post graduate engineer - Maintenance/Test Engineer	2129	High exposure, high complementarity
ST0456: Post graduate engineer - Manufacture/Production Engineer	2125	High exposure, high complementarity
ST0456: Post graduate engineer - Product Support (including logistics) Engineer	2129	High exposure, high complementarity
ST0456: Post graduate engineer - Quality Assurance/Compliance Engineer	2481	High exposure, high complementarity
ST0456: Post graduate engineer - Research and Development Engineer	2129	High exposure, high complementarity
ST0456: Post graduate engineer - Supply Chain/Procurement	2129	High exposure, high complementarity
ST0456: Post graduate engineer - System Integration Engineer	2129	High exposure, high complementarity
ST0456: Post graduate engineer - Test/Qualification Engineer	2481	High exposure, high complementarity
ST0457: Engineering technician - Aerospace Manufacturing Electrical / Mechanical & Systems Fitter	3113	Low exposure
ST0457: Engineering technician - Aerospace Manufacturing Fitter	3113	Low exposure
ST0457: Engineering technician - Airworthiness, Planning, Quality & Safety Technician	3113	Low exposure
ST0457: Engineering technician - Maritime Pipeworker	3512	High exposure, high complementarity
ST0457: Engineering technician - Mechatronics Maintenance Technician	3113	Low exposure
ST0457: Engineering technician - Product Design & Development Technician	3113	Low exposure
ST0457: Engineering technician - Toolmaker & Tool & Die Maintenance Technician	5222	Low exposure
ST0464: Smart home technician	5242	Low exposure
ST0465: Risk and safety management professional (degree)	2440	High exposure, high complementarity
ST0472: Financial services professional - Commercial/Business Banking	2422	High exposure, low complementarity
ST0472: Financial services professional - Investment Banking	1131	High exposure, high complementarity
ST0472: Financial services professional - Investment Management	2422	High exposure, low complementarity
ST0472: Financial services professional - Operations	1131	High exposure, high complementarity
ST0472: Financial services professional - Retail Banking	2422	High exposure, low complementarity
ST0472: Financial services professional - Workplace Pensions	2422	High exposure, low complementarity

Apprenticeship standard	SOC 2020 code	AI exposure category
ST0473: Science industry process and plant engineer (degree)	2125	High exposure, high complementarity
ST0474: Motor finance specialist - Finance Company	4129	High exposure, low complementarity
ST0474: Motor finance specialist - Retailer Consultant	4129	High exposure, low complementarity
ST0475: Electrical power networks engineer - Asset Management Engineer	2123	High exposure, low complementarity
ST0475: Electrical power networks engineer - Control Engineer	2125	High exposure, high complementarity
ST0475: Electrical power networks engineer - Design Engineer	2123	High exposure, low complementarity
ST0475: Electrical power networks engineer - Electrical Project Engineer	2123	High exposure, low complementarity
ST0475: Electrical power networks engineer - Operational Delivery Engineer	2481	High exposure, high complementarity
ST0475: Electrical power networks engineer - Planning Engineer	2481	High exposure, high complementarity
ST0480: Senior leader	1111	High exposure, high complementarity
ST0491: Geospatial survey technician	3114	Low exposure
ST0496: Rail and rail systems senior engineer (integrated degree) - Electrical, Mechanical or Building Services	2121	High exposure, high complementarity
ST0496: Rail and rail systems senior engineer (integrated degree) - Rail Civil Engineering	2121	High exposure, high complementarity
ST0496: Rail and rail systems senior engineer (integrated degree) - Rail Systems Integration	2121	High exposure, high complementarity
ST0496: Rail and rail systems senior engineer (integrated degree) - Signalling & Control Systems	2121	High exposure, high complementarity
ST0496: Rail and rail systems senior engineer (integrated degree) - Telecoms, Networks & Digital	2124	High exposure, low complementarity
ST0496: Rail and rail systems senior engineer (integrated degree) - Track Engineering	2121	High exposure, high complementarity
ST0496: Rail and rail systems senior engineer (integrated degree) - Traction & Rolling Stock	2122	High exposure, high complementarity
ST0497: Rail and rail systems principal engineer (integrated degree) - Electrical, Mechanical or Building Services	2121	High exposure, high complementarity
ST0497: Rail and rail systems principal engineer (integrated degree) - Rail Civil Engineering	2121	High exposure, high complementarity
ST0497: Rail and rail systems principal engineer (integrated degree) - Rail Systems Integration	2123	High exposure, low complementarity
ST0497: Rail and rail systems principal engineer (integrated degree) - Signalling and control systems	2123	High exposure, low complementarity
ST0497: Rail and rail systems principal engineer (integrated degree) - Telecoms, Networks and Digital	2123	High exposure, low complementarity

Apprenticeship standard	SOC 2020 code	AI exposure category
ST0497: Rail and rail systems principal engineer (integrated degree) - Track Engineering	2121	High exposure, high complementarity
ST0497: Rail and rail systems principal engineer (integrated degree) - Traction and Rolling Stock	2121	High exposure, high complementarity
ST0499: Autocare technician	5231	Low exposure
ST0511: Mineral and construction product sampling and testing operations	8143	Low exposure
ST0513: Groundworker	9121	Low exposure
ST0515: Manufacturing manager (integrated degree)	1121	High exposure, high complementarity
ST0520: Senior insurance professional	3532	High exposure, low complementarity
ST0521: Industrial thermal insulation technician	8159	Low exposure
ST0523: First officer pilot	3511	Low exposure
ST0526: Policy officer	2439	High exposure, high complementarity
ST0529: Food and drink advanced engineer (integrated degree) - Automation Engineers	2123	High exposure, low complementarity
ST0529: Food and drink advanced engineer (integrated degree) - Mechanical Engineers	2122	High exposure, high complementarity
ST0529: Food and drink advanced engineer (integrated degree) - Production Engineers	2125	High exposure, high complementarity
ST0533: Architect (integrated degree)	2451	High exposure, high complementarity
ST0534: Architectural assistant (integrated degree)	3120	High exposure, low complementarity
ST0536: Chartered town planner (degree)	2452	High exposure, high complementarity
ST0537: Engineering operative - Engineering Operatives Working Within a Fabrication Role	8139	Low exposure
ST0537: Engineering operative - Engineering Operatives Working Within a Maintenance Role	8139	Low exposure
ST0537: Engineering operative - Engineering Operatives Working Within a Materials, Processing or Finishing Role	8139	Low exposure
ST0537: Engineering operative - Engineering Operatives Working Within a Mechanical Manufacturing Engineering Role	8139	Low exposure
ST0537: Engineering operative - Engineering Operatives Working Within a Technical Support Role	8139	Low exposure
ST0537: Engineering operative - Engineering Operatives Working Within an Electrical & Electronic Engineering Role	8139	Low exposure
ST0548: Supply chain leadership professional (integrated degree)	1140	High exposure, high complementarity
ST0550: Safety, health and environment technician	3582	High exposure, high complementarity

Apprenticeship standard	SOC 2020 code	AI exposure category
ST0555: Improvement specialist	2431	High exposure, low complementarity
ST0556: Improvement leader	2440	High exposure, high complementarity
ST0561: Senior investment and commercial banking professional - Commercial and business banking	1131	High exposure, high complementarity
ST0561: Senior investment and commercial banking professional - Investment banking	1131	High exposure, high complementarity
ST0561: Senior investment and commercial banking professional - Investment management	1131	High exposure, high complementarity
ST0561: Senior investment and commercial banking professional - Investment operations	1131	High exposure, high complementarity
ST0588: Propulsion technician - Engine Build & Process Technician	3113	Low exposure
ST0588: Propulsion technician - Propulsion Test	3113	Low exposure
ST0597: Technician scientist	3111	Low exposure
ST0605: Mineral products technician - Asphalt & pavements	1123	Low exposure
ST0605: Mineral products technician - Cement and cementitious products	1123	Low exposure
ST0605: Mineral products technician - Clays (Heavy and White)	1123	Low exposure
ST0605: Mineral products technician - Concrete (Readymix and Precast/Prestressed)	1123	Low exposure
ST0605: Mineral products technician - Mineral Extraction	1123	Low exposure
ST0607: Metal fabricator	5211	Low exposure
ST0615: Demolition operative	8159	Low exposure
ST0621: Boatmaster	3512	High exposure, high complementarity
ST0622: Bicycle mechanic	5223	Low exposure
ST0629: BEMS (building energy management systems) controls engineer	3113	Low exposure
ST0637: Packaging professional (integrated degree)	3429	High exposure, low complementarity
ST0641: Tool process design engineer	2125	High exposure, high complementarity
ST0652: Building control surveyor (integrated degree)	2454	Low exposure
ST0662: Automation and controls engineering technician	5223	Low exposure
ST0671: Construction equipment maintenance technician	5223	Low exposure
ST0672: Electro-mechanical engineer	2129	High exposure, high complementarity
ST0675: Materials science technologist (degree)	2129	High exposure, high complementarity

Apprenticeship standard	SOC 2020 code	AI exposure category
ST0695: Process leader	1121	High exposure, high complementarity
ST0698: Transport planner (integrated degree)	2455	High exposure, high complementarity
ST0736: Construction plant operative	8229	Low exposure
ST0740: Through life engineering services specialist (integrated degree)	2125	High exposure, high complementarity
ST0742: Chartered landscape professional - Landscape and Parks Management	1224	High exposure, high complementarity
ST0742: Chartered landscape professional - Landscape Design	2451	High exposure, high complementarity
ST0742: Chartered landscape professional - Landscape Planning	2451	High exposure, high complementarity
ST0743: Fenestration installer	5317	Low exposure
ST0753: Express delivery sortation hub operative	9211	Low exposure
ST0763: Artificial intelligence (AI) data specialist	2433	High exposure, low complementarity
ST0784: Nuclear reactor desk engineer	2129	High exposure, high complementarity
ST0787: Systems thinking practitioner	2431	High exposure, low complementarity
ST0789: Keeper and aquarist	6129	Low exposure
ST0802: Curtain wall installer	5319	Low exposure
ST0808: Marine electrician	5241	Low exposure
ST0810: Procurement and supply assistant	3551	High exposure, high complementarity
ST0817: Compressed air and vacuum technician	5225	Low exposure
ST0825: DevOps engineer	2139	High exposure, low complementarity
ST0841: Engineering manufacturing technician	3119	Low exposure
ST0845: Project controls professional	2127	High exposure, high complementarity
ST0847: Engineer surveyor - Electrical	2122	High exposure, high complementarity
ST0847: Engineer surveyor - Mechanical	2123	High exposure, low complementarity
ST0851: Pipe welder	5213	Low exposure
ST0852: Plate welder	5213	Low exposure
ST0859: Fire safety engineer	2129	High exposure, high complementarity
ST0860: Infrastructure asset management professional	1139	High exposure, high complementarity

Apprenticeship standard	SOC 2020 code	AI exposure category
ST0861: Asset manager	3549	High exposure, low complementarity
ST0865: Cyber security technician	2135	High exposure, low complementarity
ST0872: Lifting equipment technician	3113	Low exposure
ST0876: Water process operative - Clean water process operative	8134	Low exposure
ST0876: Water process operative - Waste water process operative	8134	Low exposure
ST0877: Land referencer	3114	Low exposure
ST0880: Asset finance practitioner	4129	High exposure, low complementarity
ST0881: Geotechnical engineer (integrated degree)	2121	High exposure, high complementarity
ST0897: Naval architect	2122	High exposure, high complementarity
ST0898: Water network operative - Clean water network operative	8134	Low exposure
ST0898: Water network operative - Waste water network operative	8134	Low exposure
ST0936: Town planning assistant	2452	High exposure, high complementarity
ST0937: General farm worker - crop worker	5111	Low exposure
ST0937: General farm worker - livestock worker	5111	Low exposure
ST0938: Livestock unit technician	5111	Low exposure
ST0946: Vet technician (livestock)	6129	Low exposure
ST0954: Aviation movement specialist	8233	Low exposure
ST0957: Spatial data specialist	2115	High exposure, high complementarity
ST0960: Construction support technician	5330	Low exposure
ST0963: Surface finisher - Automotive Surface Finisher	5211	Low exposure
ST0963: Surface finisher - Aviation Surface Finisher	5211	Low exposure
ST0963: Surface finisher - Marine Surface Finisher	5211	Low exposure
ST0975: Uncrewed marine vehicle specialist	3512	High exposure, high complementarity
ST0978: Furniture restorer	5442	Low exposure
ST0999: Lead engineering maintenance technician	3113	Low exposure
ST1007: Aviation flight operations coordinator	3511	Low exposure
ST1017: Domestic electrician	5241	Low exposure
ST1105: Heritage construction specialist	5319	Low exposure

Apprenticeship standard	SOC 2020 code	AI exposure category
ST1291: Water industry treatment process technician - Wastewater treatment process technician	8134	Low exposure
ST1291: Water industry treatment process technician - Water treatment process technician	8134	Low exposure
ST1292: Water industry network technician - Wastewater network technician	8134	Low exposure
ST1292: Water industry network technician - Water distribution network technician	8134	Low exposure
ST1292: Water industry network technician - Water leakage technician	8134	Low exposure
ST1309: Mine management	1123	Low exposure
ST1315: Aircraft maintenance technician	5234	Low exposure
ST1317: Robotics engineer - degree	2129	High exposure, high complementarity
ST1320: Assistant farm manager	5111	Low exposure
ST1326: Mechatronics maintenance technician	5241	Low exposure
ST1327: Mobile transport refrigeration technician	5225	Low exposure
ST1330: Power industry overhead linesperson - Transmission linesperson	5249	Low exposure
ST1330: Power industry overhead linesperson - Distribution linesperson	5249	Low exposure
ST1331: Power industry substation fitter - Substation fitter - construction	5242	Low exposure
ST1331: Power industry substation fitter - Substation fitter - distribution maintenance	5242	Low exposure
ST1331: Power industry substation fitter - Substation fitter - transmission maintenance	5242	Low exposure
ST1332: Power industry distribution cable jointer	5249	Low exposure
ST1334: Craft bricklayer	5313	Low exposure
ST1338: Battery manufacturing technician - Cell assembly technician	3119	Low exposure
ST1338: Battery manufacturing technician - Electrode technician	3119	Low exposure
ST1338: Battery manufacturing technician - Formation, ageing and testing technician	3119	Low exposure
ST1338: Battery manufacturing technician - Module and pack technician	3119	Low exposure
ST1339: Bulk storage terminal technician	9252	Low exposure
ST1341: Social researcher	2115	High exposure, high complementarity
ST1348: Drainage network operative	8134	Low exposure
ST1379: Learning and skills mentor	3222	High exposure, high complementarity

Apprenticeship standard	SOC 2020 code	AI exposure category
ST1380: Learning and skills assessor	3574	High exposure, high complementarity
ST1381: Advanced robotics engineer	2129	High exposure, high complementarity
ST1386: Data engineer	2133	High exposure, low complementarity
ST1395: Engineering and manufacturing support technician	3119	Low exposure
ST1402: Maritime mechanical fitter	3113	Low exposure
ST1403: Maritime electrical fitter	3113	Low exposure
ST1406: Science manufacturing technician 2023 - Aseptic pharmaceuticals manufacturing technician	3119	Low exposure
ST1406: Science manufacturing technician 2023 - Biotechnology manufacturing technician	3119	Low exposure
ST1410: Sports Turf Technical Manager	5114	Low exposure

Notes: Enrolments are 16–24-year-old starts in the 2024/25 academic year

Sources: Skills England Occupational Maps; Department for Education, CBI Economics analysis.

Appendix Table A.4: List of green occupations

Green occupations and green category, UK SOC 2020 four-digit occupations

SOC code	SOC title	Green Category
1111	Chief executives and senior officials	Enhanced Knowledge and Skills
1121	Production managers and directors in manufacturing	Enhanced Knowledge and Skills
1122	Production managers and directors in construction	Enhanced Knowledge and Skills
1123	Production managers and directors in mining and energy	Enhanced Knowledge and Skills
1132	Marketing, sales and advertising directors	Enhanced Knowledge and Skills
1133	Public relations and communications directors	Enhanced Knowledge and Skills
1134	Purchasing managers and directors	Enhanced Knowledge and Skills
1140	Directors in logistics, warehousing and transport	Enhanced Knowledge and Skills
1150	Managers and directors in retail and wholesale	Enhanced Knowledge and Skills
1211	Managers and proprietors in agriculture and horticulture	Enhanced Knowledge and Skills
1212	Managers and proprietors in forestry, fishing and related services	Enhanced Knowledge and Skills
1241	Managers in transport and distribution	Enhanced Knowledge and Skills
1243	Managers in logistics	Enhanced Knowledge and Skills
1251	Property, housing and estate managers	Enhanced Knowledge and Skills
1252	Garage managers and proprietors	Enhanced Knowledge and Skills
1254	Waste disposal and environmental services managers	Enhanced Knowledge and Skills

SOC code	SOC title	Green Category
2111	Chemical scientists	Enhanced Knowledge and Skills
2112	Biological scientists	Enhanced Knowledge and Skills
2113	Biochemists and biomedical scientists	Enhanced Knowledge and Skills
2114	Physical scientists	Enhanced Knowledge and Skills
2115	Social and humanities scientists	Enhanced Knowledge and Skills
2119	Natural and social science professionals n.e.c.	Enhanced Knowledge and Skills
2121	Civil engineers	New and Emerging
2122	Mechanical engineers	New and Emerging
2123	Electrical engineers	Enhanced Knowledge and Skills
2124	Electronics engineers	Enhanced Knowledge and Skills
2125	Production and process engineers	New and Emerging
2126	Aerospace engineers	New and Emerging
2127	Engineering project managers and project engineers	New and Emerging
2129	Engineering professionals n.e.c.	New and Emerging
2131	IT project managers	Enhanced Knowledge and Skills
2132	IT managers	Enhanced Knowledge and Skills
2133	IT business analysts, architects and systems designers	Enhanced Knowledge and Skills
2134	Programmers and software development professionals	Enhanced Knowledge and Skills
2135	Cyber security professionals	Enhanced Knowledge and Skills
2136	IT quality and testing professionals	Enhanced Knowledge and Skills
2137	IT network professionals	Enhanced Knowledge and Skills
2139	Information technology professionals n.e.c.	Enhanced Knowledge and Skills
2141	Web design professionals	Enhanced Knowledge and Skills
2151	Conservation professionals	Enhanced Knowledge and Skills
2152	Environment professionals	New and Emerging
2161	Research and development (R&D) managers	Enhanced Knowledge and Skills
2162	Other researchers, unspecified discipline	Enhanced Knowledge and Skills
2311	Higher education teaching professionals	Enhanced Knowledge and Skills
2312	Further education teaching professionals	Enhanced Knowledge and Skills
2313	Secondary education teaching professionals	Enhanced Knowledge and Skills
2314	Primary education teaching professionals	Enhanced Knowledge and Skills
2316	Special needs education teaching professionals	Enhanced Knowledge and Skills
2411	Barristers and judges	Enhanced Knowledge and Skills
2412	Solicitors and lawyers	Enhanced Knowledge and Skills
2419	Legal professionals n.e.c.	Enhanced Knowledge and Skills
2421	Chartered and certified accountants	Enhanced Knowledge and Skills
2422	Finance and investment analysts and advisers	Enhanced Knowledge and Skills
2423	Taxation experts	Enhanced Knowledge and Skills
2431	Management consultants and business analysts	Enhanced Knowledge and Skills
2433	Actuaries, economists and statisticians	Enhanced Knowledge and Skills
2451	Architects	Enhanced Knowledge and Skills

SOC code	SOC title	Green Category
2452	Chartered architectural technologists, planning officers and consultants	Enhanced Knowledge and Skills
2453	Quantity surveyors	Enhanced Knowledge and Skills
2454	Chartered surveyors	Enhanced Knowledge and Skills
2455	Construction project managers and related professionals	Enhanced Knowledge and Skills
2481	Quality control and planning engineers	New and Emerging
2482	Quality assurance and regulatory professionals	Enhanced Knowledge and Skills
2483	Environmental health professionals	Enhanced Knowledge and Skills
3111	Laboratory technicians	Enhanced Knowledge and Skills
3112	Electrical and electronics technicians	New and Emerging
3113	Engineering technicians	New and Emerging
3114	Building and civil engineering technicians	New and Emerging
3115	Quality assurance technicians	New and Emerging
3116	Planning, process and production technicians	Enhanced Knowledge and Skills
3119	Science, engineering and production technicians n.e.c.	New and Emerging
3120	CAD, drawing and architectural technicians	Enhanced Knowledge and Skills
3131	IT operations technicians	Increased Demand for Skills
3132	IT user support technicians	Increased Demand for Skills
3133	Database administrators and web content technicians	Increased Demand for Skills
3212	Pharmaceutical technicians	Enhanced Knowledge and Skills
3312	Police officers (sergeant and below)	Enhanced Knowledge and Skills
3313	Fire service officers (watch manager and below)	Enhanced Knowledge and Skills
3421	Interior designers	Enhanced Knowledge and Skills
3532	Insurance underwriters	Enhanced Knowledge and Skills
3533	Financial and accounting technicians	Enhanced Knowledge and Skills
3541	Estimators, valuers and assessors	Enhanced Knowledge and Skills
3542	Importers and exporters	Enhanced Knowledge and Skills
3544	Data analysts	Enhanced Knowledge and Skills
3551	Buyers and procurement officers	Enhanced Knowledge and Skills
3555	Estate agents and auctioneers	Enhanced Knowledge and Skills
3557	Events and exhibition managers and organisers	Enhanced Knowledge and Skills
3560	Public services associate professionals	Enhanced Knowledge and Skills
3572	Careers advisers and vocational guidance specialists	Enhanced Knowledge and Skills
3574	Other vocational and industrial trainers	Enhanced Knowledge and Skills
3581	Inspectors of standards and regulations	Enhanced Knowledge and Skills
4111	National government administrative occupations	New and Emerging
4131	Records clerks and assistants	Increased Demand for Skills
4134	Transport and distribution clerks and assistants	Increased Demand for Skills
4143	Customer service managers	Increased Demand for Skills
5111	Farmers	Enhanced Knowledge and Skills
5112	Horticultural trades	Enhanced Knowledge and Skills
5113	Gardeners and landscape gardeners	Enhanced Knowledge and Skills

SOC code	SOC title	Green Category
5114	Groundsmen and greenkeepers	Enhanced Knowledge and Skills
5119	Agricultural and fishing trades n.e.c.	Increased Demand for Skills
5211	Sheet metal workers	Enhanced Knowledge and Skills
5212	Metal plate workers, smiths, moulders and related occupations	Increased Demand for Skills
5213	Welding trades	Increased Demand for Skills
5214	Pipe fitters	Enhanced Knowledge and Skills
5221	Metal machining setters and setter-operators	Enhanced Knowledge and Skills
5222	Tool makers, tool fitters and markers-out	Enhanced Knowledge and Skills
5223	Metal working production and maintenance fitters	Enhanced Knowledge and Skills
5224	Precision instrument makers and repairers	Enhanced Knowledge and Skills
5225	Air-conditioning and refrigeration installers and repairers	Enhanced Knowledge and Skills
5231	Vehicle technicians, mechanics and electricians	Enhanced Knowledge and Skills
5232	Vehicle body builders and repairers	New and Emerging
5233	Vehicle paint technicians	Enhanced Knowledge and Skills
5234	Aircraft maintenance and related trades	Enhanced Knowledge and Skills
5235	Boat and ship builders and repairers	Enhanced Knowledge and Skills
5236	Rail and rolling stock builders and repairers	Enhanced Knowledge and Skills
5241	Electricians and electrical fitters	Increased Demand for Skills
5246	Electrical service and maintenance mechanics and repairers	Enhanced Knowledge and Skills
5249	Electrical and electronic trades n.e.c.	New and Emerging
5250	Skilled metal, electrical and electronic trades supervisors	Enhanced Knowledge and Skills
5311	Steel erectors	Increased Demand for Skills
5312	Stonemasons and related trades	Increased Demand for Skills
5314	Roofers, roof tilers and slaters	Enhanced Knowledge and Skills
5315	Plumbers & heating and ventilating installers and repairers	Enhanced Knowledge and Skills
5316	Carpenters and joiners	Increased Demand for Skills
5317	Glaziers, window fabricators and fitters	Enhanced Knowledge and Skills
5319	Construction and building trades n.e.c.	Increased Demand for Skills
5321	Plasterers	Enhanced Knowledge and Skills
5322	Floorers and wall tilers	Enhanced Knowledge and Skills
5323	Painters and decorators	Enhanced Knowledge and Skills
5330	Construction and building trades supervisors	Enhanced Knowledge and Skills
6121	Pest control officers	Enhanced Knowledge and Skills
7115	Vehicle and parts salespersons and advisers	Enhanced Knowledge and Skills
7123	Roundspersons and van salespersons	Enhanced Knowledge and Skills
7212	Telephonists	Increased Demand for Skills
7213	Communication operators	Increased Demand for Skills
7214	Market research interviewers	Increased Demand for Skills
7219	Customer service occupations n.e.c.	Increased Demand for Skills

SOC code	SOC title	Green Category
8111	Food, drink and tobacco process operatives	Enhanced Knowledge and Skills
8113	Chemical and related process operatives	Increased Demand for Skills
8114	Plastics process operatives	Enhanced Knowledge and Skills
8132	Mining and quarry workers and related operatives	Enhanced Knowledge and Skills
8133	Energy plant operatives	New and Emerging
8134	Water and sewerage plant operatives	New and Emerging
8141	Assemblers (electrical and electronic products)	Increased Demand for Skills
8142	Assemblers (vehicles and metal goods)	Increased Demand for Skills
8143	Routine inspectors and testers	New and Emerging
8144	Weighers, graders and sorters	New and Emerging
8149	Assemblers and routine operatives n.e.c.	Increased Demand for Skills
8151	Scaffolders, stagers and riggers	Increased Demand for Skills
8152	Road construction operatives	Increased Demand for Skills
8153	Rail construction and maintenance operatives	New and Emerging
8159	Construction operatives n.e.c.	New and Emerging
8160	Production, factory and assembly supervisors	Increased Demand for Skills
8211	Large goods vehicle drivers	Increased Demand for Skills
8212	Bus and coach drivers	Increased Demand for Skills
8214	Delivery drivers and couriers	Enhanced Knowledge and Skills
8221	Crane drivers	Increased Demand for Skills
8222	Fork-lift truck drivers	Increased Demand for Skills
8229	Mobile machine drivers and operatives n.e.c.	Increased Demand for Skills
8231	Train and tram drivers	Increased Demand for Skills
8232	Marine and waterways transport operatives	New and Emerging
8234	Rail transport operatives	Increased Demand for Skills
9111	Farm workers	Enhanced Knowledge and Skills
9112	Forestry and related workers	Increased Demand for Skills
9121	Groundworkers	Enhanced Knowledge and Skills
9139	Elementary process plant occupations n.e.c.	Increased Demand for Skills
9222	Street cleaners	Enhanced Knowledge and Skills
9225	Refuse and salvage occupations	Enhanced Knowledge and Skills
9251	Elementary storage supervisors	Increased Demand for Skills
9252	Warehouse operatives	Increased Demand for Skills
9253	Delivery operatives	Increased Demand for Skills
9259	Elementary storage occupations n.e.c.	Increased Demand for Skills

Source: Skills Development Scotland (2022)

POWERED BY

CBI Economics

November 2026

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