UK Government

Clean Energy Jobs Plan

Technical Annex

Department for Energy Security and Net Zero (2025)

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Contents

This annex describes the experimental approach taken to assessing the growth required in the clean energy workforce from a 2023 baseline to 2030, where opportunities are likely to be located, and the types of occupations likely to be in high demand and relatively more difficult to fill.

Clean energy technologies encompass power generation, transmission and distribution, greenhouse gas removals, clean heat, and energy efficiency. The full list of sub-sectors is provided in Table 1 below. Clean energy jobs are measured as the number of jobs that are supported by the deployment and operation of clean energy technologies and their supply chains. This analysis covers both direct and indirect jobs, these employment categories can be defined as:

- **Direct jobs:** employment that is directly within the primary industry or sector under consideration (for example, construction of wind farms and/or manufacturing of wind turbines, and installation of heat pumps).
- **Indirect jobs:** employment generated in industries that supply goods or services to the primary sector. This includes jobs supported lower down the supply chain related to production of intermediate inputs used by the primary sector (for example, manufacturing the compressors that are used in heat pump installation).

Induced jobs are excluded from this analysis; employment resulting from the spending of wages by workers in direct and indirect employment, leading to increased demand in other sectors.

This analysis does not measure net additional jobs across the economy. Much of the increase in workforce across clean energy sectors will involve workers who have transitioned from other sectors or will displace high carbon energy jobs; however, these effects are not accounted for as the evidence is not available. The analysis also does not capture replacement demand - i.e., the workers required to replace workers that leave the clean energy workforce.

There is inherent uncertainty in estimating the size of the 2030 clean energy workforce. The future size and geographic spread of the clean energy workforce will be dependent on delivery and final location of the pipeline of projects out to 2030, the ability to recruit into the sector, cost assumptions, any assumptions made about the ability of UK businesses to export overseas, and the validity of the assumptions made around the workers required to deploy a particular amount of technology. These estimates do not represent precise predictions; they are indicative of the orders of magnitude the clean energy workforce will need to increase by 2030 to meet demand in UK clean energy sectors and their supply chains (where possible, both domestic and global demand has been considered - see Table 1 for details).

Clean energy workforce estimates

The assessment of the current and future size of the clean energy workforce represents a combination of several different methodologies and approaches. The Office of National Statistics (ONS) Low Carbon and Renewable Energy Economy Estimates (LCREE) provide a baseline for several clean energy sectors. To construct a clean energy employment baseline, LCREE estimates have been supplemented with other external sources and internal Department for Energy Security and Net Zero (DESNZ) analysis. An effort has been made to ensure these different methodologies measure jobs as consistently as possible, however there are instances where there are differences in scope. For example, whether estimates capture all of the UK (or only Great Britain), the extent of the value chain, and whether jobs supported by businesses exporting overseas are captured.

LCREE sectors do not accurately map to clean energy sectors (see Table 1 below). Where possible, imperfect matches have been replaced with bespoke DESNZ analysis. Note that estimates for the heat and buildings sector may be revised in the Warm Homes Plan, due to be published shortly.

Table 1 – Summary of sources used to inform baseline and 2030 workforce estimates

Sector	Baseline (2023)	2030 estimate
Offshore Wind	ONS Low Carbon and Renewable Energy Economy Estimates	Energy Innovation Needs Assessments (EINA) economic opportunities calculator. Updated to reflect a central deployment scenario from the Clean Power Action Plan and assumptions from DESNZ 2023 Electricity Generation Cost report. This method captures both jobs supported by the domestic and export markets.[1]
Onshore Wind	ONS Low Carbon and Renewable Energy Economy Estimates	DESNZ methodology based on ClimateXChange and ONS LCREE estimates.[2]
Solar	ONS Low Carbon and Renewable Energy Economy Estimates	DESNZ methodology based on ClimateXChange and ONS LCREE estimates.[3]
Fusion energy	DESNZ analysis based on published employee numbers of UKAEA, First Light Fusion and Tokamak Energy.[4] Indirect jobs estimates use ONS Full Time Equivalent (FTE) per £m and Type I (indirect) multipliers based on historic UKAEA spend by SIC code.	Job estimates based on published estimates of growth in sector by UKAEA.[5]

[1] DESNZ (2025) Job estimates for wind generation by 2030: methodology note - GOV.UK
[2] DESNZ (2025) Job estimates for wind generation by 2030: methodology note - GOV.UK
[3] DESNZ (2025) Job estimates for solar PV by 2030: methodology note - GOV.UK
[4] Fusion Cluster (2023) Growing the Fusion Workforce
[5] FOSTER | UKAEA Fusion Energy

Sector	Baseline (2023)	2030 estimate
Nuclear fission	Cogent Skills 2024 Nuclear Workforce Assessment[6]. Relates to the Civil Nuclear sector only. Assume reported estimates for supply chains relates to indirect jobs.	Cogent Skills, supporting the industry-led cross-sector Nuclear Sector Plan, 2024, industry-led 2024 Nuclear Workforce Assessment. Relates to the Civil Nuclear only. Assume reported estimates for supply chains relates to indirect jobs.
Smart and flexibility	ONS Low Carbon and Renewable Energy Economy Estimates. Sector has been mapped to energy monitoring, savings or control systems, and fuel cells and energy storage systems.	Projection based on historic LCREE growth (2015-23) in energy monitoring, savings or control systems, and fuel cells and energy storage systems.
Electricity networks	Direct jobs are derived by linear interpolation of network operator business plans and financial statements. An ONS Type I multiplier (SIC 35.1) is applied to derive indirect jobs. Covers onshore network only.	Direct jobs are derived by linear interpolation of network owner business plans and financial statements. An ONS Type I multiplier (SIC 35.1) is applied to derive indirect jobs. Covers onshore network only.
Hydrogen	ONS Low Carbon and Renewable Energy Economy Estimates. Sector has been mapped to 'alternative fuels', this likely overestimates by capturing other kinds of fuels in addition to hydrogen such as alcohol fuels and ammonia.	EINA economic opportunities calculator. Updated to reflect deployment consistent with Spending Review settlement. This method captures both jobs supported by the domestic and export markets. Hydrogen estimates include hydrogen production through electrolysis and methane reformation with CCUS; hydrogen transport and storage; and hydrogen to power.

[6] Cogent Skills (2025) [2024 Nuclear Workforce Assessment.]

Sector	Baseline (2023)	2030 estimate
CCUS & GGR	ONS Low Carbon and Renewable Energy Economy Estimates.	EINA economic opportunities calculator. Updated to reflect power CCUS deployment from the Clean Power Action Plan, GGRs deployment from mixed sources, and captures H2 BECCS and relevant applications from industry. This method captures both jobs supported by the domestic and export markets.
Domestic Heat Pumps	Derived from the DESNZ Heat Pump Installer Workforce Model.	Derived from the DESNZ Heat Pump Installer Workforce Model (see appendix A); a bottom-up approach using the projected HP deployment scenario, in combination with the assumed installation and maintenance time of a heat pump to determine the projected FTE demand. ONS LCREE ‘renewable heat’ multiplier (based on the 5-year average ratio of total jobs to indirect jobs ratio between 2018 to 2022) has been used to estimate indirect jobs.
Heat Networks	Modelled by EINA economic opportunities calculator (2019 methodology) based on existing heat networks from 2022 Heat Network (Metered and Billing) Regulations statistics. LCREE ‘renewable heat’ multiplier used to estimate indirect jobs. This method currently only captures jobs supported by the domestic markets.	EINA economic opportunities calculator (2019 methodology) based on modelled deployment from implemented and planned policies on heat networks. LCREE ‘renewable heat’ multiplier used to estimate indirect jobs. Currently only captures job supported by domestic markets.
Biomethane	Applies jobs per TWh assumptions for AD plant construction and operations phases from the 2021 GGSS IA to the 2023 biomethane sector based on implemented policies.	Applies jobs per TWh assumptions for AD plant construction and operations phases from the 2021 GGSS IA to 2030 biomethane forecasts based on implemented and planned policies.

Sector	Baseline (2023)	2030 estimate
Energy efficiency	DESNZ analysis of the number of jobs supported is calculated through applying jobs multipliers[7], for direct and indirect jobs, to estimates of capital expenditure for key government policies	DESNZ analysis. Estimates of the number of jobs supported is calculated through applying jobs multipliers, for direct and indirect jobs, to estimates of capital expenditure for key government policies

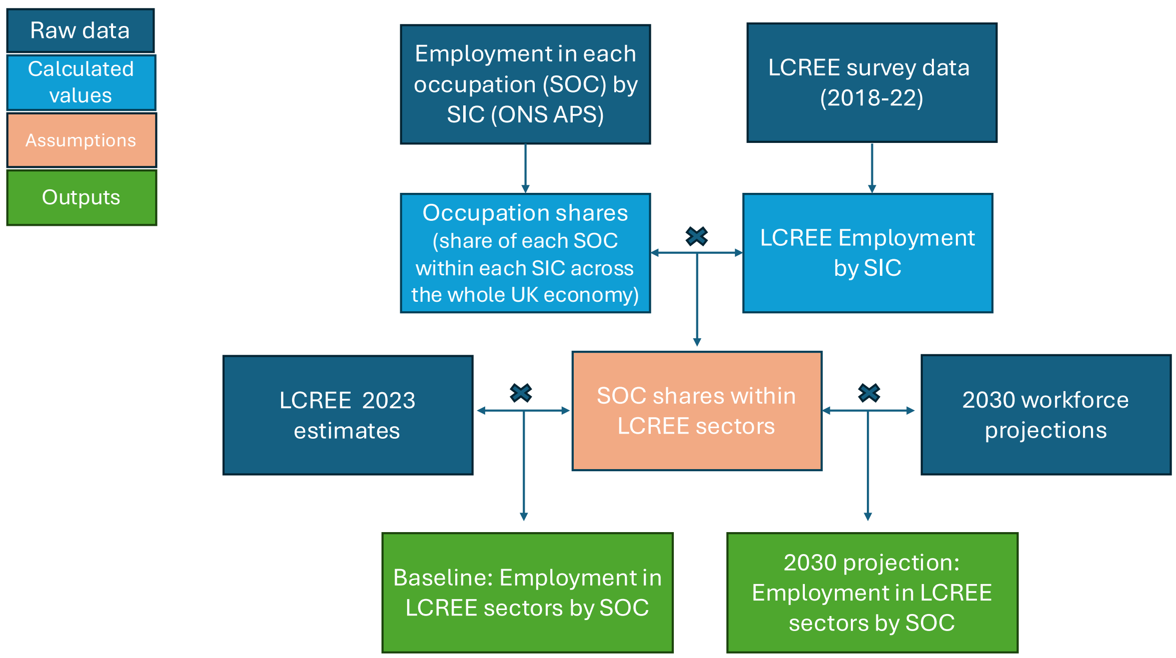
[7] The Energy Efficiency Industrial Forum (2012) How Many Jobs?

Occupational analysis

Clean energy sectors do not map onto Standard Industrial Classification (SIC) codes and therefore sector by occupation data from official statistics are not available[8]. Therefore, an experimental approach was developed to apportion clean energy jobs by occupation, at the four-digit Standard Occupation Classification level (SOC). [9] This approach identified the relative importance of occupations based on economy-wide SOC by Standard Industrial Classification (SIC)[10] employment breakdowns sourced from the ONS Annual Population Survey.[11] These have been combined with employment by SIC division reported in the ONS

LCREE survey to obtain occupational splits for LCREE sectors. This experimental approach is visualised in Figure 1, and Box 1 provides a worked example of this method.

Figure 1 – Experimental methodology for disaggregating clean energy workforce estimates by occupation



[8] DESNZ (2025) Industrial Strategy Sector Definitions List See “Clean Energy Industries: use of SIC codes”
[9] ONS, Standard Occupational Classification
[10] ONS, UK SIC 2007
[11] ONS (2024) Annual Population Survey/Labour Force Survey

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.

$$\underbrace{\mathbf{4,000}}_{\text{LCREE FTEs}} \times \underbrace{\mathbf{0.1}}_{\text{SIC/SOC share}} = \mathbf{400}$$

These calculations are run for all SIC codes to obtain SOC shares for each LCREE sector. These shares are then applied to:

1. 2023 LCREE estimates
2. 2030 estimates (based on imperfect mapping to LCREE sectors)

This method can lead to some spurious results, for example, if across the economy 0.25% of workers in SIC 71 were employed in **SOC 9266 - coffee shop workers**, then modelling would estimate that there are 10 coffee shop workers employed in offshore wind within SIC 71. This method for selecting priority occupations only considers higher ranking SOC codes and so filters out examples such as coffee shop workers.

This experimental approach helps to illustrate the relative importance of different SOCs for clean energy sectors, by applying high level assumptions that can be applied consistently across clean energy sub-sectors. However, there is high uncertainty around individual estimates and so should be treated as indicative only. The following simplifying assumptions should be considered:

- The relative importance of different occupations is based on SIC divisions reported by businesses in the LCREE survey. We assume that the occupational mix of SIC divisions across the economy is also reflected within the LCREE economy. *For example, if welders make up 10% of total UK construction jobs, we assume welders also make up 10% of clean energy construction jobs.* There is a risk that this could overstate the importance of more general occupations which are important at the economy-wide level but are less critical for clean energy sectors, and thereby also understate occupations which are specific to clean energy sectors.

- Assumes the profile of occupations is constant over time; an average is taken across 2018-22 LCREE microdata. SIC by SOC shares relate to the latest APS - 2024 values. This does not capture the possibility that different occupations become more or less important over time. It is possible that deployment of new innovative technologies in clean energy sectors could shift this. Occupation mixes could also vary according to the life cycle of major clean energy projects (e.g., demand for construction related occupations is likely to peak during the construction phase).
- To enable this analysis, DESNZ clean energy sectors have been mapped against ONS LCREE sector definitions. There is not perfect equivalence between the two, with several LCREE sectors encompassing a broader range of technologies (e.g. renewable heat, energy efficient products, alternative fuels). ONS LCREE does not capture the workforce in electricity networks, and so this is accounted for separately using evidence from stakeholders on the electricity distribution industry; the profile of occupations in the distribution sector was applied to both distribution and transmission jobs, however in reality the profile of occupations may differ
- Occupations are examined using the ONS Standard Occupation Classification (SOC)[12]. The SOC system does not always accurately reflect the specific types of roles in clean energy sectors. The transition to clean energy is changing the nature of many roles and creating some entirely new ones, therefore there are difficulties in matching some clear energy roles to SOC codes. For example, some retrofit jobs in the heat & buildings sector are not represented by dedicated SOC codes.
- The priority occupational analysis covers direct jobs only; there is insufficient evidence available to assess the typical mix of occupations along clean energy supply chains.

[12] ONS, Standard Occupational Classification

Priority occupations

An approach was developed to identify priority occupations at ONS's four-digit SOC level. 'Priority' was defined in this instance as occupations requiring the greatest increases in workforce by 2030 and which are experiencing workforce supply challenges. This method combines a quantitative analysis of various workforce demand metrics, developed from the occupational analysis described above and additional supply metrics. These are further supplemented by mainly qualitative insights from DESNZ sector teams and key industry stakeholders. This approach aims to ensure that findings from the experimental quantitative analysis and broader economic statistics are aligned with real-world experiences from the clean energy sector. This approach was also used for DESNZ's contribution to Skills England's recently published 'Assessment of priority skills to 2030', providing consistency across cross-government workforce and skills analysis.[13] The steps for identifying priority occupations are detailed below.

Quantitative indicators

Two demand (D1 and D2) and two supply (S1 and S2) metrics, detailed in Table 2, were used. All four metrics were available at the four-digit SOC level.

Table 2 – Indicators used to inform selection of priority occupations

	Metrics – calculated at 4-digit SOCs	Description	Data sources(s)
Demand	D1. Required increase in workforce by clean energy	Direct jobs. Calculated by applying 2030 estimates to estimated LCREE SOC shares. Derived from DESNZ occupational analysis.	ONS, LCREE[14] ONS, Annual Population Survey[15] DESNZ, occupational analysis

[13] Skills England (2025) Assessment of Priority Skills to 2030
[14] ONS (2025) Low Carbon and Renewable Energy Economy, UK: 2023.
[15] ONS (2025) Annual Population Survey

	Metrics – calculated at 4-digit SOCs	Description	Data sources(s)
Demand	D1. Required increase in workforce by clean energy	The % increase in the total workforce required to meet clean energy demand, assuming everything else stays the same. Derived from DESNZ occupational analysis.	ONS, Annual Population Survey DESNZ, occupational analysis
Supply	S1. Skills shortage vacancy density (%)	The share of vacancies hard-to-fill in this occupation due to skills shortages. Data was transformed from SOC2010 to SOC2020 using weighted averages derived from SOC relationships tables.[16]	DfE, Employer Skills Survey[17]
Supply	S2. Population meeting skills requirements	Number of workers across the UK meeting 100% of skills requirements for this SOC.	ONS, People's ability to work in other occupations[18]

Occupations requiring the greatest increases in workforce demand and experiencing workforce supply challenges were assessed based on the following conditions:

A) Indicators D1 and D2 (Table 2 above) fall within top quintile.

B) **At least one** of S1 and S2 falls within the top quintile.

Occupations meeting these thresholds formed the initial shortlist of priority occupations to be further developed through stakeholder feedback.

Qualitative stakeholder feedback

The results of the quantitative indicator analysis, including the initial priority shortlist, categorisations of all occupations, and methodology were shared with stakeholders for feedback. Stakeholders included DESNZ sector teams and industry groups.[19] Stakeholders were asked to sense-check the outputs, and to provide supporting evidence where they felt that the demand or supply assessment for any occupations was inaccurate. Stakeholders were

[16] ONS (2021) The relationship between Standard Occupational Classification 2010 and Standard Occupational Classification 2020
[17] DfE (2023) Employer Skills Survey, 2022
[18] ONS (2025) People's ability to work in other occupations in the UK, 2024
[19] RUK, ECITB, CITB and EU Skills were contacted and asked for feedback.

supportive of the initial shortlist of priority occupations. No stakeholder feedback recommending the downgrading of an occupation's ranking was provided.

To keep the list of priority occupations focused and meaningful, only occupations supported by strong additional evidence, indicating both high expected 2030 demand and alongside high risks of supply shortages were included. After two rounds of feedback, six occupations flagged by stakeholders were deemed to meet this threshold, when also considered alongside DESNZ's existing quantitative analysis. These are listed in Table 3 alongside a summary of stakeholder feedback.

Table 3: SOCs included following stakeholder feedback

Unit Group (4-digit)	Group Title	Summary of feedback
1121	Production managers and directors in manufacturing	Leaders needed in many clean energy sectors including solar, wind, battery, and heat pump production; the specialist knowledge required for clean energy technologies creates additional constraints not captured in economy-wide metrics.
1122	Production managers and directors in construction	Industry expects roles to be among top 20 for demand and have historically faced recruitment challenges globally.
2124	Electronics engineers	Clean energy sector requires electronics engineers with power systems expertise and knowledge of energy sector specific safety standards which traditional electrical engineers can lack. Industry report extended recruitment periods due to these barriers.
2453	Quantity surveyors	Employers report a shortage of experienced workers.
3113	Engineering technicians	Critical roles for clean energy project delivery. Technicians install, test, and maintain systems across clean energy technologies, and bridge the gap between design and practical implementation. Experiences from the clean energy sector are that there is a real shortage of specialised skills in practice, even if not showing in wider economy statistics
3120	CAD, drawing and architectural technicians	Industry feedback suggests among top hard-to-fill vacancies for their sector.

5 out of 6 of these occupations were already categorised as high demand based on DESNZ quantitative metrics. Stakeholder feedback focused on clean energy sector specific workforce supply shortage insights to build on DESNZ's use of economy-wide indicators.

A final list of 31 priority occupations was produced by combining DESNZ's quantitative metric analysis and stakeholder feedback.[20] This is summarised in Table 4:

Table 4: Final priority occupations list

Unit Group (4-digit)	Group Title
8159	Construction operatives n.e.c.
8151	Scaffolders, stagers and riggers
8143	Routine inspectors and testers
8120	Metal working machine operatives
8114	Plastics process operatives
5322	Floorers and wall tilers
5321	Plasterers
5317	Glaziers, window fabricators and fitters
5316	Carpenters and joiners
5315	Plumbers and heating and ventilating installers and repairers
5314	Roofers, roof tilers and slaters
5313	Bricklayers
5249	Electrical and electronic trades n.e.c.
5242	Telecoms and related network installers and repairers
5241	Electricians and electrical fitters
5223	Metal working production and maintenance fitters
5221	Metal machining setters and setter-operators

[20] An earlier version of the priority occupations list was published in Skills England's Assessment of Priority Skills to 2030. Subsequent analysis led to minor revisions: Production, factory and assembly supervisors (8160) were included in the earlier list but no longer meet the criteria. All other occupations remain unchanged.

Unit Group (4-digit)	Group Title
5213	Welding trades
3120	CAD, drawing and architectural technicians
3113	Engineering technicians
2455	Construction project managers and related professionals
2453	Quantity surveyors
2129	Engineering professionals n.e.c.
2127	Engineering project managers and project engineers
2125	Production and process engineers
2124	Electronics engineers
2123	Electrical engineers
2122	Mechanical engineers
2121	Civil engineers
1122	Production managers and directors in construction
1121	Production managers and directors in manufacturing

Occupations ending in ‘n.e.c.’ refer to occupations not elsewhere classified within that minor group. Electrical and electronic trades n.e.c. can refer to a varied range of roles including assembly of electronic equipment, erection of poles or towers to carry overhead lines, and connecting or installing transformers. Construction operatives n.e.c. covers a variety of roles including operatives who operate insulating equipment, fix plasterboard to ceilings and walls, help construct, maintain, repair and demolish buildings and clean and resurface eroded stonework, lay, join and examine pipe sections for drainage, gas, water or similar piping systems, install lighting systems in roads, domestic and commercial settings and carry out a variety of other construction operative tasks not elsewhere classified in minor group 815. Engineering professionals n.e.c. refers to a variety of professional engineering functions not elsewhere classified in minor group 212- these occupations will usually be performed by chartered engineers with an accredited university degree.

Priority occupations caveats and limitations

For this analysis, priority occupations were defined as those requiring the greatest increases in workforce demand and experiencing workforce supply challenges. It is recognised that alternative definitions could have been used to define priority occupations through different criteria. For example, this could involve identifying occupations with currently low workforce numbers that may experience significant growth in the future beyond modelled assumptions, such as those linked to emerging clean energy technologies and digital solutions. It could also involve identifying roles essential to clean energy projects that require lower numbers of workers compared to the highest demand occupations but are nonetheless critical to clean energy project delivery. However, given that DESNZ occupational modelling suggests clean energy jobs will be spread across hundreds of occupations, broader prioritisation criteria was not feasible. The set of priority occupations identified through this analysis is not intended as a definitive list but provides a meaningfully concise shortlist and builds understanding of where targeted support may be impactful.

There are also limitations with the metrics used to identify this shortlist. On the workforce supply side, both the skills shortage vacancy density and skills supply estimates represent the economy-wide view, rather than the clean energy sector specific view. Noting that clean energy sector and clean energy sub-sector experiences may differ from the wider economy, the risk has been mitigated by triangulating the supply metrics with industry insights. The assumptions, caveats and limitations associated with the 2030 demand data are outlined in the occupational analysis section.

There are also limitations associated with SOC codes. Whilst these provide a valuable statistical classification system across the economy, they are not always specific enough to represent jobs and skills requirements within sectors. For example, workers classified within the same SOC code working in different sectors may have different standards, skills and training requirements. This means the numbers of workers meeting these requirements may vary across sectors, therefore skills supply challenges may not be equal across sectors within SOC codes.

Regional workforce analysis

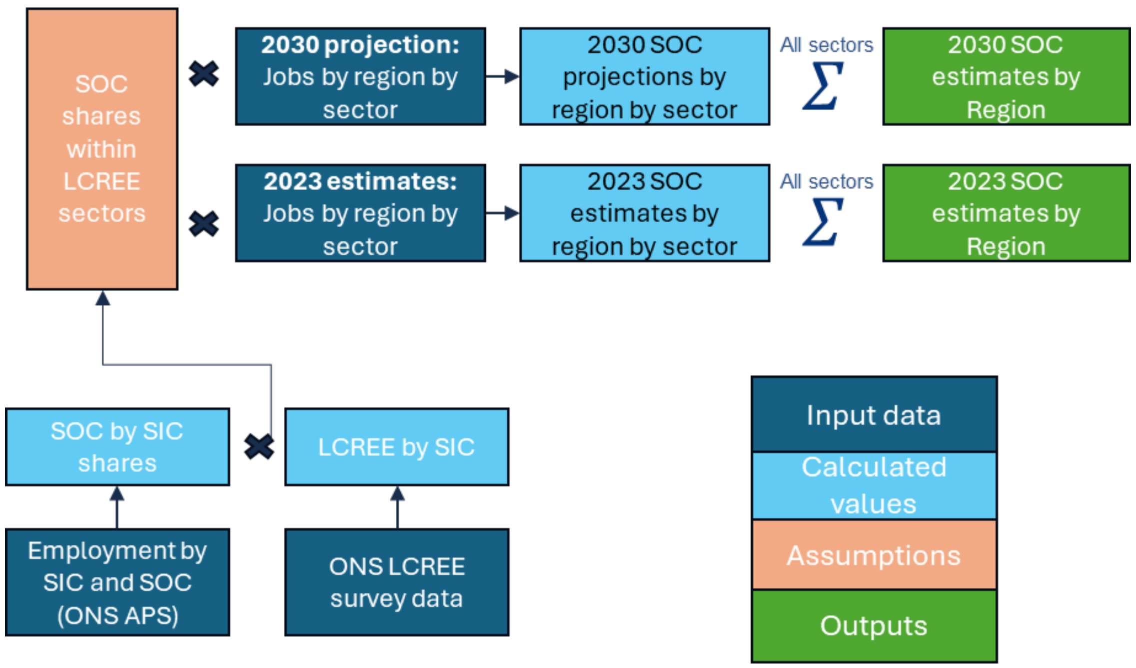
There is limited official data available on clean energy jobs by region. DESNZ has developed an experimental methodology to estimate the regional distribution of clean energy occupations for 2023 and 2030. Due to the limitations in the methodology and the underlying data there is high uncertainty around these estimates, and they should be treated as indicative only. They provide an indication of the growth in occupations required in each region. Data has been presented at International Territorial Levels 1 (ITL 1); e.g. North West of England, London, Scotland, Wales, Northern Ireland, etc, in order to allow for comparison between areas whilst mitigating against the increased uncertainty arising from presenting data for smaller geographical areas.

ITL1 regions do not map exactly to Mayoral Strategic Authorities (MSAs). As in action 5.2 of the of the Clean Energy Jobs Plan, the Office for Clean Energy jobs has committed to work with MSAs and Skills England to improve the detail of our clean energy workforce demand estimates. By working with MSAs to improve data, we will support regions to plan localised skills interventions targeted at priority occupations and sectors.

Method

In order to distribute jobs across the regions and provide the occupational mix it was necessary to estimate where the jobs related to each sector are likely to be located. The methods used to do this are set out in Table 5. The SIC by SOC matrix described in Section 1 was then applied to these estimates at a sector level, to obtain the distribution of occupations. These were then combined to obtain an estimate of occupation by region for 2023 and 2030. A flow chart setting out this method can be found in Figure 2.

Figure 2 – Disaggregating regional workforce estimates by occupation



This method has been applied to direct jobs only as there is insufficient correlation between the proxies used and the locations of indirect jobs, and therefore does not support robust or reliable regional estimates for indirect employment. The emphasis of this analysis was to understand how clean energy occupations will be distributed in 2030 in order to aid the development of skills policy. For this reason, quality assurance of the estimates has been carried out only at occupational level.

Table 5 – Summary of methods used to produce regional splits of baseline and 2030 workforce estimates

Sector(s)	Method
Offshore Wind, Onshore Wind, Solar	Distribution using share of capacity (GW) by region. For Offshore Wind the location of grid connection point of developments has been used. For Onshore Wind and Solar, location of deployment has been used.
Fusion energy, Nuclear fission	Fusion estimates use previously published estimates of the current regional split of UKAEA jobs and the wider fusion industry and apply to indirect jobs.[21] Fission estimates are based on DESNZ analysis using both the 2023[22] and 2024[23] Nuclear Workforce Assessment, including some data which has not been published.
Smart and flexibility, Hydrogen	2030 Regional distribution assumed to be unchanged from analysis of 2023 Business Register and Employment Survey (BRES)[24]
Electricity networks	Direct distribution jobs allocated to regions based on Distribution Network Operators (DNO) jobs figures, adjusted to fit ITL1 geographical boundaries. Transmission jobs allocated by the distribution of ONS LCREE jobs across all relevant sectors.
CCUS & GGR, Biomethane	Distributed using project data for clusters. Biomethane uses published jobs analysis from the Green Gas Support Scheme (GGSS) impact assessment applied to the latest deployment forecasts for Biomethane. CCUS jobs distributed according to location of projects and clusters modelled to have taken FID by 2030 in internal Spending Review analysis.

[21] UKAEA Annual Report and Accounts, 2023/24, HC175 - GOV.UK for regional splits of UKAEA jobs. For indirect jobs by region, London Economics (2023) Overview of the UK fusion Sector
[22] Cogent Skills (2024) 2023 Nuclear Workforce Assessment
[23] Cogent Skills (2025) 2024 Nuclear Workforce Assessment
[24] ONS (2024) Employees in Great Britain: 2023

Sector(s)	Method
Heat and Building Sectors (Domestic Heat Pumps, Heat Networks, and Energy Efficiency)	Proxies used to distribute jobs, including UK housing stock[25], technical potential of heat network stock, and historical deployment of heat pumps, heat networks and energy efficiency measures. Equivalent policy action is assumed in the Devolved Administrations.

Assumptions and limitations

This analysis required simplifying assumptions to be made and therefore a number of caveats should be highlighted:

- For some sectors – notably offshore wind, onshore wind, solar and heat and building sectors - deployment estimates have been used as a proxy for where the jobs will be located. Not only is there uncertainty in where the deployment will take place, but this is a simplifying assumption as there is not necessarily a direct link between deployment and jobs. For example, it does not take geographical workforce mobility or having headquarters in larger cities rather than areas of deployment into account. Jobs may not be sourced locally to renewable energy developments, reasons for this include the use of established multinational corporations many of whom operate across borders, the concentration of UK expertise in certain hubs/regions, and temporary nature of jobs.
- Most sectors have been able to estimate how the distribution of jobs changes by 2030. However, for some sectors, an assumption has been made that the distribution of jobs in 2023 is the same as 2030. This is a limitation, but it was not possible to identify an alternative approach.
- A major limitation of this method is the assumption that the ratio of occupations within a given sector is consistent across all regions of the UK. As a result, the conclusions are indicative; headquarters effects and other geographical workforce nuances are not considered.
- As described in the 'Occupational Analysis' section, the occupational mix is assumed to be constant over time; which means that the regional analysis also does not capture the possibility that different occupations become more/less important over time. Additionally, it is assumed that the relative importance of different occupations within a sector is the same as in SIC divisions reported by businesses in the LCREE survey, as detailed previously. In other words, the occupational mix of SIC divisions across the economy is assumed to be reflected within the LCREE economy.

[25] 2023-24_EHS_Headline_Report_Chapter_2_Energy_Efficiency_Annex_Tables.ods, Scottish Household Survey, 2023 - gov.scot, Dwelling stock estimates: as at 31 March 2023 [HTML] | GOV.WALES, The Housing Executive - House Condition Survey

- Due to differences in modelling approaches and data availability, the estimates for devolved nations varies by sector. This means that jobs estimates for Northern Ireland are likely a lower bound, as projections are not available for this region across all clean energy sectors.[26]
- Due to the smaller samples involved when estimating at a regional level, the uncertainties presented in the overall jobs estimates could be greater.

To help mitigate the limitations listed above we have presented the analysis through an occupational lens, and quality assured at this level. In addition, we have presented the results in bands to avoid spurious accuracy. Moreover, conclusions regarding regional occupational demand changes are presented at SOC2 level. Drawing conclusions at a more granular level (e.g. SOC4) would have higher levels of uncertainty associated with it due to the smaller sample sizes. Similarly, ITL1 level of regional disaggregation has been chosen to balance presenting trends from across the UK without presenting the analysis to a level more accurate than the methodology can support, which would potentially occur if smaller geographical areas were used.

[26] Offshore and Onshore Wind, Solar and Nuclear Fission estimates are for GB only. Fusion Energy, CCUS and GGR, Electricity Networks, Heat and building sector estimates are for UK. Heat and Building sector estimates for Devolved Nations are made on the assumption that there will be equivalent policy action in the Devolved Administrations.

Supply pool analysis

This section outlines the approach taken to estimate the potential supply of workers into priority clean energy occupations from three key sources: people currently out-of-work, military leavers and veterans, and people currently employed in phase-down sectors. This analysis is not intended as a comprehensive assessment of all supply routes into the clean energy sector; supply routes were selected based on data availability and actions within the Clean Energy Jobs Plan.

For people currently out of work and military leavers and veterans, relevant occupational data for clean energy priority roles was sourced directly from ONS and Ministry of Defence statistics, summarised below.

Table 6: Data sources for people currently out of work, military leavers and veterans

Supply pool	Statistical publication
Out of work people	ONS, People's ability to work in other occupations in the UK, 2024[27] ONS, People's ability to work in clean energy occupations in the UK, 2024[28]
Military veterans and leavers	MoD, Career Transition Partnership ex-service personnel employment outcomes: financial year 2023/24[29]

Additional steps were required to estimate the number of workers in clean energy priority occupations across phase-down sectors as an existing data set was not available.

Phase-down sectors were taken from analysis completed by the Climate Change Committee, summarised in the table below.[30]

[27] ONS (2025) People's ability to work in other occupations in the UK, 2024
[28] ONS (2025) People's ability to work in clean energy occupations in the UK, 2024. Note that production, factory and assembly supervisors (8160) are included in the ONS occupation list but not the Jobs Plan occupation list. However, this does not impact figures used in the report due to the lack of supply of out of work people from this occupation.
[29] Ministry of Defence (2025) Career Transition Partnership ex-service personnel employment outcomes: financial year 2023/24
[30] Climate Change Committee (2023) A Net Zero Workforce. See Table 1 and Annex 2. The SIC "retail sale of automotive fuel in specialised stores", although noted by the Climate Change Committee, was excluded from the scope of this analysis.

Table 7: Phase-down sectors identified by the Climate Change Committee

Division Number	SIC Name
05	Mining of coal and lignite
06	Extraction of crude petroleum and natural gas
09	Mining support service activities
19	Manufacture of coke and refined petroleum products

Employment estimates for these sectors were taken from the Business Register and Employment Survey (BRES)[31], as the recommended source by the ONS for industry-level employment data.[32] Four-digit SOC by industry (SIC) breakdowns were not available via BRES, so occupational shares at the four-digit SOC level were calculated for each phase-down sector using the APS.[33]

APS occupational shares were applied to the BRES sector employment figures to estimate the distribution of employment across priority clean energy occupations within these sectors. Values across these sectors were summed to provide phase-down sector totals.

[31] ONS (2023) Business Register and Employment Survey: open access
[32] ONS (2016) Business Register and Employment Survey It is noted that sector employment estimates from other sources, such as the Annual Population Survey (APS) would lead to different results.
[33] ONS (2024) Annual Population Survey/Labour Force Survey

Appendix A: Heat pump installer workforce modelling approach

Domestic heat pump installer job estimates are based on the Department's heat pump installer workforce model, which uses a bottom-up approach to project future full time equivalent (FTE) demand. The model incorporates projected annual heat pump deployment and stock scenarios, alongside assumptions about labour intensity for installations and annual maintenance across new-build and retrofit homes. The methodology is adapted from the Heat Pump Association's (HPA) report '*Projecting the Future Domestic Heat Pump Workforce*'.[34]

FTE demand for heat pump installations is calculated by multiplying the projected deployment in new-build and standard retrofit homes by their respective installation time assumptions in year x. Annual maintenance related FTE demand is estimated by applying the maintenance time assumption in year x to the cumulative installed stock from year x-1. The exact mix of future heat pump technologies is uncertain, but we expect air source heat pumps (ASHPs) to make up the vast majority of future installs, so the model uses installation times associated with ASHP.

Labour intensity assumptions for heat pump installation and maintenance are based on the assumptions in the HPA report.[35] The model initially assumes 9.8 FTE days for an ASHP installed in a standard retrofit house, and 7.6 FTE days in a new build house. Annual maintenance time for is assumed to be 0.4 FTE days. To express as FTE, the combined demand estimates (total installation and maintenance days) are divided by the number of working days per year – assumed to be 230 after accounting for weekends, public holidays and statutory annual leave allowance.

The model also considers possible future reductions in the labour intensity of heat pump installations and maintenance (e.g. due to innovations or economies of scale). Compared to current estimates, we assume around a 50% reduction in labour intensity from AHSP installations by 2035, reducing the assumed installation of an ASHP in a standard retrofit and new build home to 4.8 and 3.7 FTE days respectively.[36] For maintenance, we assume this will largely be driven by the scale of the market, so by 2035, this reduces to 0.25 FTE days to be comparable with a gas boiler.

Indirect HP job estimates are calculated by applying an indirect job multiplier to the workforce model's direct HP job estimates. The multiplier is derived from the latest ONS LCREE dataset

[34] HPA (2024) Projecting the future domestic heat pump workforce
[35] Labour intensity assumptions reflect the typical tasks involved in heat pump installation – such as upgrading heat emitters, installing hot water systems, wiring the heat pump unit, and final commissioning – based on evidence from the HPA (2024) Projecting the future domestic heat pump workforce
[36] We assume that installation cost reductions are realised mainly through productivity increases. Installation cost reduction for ASHPs based on outcomes of Eunomia (2023) Cost of Domestic and Commercial Heating Appliances

and is based on the 5-year average ratio of total jobs to indirect jobs in the renewable heat sector across 2018 to 2022, with a value of 1.48.[37]

While the job estimates in the Jobs Plan include both direct and indirect roles in heat pump installation and manufacturing, installer roles are expected to account for the vast majority. Manufacturing jobs are projected to represent only a small proportion of the total FTE demand by 2030 and are therefore not estimated separately. Instead, they are captured within the installer model outputs and expected to fall within the model's margin of error.

[37] Office for National Statistics (2025) Low carbon and renewable energy economy indirect estimates

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