EngineeringUK

Engineering skills needs – now and into the future

A report produced by
Lightcast for EngineeringUK

Lightcast

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Executive summary

In an ever-changing labour market, employers' needs are rapidly evolving. Technological changes, an ageing population and the shift to a greener economy are all contributing to reshaping the UK's labour market. To stay abreast of these changes and unlock new opportunities, it is essential that current and prospective workers understand what these trends mean for them. It is also critical that these changes are being understood by policymakers: from those developing qualifications and curricula to the people in charge of assessing the future needs of roles and delivering careers advice.

The engineering and technology profession is no exception to these changes. The composition of the sector is evolving and so are the skills requirements within specific roles, with important implications for policymakers and education providers as they look to prepare for the labour market of the future.

This report, produced by Lightcast for EngineeringUK, aims to shed light on these changes. While it is impossible to predict the future, this report provides cutting-edge insights on the direction of travel for the engineering profession. It does so by combining projections from past labour market trends with big data analytics from job postings data – a unique, almost real-time source of information on employers' skills needs.

Each chapter of the report answers a different research question related to how the engineering profession is changing:

- **Chapter 2** looks at how the engineering profession is projected to grow in the future;
- **Chapter 3** looks at recruitment activity in the engineering profession;
- **Chapter 4** focuses on the skills required within engineering roles;
- **Chapter 5** looks at changes in skills demand in the profession over time;
- **Chapter 6** deep dives into green skills in the engineering profession;
- **Chapter 7** provides insights on the regional distribution of engineering activities.

The key findings for each chapter are set out below.

Chapter 2: Where is the engineering profession headed?

By combining data from the Annual Population Survey and Lightcast projections, this first chapter looks at the number of jobs within the engineering profession today and how this may be changing in the future.

- As of 2021, there were approximately 6.1 million jobs within engineering occupations across all industries, representing approximately 19% of all jobs in the UK.
- Engineering occupations are projected to grow by a further 2.8% by 2030, adding 173,000 net new jobs. This represents a faster rate of growth than that projected for the national average of all occupations (2.3%).
- Future job growth is projected to occur across the engineering footprint, with occupations related to ICT, skilled construction trade and civil engineering expected to add the most additional jobs.[1]

Chapter 3: Recruitment activity in the engineering profession

This chapter focuses on recruitment activity for engineering roles by using cutting-edge data on job postings. This data comes from Lightcast proprietary job postings library with over 80 million job postings collected in the UK since 2012. These postings are collated, deduplicated and categorised daily to complement official statistics by providing near-real time insights on hiring trends.

- In the 12 months between October 2021 and September 2022 there were over 3.65 million unique job postings recorded in the UK relating to engineering occupations, representing approximately 25% of all job postings in the country. The fact that engineering occupations account for 19% of current jobs but for 25% of all job postings suggests that the current skills shortage in engineering is greater than in other areas, or that employers are hiring for future growth, or a combination of the two.
- ICT and software occupations accounted for the largest shares of these engineering job postings, followed by other (unclassified) engineering, civil and electrical. Compared to current jobs, ICT occupations have a particularly active recruitment market. This is due to fast growth in these occupations as well as indicative of high churn.
- In contrast, construction and operative occupations appear to have fewer job postings relative to the size of jobs they account for. This is in part explained by the fact that employers in these occupations may be less likely to advertise their openings online.
- Median advertised salaries of the engineering footprint are 30% higher than that of the national average (£38,600 v £30,000), with most engineering career groups having median advertised salaries above the national average.
- Some 1.3% (47,400) of all postings in the footprint were classified as apprenticeship opportunities (slightly above that of the national average), with most openings arising within ICT and software, mechanical and metal, and construction trades.[2]
- While initially impacted by the pandemic, the scale, speed and sustained nature of recovery in recruitment activity both within the engineering footprint and wider economy has been unprecedented. Within the footprint, construction trades, environment, and ICT have seen particularly strong demand since the pandemic.

[1] The engineering footprint encompasses a wide range of occupations across many different industries. To capture the nuances within the footprint, this report has organised engineering occupations in 13 categories. These are discussed in more details in Box 1.

[2] It is not possible to identify the specific level of apprenticeship being advertised in job postings.

Chapter 4: What skills do engineering roles require?

This chapter investigates what exactly engineering skills are and what other skills are needed by those working in engineering roles. The analysis in this chapter was conducted by applying the Lightcast Open Skills Taxonomy to its job posting library.

- Each occupational group within the engineering footprint has its own unique composition of skill requirements, and as such, the skills composition of the engineering footprint as a whole is extremely diverse and complex.
- On average, the engineering footprint and most of its subgroups are more skewed towards requiring specialised and software skills than common skills compared to other occupations. This is indicative of the highly specialised skillsets required by many of the occupations related to engineering.
- Despite that, common skills do still play a key role in engineering roles. These skills include 'communication', 'management', 'customer service' and 'problem solving' skills and they are broadly consistent across the footprint.
- Unlike with common skills, key differences emerge across the footprint when examining specialised skills. On average, 25% of job postings related to the engineering footprint require at least one specialised engineering skill. These specialised engineering skills are skills which, according to Lightcast's Open Skill Taxonomy, are unique to engineering related roles, such as a knowledge of civil engineering or engineering analysis. However, this varies significantly within the engineering footprint, with quite high shares of job postings requiring specialised engineering skills found for those occupations related to electrical, mechanical, and civil engineering and relatively few within ICT.
- In addition to that, each subgroup of engineering roles has its own specific skills needs. While demand for other non-engineering skills – both common and specialised skills – such as business, communications and digital skills is high across the footprint, each part of the engineering footprint also requires specific skills linked to its specialisation. For example, computer-aided design skills are particularly important for civil engineering roles, while programming languages are important for ICT roles within the engineering footprint.

- There are not many occupations outside the engineering footprint with a similar skills profile to engineering roles, especially in terms of the top, specialised skills sought after for engineering occupations. This can make it more difficult for employers looking to fill engineering roles to find talent from other occupations.
- On average, engineering roles tend to require a more complex and specific sets of skills compared to other occupations. This is particularly the case for quality assurance and regulatory, civil, ICT, and design engineering occupations.
- Beyond skills, job posting data suggests that different levels of formal education are typically required for different areas of engineering. Civil engineering and ICT roles for example, are more likely to require a bachelor's degree or higher compared to construction, electrical, and mechanical engineering, where employers more often require A-levels, GCSEs or equivalent qualifications.

Chapter 5: The changing nature of engineering skills

Continuing the investigation on skills using Lightcast Open Skills Taxonomy and job postings library, this section looks at how the engineering footprint has changed in the past five years.

- On average, the range of skills demanded by employers is becoming increasingly diverse across the engineering footprint. This suggests the engineering profession is becoming broader, with wider application of engineering principles across the economy.
- Demand for specialised engineering skills is growing. Overall, growth in demand for specialised engineering skills has outpaced the growth of the engineering footprint overall, with specialised engineering skills now featuring in proportionally more job posts than in 2016/17.
- Of the specialised engineering skills, emerging fields such as 'chemical and biomedical engineering' and 'robotics' have seen the fastest rates of growth, while at the other end, more traditional engineering technologies such as 'hardware description languages'[3], 'aerospace engineering' and 'radio frequency technology', have seen their proportional shares decline.
- Some 45% of job postings within the engineering footprint required software skills. This is pretty much unchanged over time and substantially higher than the average for all occupations, which is approximately 30%, and particularly driven by ICT related engineering job postings. However, the composition of the top software skills demanded has continued to morph, driven by the rise of new software and new technologies such as cloud computing.
- While software skills are most heavily concentrated within ICT occupations, demand does exist in other engineering fields, with computer-aided design skills, Microsoft Office applications and Python (programming language) among the most sought after elsewhere within engineering.
- Three types of digital and software skills are particularly important for engineering roles:
  - *Automation and robotics skills:* This is an emerging field and demand is growing across the engineering footprint, albeit to different degrees. These skills are most heavily concentrated within electrical occupations.
  - *Programming language skills:* Demand is also growing across the engineering footprint, particularly in the quality assurance and civil thematic groups.
  - *Computer Aided Design skills:* Although proportional demand has declined slightly across the engineering footprint, these skills remain among the most prevalent 'engineering' skills, particularly for the civil, mechanical and design career groups.
- On average, 27% of working time in engineering roles is spent on highly automatable tasks, in line with the national average. However, much of the work of the engineering footprint relates to 'creative intelligence tasks,' which are more challenging to artificially replicate or automate.
- The potential impact of automation is not evenly split across the engineering sector, with skilled construction trades, skilled metal trades, and operative roles among the most likely to have the routine aspects of their work impacted as a result of forecast technological advancements. It is important to stress however, that a higher likelihood of automation impacting work does not necessarily mean job displacements in these occupations, but rather they are more likely to have their existing tasks changed by technological advancement.

[3] Hardware description languages refers to specialised computer languages used to describe the structure and behaviour of electronic circuits.

Chapter 6: The engineering footprint and the green economy

This chapter deep dives into the relationship between the engineering footprint and the green economy. The analysis presented in this chapter is based on job postings data. The size of the green economy was measured by searching Lightcast job postings library for 370 job titles classified as 'green' and 230 green skills. This is an experimental approach to kickstart the discussion around the green economy while a common framework to look at green jobs is being developed by the Government.

- The engineering footprint is becoming 'greener' – with a larger share of engineering job postings either having a green job title or requiring green skills. Activities and skills of those employed in engineering will be critical in achieving the UK 's net zero carbon emissions targets.
- Within the footprint and across each of its thematic career groups, demand for both 'green skills' and 'green jobs' have grown steadily and were, as of September 2022, at record levels. Albeit, from a small basis, the frequency of green job titles among engineering job postings increased by 55% in the past five years, and the number of engineering job postings mentioning a green skill has also grown by 48%. As of 2022 there were approximately 23,000 engineering job postings for green roles and a further 212,000 requiring green skills. This suggests that the engineering footprint is both growing its number of green jobs as well as traditional engineering jobs, such as civil or mechanical engineers becoming greener.
- 'Environmental engineers', 'renewable engineers' and 'environmental consultants' are among the most frequently appearing green job titles across the footprint. They respectively account for 7.1% (1,650), 6.0% (1,380) and 5,2% (1,200) of all engineering job postings with a green job title. However, there has been strong growth recently for other roles such as 'carbon analysts' and 'climate change specialists', albeit from a small basis. These two roles accounted for 600 and 250 job postings respectively in the past year. These more analytical and advisory roles are suggestive of more businesses seeking to measure the environmental impact of their work, or that of others. Demand for specialist solar installers has also increased markedly, with four out of the 10 fastest growing green job titles in the engineering footprint relating to solar energy.
- Looking at green skills, 'environment health and safety', 'water treatment' and 'environmental laws' are among the top demanded across the engineering footprint. Similar to green job titles however, the last 5-years has seen rapid growth in a plethora of new skills such as those relating to electric vehicles, achieving net zero emissions, and ESG reporting standards. Many green skills however remain niche and therefore, are typically concentrated within just their specific industry or related occupations.

Chapter 7: The regional shape of the engineering footprint

This last chapter looks at the geographical distribution of green jobs across the UK both at a macro regional level (defined using NUTS1 regions) and at a more granular geography – that of the areas in charge of Local Skills Improvements Plans. It does so by combining insights from official statistics with job postings data for 2022.

- Consistent with wider UK population and labour market trends, the absolute number of jobs relating to the engineering footprint is most heavily concentrated in London and the South East. However, the occupational composition of engineering is not standard across the UK's regions, with each area having its own unique make-up and relative strengths.
- London and the South East are particularly specialised in ICT and civil engineering occupations, while there is more of a mechanical and electrical occupations focus in the north and midlands. Similarly, Scotland has a very high degree of specialisation in environment, energy and earth occupations, whereas skilled trades, industrial and general operative roles are more concentrated in the north of England, Wales and Northern Ireland.
- Digging down to the local areas in charge of the Local Skills Improvement Plans (LSIPs) in England, reveals that Thames Valley Berkshire, G First (Gloucestershire) and D2N2 (Derby, Derbyshire, Nottingham and Nottinghamshire) have the highest concentration of engineering jobs overall, relative to the size of their economy. However, what is also notable is that similar to the broad regional perspective, each LSIP area (and NUTS2 region for devolved UK nations) has unique strengths in different areas of engineering.
- Looking forward, the number of engineering jobs in all regions is projected to grow by 2030, with most new jobs being added in the south (South East and South West) and East of England regions.
- Latest recruitment activity shows that, similar to overall job numbers, demand is concentrated in London and the South East. However, its proportional share of all engineering job postings has declined since 2016/17 with equivalent rises in shares seen across the more northerly regions of the UK. This suggests that demand for engineering roles is growing faster outside of the capital and its surrounding areas.
- Finally, median advertised salaries for engineering-related positions are found to be highest in London and the South East, consistent with typical labour market trends, and their occupational compositions. However, within each individual geography, engineering jobs offer higher salaries than the average, highlighting the important role that engineering can play in promoting economic growth in a local area.

Chapter 1
Introduction

The economy and labour market are changing rapidly. The ongoing introduction of new technologies, the shift to a greener decarbonised economy, as well as wider economic trends are all contributing to a changing workforce and the skills businesses need to drive future growth.

Engineering, both as a discipline and a diverse skill set, has, and will continue to be, central to the UK economy. However, to be successful in this rapidly evolving environment, policymakers, employers, and education providers must fully understand how engineering roles and skills are changing and update their priorities and training provision accordingly, so as to ensure the UK economy has an appropriate supply of the necessary skills for the future.

This report, commissioned by EngineeringUK, endeavours to fill this research gap by providing a detailed analysis of the engineering occupation both in terms of the changing nature of its most sought-after skills as well as through future employment projections, across the UK. In doing so, this report will complement EngineeringUK's existing suite of research including its reports on **Educational Pathways into Engineering (2022)** and **Trends in the Engineering Workforce (2022)**.

The report is structured across six core chapters that each consider a different dimension of the engineering footprint. Chapter 2 opens with an examination of engineering job numbers both at an occupational and industry level and uses Lightcast's projection model to estimate how these will have changed by 2030. Using Lightcast's innovative job postings data, chapter 3 looks at recent trends in employer recruitment activity (October 2021 – September 2022) within engineering – taking an occupational perspective using the ONS Standard Occupational Classification codes identified as part of the engineering footprint (see Box 1). Chapter 3 also looks at how these trends have been impacted by the COVID-19 pandemic. Chapter 4, again using Lightcast's extensive job posting database, examines the specific skills most in demand by employers across the different areas of engineering, while chapter 5 examines how these skills continue to evolve over time. Chapter 5 also contains an analysis of the areas of engineering likely to be most disrupted by emerging automotive technologies. Chapter 6 is focused on the critical role engineering plays in decarbonisation, with a particular focus on the jobs and skills emerging within the profession that will enable an economy-wide green transition. Chapter 7 then considers engineering through a regional and sub-regional lens, highlighting the relative regional strengths different areas have for different sub-sectors of engineering.

A detailed overview of the definition of engineering used in the report, as well as of the data and methodologies applied can be found in Box 1 and Box 2.

Box 1: Defining 'engineering'

The 'Engineering footprint'

This report defines 'engineering' by using the 'engineering footprint' definition developed by EngineeringUK, the Royal Academy of Engineering and the Engineering Council.

This definition was developed by agreeing on a set of criteria regarding the level of qualifications and skills deemed to be required for engineering roles. The process involved undertaking an extensive review of standard occupational classification (SOC) and standard industrial classification (SIC) codes and agreeing a list that fulfilled the criteria.

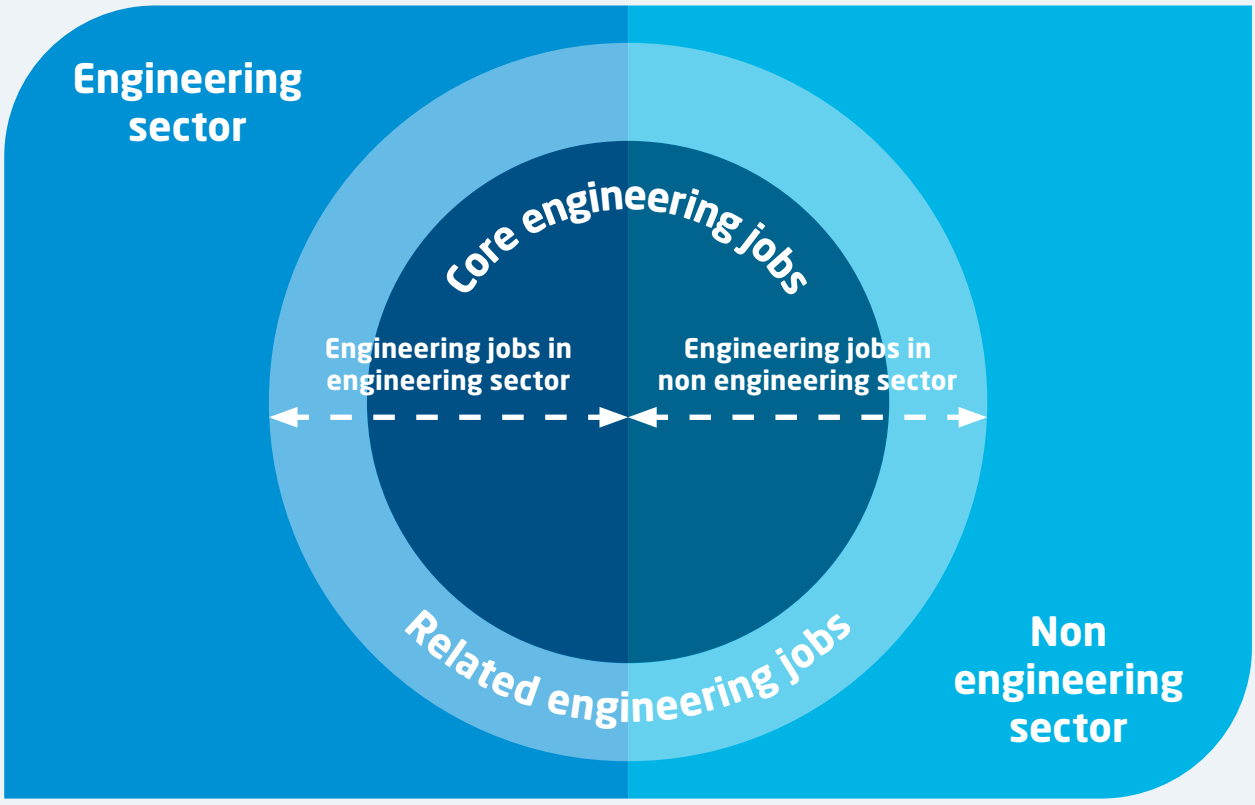
Following this framework, the **engineering workforce** was defined as those working in the Standard Occupational Classifications (SOC) that meet the footprint's criteria for 'engineering'. Where appropriate, the analysis further disaggregates this according to the footprint's definition of 'core' and 'related' engineering:

- **Core** – refers to roles that are primarily engineering-based and require the consistent application of engineering knowledge and skills to execute the role effectively (for example, civil engineers or mechanical engineers).
- **Related** – refers to roles that require a mixed application of engineering knowledge and skill alongside other skill sets, which are often of greater importance to executing the role effectively (for example, quantity surveyors, or IT operations technicians).

Similarly, the **engineering sector/those working in engineering industries**, are defined as those people who work in the Standard Industrial Classifications (SIC) that meet the footprint's criteria for 'engineering'.

It is worth noting that these concepts are inter-related. For example, one can work in an engineering job (SOC) within or outside of the engineering sector (SIC).

Figure 1. The occupational and industrial engineering footprint



Source: EngineeringUK (2022). *'Trends in the engineering workforce between 2010 and 2021'.*

Unless otherwise stated, this report uses the SOC definition of the engineering footprint as the basis for the analysis.

Thematic Career Groupings

While the engineering footprint provides a useful base from which to view developments and trends in engineering occupations as a whole, its broadness as a definition can obscure many of the important nuances associated with different careers or specific occupational groups. This is particularly the case for skills, where each occupation requires its own unique skillsets. Solely analysing the footprint as a whole risks focusing the analysis on those occupations that account for the largest shares of jobs or job postings, and therefore, may not accurately tell the full story of the dynamics driving developments within different areas of the engineering profession.

In an effort to overcome this challenge, Lightcast and EngineeringUK have agreed a set of 13 broad 'thematic career groups' which includes all 97 individual SOC codes of the engineering footprint.

The 13 thematic career groups are as follows, with a detailed list of associated SOC codes in each group included in the appendix of this report.

1. **Civil**
   civil engineers, surveyors, etc.
2. **Design and Development**
   design and development engineers, etc.
3. **Electrical**
   electrical/electronic engineers, electricians, etc.
4. **Environment, Energy and Earth**
   environment professionals, energy operatives, etc.
5. **Industrial**
   production and process engineers, etc.
6. **ICT and Software**
   programmers and software development professionals, etc.
7. **Mechanical**
   mechanical engineers, vehicle technicians/mechanics, etc.
8. **Water, Air and Waste**
   plumbers and heating and ventilating engineers, etc.
9. **Skilled Construction Trades**
   carpenters and joiners, bricklayers, etc.
10. **Skilled Metal Trades**
    welding trades, metal working production, etc.
11. **Quality Assurance and Regulatory**
    quality control and planning engineers, quality assurance and regulatory professionals etc.
12. **Other Operatives**
    assemblers, plastics process operatives, etc.
13. **Other Engineering**
    unspecified discipline including engineering professionals/technicians not else classified.

Box 2: Lightcast data and methodology

Lightcast brings together different data sources to create a robust composite dataset that provides labour market intelligence on hundreds of industries and occupations at the lowest geographic levels. By joining together these datasets, Lightcast can provide unique insights into the relationship between industry trends and associated occupations requirements.

Official datasets used by Lightcast

Lightcast builds the data from eight different government data sources, each describing different aspects of the labour market that in isolation only tell part of the story or contain inherent weaknesses, but when modelled together provide a more holistic and robust view of the labour market. These eight data sources are:

1. ONS Annual Business Inquiry
2. ONS Annual Population Survey
3. ONS Annual Survey of Hours and Earnings
4. ONS Business Register and Employment Survey
5. DEFRA Statistics
6. ONS Labour Force Survey
7. UKCES Working Futures
8. ONS Workforce Job Series

Labour market projections

Lightcast's industry data are projected forward to 2030 from a bottom-up level, with 4-digit SIC industries projected on the basis of an average of 3, 5 and 8-year time trends. Lightcast projections lean heavily on an extrapolation on the basis of past trends. The envelope for those projections is enhanced by accounting for the forecast trajectory for macroeconomic trends in terms of labour supply – on the basis of educational and demographic trends – and labour demand – in terms of the path of the wider economy. It is important to note that these are projections, not forecasts, meaning they look at the future based on past trends only.

Like with all projections and forecasts produced by different organisations, Lightcast's projections too are subject to substantial disruption in practice and should therefore be taken as a baseline to frame a discussion about future trends, not the last word.

Job postings data

Alongside data from official data sources, Lightcast has its own proprietary data on job postings. This dataset contains over 80 million job postings for the UK, collected since 2012.

Online job postings data provides insights into labour market trends that are complementary to traditional data. Lightcast's job postings library is built by scraping on a daily basis over 1,000 online job boards, newspapers and employer sites. The job adverts are then deduplicated to ensure only one posting is counted for each opening, regardless of how many places it is advertised in. The job postings are then classified by location, employer, occupation, skills required and any other type of relevant information that can be extracted from the ad. Compared to traditional data sources, job postings data allows for a detailed, real-time look at the labour market and what employers need. However, the data is dependent on employers advertising their openings online, which is more popular for some jobs and job types than others.

When examining job postings, it is important to remember that these are distinct from actual 'job' numbers. Employers may be advertising because they are creating a new job, but it could also be that they are advertising to replace someone who has recently left the company (labour market churn) or to test the market and understand the pool of candidates available to them. A high number of postings compared to jobs therefore suggests that recruitment activity is particularly 'active' but it should not be considered a one-to-one relationship in terms of new jobs.

'Green' classification

In the absence of a standard definition as to what constitutes a 'green job' or associated 'green skills', Lightcast has developed its own working taxonomy of almost 230 unique 'green skills' and over 370 'green job titles'. These skills and job titles were selected for their particular relevance to sustainability, environmental protection, and decarbonisation activities. Using these taxonomies, this report analyses UK job postings to get a sense as to the level of green recruitment activity and prevalence of green skills. In doing so, the methodology offers some initial estimates of the degree and direction of employer demand for both green skills and green jobs and how they are affecting the composition of the engineering workforce compared to the national average.

Automation Index

To examine the extent to which automation and technological advancement may disrupt or change work activities, Lightcast has developed a UK Automation Index. The index examines the proportion of working time spent in each occupation performing tasks which are deemed to be 'high-risk' of disruption through automation and other technological change anticipated over the next 20 to 30 years.

Estimates of how much time is spent performing 'high risk' tasks are constructed using the frequencies for different Work Activities in the US O*NET database, and mapped across to UK SOC (further information on the methodology underpinning Lightcast's Automation Index is referenced in section 5.4).

Regional specialisation: Location quotient methodology

To determine the relative specialisations of different regions in specific occupations or occupational groups, Lightcast uses location quotients. This metric quantifies how concentrated a particular industry or occupation is in a region compared to the national average. A value above 1 means a particular occupational group is more concentrated at the 'local' level than at the national level.

Chapter 2
Where is the engineering profession headed?

Key Insights

- There are approximately 6.1 million jobs within the engineering footprint occupations, as of 2021, representing approximately 19% of all jobs in the UK.
- Overall, the occupations of the engineering footprint are projected to grow by a further 2.8% by 2030, adding 173,000 net new jobs. This represents a faster rate of growth than that projected for the national average of all occupations (2.3%).
- Future job growth is projected to occur across the engineering footprint, with ICT, skilled construction trade, and civil occupations expected to add the most additional jobs.

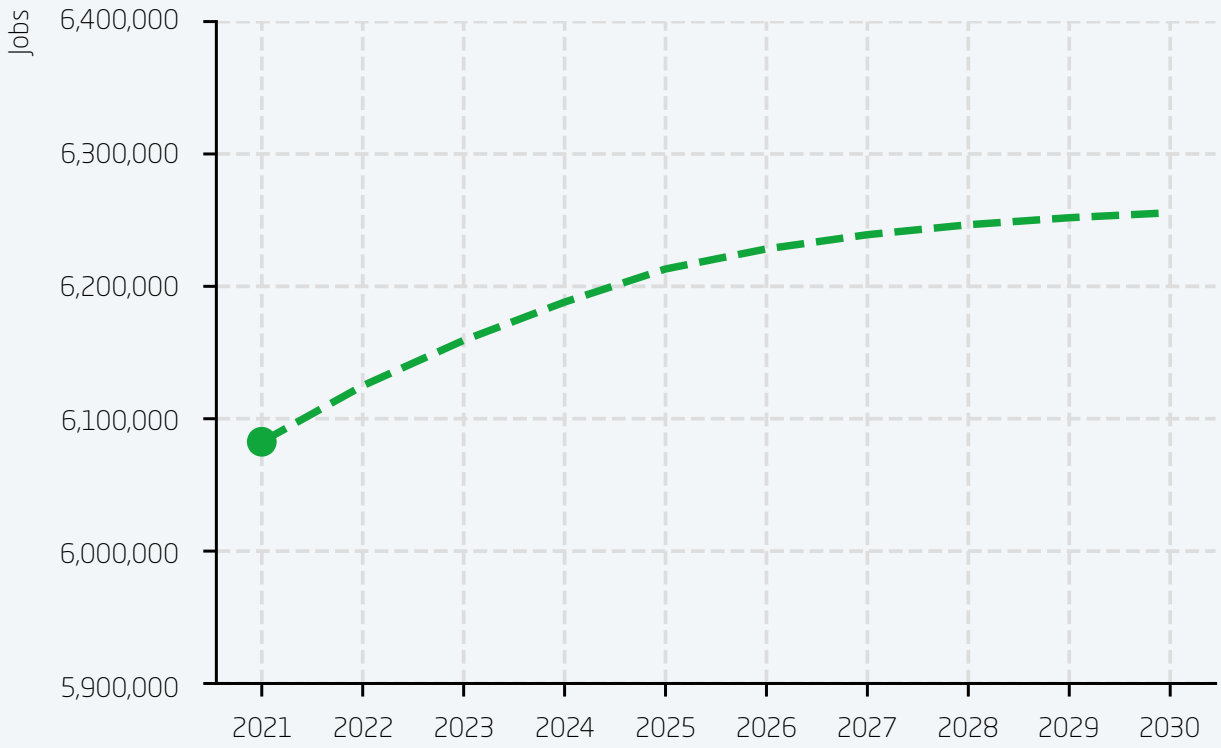
This first section provides an overview of the number of jobs included in the engineering footprint across the UK and how this might be changing over the next few years. The purpose of this section is to set the context for the rest of the analysis by offering insights on the future of engineering jobs based on past trends, before delving into the analysis of job postings and skills data in the next chapters.

2.1. Jobs growth projections of the engineering footprint

As of 2021, there were approximately 6.1 million jobs within the engineering footprint, representing approximately 19.2% of all jobs in the UK[4]. Of these jobs, 65% are in 'core' engineering occupations including civil engineers, mechanical engineers and software engineers among others, while the remaining 35% are in 'related' occupations such as quantity surveyors, carpenters, and assemblers.

Applying Lightcast projections to these figures suggest engineering jobs will continue to grow over the rest of the decade, reaching almost 6.26 million by 2030 (see Figure 2). Engineering jobs are projected to grow year-on-year up to 2030, adding approximately 173,000 jobs. This amounts to a 2.8% projected growth to 2030, and is above the average growth for all occupations which is projected to be at around 2.3%.

Figure 2. Job trend projections Engineering footprint SOC definitions, UK, 2021-2030



Source: ONS APS and Lightcast calculations

When interpreting Lightcast projections it is however important to remember that they are built on past trends and are not forecasts. While they do take into account wider macroeconomic trends in terms of labour supply and demand, they are subject to disruption in practice. More specifically, because they rely on past trends, Lightcast projections cannot take into account potential future shocks to the economy or changes in government policy, either of which could substantially impact the demand for, or supply of, labour within the engineering workforce.

[4] The occupational job numbers presented in this chapter are based on the average of four quarters of data from the Office for National Statistics Annual Population Survey (APS).

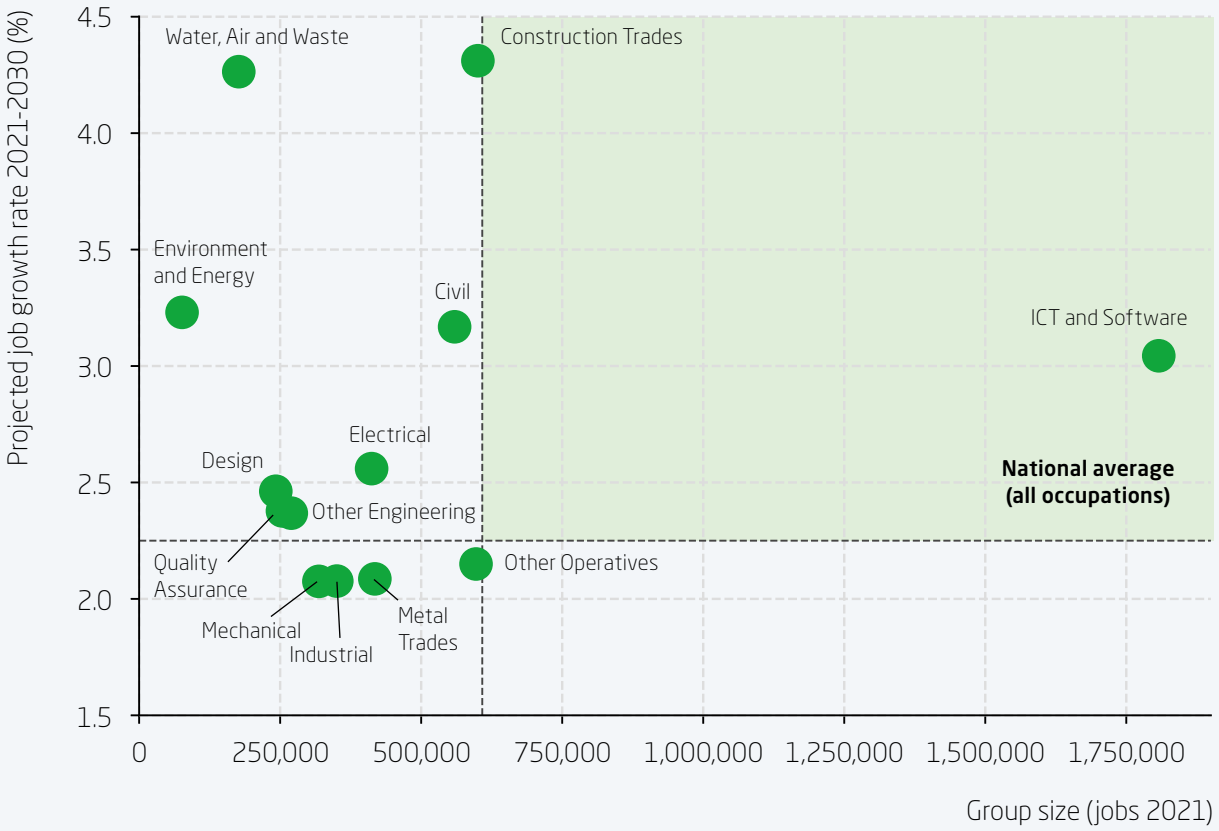
2.2 Jobs growth projections by career group

All parts of the engineering footprint are projected to grow over the next seven years to 2030. 'Core' engineering occupations, are projected to grow by 2.6%, accounting for 105,000 or 61% of additional jobs in the footprint. 'Related' occupations, are projected to grow even more, at 3.1%, adding more than 68,000 new jobs by 2030.

A significant share of this future growth will be driven by new jobs arising in ICT and software related occupations (see Figures 3 and 4). This is down to two factors: firstly, the group accounts for the largest share of jobs within the footprint (over 1.8m jobs, or 30% of the jobs in the footprint) and secondly, the group is projected to experience above average growth to 2030 (+3%). As such, it will account for 32% – or 55,000 – of the projected new jobs in the SOC engineering footprint.

Figure 3. Occupation size vs growth to 2030

Thematic career grouping, engineering footprint, UK

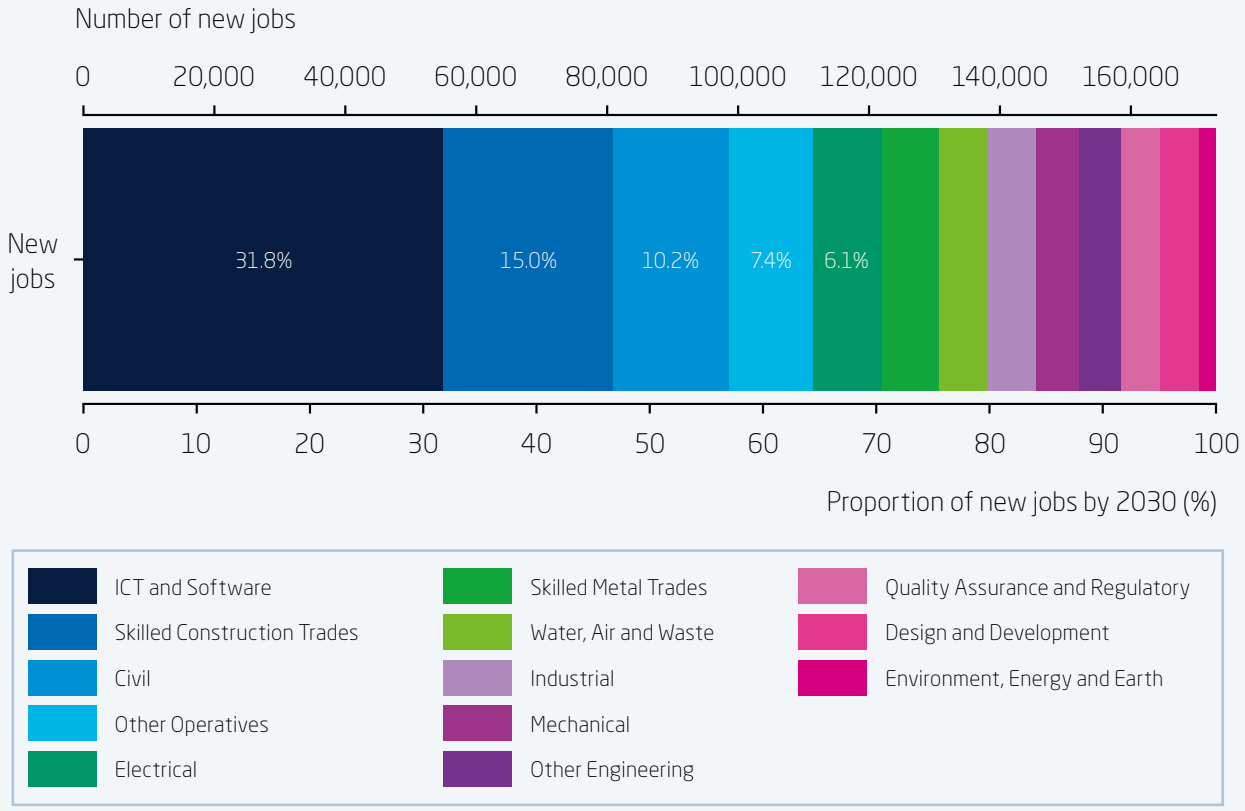


Source: ONS APS and Lightcast calculations

Beyond ICT, occupations related to skilled construction trades and civil engineering account for the next largest shares of new jobs, (15% and 10% respectively). It is worth noting that the former has the highest projected growth of any thematic career grouping, with job numbers expected to grow by over 4% by 2030.

Figure 4. Projected new engineering footprint jobs by 2030

SOC thematic career grouping, UK, 2021-2030

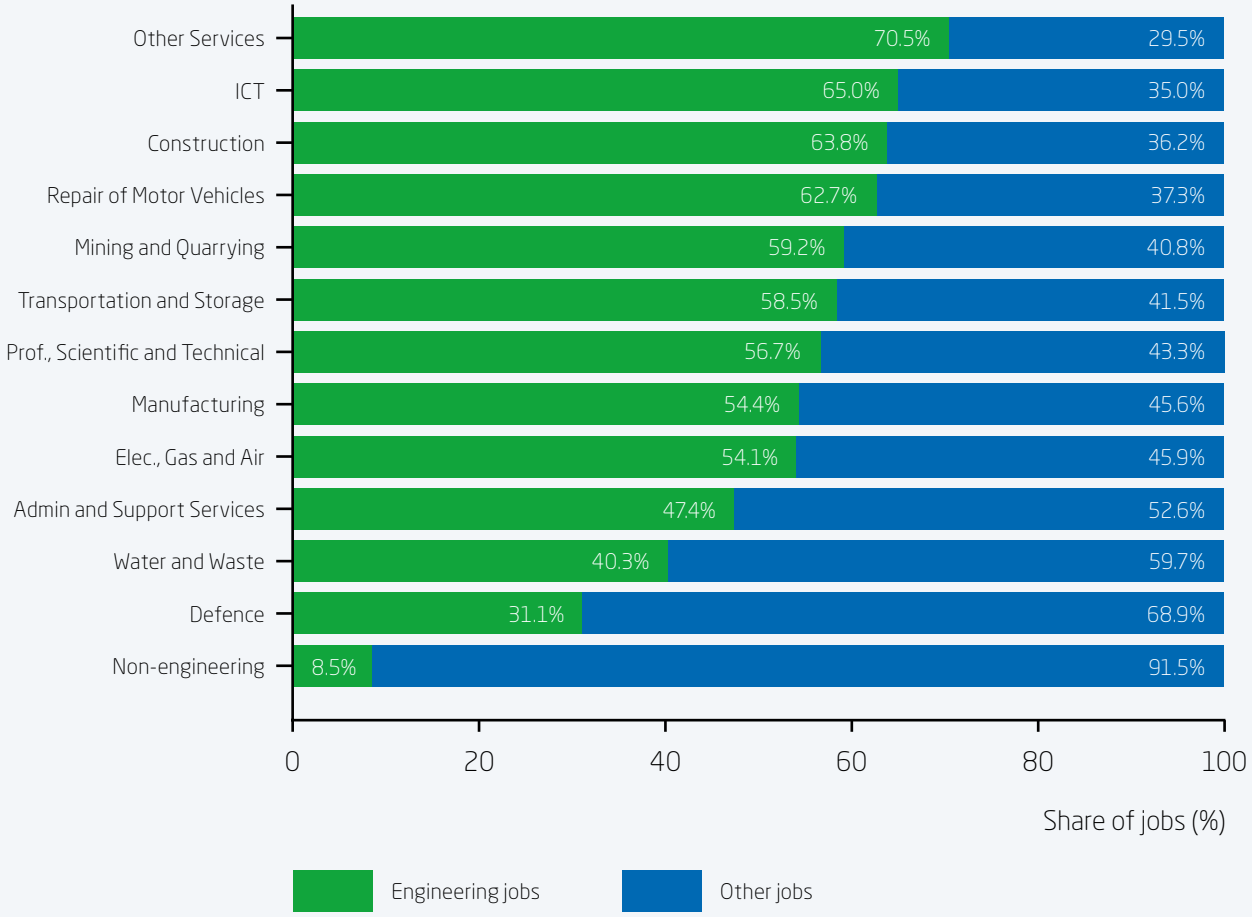


Source: ONS APS and Lightcast calculations

These trends are reflected in the engineering industry (using SIC rather than SOC). Engineering occupations account for approximately 59% of all jobs within engineering industries, but engineering industries also include jobs in business support occupations such as human resources and marketing. The distribution between 'engineering' jobs and other 'business support' jobs varies somewhat from one major industry group to another as illustrated in Figure 5.[5]

[5] The engineering industries within the 'other services' group include the repair of various instruments such as communication equipment, computers and peripheral equipment, consumer electronics, and household appliances.

Figure 5. The make-up of engineering industries UK, 2021



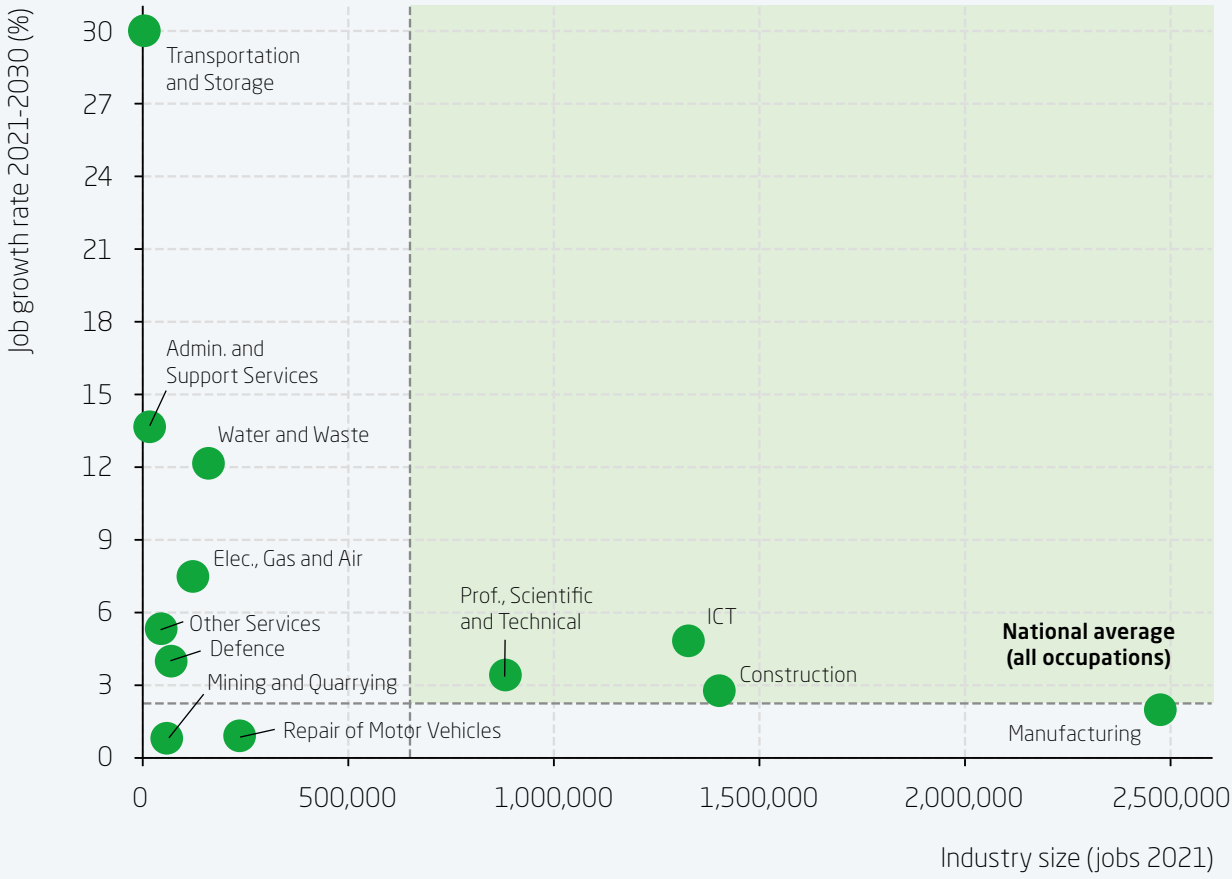
Source: ONS APS and Lightcast calculations

When looking at all jobs within the engineering industry, the engineering footprint accounts for approximately 6.8 million jobs.

From this perspective, the engineering footprint is projected to grow by 3.3% by 2030, adding another 222,000 jobs to the UK economy. Figures 6 and 7 show that the industry group that will contribute the largest number of new jobs out to 2030 will be in ICT, accounting for almost 64,000 new jobs – a growth of 4.8%. Manufacturing, the largest broad industry group within the engineering footprint in terms of existing job numbers, is projected to account for the second largest number of new jobs, approximately 49,000, although its absolute rate of growth is more modest at around 2%.

Figure 6. Industry size vs growth to 2030

Engineering SIC footprint, broad sectors, UK

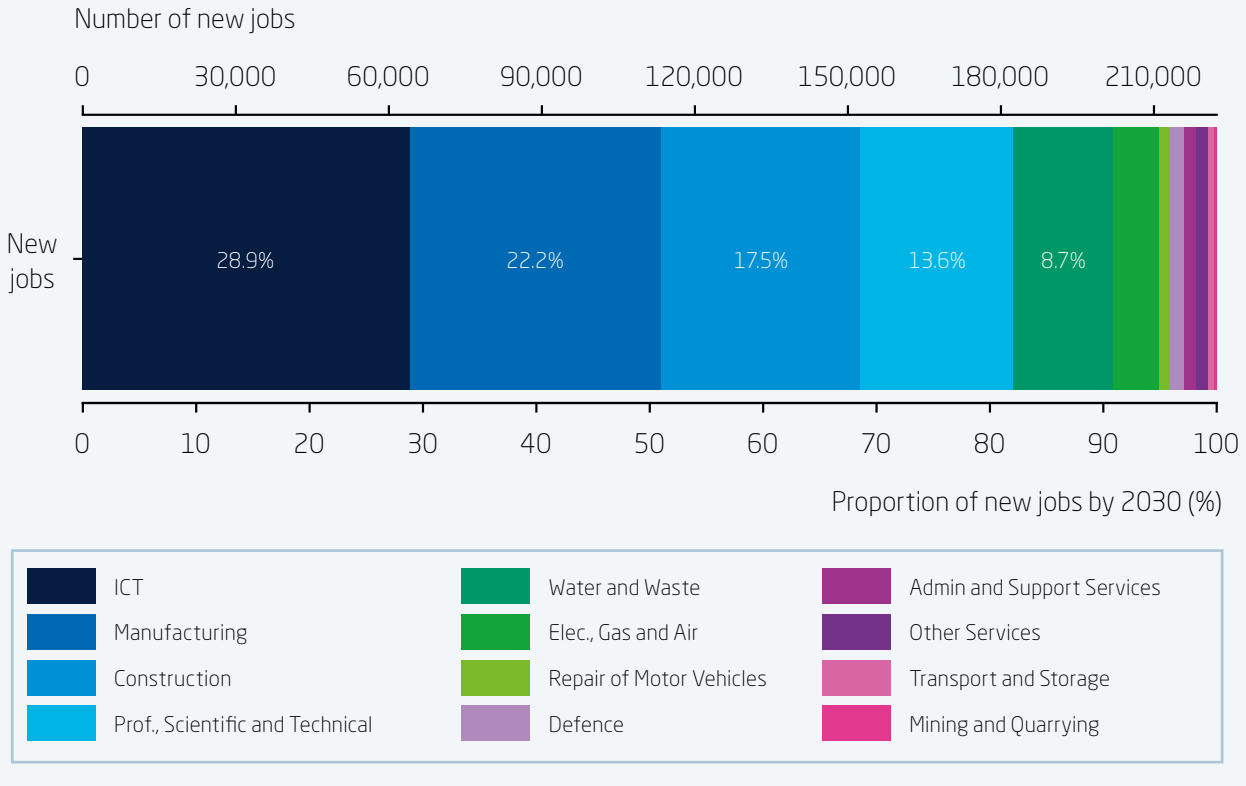


Source: ONS APS and Lightcast calculations

Construction, professional, scientific and technical services, as well as water and waste services in particular are also projected to grow strongly over the time frame (2.8%, 3.4% and 2.2% respectively). Combined with the ICT and manufacturing industries these five sectors will account for over 90% of projected new engineering footprint jobs.

Figure 7. Projected new engineering footprint jobs by 2030

SIC Engineering footprint, UK, 2021-2030



Source: ONS APS and Lightcast calculations

Chapter 3
Recruitment activity in the engineering profession

Key Insights

- Over the year October 2021 – September 2022 there were over 3.65 million unique job postings recorded in the UK relating to engineering occupations, representing just over 25% of all job postings recorded in the UK. The fact that engineering occupations account for 19% of current jobs but for 25% of all job postings suggests that the current skills shortage in engineering is greater than in other areas, or that employers are hiring for future growth, or a combination of the two.
- ICT and software occupations dominate in terms of engineering job postings, followed by other (unspecified) engineering, and civil.
- Median advertised salaries of the engineering footprint are almost 30% higher than that of the national average (£38,600 v £30,000).
- 1.3% (47,400) of all postings in the footprint are classified as apprenticeship opportunities (slightly above that of the national average), with most openings arising within ICT and software, mechanical, and metal and construction trades.
- While initially impacted by the pandemic, the scale, speed and sustained nature of recovery in recruitment activity both within the engineering footprint and wider economy has been unprecedented. Recruitment activity in all thematic groups of the engineering footprint is well above their pre-pandemic levels, particularly in construction trades, environment, and ICT.

After having analysed broad trends in the future trajectory of the engineering footprint, this chapter looks in detail at current trends in recruitment activity for engineering roles. This is an innovative perspective on recent developments in the engineering profession, carried out using job postings data.

Job posting data complements official statistics by offering a unique and timely perspective of how the labour market and recruitment patterns are changing in the engineering profession. By looking at this data, it is possible to uncover the most recent trends in how the footprint is evolving, capturing early insights on employers' needs and hence what the footprint may look like in the future.

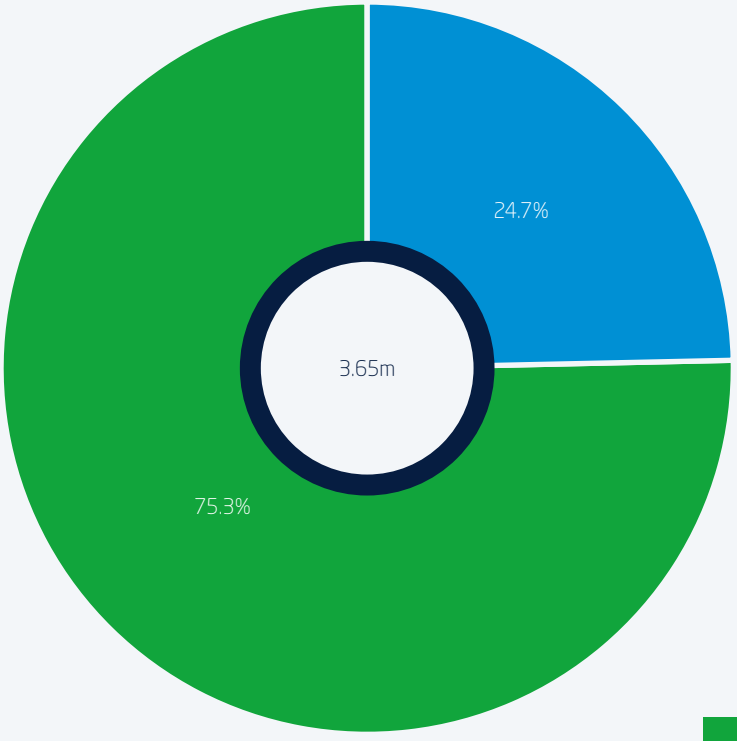
3.1 Recruitment activity for engineering roles

Over the year October 2021 – September 2022 there were over 3.6 million unique job postings recorded in the UK relating to engineering footprint occupations. This represents just over 25% of all job postings recorded in the UK. The vast majority of these postings (75%) related to 'core' occupations.

The number of job postings in engineering-related roles has grown steadily in recent months, after the labour-market shock induced by the pandemic. Unique active monthly postings rebounded strongly from a low of 250,000 job postings per month following the onset of the pandemic in mid-2020 to levels not reached since 2017/18, with the latest 3-period rolling average monthly figure (Jul – Sep 2022) above 700,000 job postings (see Figure 9).[6]

Of the job postings in the past 12 months, 19% specified years of relevant experience required for the role, and of these, 37% were looking for junior roles, i.e. roles requiring 2 years or less of experience (see Figure 10). A further 44% were recruiting mid-career candidates with between 3 and 5 years' experience while 18% of relevant postings were looking for more experienced candidates with 6 or more years of experience in their field of work. Furthermore, 1.3% of all job postings, just shy of 50,000 postings, were advertised as apprenticeships (see Box 3 for a deep dive on apprenticeships job postings).

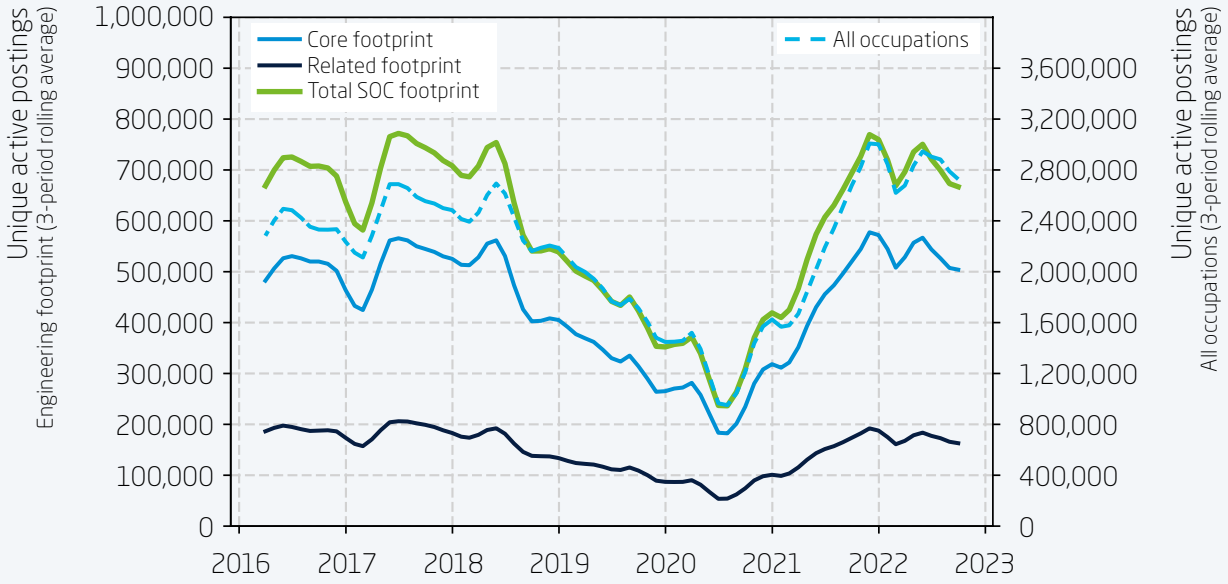
Figure 8. Unique active job postings
Engineering footprint, UK, Oct 2021 – Sep 2022



Source: Lightcast job postings

Figure 9. Trends in monthly job postings

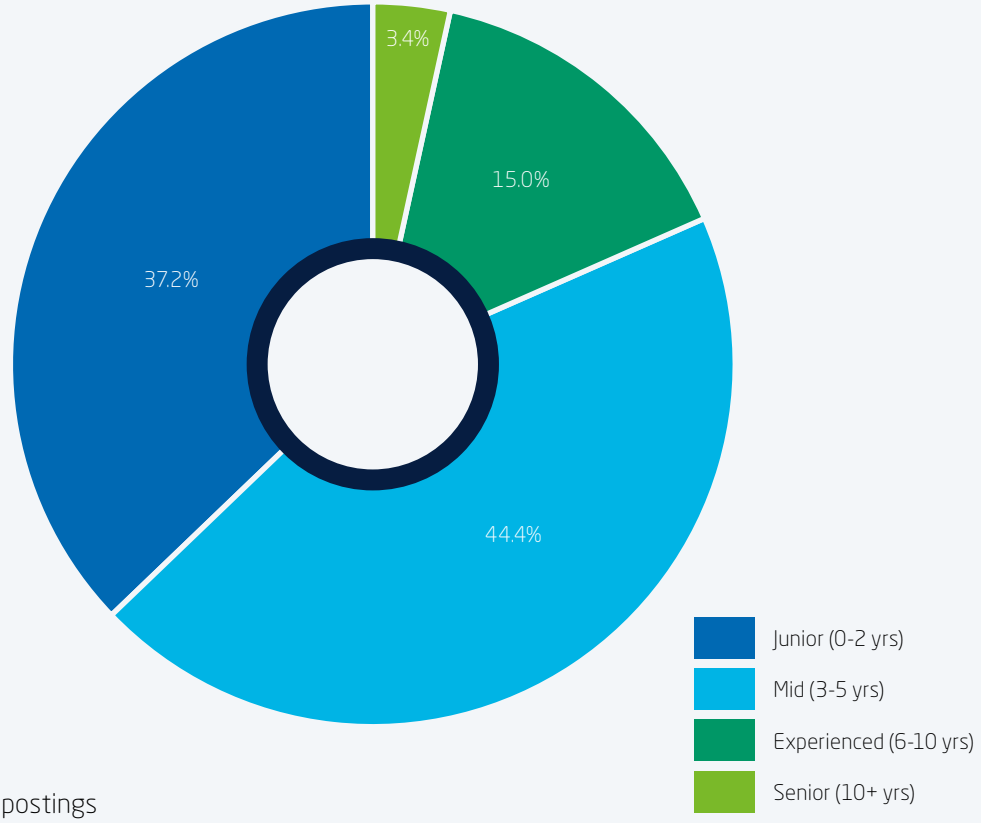
Engineering footprint, active postings, UK, Jan 2016 – Sep 2022



Source: Lightcast job postings

Figure 10. Minimum years of experience

Unique job postings, engineering footprint, UK, Oct 2021 – Sep 2022



Source: Lightcast job postings

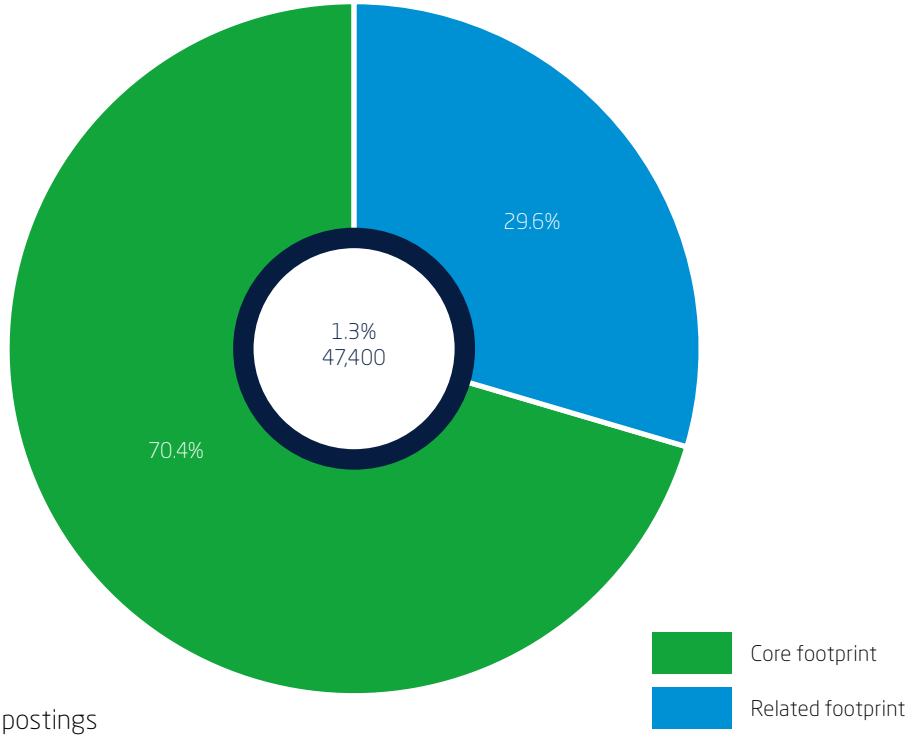
[6] Throughout this report, 3-month rolling average job postings figures are typically used for timeseries analysis so as to present a more stable trend over time, given the (seasonal) volatility of posting data.

Box 3: Apprenticeships within the engineering footprint

Apprenticeships are an important entry level route into many occupations relevant to the engineering profession, and typically require very little prior knowledge, with valuable experience and training gained on-the-job.

In terms of job postings, 1.3% (or 47,400) of all unique postings recorded between October 2021 and September 2022 were classified as apprenticeships, with 70% of these in 'core' engineering occupations (Figure 11).

Figure 11. Apprenticeships Engineering footprint, UK, Oct 2021 – Sep 2022



Source: Lightcast job postings

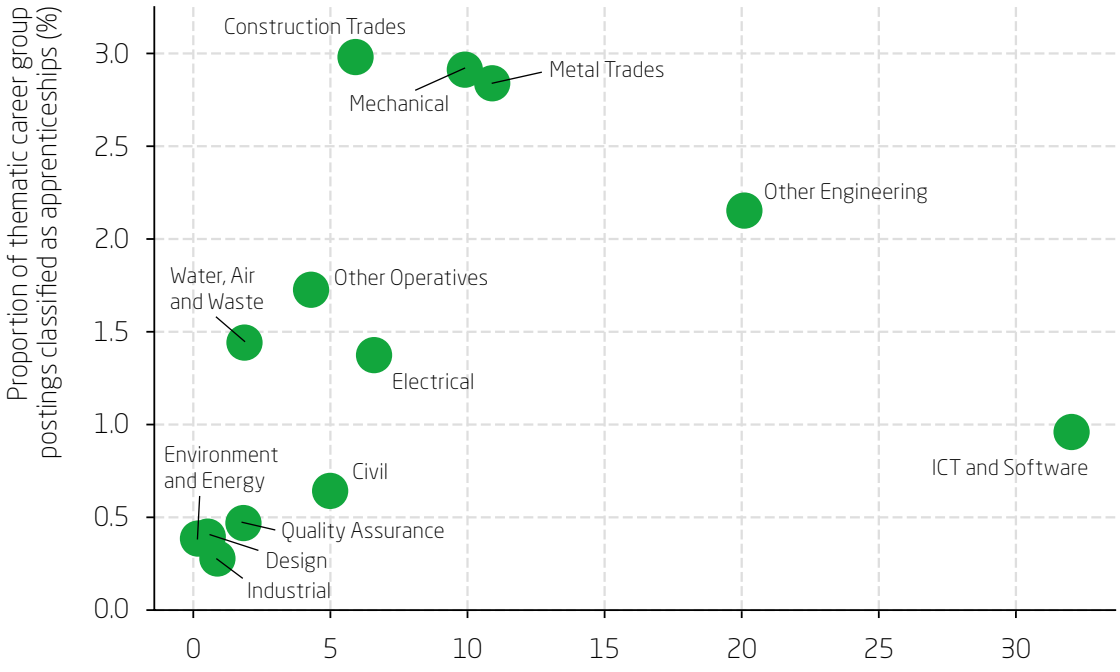
Figure 12 delves deeper, revealing the proportion of all engineering footprint apprenticeships accounted for by each thematic career group, as well as the share of job postings within each career group classified as apprenticeships.

Skilled construction trades, metal trades and mechanical-related roles are amongst the highest in terms of the proportion of postings that are apprenticeships. Within these groups between 2.8% and 3% of all postings relate to apprenticeships. ICT has an average share of apprenticeships, with 1% of ICT postings classified as apprenticeships. However, given its large share of total job postings, the ICT and software group accounts for the largest share of apprenticeships recorded within the footprint, 32%.

As shown in Figure 13, since 2016, the number of unique active postings relating to engineering apprenticeships has fluctuated considerably, although has broadly tracked the trajectory of the national average of all apprenticeships. Similar to the trends for overall numbers of job postings, apprenticeships dropped sharply during the initial phases of the pandemic falling to almost 2,000 openings. However, by year-end activity had largely rebounded to pre-pandemic levels and continued to grow strongly through 2021 peaking close to 11,000. In 2022, apprenticeship postings have, similar to postings for the overall footprint, remained relatively stable at an elevated level – a level higher than any period in the previous 5-years.

Figure 12. Prevalence of apprenticeships

Thematic career grouping, engineering footprint, UK, Oct 2021 – Sep 2022

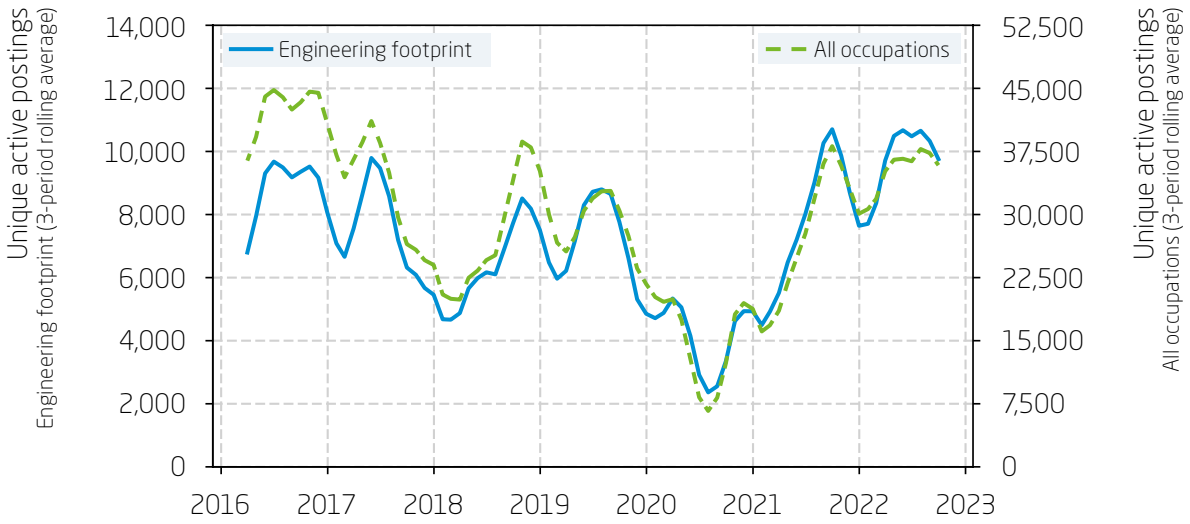


Source: Lightcast job postings

While apprenticeship job posting figures do not reflect the decline in apprenticeship starts seen in DfE data over the same time period, this could potentially be explained by a number of factors; either these apprenticeship places are not getting filled, or that more apprenticeships are now advertised in the same way as other jobs than they used to be.

Figure 13. Trends in monthly apprenticeship job postings

Engineering footprint, UK, Jan 2016 – Sep 2022

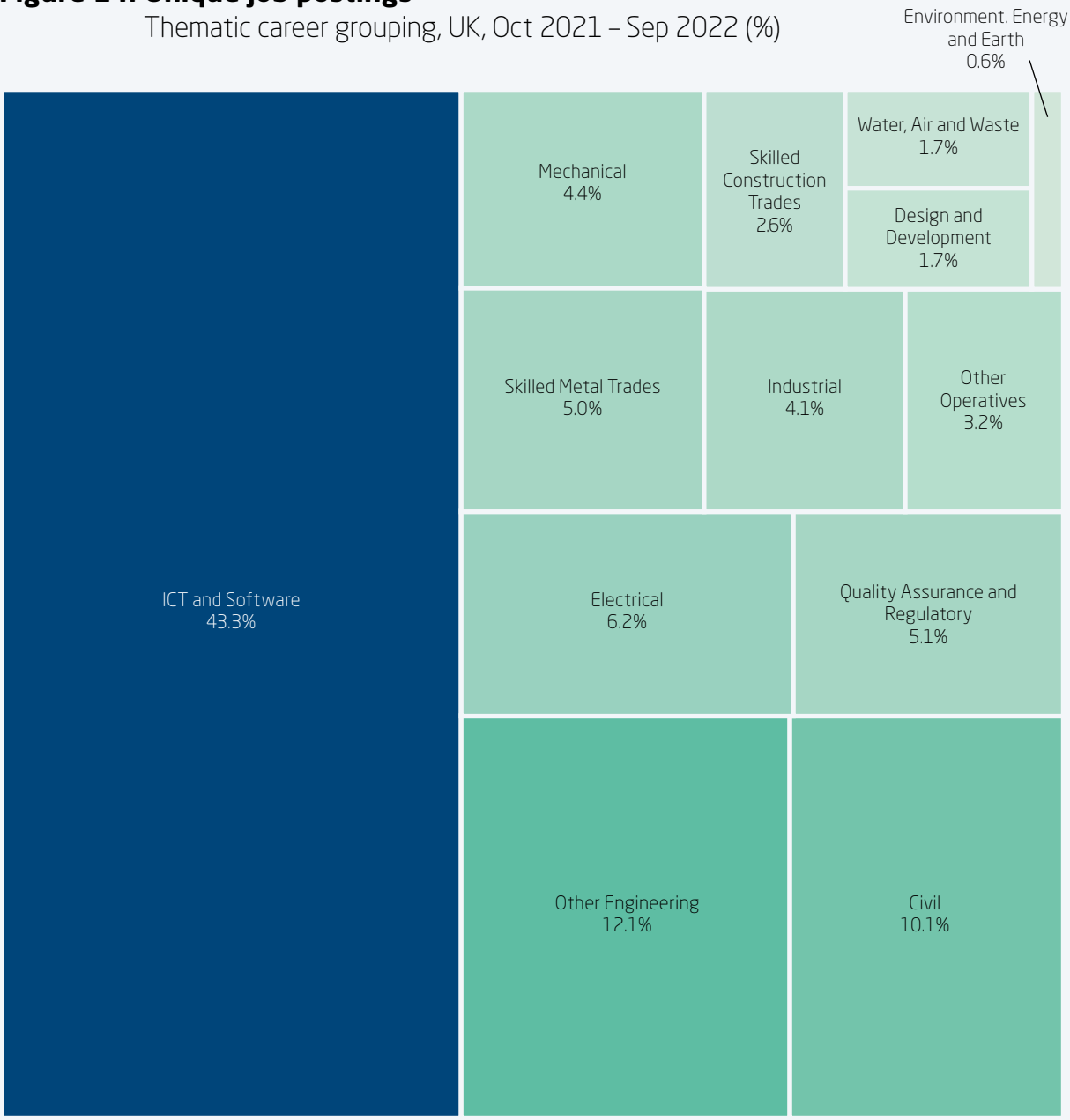


Source: Lightcast job postings

In terms of occupations, Figure 14 shows that ICT and software occupations dominate postings within the footprint, accounting for over 43% of all postings (1.58m) in the last year, followed by other (unspecified) engineering, civil engineering and electrical engineering. In contrast, the environment, energy and earth group recorded just 0.6% (21,000), the least of any group.

Figure 14. Unique job postings

Thematic career grouping, UK, Oct 2021 – Sep 2022 (%)



Source: Lightcast job postings

The proportion of job postings associated with different thematic career groups is, in some cases, disproportionately large – or small – relative to their equivalent number of total existing jobs (Chapter 2). For example, skilled construction trades account for almost 15% of all jobs but only 2.6% of job postings.

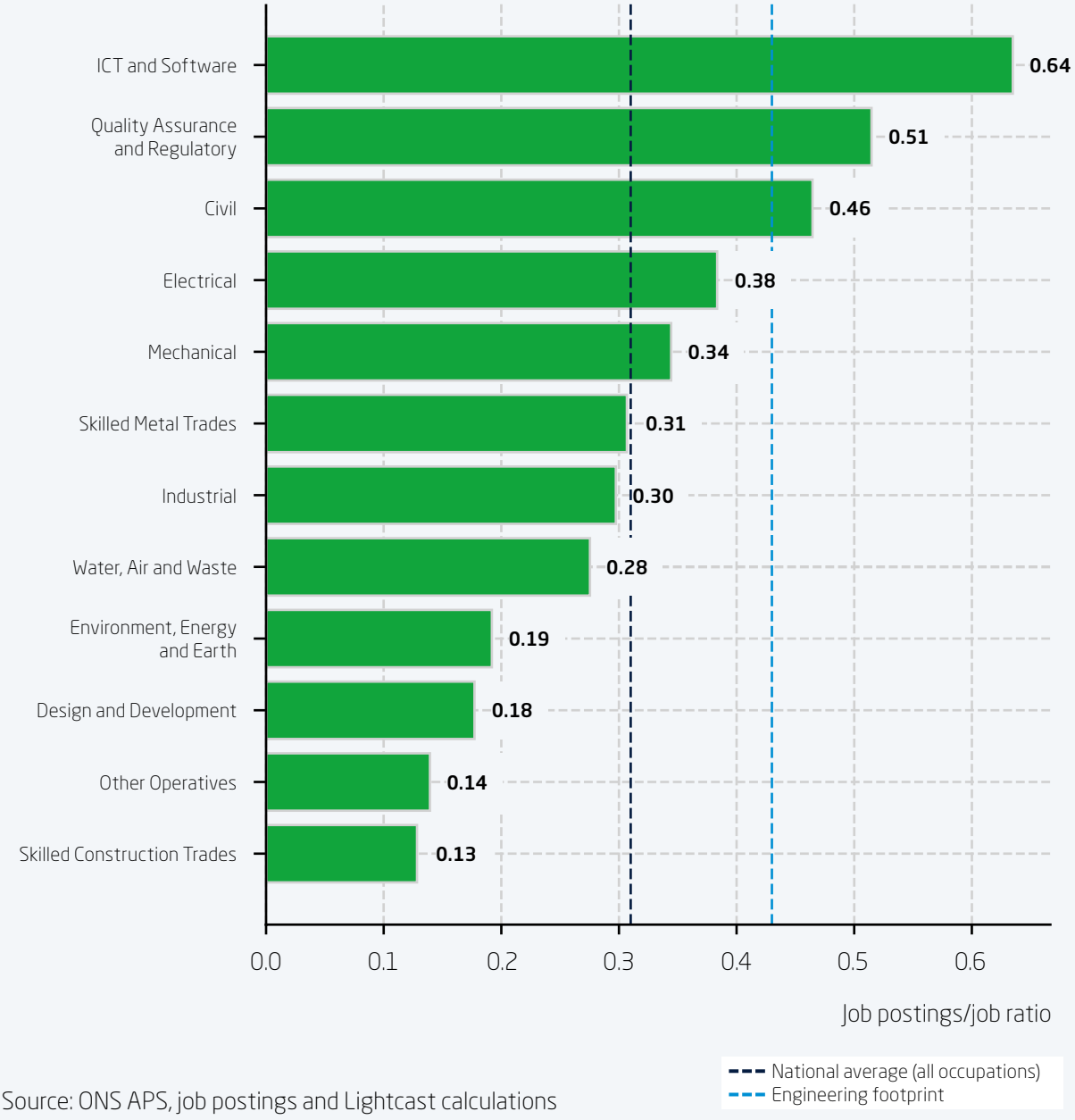
There may be a number of reasons behind this trend. Firstly, as Figure 15 shows, different groups have different job-to-job-posting ratios. This job-postings-to-job metric is typically used to get an indication of labour market dynamism, with a higher ratio suggesting either rapid growth of additional jobs or labour market churn. Groups such as ICT, quality assurance, and civil are found to have particularly high ratios.

A second factor is that there are likely to be differences in the way employers recruit in different roles, with knowledge-based jobs, or those suitable for 'remote working' more likely to be posted online than other roles, such as trades or operative positions.[7]

Relative to 2016/17, recruitment activity in 2021/22 has grown across all areas of the engineering footprint, supported by a buoyant labour market post-COVID. The areas of the engineering footprint that have grown the most in terms of recruitment activity are other operatives, skilled construction trades, and water, air and waste roles. These have grown

Figure 15. Job postings over job ratio

Thematic career grouping, UK, 2021



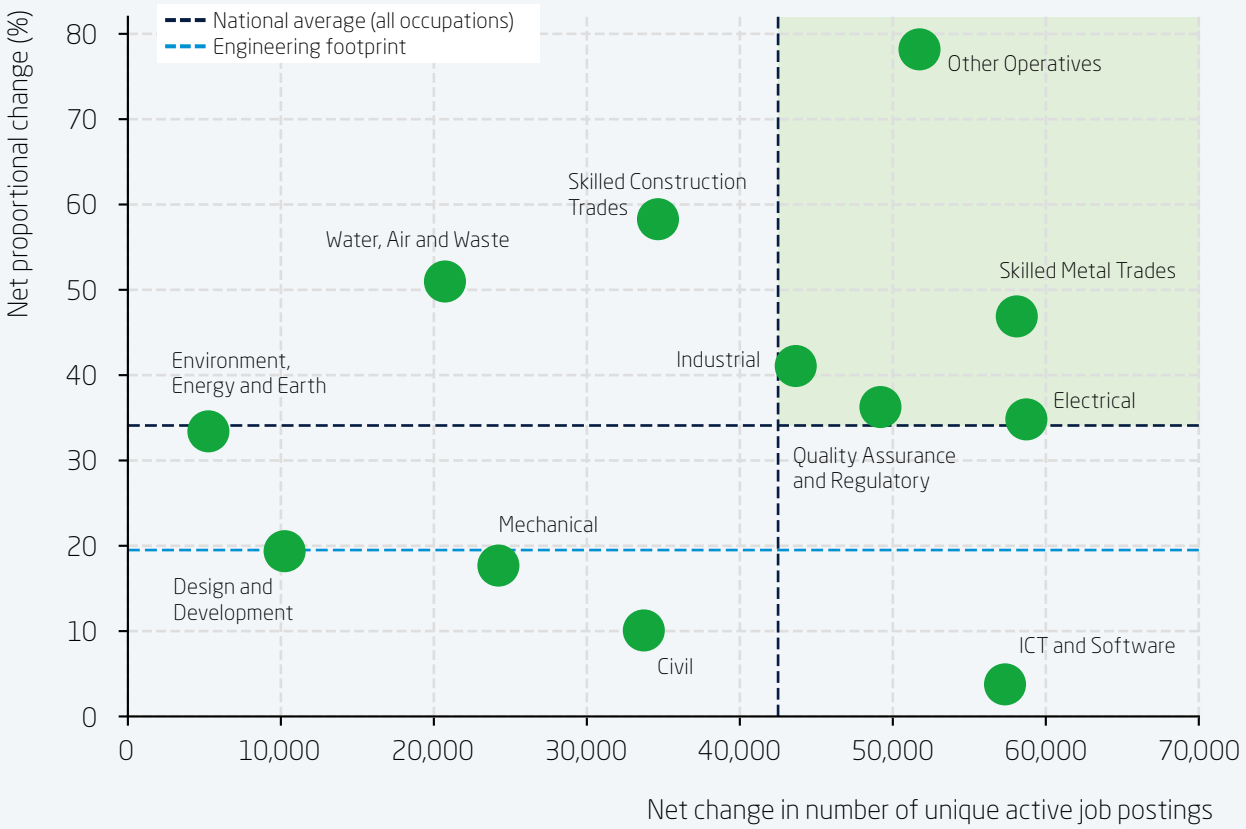
Source: ONS APS, job postings and Lightcast calculations

[7] See Box 2 for more information about job postings data

by 78%, 58% and 50% respectively relative to their 2016/17 levels, albeit these generally being from a low base. With respect to the operative group in particular, the data suggests that there has been very strong growth in demand for both warehouse workers and manufacturing machine operative roles – which has driven its overall change.

In comparison, the groups that have grown the most in terms of absolute number of job postings are skilled metal, electrical, and ICT and software. Within skilled metal, job roles such as platform engineers, and welders and fabricators have grown particularly strongly over the period, as have field service engineers and electricians within the electrical group. Having grown slowest of all groups over the period (3.4%), given its large size, the ICT group still equated to 58,000 additional unique job posts, the third largest increase of any group, as shown in Figure 16.

Figure 16. Net growth in job postings, Oct-Sep 2016/17 vs Oct-Sep 2021/22
Thematic career grouping, UK, (%)



Source: Lightcast job postings

3.2 Advertised salaries in the engineering footprint

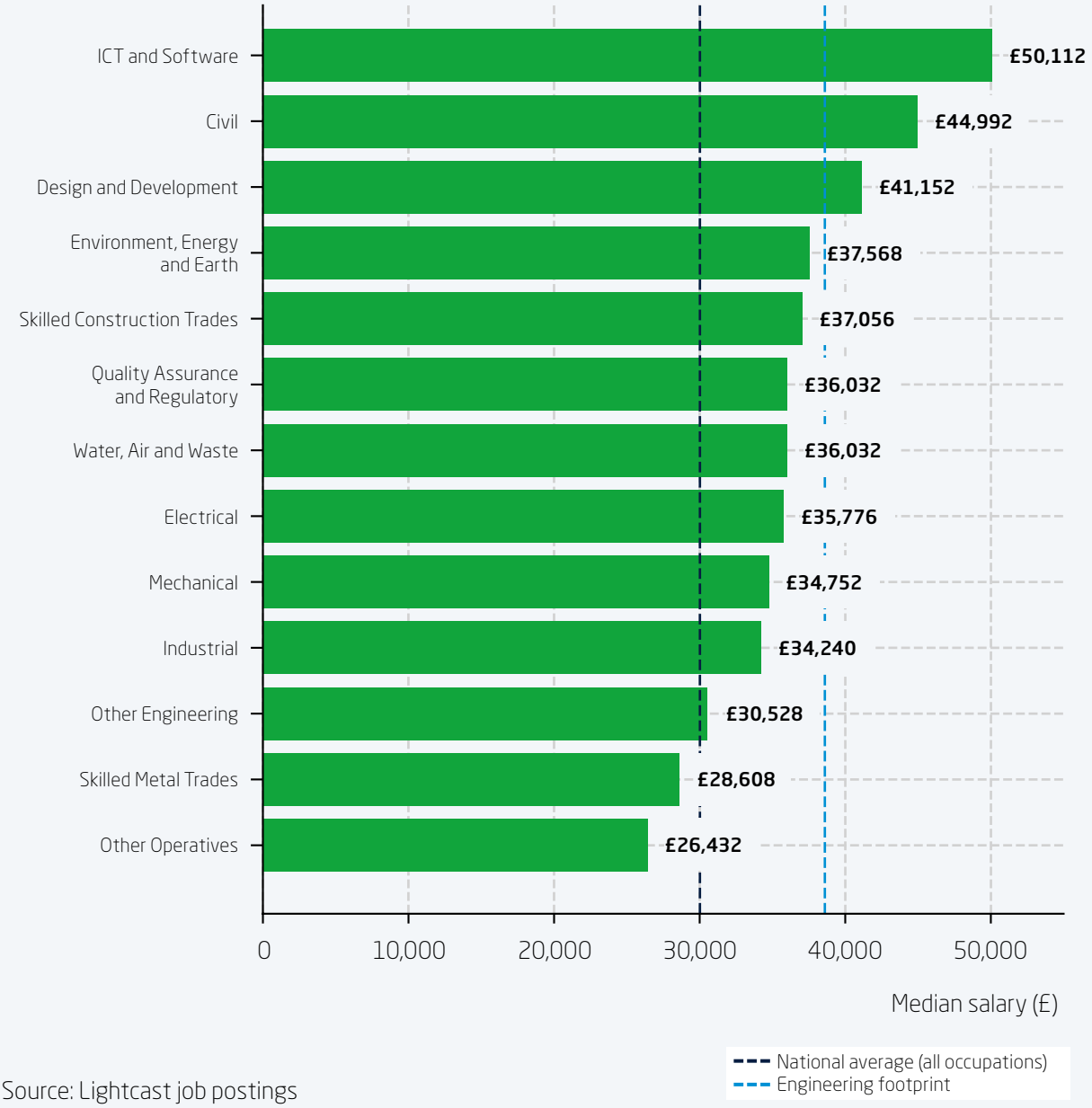
Not only does the engineering footprint have an active recruitment market, but its advertised salaries are also better than the average. The median advertised salary of all roles related to the engineering footprint between October 2021 – September 2022 was £38,600, almost 29% higher than the national average of all occupations, £30,000.

This is also true for most engineering sub-sectors (see Figure 17).[8] ICT has the highest median advertised salary of £50,000, followed by civil at £45,000. In contrast, other operative roles have the lowest advertised salary in the footprint (£26,400).

[8] Of all unique postings related to the SOC engineering footprint definition between October 2021 – September 2022, approximately 34% included salary information compared to 37% of all occupations.

Figure 17. Median advertised salary

Thematic career grouping, UK, Oct 2021 – Sep 2022 (%)

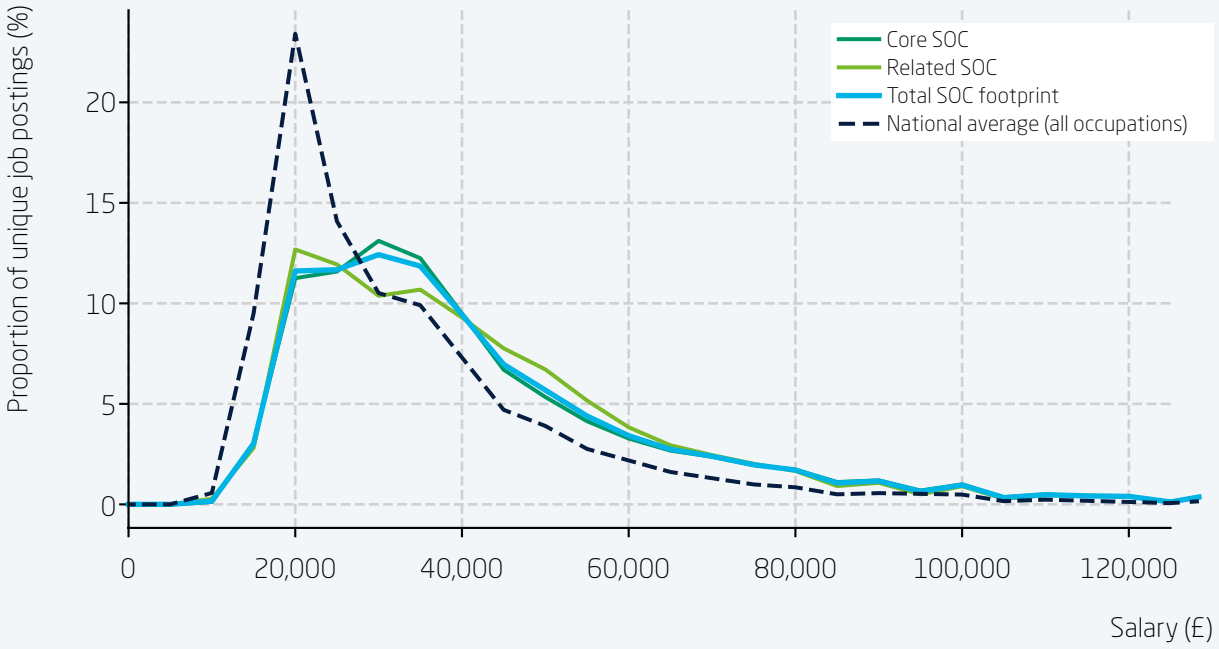


Source: Lightcast job postings

Figure 18, furthers this examination by illustrating the proportional distribution of advertised salaries for the engineering footprint overall. Compared to the national average of all occupations – which is heavily concentrated towards the lower end of the salary spectrum, and spikes around the £20,000 mark reflecting minimum wage requirements – the engineering footprint has a more even distribution, with a higher proportion of its relevant postings advertised as having higher salaries.

Figure 18. Advertised salary distribution

Engineering footprint, UK, Oct 2021 – Sep 2022



Source: Lightcast job postings

Box 4: Recruitment Activity: COVID-19 pandemic impact and recovery

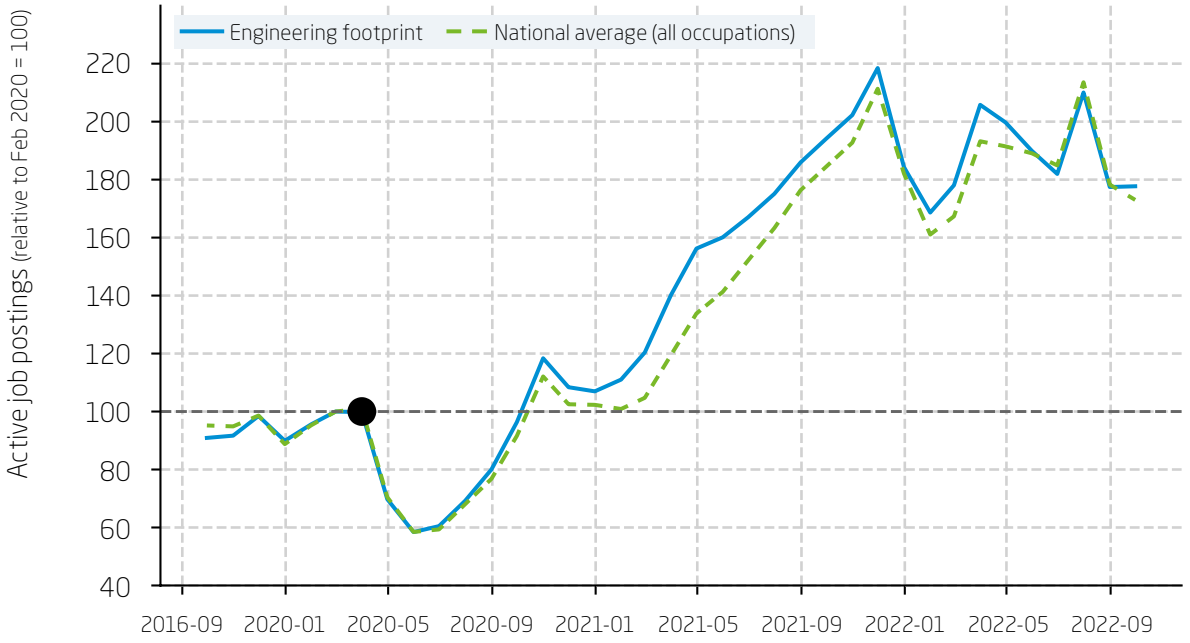
The onset of the COVID-19 pandemic in March 2020 had an abrupt and adverse impact on the UK economy and labour market, including those occupations within the engineering footprint. However, in terms of recruitment activity it has also become clear that this sharp shock was relatively short lived and indeed precipitated a remarkable rebound in labour demand above its equivalent pre-pandemic level.

Figure 19 illustrates this by standardising the percentage change of active job postings relative to February 2020, for both the engineering footprint and the national average of all occupations. Both the engineering footprint and national average follow almost identical trajectories over the course of the pandemic with the number of active postings dropping by 40% in each in the months immediately following the introduction of the first national public health lockdown.

While the public health and economic outlook remained extremely uncertain for the remainder of 2020, recruitment activity rebounded to pre-pandemic levels across the economy by Q4 2020.

Figure 19. Pandemic impact and recovery

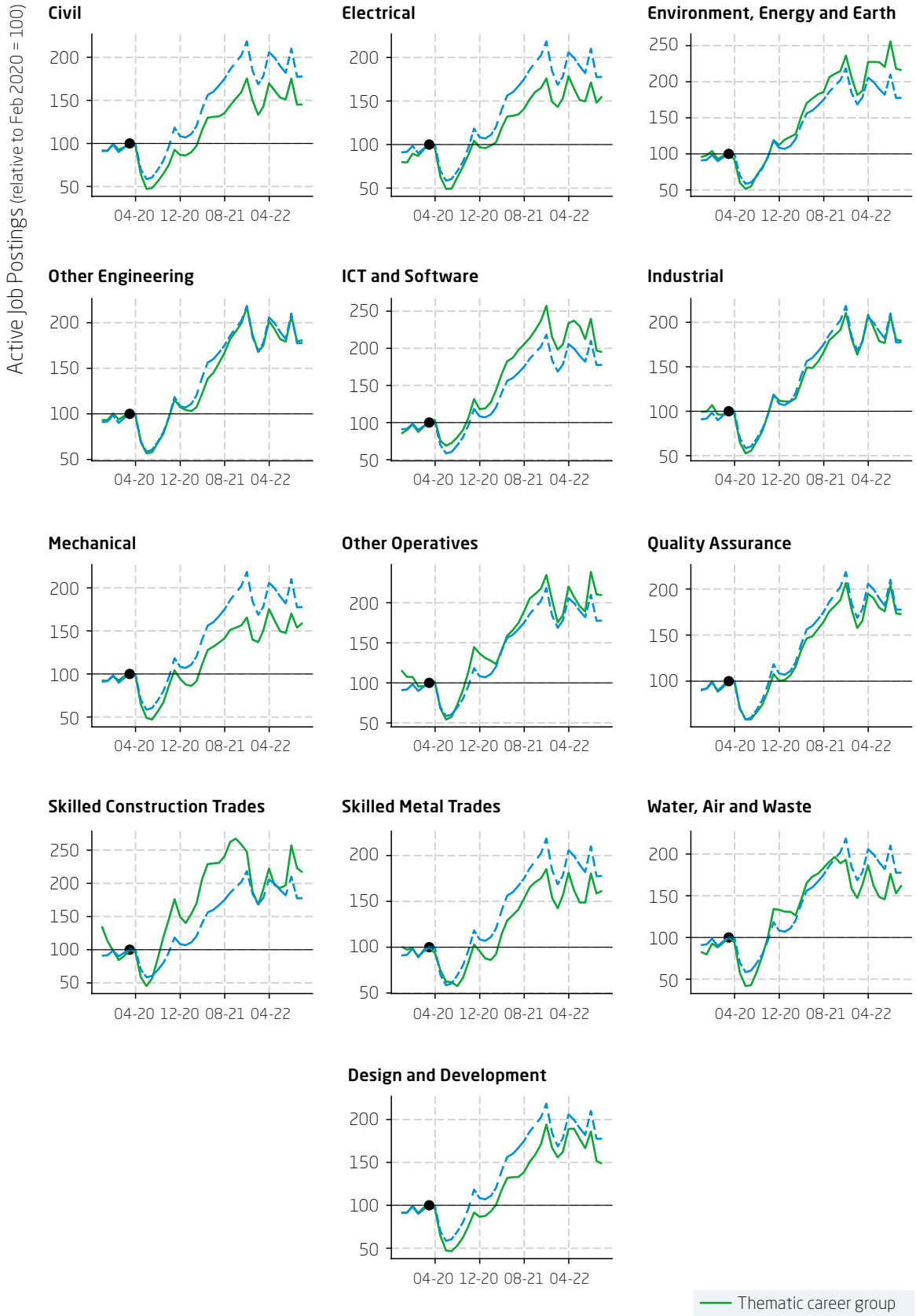
Engineering footprint, UK, Oct 2018 – Sep 2022



Source: Lightcast job postings

Figure 20. Pandemic impact and recovery

Thematic career grouping, UK, Sep 2019 – Sep 2022



Source: Lightcast job postings

Interestingly however, as shown by Figure 20, while the onset of the pandemic had a similar negative impact on recruitment across the engineering footprint, initial recovery was somewhat more varied.

Recruitment of skilled construction trades, operative roles, and water, air and waste occupations recovered particularly quickly. Other groups particularly amenable to 'remote working', such as ICT and software occupations, also saw its recruitment recover quickly. This can also explain why ICT related occupations were the least impacted group by the initial onset of the pandemic.

By mid-2021, recruitment activity picked up sharply across the engineering footprint, with all career groups well above their pre-pandemic level by the middle of the year. Throughout the recovery, recruitment in ICT and software occupations, and construction roles consistently led the career groupings relative to their pre-pandemic levels.

Recruitment activity continued to grow strongly in the second half of 2021 and into 2022 (excluding seasonal dip in Dec-Jan), with employers competing for increasingly scarce numbers of job candidates. Since early 2022 active job posting numbers have remained largely stable, albeit at an elevated level, across the engineering footprint and its thematic career groups. Over summer 2022, job postings numbers began to trend downwards slightly, perhaps indicating a slight cooling of the labour market in the face of a more uncertain/pessimistic macro-economic environment.

Relative to its pre-pandemic February 2020 level however, the engineering footprint as a whole is in-line with the national average of all occupations at approximately twice its former level. Across career groups, all are well in excess of their pre-pandemic levels reflecting the continued high demand for all engineering footprint occupations, with skilled construction trades, ICT, operatives, and environment, energy and earth amongst the highest. Civil, design and electrical are towards the lower end, although still at a high level.

Chapter 4
Engineering skills

Key Insights

- Each occupation within the engineering footprint has its own unique composition of skill requirements, and the skills composition of the footprint as a whole is extremely diverse and complex.
- On average, the engineering footprint, and the majority of career groupings, are more skewed towards specialised and software skills than the national average. This is indicative of the highly specialised skillsets required by many engineering occupations.
- The common skills most required by employers recruiting for engineering roles are broadly the same across the footprint and include 'communications', 'management', 'customer service' and 'problem solving' ability.
- Unlike with common skills, key differences emerge across the footprint when examining specialised skills. On average, 25% of job postings related to the engineering footprint require at least one specialised engineering skill. However, this varies greatly by thematic group, with ICT job postings only mentioning specific engineering skills in 11% of the cases.
- Looking specifically at specialised engineering skills reveals that skills and knowledge relating to specific disciplines including mechanical, electrical and civil engineering are amongst the most demanded by employers. More cross-cutting engineering skills, such as technical drawing and computer aided-design, engineering management practices and automation engineering are also highly sought after.
- Many of the top, specialised engineering skills sought after by employers are not particularly prevalent across the wider workforce, making it more difficult for employers looking to fill engineering roles to find talent in other occupations.
- Engineering roles tend to require a more complex and specific set of skills compared to the average occupation and this is particularly the case for ICT related roles.
- Beyond skills, different levels of formal education are typically required for different areas of engineering. Areas such as civil and ICT are more likely to require a bachelor's degree or higher compared to roles in construction, electrical, and mechanical engineering.

Given the diverse range of activities performed within the occupations of the engineering footprint, it is of little surprise that employers demand an equally expansive list of skills when recruiting for associated roles.

This chapter looks to determine what specific skills are most sought after by employers, based on the information extracted from the 3.65m job postings relevant to the engineering profession recorded in the 12 months between October 2021 – September 2022.

4.1. Distribution of skills by type

Using Lightcast Open Skills Taxonomy, it is possible to classify skills required by employers in job postings in three categories:

1. **Common** – these are skills prevalent across many different industries and include personal attributes, behaviours, competencies, and learned skills.
2. **Specialised** – these are skills unique to a task or ones that are primarily sought after within a subset of occupations.
3. **Software** – a subset of specialised skills, these include specific computer programs and programming skills requested in job postings.

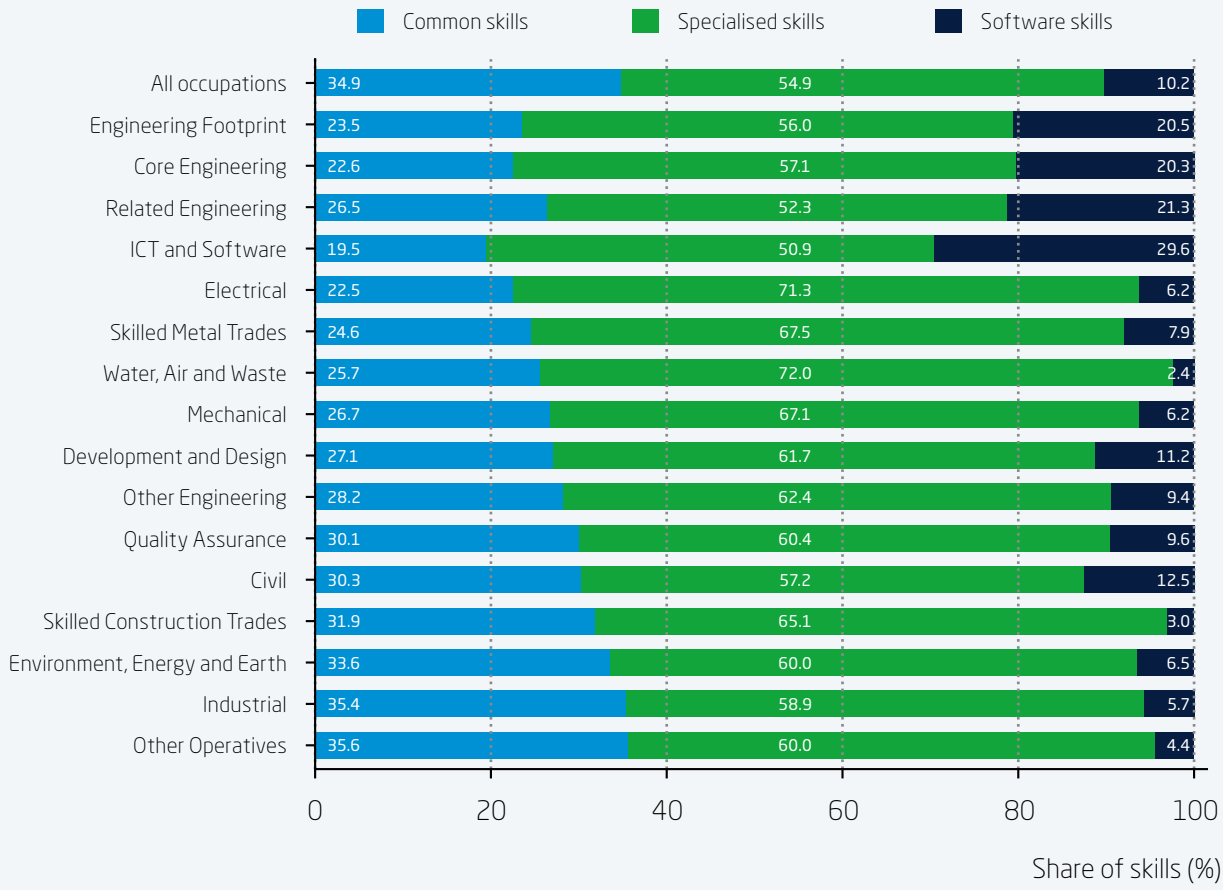
Figure 21 shows the distribution of each of these skill types within the engineering footprint. In general, the engineering footprint has a skills distribution more skewed towards specialised and software skills than the average. This reflects the degree of specialist knowledge and skillsets required to perform the duties of many of the engineering relevant occupations.

In particular, twice as many of the skills required in the engineering footprint relate to software (20% v 10%), compared to the national average.

Behind the headline however, there are clear differences within the footprint. For example, in ICT roles, software skills play a more significant role than anywhere else in the footprint, while they play a very small role in engineering roles related to skilled construction trades, and water, air and waste. In addition to that, some engineering occupations have a relatively high share of common skills required compared to others. This includes other operatives, industrial engineering occupations and engineering occupations associated with the environment, energy and earth.

Figure 21. Distribution of skills by type

Thematic career grouping, UK, Oct 2021 – Sep 2022



Source: Lightcast job postings

4.2 Common skills most in demand in the engineering footprint

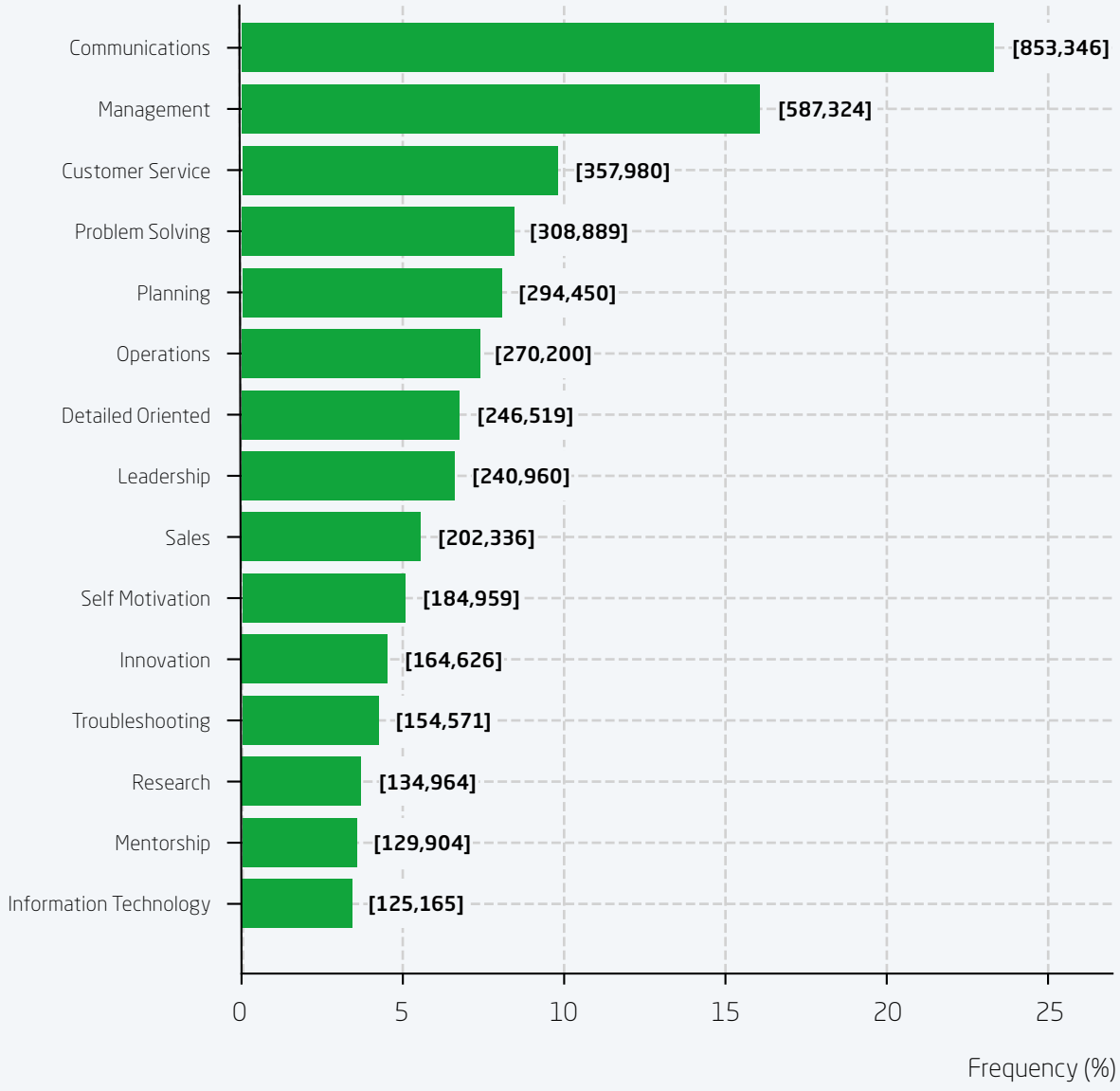
While the role that common skills play in the engineering footprint varies across groups, the type of common skills that are most relevant to engineering roles is pretty stable across the board.

The specific common skills – or softer transferable skills – most prevalent in job postings related to the engineering footprint are 'communications', 'management' and 'customer service', followed by 'problem solving' and 'planning'.

These common skills are important across the engineering footprint. For example, across a range of industries, engineers (or related disciplines) frequently need efficient project management skills to both plan and execute the delivery of engineering works. To achieve this, it is vital for many in these occupations to be able to break-down technical concepts into accessible ideas when they present ideas/solutions to their clients. The ability to think in an analytical and innovative way in order to problem solve is also integral to many of the roles. Furthermore, many engineering-related roles require the ability to lead and mentor fellow colleagues, providing them with clear instruction on how to carry out specific tasks or operations.

Figure 22. Top 15 common skills

Engineering footprint, UK, Oct 2021 – Sep 2022



Source: Lightcast job postings

[Bracketed values are the absolute number of engineering footprint postings requiring skill]

Common skills for engineering are broadly similar to that of the national average of all occupations, although there are some important differences such as much larger share of postings that specify problem-solving ability and knowledge of IT.

The high frequency of these common skills, suggest that there are a number of general, overarching skills and attributes that any engineer (or related discipline) needs to succeed in their roles.

4.3. Specialised skills required in the engineering footprint

Digging deeper into the skills most in demand among employers recruiting for engineering roles shows that there is great variation in the type of skills required from one area of the footprint to another. This is illustrated in Figure 23. The figure plots the frequency with which skills within each of the 31 Lightcast skills categories are mentioned by employers in job postings in the engineering footprint, within each specific thematic group and in the recruitment market overall.

Specialised engineering skills are cited in 25% of all job postings within the engineering footprint. These specialised engineering skills are skills which according to Lightcast's Skill Taxonomy are unique to engineering-related roles, such as a knowledge of civil engineering or aircraft design. That said, their role varies within the engineering footprint. Specialised engineering skills are cited in more than half of job postings related to the electrical career group and in almost half of job postings associated with mechanical, civil, and design and development engineering. In contrast, specialised engineering skills are only cited in 9% of job postings related to construction and in 11% of job postings linked to ICT roles within the engineering footprint.

Given the large weight that ICT job postings play in the data, this latter point suggests ICT roles is bringing down the frequency with which specialised engineering skills appear in the footprint overall. Excluding ICT job postings from the engineering footprint does indeed show this, with 36% of job postings mentioning specialised engineering skills.

Alongside the role of specialised engineering skills in the footprint, Figure 23 also shows that other skills groups are particularly important for employers recruiting for engineering roles across disciplines. Overall, skills related to business, physical and inherent abilities, and information technology are among the most popular skills categories required by employers for roles across the engineering footprint.[9,10] This suggests that employers are looking for a mix of skills that goes beyond specific engineering skills when recruiting for these roles.

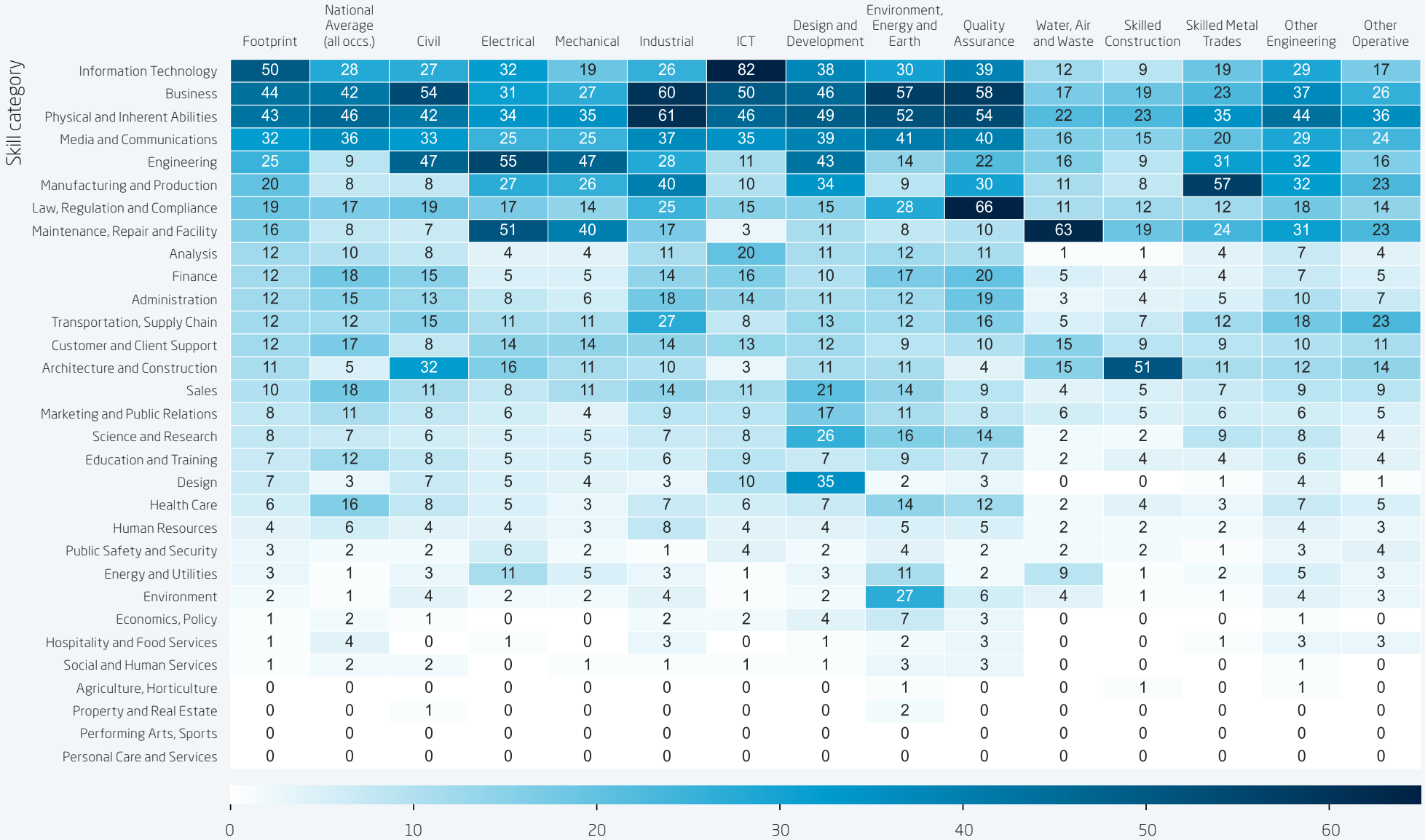
In addition, groups within the footprint show peaks in skills requirements for categories aligned with their thematic group. For example, law and regulation skills are seen to be particularly important for engineering roles related to quality assurance, architecture and construction for skilled construction trades and manufacturing and production skills for engineering roles linked to skilled metal work. This points to the fact that the engineering footprint comprises a broad range of roles and that each of these roles also has its own specific skills needs.

Individual snapshots with key findings and top skills requirements for each individual thematic group are available in Annexe 1.

[9] A full list of the skill subcategories and specialised skills within each skill category group, can be found **here**. As an example, the physical and inherent abilities skill category comprises skill sub-groups such as personal attributes (such as enthusiasm, resilience, etc.), physical abilities (such as physical strength, lifting ability, etc.), initiative and leadership (such as result focused, creative thinking, etc.) and critical thinking and problem-solving skills (such as analytical skills, logical reasoning, innovation, etc.).

[10] Excluding ICT from the analysis reduces the prevalence of information and technology skills for the footprint overall from 51% to 27%.

Figure 23. Top skills categories across the engineering footprint



Skill category	Footprint	National Average (all occs.)	Civil	Electrical	Mechanical	Industrial	ICT	Design and Development	Environment, Energy and Earth	Quality Assurance	Water, Air and Waste	Skilled Construction	Skilled Metal Trades	Other Engineering	Other Operative
Information Technology	50	28	27	32	19	26	82	38	30	39	12	9	19	29	17
Business	44	42	54	31	27	60	50	46	57	58	17	19	23	37	26
Physical and Inherent Abilities	43	46	42	34	35	61	46	49	52	54	22	23	35	44	36
Media and Communications	32	36	33	25	25	37	35	39	41	40	16	15	20	29	24
Engineering	25	9	47	55	47	28	11	43	14	22	16	9	31	32	16
Manufacturing and Production	20	8	8	27	26	40	10	34	9	30	11	8	57	32	23
Law, Regulation and Compliance	19	17	19	17	14	25	15	15	28	66	11	12	12	18	14
Maintenance, Repair and Facility	16	8	7	51	40	17	3	11	8	10	63	19	24	31	23
Analysis	12	10	8	4	4	11	20	11	12	11	1	1	4	7	4
Finance	12	18	15	5	5	14	16	10	17	20	5	4	4	7	5
Administration	12	15	13	8	6	18	14	11	12	19	3	4	5	10	7
Transportation, Supply Chain	12	12	15	11	11	27	8	13	12	16	5	7	12	18	23
Customer and Client Support	12	17	8	14	14	14	13	12	9	10	15	9	9	10	11
Architecture and Construction	11	5	32	16	11	10	3	11	11	4	15	51	11	12	14
Sales	10	18	11	8	11	14	11	21	14	9	4	5	7	9	9
Marketing and Public Relations	8	11	8	6	4	9	9	17	11	8	6	5	6	6	5
Science and Research	8	7	6	5	5	7	8	26	16	14	2	2	9	8	4
Education and Training	7	12	8	5	5	6	9	7	9	7	2	4	4	6	4
Design	7	3	7	5	4	3	10	35	2	3	0	0	1	4	1
Health Care	6	16	8	5	3	7	6	7	14	12	2	4	3	7	5
Human Resources	4	6	4	4	3	8	4	4	5	5	2	2	2	4	3
Public Safety and Security	3	2	2	6	2	1	4	2	4	2	2	2	1	3	4
Energy and Utilities	3	1	3	11	5	3	1	3	11	2	9	1	2	5	3
Environment	2	1	4	2	2	4	1	2	27	6	4	1	1	4	3
Economics, Policy	1	2	1	0	0	2	2	4	7	3	0	0	0	1	0
Hospitality and Food Services	1	4	0	1	0	3	0	1	2	3	0	0	1	3	3
Social and Human Services	1	2	2	0	1	1	1	1	3	3	0	0	0	1	0
Agriculture, Horticulture	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0
Property and Real Estate	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0
Performing Arts, Sports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Personal Care and Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

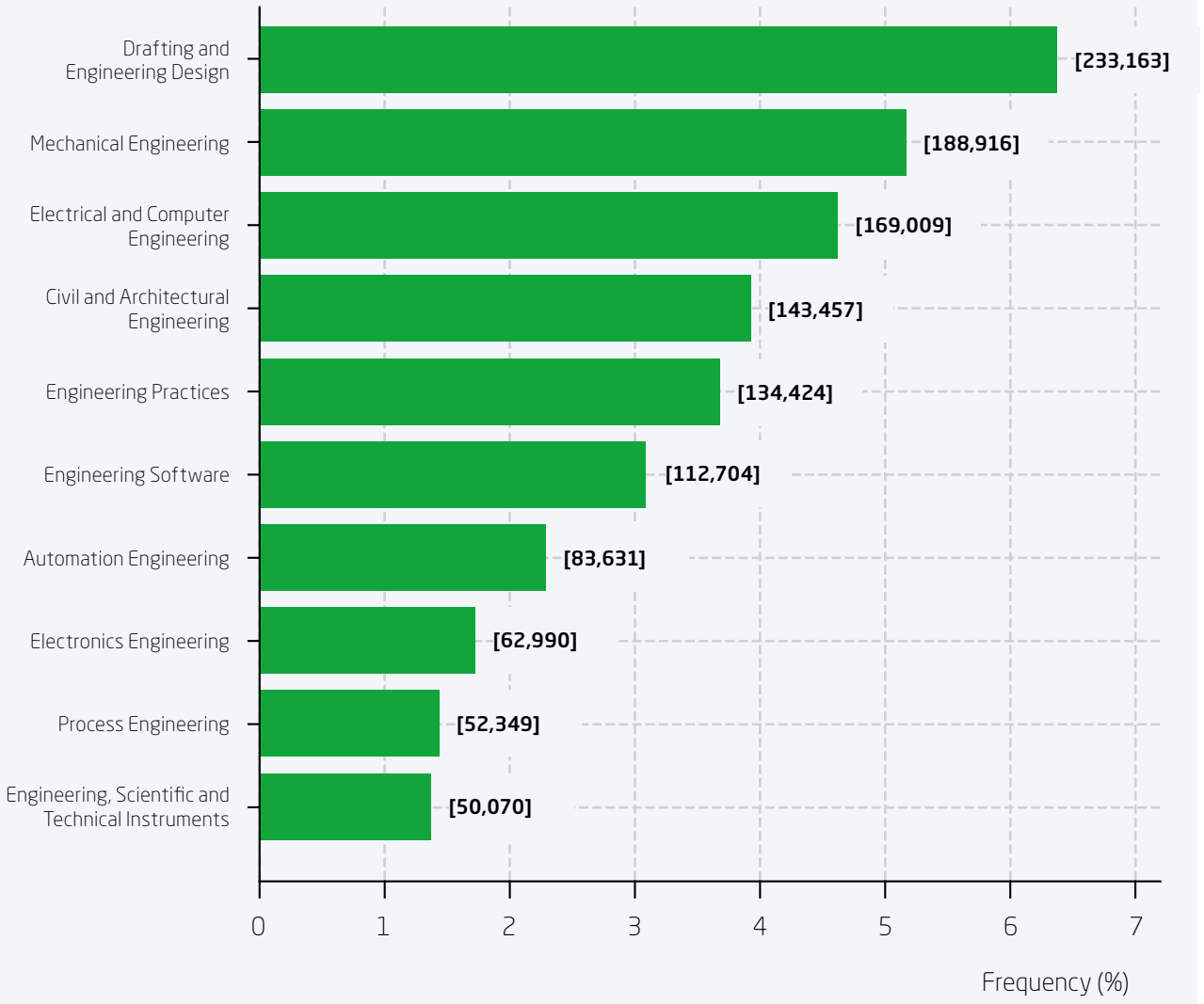
Source: Lightcast job postings

Proportion of job postings requiring skills from category (%)

4.4 Deep dive into specialised engineering skills

Focusing on the specialised 'engineering skills' category shows a wide range of skills being in high demand across engineering roles. Figure 24 shows that the broad skill subgroups most popular within the footprint are skills relating to specific disciplines including mechanical, electrical, and civil engineering as well as more cross-cutting engineering skills, such as drafting and design, engineering practices, and automation.

Figure 24. Top 10 'engineering' specialised skill sub-categories
Engineering footprint, UK, Oct 2021 – Sep 2022



Source: Lightcast job postings

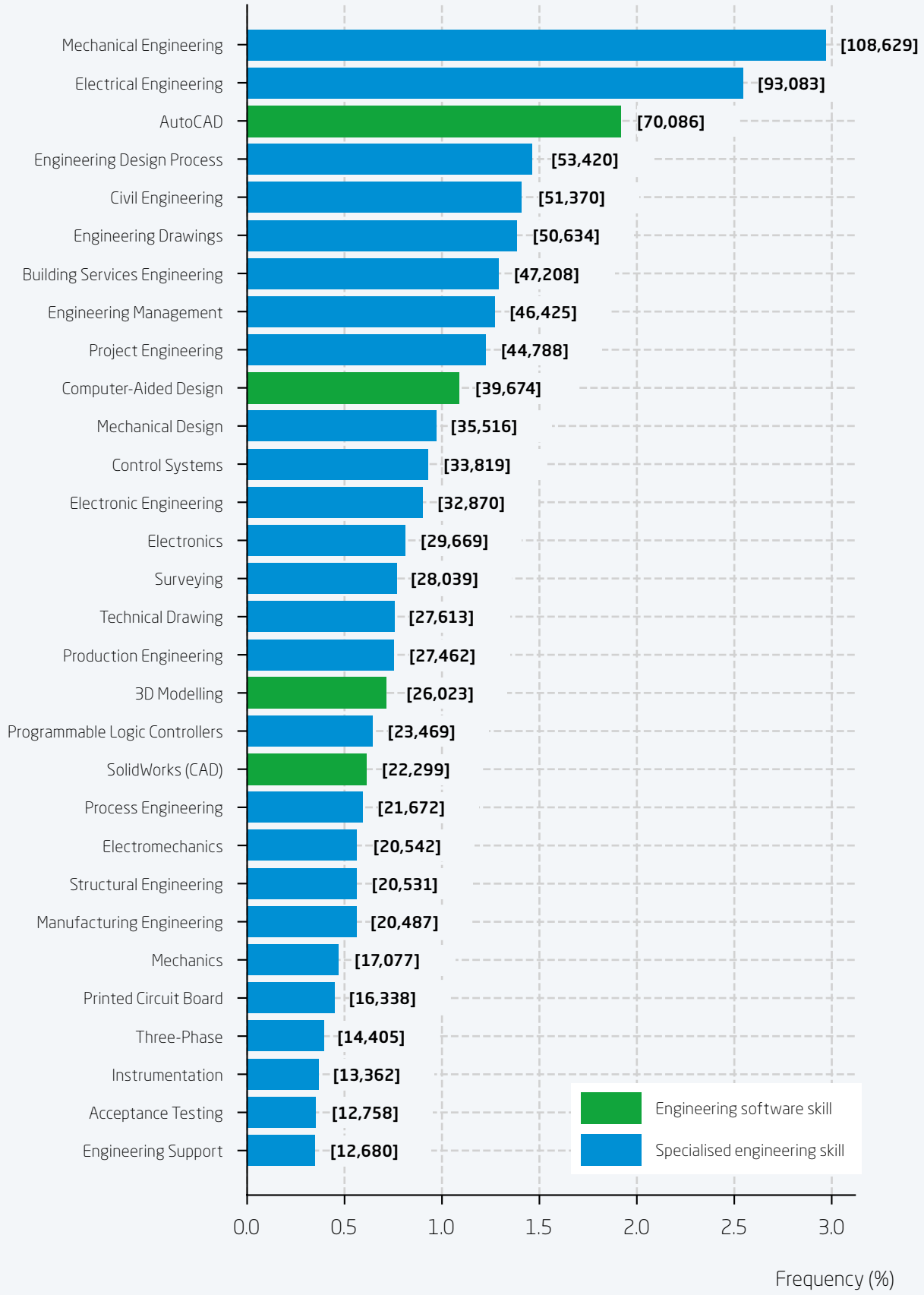
[Bracketed values are the absolute number of engineering footprint postings requiring skill from sub-category]

Further deepening the analysis, Figure 25, displays the most in-demand specific specialised 'engineering' skills.

Skills related to design and technical drawing feature strongly among the top skills, with computer-aided design (CAD) and its associated programmes ranking particularly highly. As an engineer (multi-discipline) the ability to accurately design and model new machines, processes and structures remains an essential skill, as evidenced by the high level of employer demand.

Figure 25. Top 30 specialised 'engineering' skills

Engineering footprint, UK, Oct 2021 – Sep 2022



[Bracketed values are the absolute number of engineering footprint postings requiring skill]

Source: Lightcast job postings

Many of the top specialised engineering skills in Figure 25 are broad terms, such as 'mechanical engineering' and 'civil engineering'. While general, these terms can be interpreted as employers requiring either some significant degree of knowledge or expertise in their respective fields or requiring certified qualifications. The high level of demand here both reflects their overarching nature but also the value that employers maintain in job candidates having at least some experience or knowledge of these specific areas of engineering. Further down the list skills/knowledge relating to more specific fields of engineering emerge, such as 'process engineering' and 'electromechanics'.

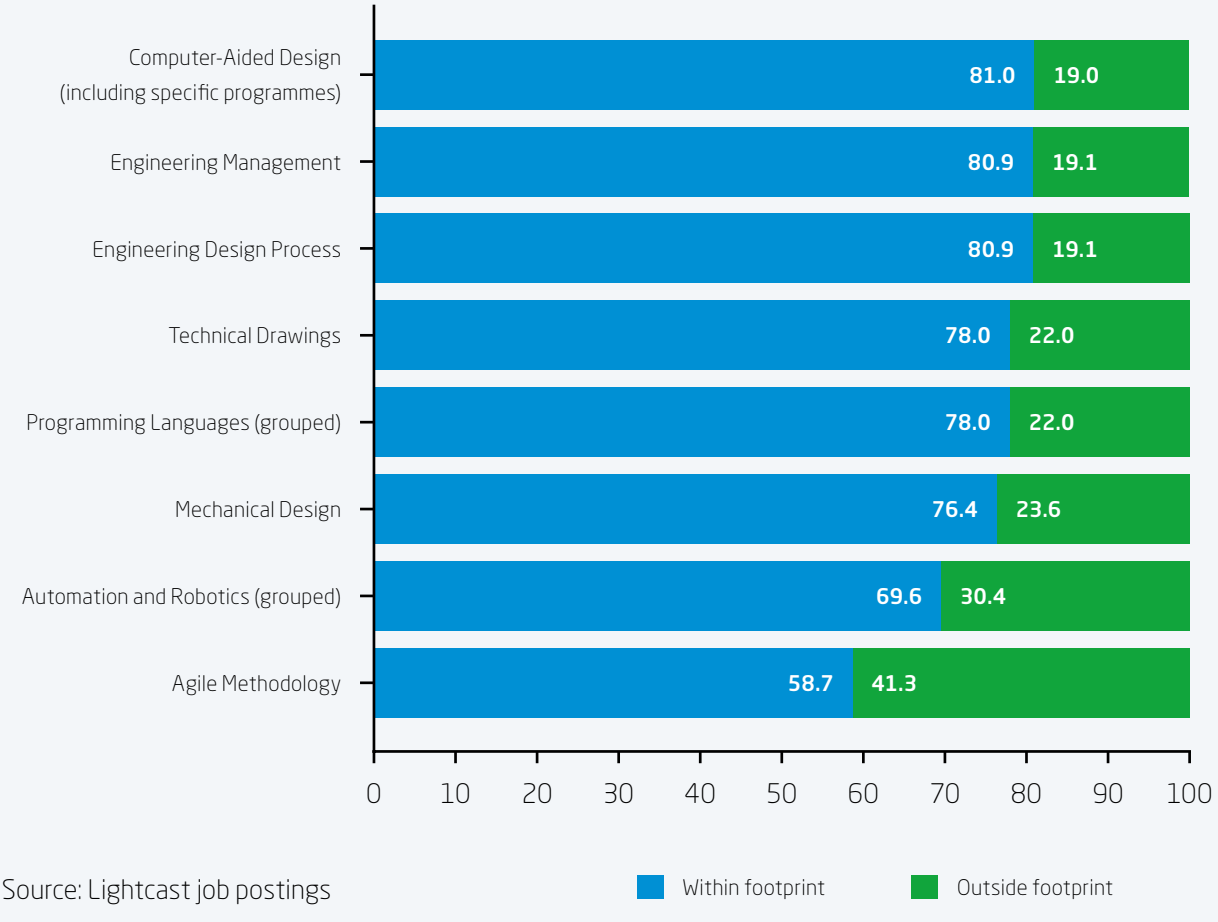
The leadership-oriented skill of 'engineering management' also features in the top 'engineering' skills. This skill brings together the technological problem-solving ability of engineering and the organizational, administrative, legal and planning abilities of management in order to oversee the operational performance of complex engineering driven enterprises. Its high level of demand among employers might suggest that the intricacies of engineering mean that specialist managers are often required to oversee engineering projects rather than those with more general management or administration skills.

4.5 Specialised engineering skills outside the engineering footprint

This section focuses on a number of the most frequently appearing inter-disciplinary specialised skills for the engineering footprint and investigates how often they appear outside the engineering footprint (see Figure 26).

While the majority of these skills were selected from within the 'Engineering' skill category a number were also chosen from the ICT group in recognition of its predominance within the footprint and the potential applicability of some of its top skills across sectors. The skills chosen from the ICT group include 'agile methodology' and 'programming languages' (a hybrid skill including all popular programming languages). 'Automation' is another skill that features heavily within ICT but also has overlap with similar engineering skills including automation engineering and robotics.

Figure 26. Employer demand for the top engineering skills
Engineering footprint, UK, Oct 2021 – Sep 2022 (%)



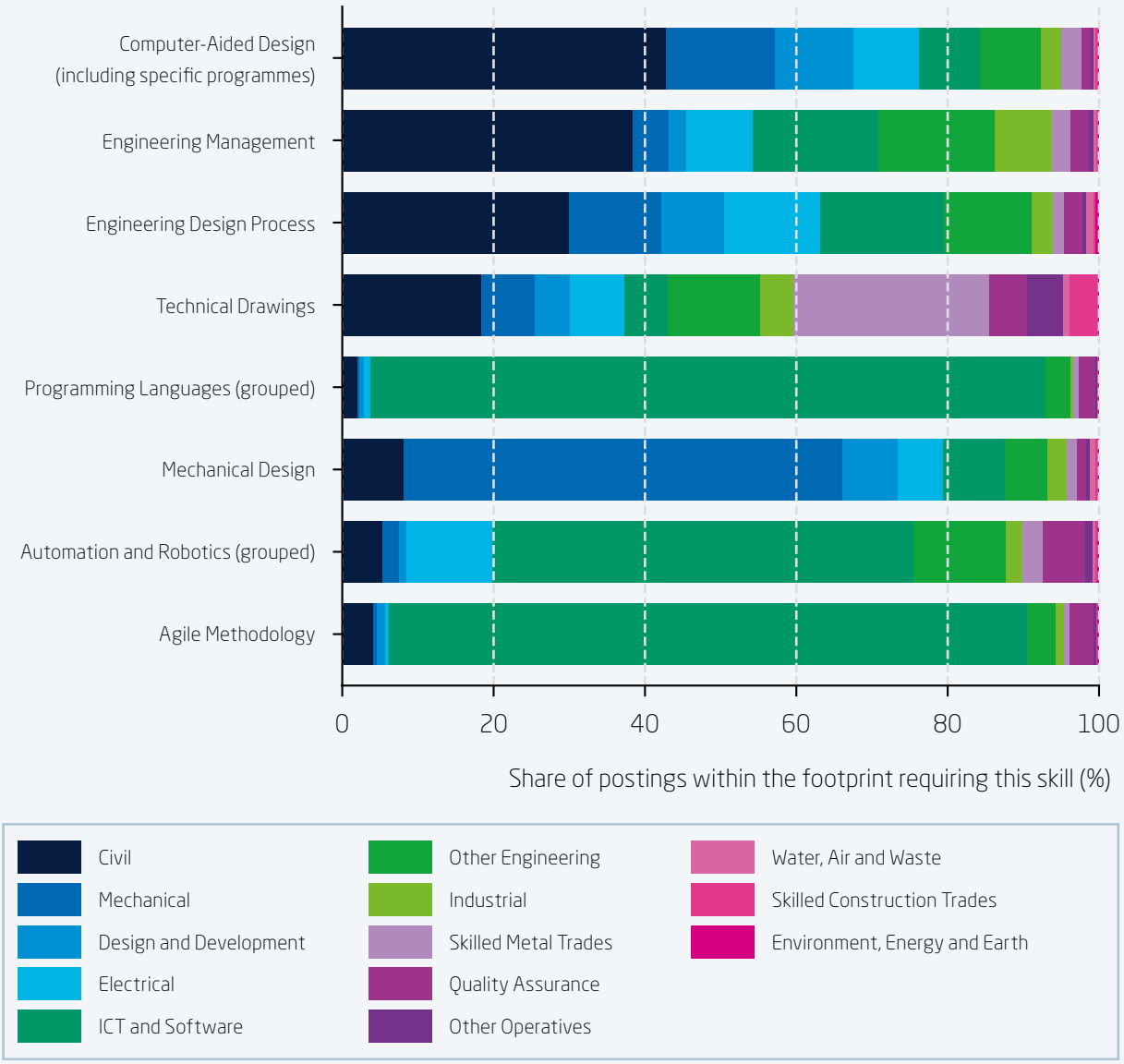
Source: Lightcast job postings

The majority of these specialised 'engineering' skills are highly concentrated in the occupations of the engineering footprint, indicating that they are not typically required for jobs in the wider workforce. As shown in Figure 26, over 80% of job postings that sought CAD skills, 'engineering management' or 'engineering design process' were in occupations inside the footprint. This suggests that trying to recruit these skills from outside the footprint would be challenging.

In the case of CAD for example, the thematic groups within the footprint where this still is most frequently demanded include civil and mechanical (Figure 27). Outside the footprint, the occupations most requiring these skills are graphic designers and artists, although these are likely to be focused on a different kind of design software.

As a skill, 'technical drawing' (both as an ability and an understanding of) has perhaps the most even split across the thematic career groups, in absolute terms, indicative of its usefulness across engineering disciplines. However, it is skilled construction, operative, and in particular, skilled metal roles that have a high proportional demand for the skill.

Figure 27. Distribution of top skills across the engineering footprint
Thematic career grouping, UK, Oct 2021 – Sep 2022



Source: Lightcast job postings

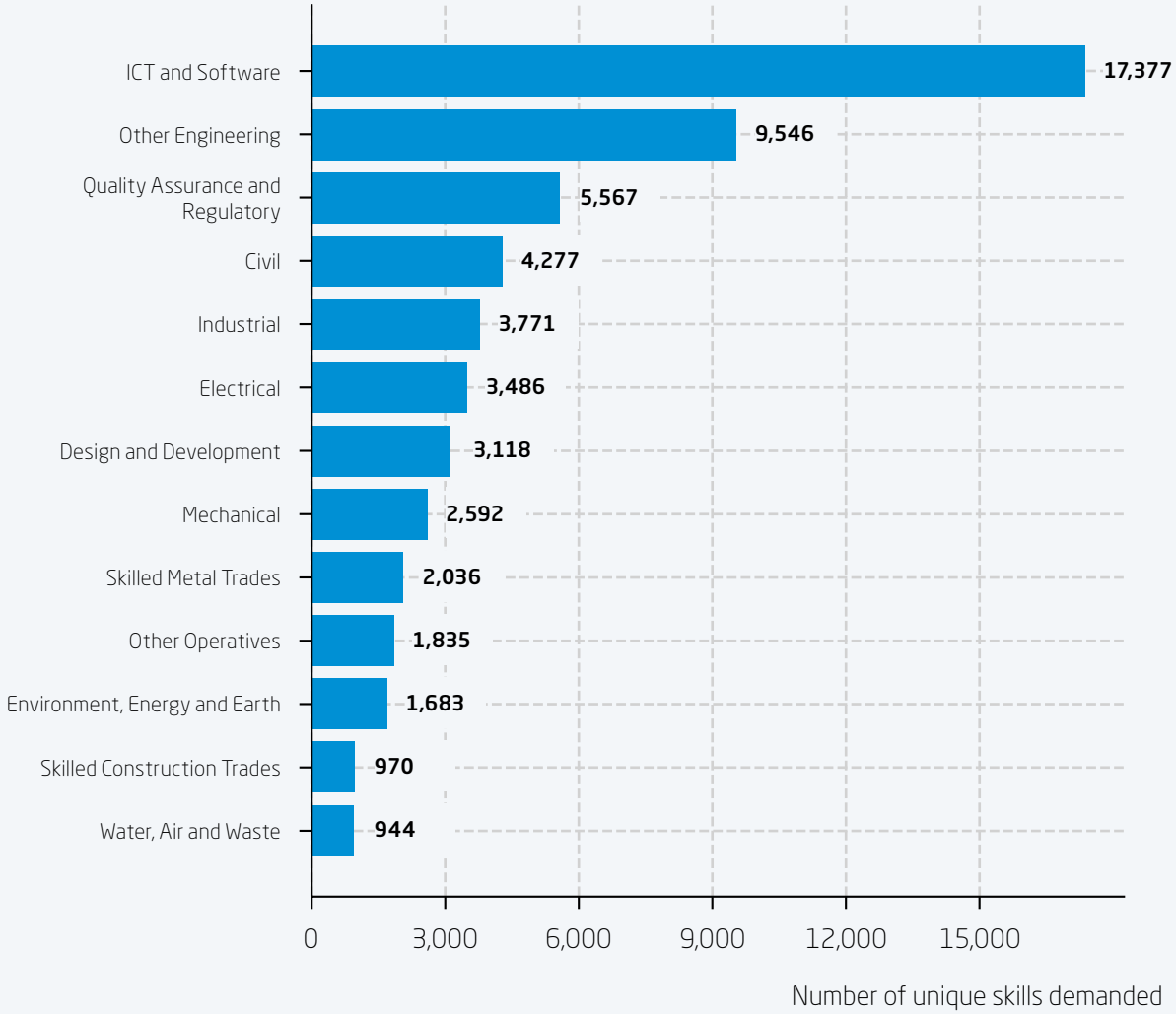
4.6. Skills complexity within the engineering footprint

While the engineering footprint is diverse, the scale of that diversity in terms of skills varies. Figure 28 shows the number of unique skills requested by employers within each thematic career group, with ICT having by far the widest range of skills at almost 18,000. However, even at the lower end, water, air and waste, as well as skilled construction trades, required almost 1,000 unique skills respectively. The high diversity of ICT is likely driven by both the vast range of specific software skills demanded across industries and occupational roles, as well as the large total number of job postings.

Building upon this, Lightcast developed an innovative metric of occupational 'complexity'. This metric combines both how diverse the skillset for a given occupation is and also how specialised – or ubiquitous – those skills are to that occupation, relative to the wider workforce. Figure 29 shows that for the engineering footprint, occupations such as ICT, quality assurance, civil, and design have the highest complexity, while others such as water, air and waste have a lower complexity score, driven by either a lower diversity of skills required, more ubiquitous skills, or a combination of the two.

Figure 28. Skill diversity

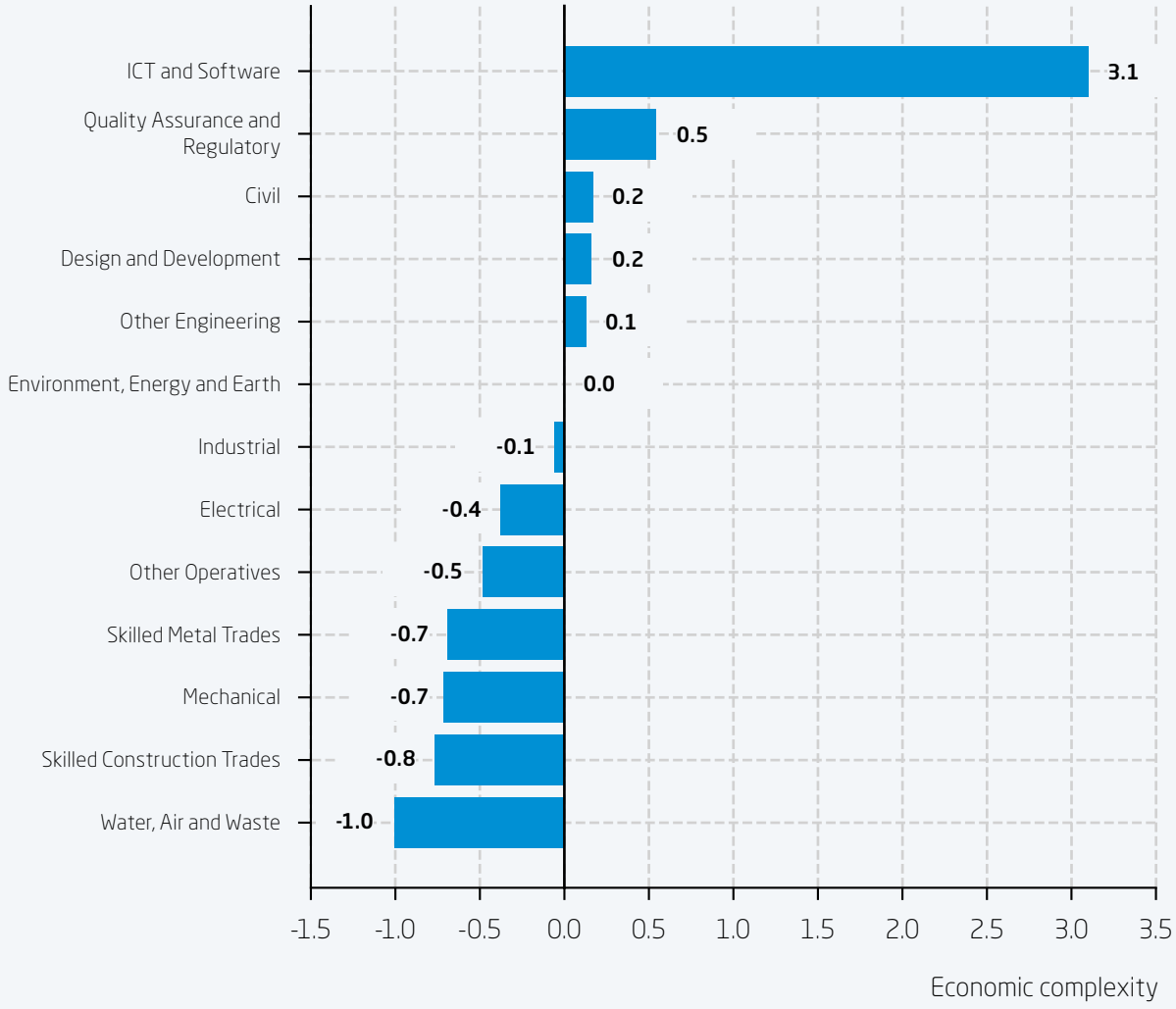
Thematic career grouping, UK, 2021



Source: Lightcast job postings

Figure 29. Economic complexity

Thematic career grouping, UK, 2021



Source: Lightcast job postings

An interesting case is that of environment, energy and earth which in Figure 28 has a relatively low diversity but in Figure 29 has average complexity. This suggests that while the skills demanded for the environment group are not particularly expansive relative to other groups, the skills that are demanded are relatively unique to these occupations.

4.7. Education requirements to access engineering related roles

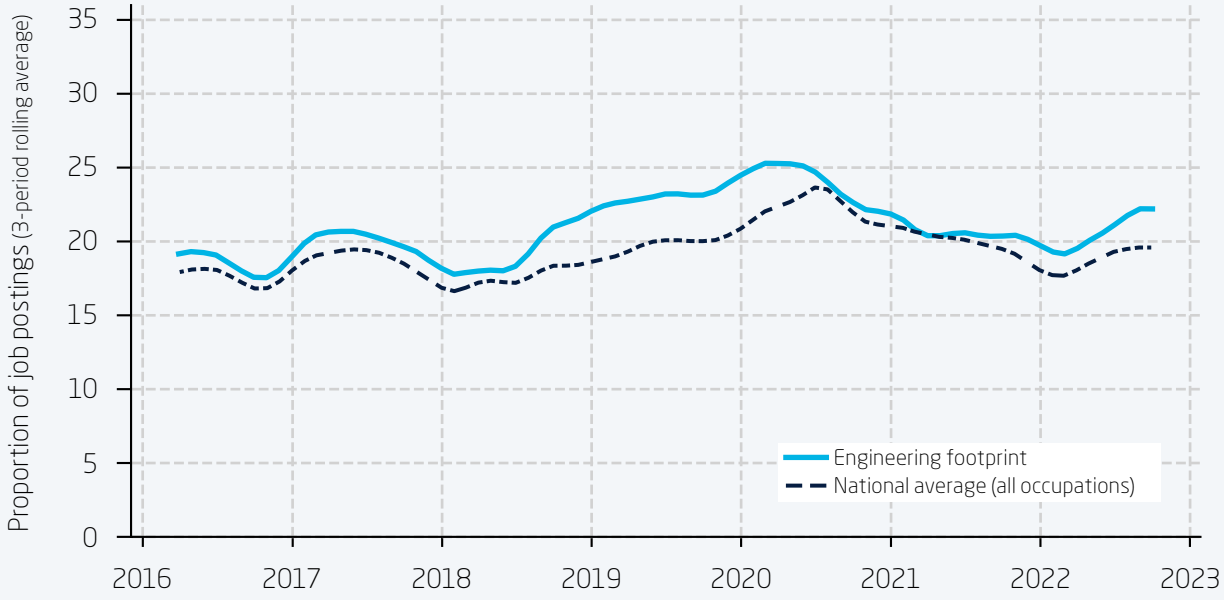
While this analysis of the engineering footprint has focused primarily on employers' expressed demand for specific skills when recruiting, it is important to bear in mind they may also specify desired minimum levels of formal education.

Along with apprenticeships (discussed earlier in Chapter 3), certified educational achievements offer a pathway to employment for many seeking a career within the engineering profession. Moreover, from an employer's perspective they commonly represent a proxy benchmark from which to measure candidate's competence or base expertise in a given field.

As shown in Figure 30, between October 2021 – September 2022, approximately 21% (740,000) of engineering job postings specified a minimum desired level of education for potential candidates, marginally higher than the national average.

Figure 30. Employer specification of minimum education level

Engineering footprint, UK, Jan 2016 – Sep 2022

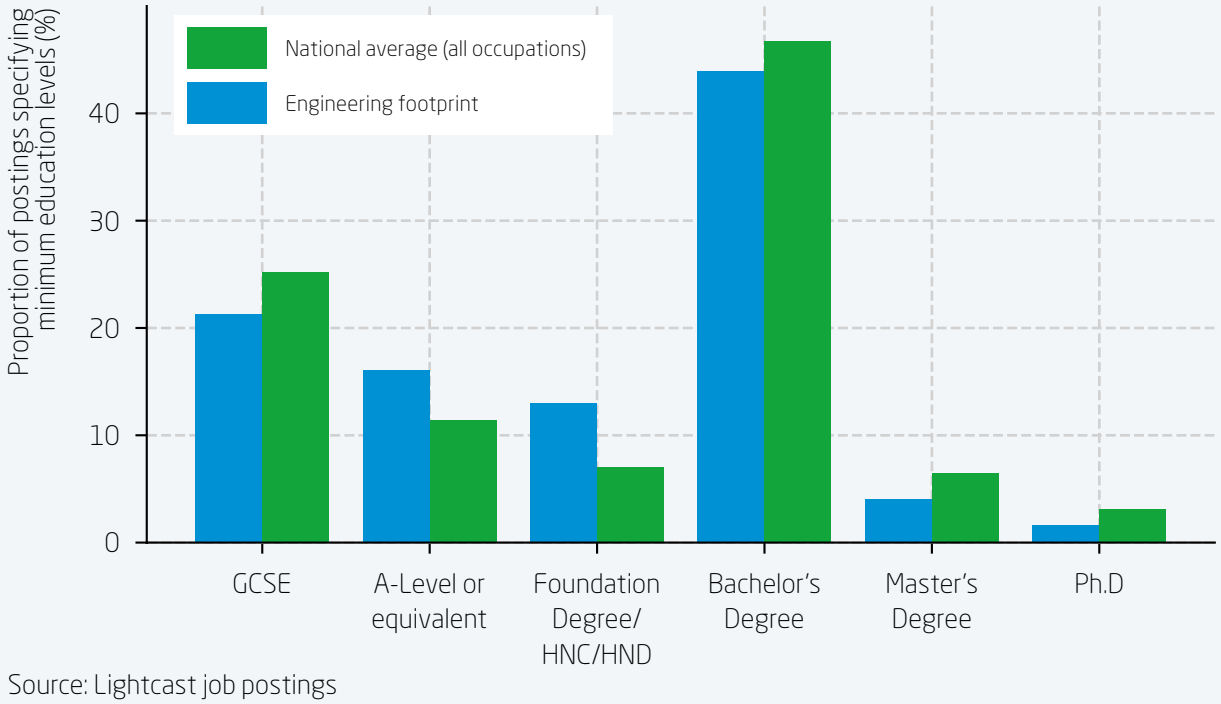


Source: Lightcast job postings

The composition of desired minimum educational levels for the engineering footprint differs slightly from that of the national average, however. For example there are proportionally more postings related to engineering requiring A-Levels or equivalent and Foundational degrees or Higher National Certificates (HNCs), as shown by Figure 31. Proportionally overall, a slightly lower education qualification level is needed in the footprint compared to the national average.

Figure 31. Minimum education levels

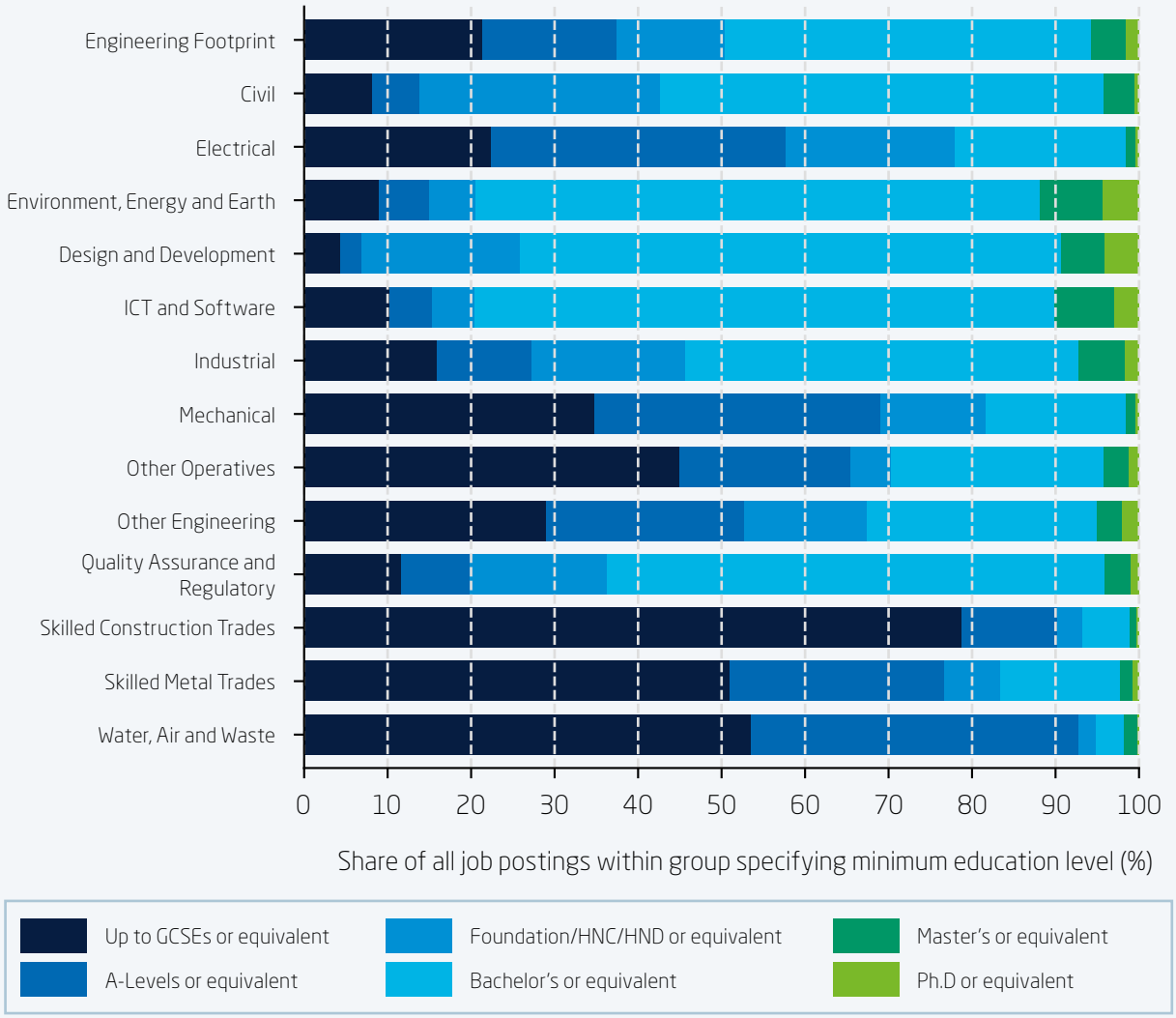
Engineering footprint, UK, Oct 2021 – Sep 2022 (%)



Source: Lightcast job postings

Figure 32. Minimum education levels

Thematic career grouping, UK, Oct 2021 – Sep 2022



Source: Lightcast job postings

To help explain this difference, it is important to recognise that employer demand for different levels of minimum educational attainment is largely predicated on the career area in question. Given the diversity of skills required by occupations within the engineering footprint, it is understandable that employers from different industry areas will require differing levels of prior subject expertise or formal training.

This difference at a thematic career group level is illustrated in Figure 32. It shows that thematic career groups such as ICT and software, civil, design, and environment roles typically require higher academic qualifications, although there are also opportunities for those without degrees. In comparison, employers of those in mechanical, electrical, and skilled construction appear to put a greater emphasis on more foundational levels of education. The relatively high proportion of the footprint associated with these types of occupations compared to the national average also helps to explain the difference in desired minimum educational attainment between the two.

The overall findings from this chapter (and the associated snapshots in Annexe 1) detail what is typically required by employers in terms of both skills and education. However, it is clear from the diverse mix of skills sought after within each thematic career group, as well as the variations in minimum education levels, that there are numerous avenues into all areas of engineering.[11]

[11] Educational pathways into engineering (EngineeringUK, 2022)

Chapter 5
The changing nature of engineering skills

Key Insights

- On average, the range of skills demanded by employers is becoming increasingly diverse across the engineering footprint. This suggests the engineering profession is becoming broader, with wider application of engineering principles across the economy.
- Demand for specialised engineering skills is growing. Overall, growth in demand for specialised engineering skills has outpaced the growth of the engineering footprint overall, with specialised engineering skills now featuring in proportionally more job posts than in 2016/17.
- Of the specialised 'engineering' skill sub-categories, emerging fields such as 'chemical and biomedical engineering' and 'robotics' have seen the fastest rates of growth, while at the other end, more traditional engineering technologies such as 'hardware description languages'[12], 'aerospace engineering' and 'radio frequency', have seen their proportional shares decline.
- While the proportion of engineering-related job postings requiring specialised software skills has remained largely consistent over time, the composition of the top software skills demanded has continued to morph, driven by the rise of new software for specialist tasks and/or emerging fields.
- Technological skill deep-dive analysis:
  - Automation and robotics skills: An emerging field, demand is growing across the engineering footprint, albeit to different degrees.
  - Programming language skills: Demand is also growing across the engineering footprint, particularly in the quality assurance and civil thematic groups.
  - Computer Aided Design skills: Proportional demand has declined slightly across the engineering footprint, although they remain among the most prevalent 'engineering' skills, particularly for the civil, mechanical, and design career groups.
- Potential impact of automation advances:
  - The majority of jobs in the engineering footprint are unlikely to be disrupted by automation, with 27% of working time spent on highly automatable tasks, slightly lower than the national average.
  - The relatively low share reflects the fact that much of the work of the engineers relates to 'creative intelligence tasks,' which are difficult to artificially replicate or automate.
  - However, the potential impact of automation is not evenly split across the footprint, with skilled construction trades, skilled metal trades and operatives roles among the most likely to have the routine aspects of their work changed as a result of forecast technological advancements.

The skillsets necessary for every field of work are constantly changing and evolving to take account of new technologies and best practices. In this regard the engineering profession is no different, with some skill areas growing rapidly in importance while the relevance of others gradually declines.

Building on the findings of chapter 4, this chapter investigates how the composition of skills, particularly specialised engineering skills have changed over the past 5 years, within the engineering footprint. The chapter also looks at the changing face of software and technology skills, and contains a deep-dive into the changing demand for three specific skill areas important for the overall footprint, 'automation and robotics', 'programming languages' and 'computer-aided design (CAD)'. Finally, the potential disruptive impact of automation adoption across the footprint is also assessed.

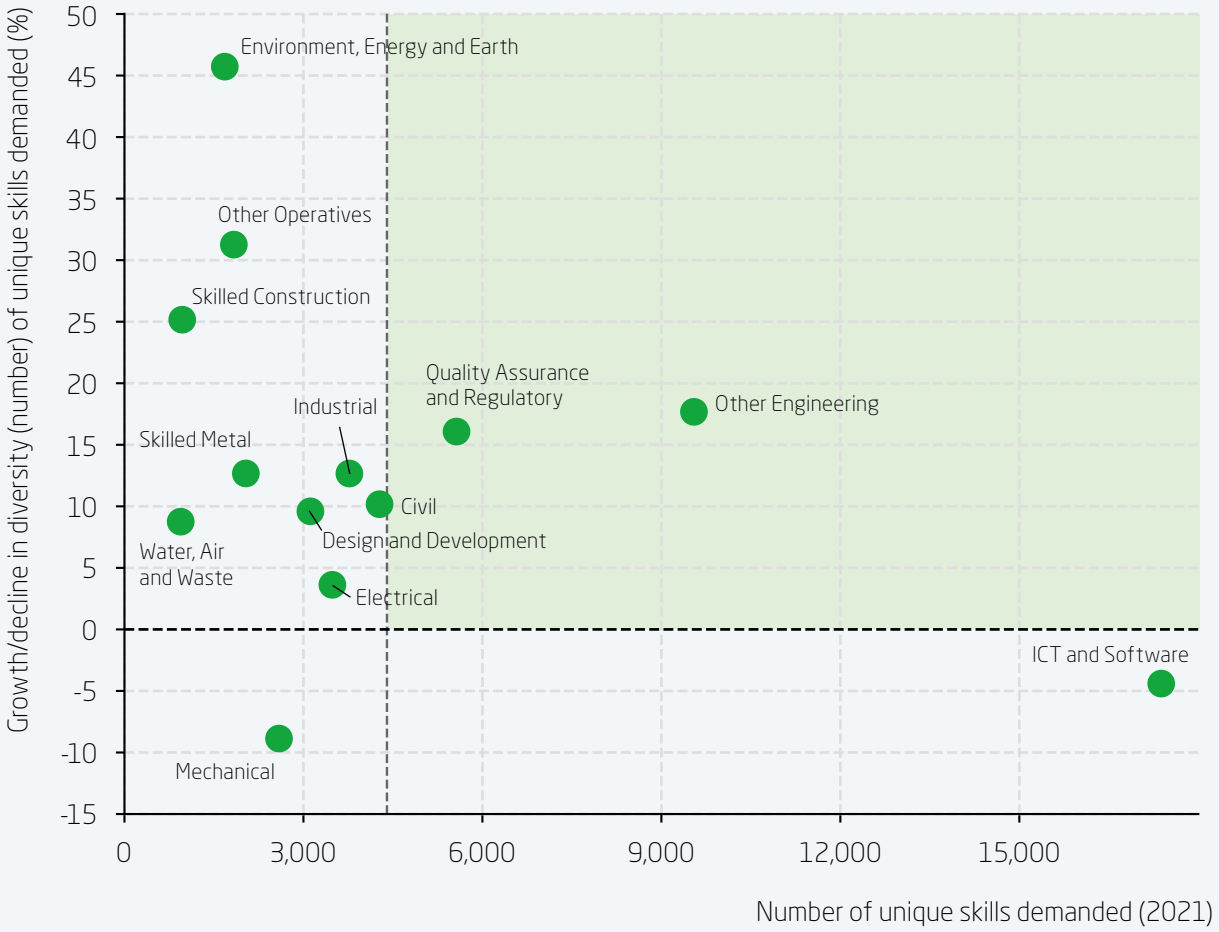
[12] Hardware description languages refers to specialised computer languages used to describe the structure and behaviour of electronic circuits.

5.1. Skills diversity in the engineering footprint

Figure 33 shows that, for the majority of the engineering footprint's thematic career groups, the diversity of skills demanded by employers has grown relative to their 2017 level. This is particularly the case for the environment, energy and earth group which has seen its skill diversity grow by over 45%. This is likely in large part due to the wide-spread adoption of net zero and sustainability agendas across the economy which in turn has resulted in more specific expertise being sought in this field.

Figure 33. Changing skill diversity

Thematic career grouping, UK, 2017-2021



Source: Lightcast job postings

ICT and software, the most complex of the groups, has seen the diversity of skills required decline somewhat over recent years. This may be attributable to the rise of more general programmer and related roles as the industry has become progressively more established, with employers needing to specify fewer specific skills or software. The growth of the 'other engineering' groups is likely indicative of a rise in newer engineering job titles, not yet easily classifiable under existing SOC codes.

5.2 Fastest growing and declining skills in the engineering profession

As with ascertaining the top specialised skills (Chapter 4), when determining the fastest changing skills of the engineering footprint overall this analysis examines only those skills classified as being specialised to engineering, according to Lightcast's Open Skills Taxonomy. Moreover, to provide a better sense of the changing composition of engineering skill demands, it examines changes in engineering skill subcategory proportions rather than looking at specific specialised skills. Doing so provides a more general view of the shifting demand for specialised engineering skills.

In general, across the footprint, it appears that specialised engineering skills relating to newer, more 'cutting edge' technologies and emerging fields of science are the fastest growing while older engineering technologies are proportionately declining in importance among employers.

The fastest growing engineering skill subcategories within the engineering footprint over the last 5-years, in terms of proportional share growth, have been 'chemical and biomedical engineering', 'robotics' and 'simulation and simulation software'. Each of these have seen their share of job postings within the footprint grow by 30%, 30% and 29% respectively. While each of these are growing from a relatively low base in absolute terms, as shown in Figure 34, their rapid growth suggests that they are emerging areas of technological and engineering progress. It is also interesting that many of the largest skill subcategories have also grown strongly over the period, particularly 'electrical and computer engineering', which saw its share grow by 15%.

Figure 34. Changing demand in 'engineering' skill sub-categories[13]
Engineering footprint, UK, Oct-Sep 2016/17 – Oct-Sep 2021/22

Source: Lightcast job postings

[13] In the interest of reader accessibility, Figure 34 includes only those specialised 'engineering' skill subcategories that account for more than 0.15% of all footprint postings.

While most specialist engineering skill subcategories have seen their share of footprint postings grow over the 5-year period, some such as 'hardware description languages', 'aerospace engineering' and 'engineering software' skills have declined.[14]

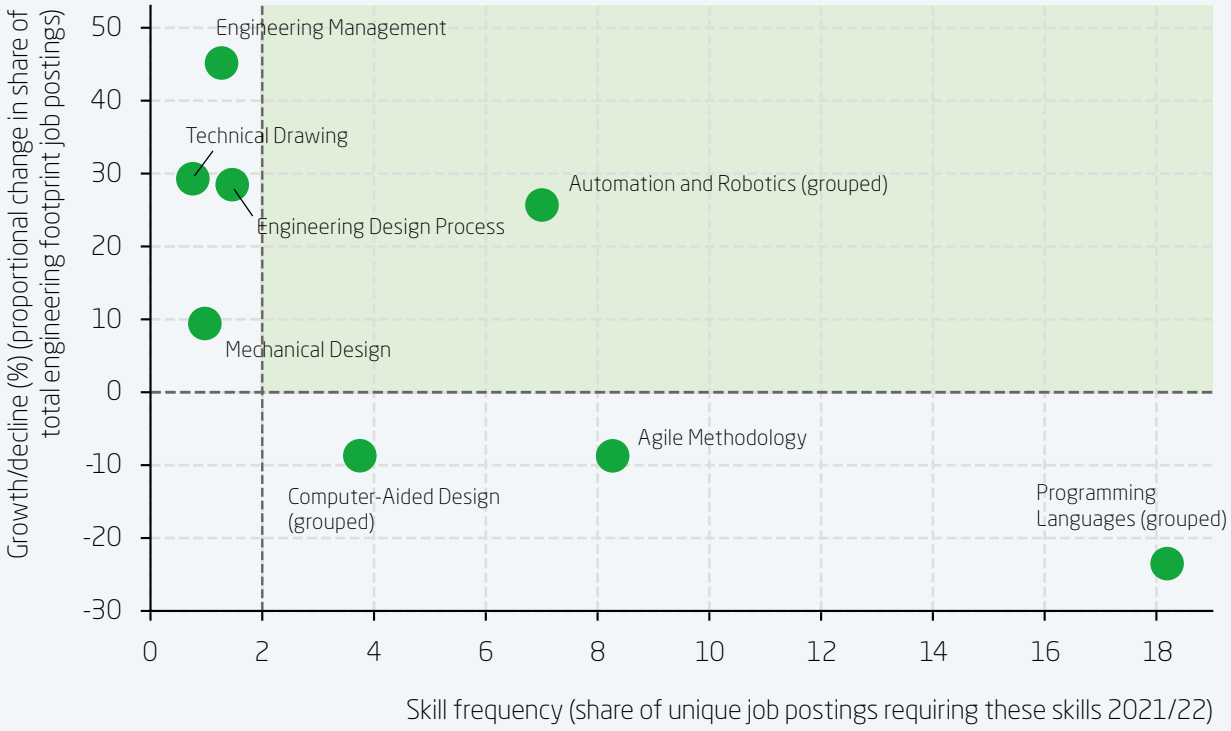
It is worth noting however, that, with the exception of 'hardware description languages', all of the other skill subcategories in the lower two quadrants of Figure 34 have in fact seen an increase in the absolute number of postings requesting their skills. In other words, while these skill areas are not rapidly growing in share of total engineering postings, they are still highly sought after by employers of the relevant occupations.

Figure 35 present a similar analysis considering the top specialised skills for engineering, identified in section 4.5. While featuring in relatively few postings across the entire footprint given their concentration in more 'traditional' disciplines of engineering, the specifically 'engineering' skills of 'engineering management', 'technical drawing', and 'engineering design process', have all seen particularly strong proportionate growth in prevalence over the last five years. 'Automation and robotics', a more wide-ranging set of skills, has also seen strong demand among employers, with its frequency growing by over 25%, relative to 2016/17 levels.

In contrast, 'CAD', 'agile methodology' and 'programming languages' have all seen a relative decline in their share of total footprint postings. The prevalence of programming languages in particular has declined significantly – down over 23% relative to its 2016/17 level. In saying this, it remains easily the most frequently demanded of the top skills, concentrated particularly in the ICT and software career group. In terms of the absolute number of job postings featuring these skills, it is only the programming skills group have seen a decline in demand since 2016/17, with CAD and agile methodology continuing to grow, albeit at a slower rate than the over number of engineering postings. (For a more detailed discussion on trends in CAD, programming languages and automation/robotics across career groups see Box 5).

Figure 35. Changing demand in top engineering skills

Engineering footprint, UK, Oct-Sep 2016/17 – Oct-Sep 2021/22



Source: Lightcast job postings

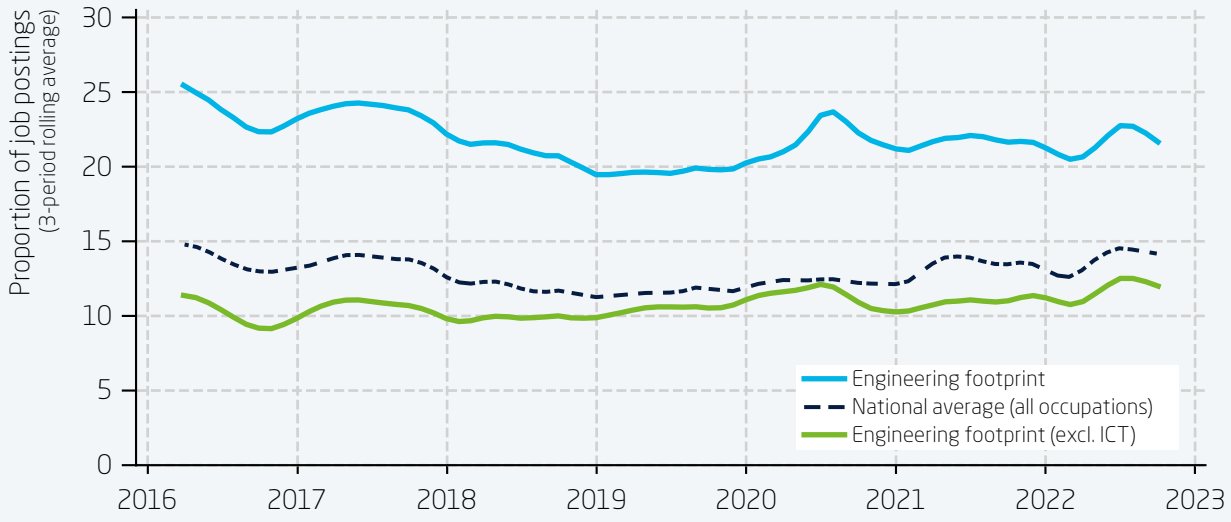
[14] 'Engineering software' is an umbrella skill subcategory which refers to a host of specific software that are typically unique to those working in engineering-related roles (note it does not include all specialised software used by engineers). The specific skills included within the category can be found **here**.

5.3 Software skills over time in the engineering footprint

Knowledge and expertise in using specialised software programmes are important for a large share of the engineering footprint, particularly the ICT and software thematic career group. Latest job posting figures suggest that around 45% of postings in the footprint requested software skills of candidates, significantly higher than that of the national average for all occupations. Excluding ICT, however, shows that a much smaller share of footprint postings – although still substantial – typically require specialised software skills, approximately 24%.

Figure 36. Demand for software skills

Engineering footprint, UK, Jan 2016 – Sep 2022

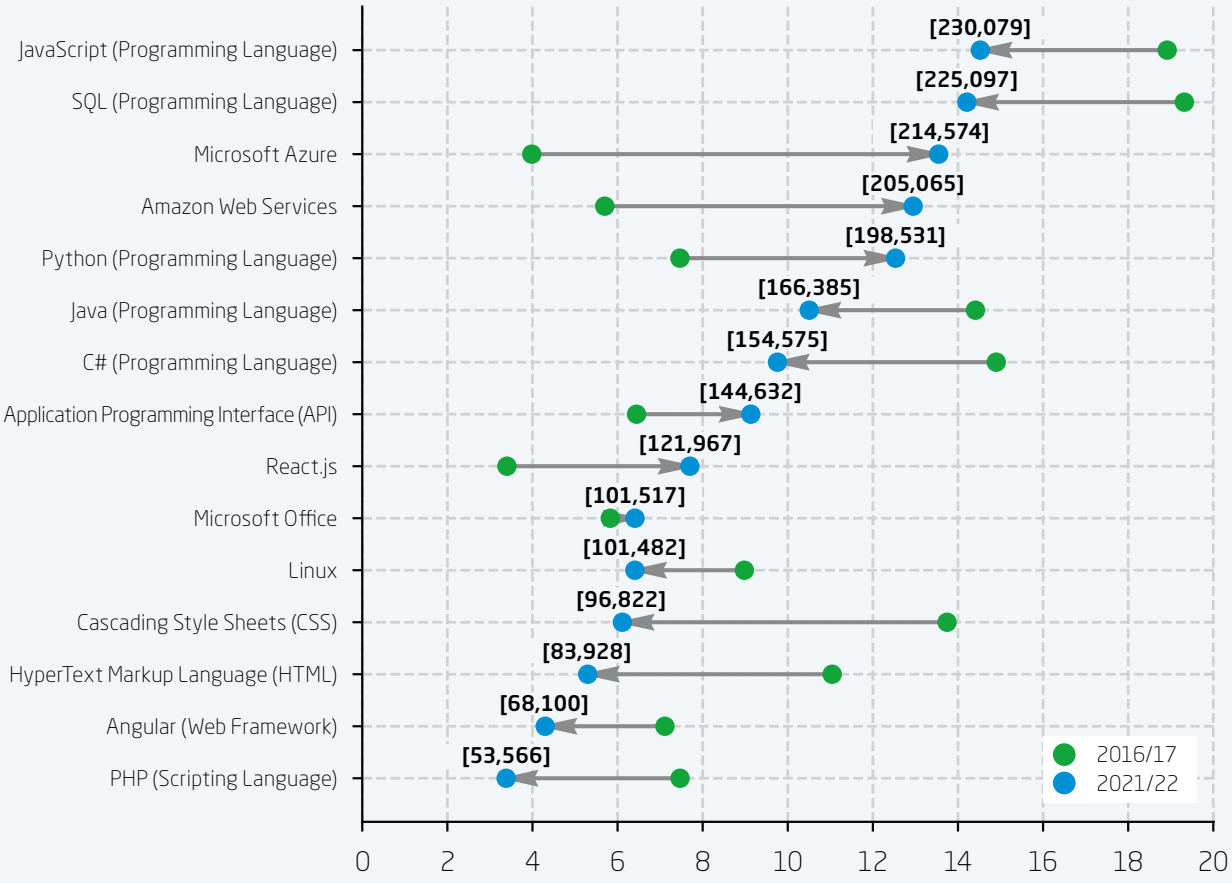


Source: Lightcast job postings

While the proportion of postings within the footprint requiring specialised software skills has remained relatively stable over time, as shown in Figure 36, its specific skill composition has been continuously evolving. Figure 37 includes the top 10 software skills of both 2016/17 and 2021/22 for the entire footprint and shows their relative change in prevalence over the last five years, among all job postings which required software skills. While remaining important skills, almost all of the top 10 software skills in 2016 have declined in proportional prevalence. This can partly be explained by the rapid growth of other specific software skills, such as 'Microsoft Azure', 'Amazon Web Services' and other cloud computing platforms in particular which have emerged in recent years.

Figure 37. Changing demands for software skills

Engineering footprint, UK, Oct-Sep 2016/17 – Oct-Sep 2021/22



[Bracketed values are the absolute number of engineering footprint postings featuring that skill in 2021/22]

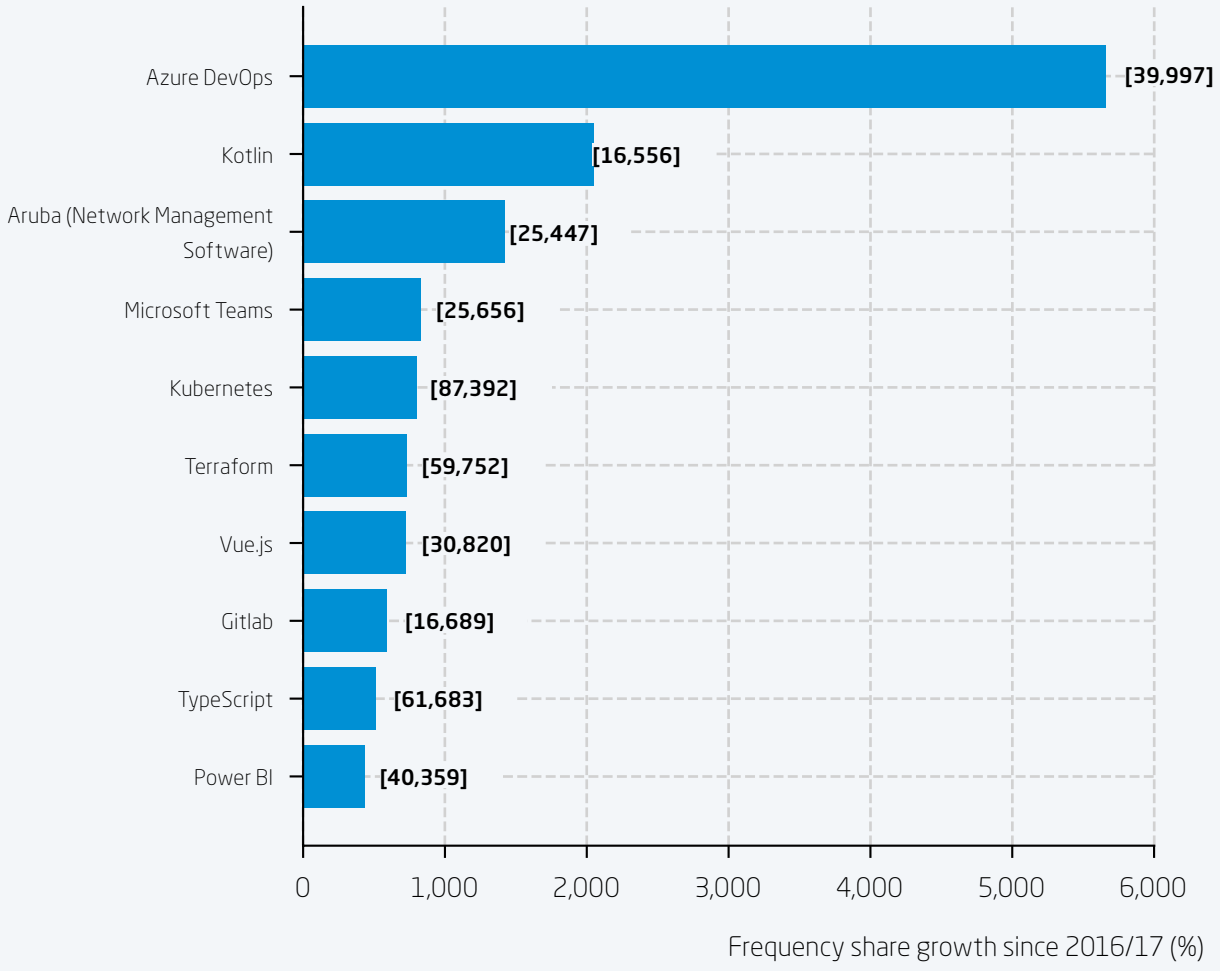
Source: Lightcast job postings

Many of the top software skills demanded by employers are specific programming languages. Consistent with the previous findings in section 5.2, most, including JavaScript and SQL have experienced a relative decline over the last 5 years. Python is the notable exception however, growing its share from 7.5% to 12.5% (see Box 5 for a more detailed analysis).

Further emphasising the diversity and rapid expansion of software skills demanded by employers of engineering footprint occupations, Figure 38 shows the fastest growing software skills. The rapid growth of 'Microsoft Teams' in particular is indicative of the shift towards remote\hybrid working seen across many areas of the engineering footprint and which was expediated by the COVID-19 pandemic. The growth in demand for cloud computing software and expertise (such as those relating to Microsoft Azure development) is also clear. The rest of the fastest growing skills, such as Kubernetes (an open-source container-orchestration system for automating computer application deployment), are more specific to software engineering roles, but reflect the growing degree of software task specialisation.

Figure 38. Top 10 fastest growing software skills

Engineering footprint, UK, Oct-Sep 2016/17 – Oct-Sep 2021/22



[Bracketed values are the absolute number of engineering footprint postings featuring that skill in 2021/22]

Source: Lightcast job postings

The vast majority of the top software skills outlined above are heavily concentrated within the ICT and software career group. Looking at top software skills excluding this group reveals that computer-aided design software skills (AutoCAD, SolidWorks and AutoDesk Revit) are highly sought after by employers within the engineering footprint, as are expertise in general Microsoft Office tools (Excel, Outlook and Powerpoint). Python is also among the top software skills for the non-ICT areas of the engineering footprint.

Box 5: Technological skill deep-dive

The changing importance of automation/robotics, programming skills, and CAD, over time across thematic career groups.

Building on the analysis of section 4.5, 5.2 and 5.3, a number of specialised technological skill groups were identified as being in particularly high demand among employers recruiting for occupations within the engineering footprint. These skills – 'automation and robotics', 'programming languages' and 'computer-aided design (CAD)' – each have potential application across the footprint's thematic career groups, and so, a deeper dive into their trends over time is warranted.

1. Automation Development and Robotics

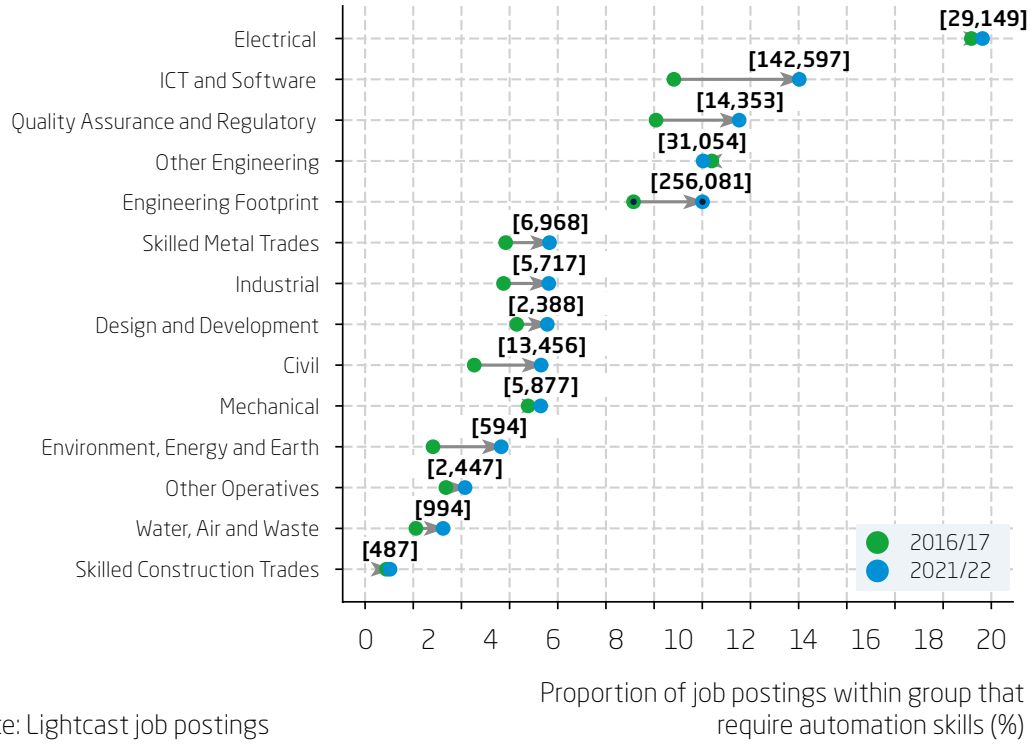
An emerging area of expertise, the automation and robotics skill group, in this context, refers to a wide range of technologies and skills working to reduce human intervention in processes and increase overall efficiency. As this broad definition would suggest, it includes a host of automation, robotic, and electronic related skills from across Lightcast's skill taxonomy but particularly the engineering skill subcategory groups of 'automation engineering' and 'robotics' which are focused on application and automation design.[15]

Relative to 2016/17, the proportion of job postings within the engineering footprint requiring automation development and robotics skills has grown from 5.5% to 7.1% (approximately 256,000 job postings), as shown in Figure 39. However, the concentration of these skills differs significantly across each of the footprint's thematic career groups with ICT and software, and electrical accounting for the highest proportional shares. Interestingly, the share of postings requesting automation and robotics related skills has grown across almost all thematic career groups relative to 2016 levels, with particularly strong growth seen in civil engineering, quality assurance and regulatory, and ICT and software. This might suggest a growing importance among employers on the principles of automation as they seek to increase the efficiency of their services, systems and designs.

Figure 39. Automation and robotics skills on the rise

Thematic career grouping, UK, Oct-Sep 2016/17 – Oct-Sep 2021/22

[Bracketed values are the absolute number of postings within group featuring that skill in 2021/22]



Source: Lightcast job postings

[15] Among the most demanded specialised skills of this group are 'Automation',' Control Systems',' Programmable Logic Controllers', 'Control Engineering',' Robotics', 'Building Controls' and 'Robotic Process Automation'. The definition used in this instance stops short of including more advanced but related software skills such as 'Machine Learning' and 'Artificial Intelligence' as well as practical use of automated machinery, such as 'CNC Milling'..

2. Programming Languages

Programming languages or 'coding' skills can be used to perform a wide range of tasks in an efficient manner, including writing computer programs, developing web applications or performing data analysis. The programming language skill group, in this instance, includes over 60 specific programming languages from across the IT space.[16]

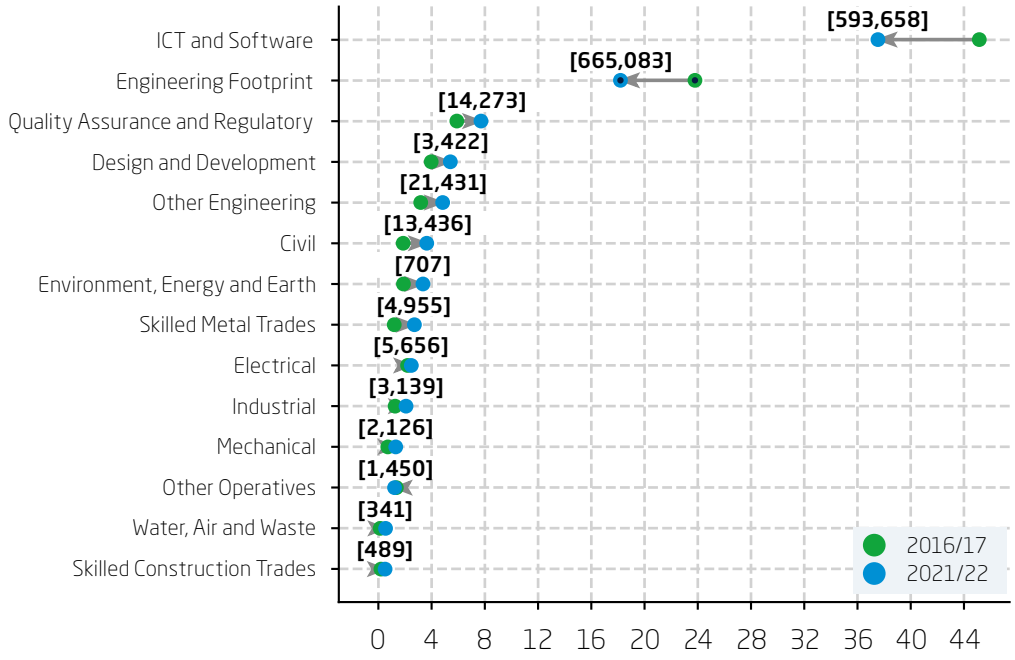
Somewhat surprisingly perhaps (and as shown in earlier sections), compared to 2016/17, the proportion of job postings within the engineering footprint specifically requiring programming language skills has fallen from 24% to 18%, as shown in Figure 40. However, this decline is driven solely by a decline in the skill's prevalence among job postings related to the ICT and software thematic group – the group with the highest concentration of these skills.

The decline in this group has two possible explanations; (i) the relative importance of these skills is declining within the group, and/or (ii) these skills have become so ubiquitous among the occupational groups related to ICT and software, that employers are no longer specifically requesting them in job postings, but rather presuming candidates are equipped. In reality, both are likely to be true. For example, given, their wide and varied use in a sector, and with a high share of postings asking for software skills that implicitly require a knowledge of programming languages (such as 'Application Programming Interface' and 'React.js'), the latter is certainly a possibility. However, upon deeper investigation of the sector it is clear that its own composition has also changed considerably, with occupations such as web developers – an occupation that relies heavily on core programming language skills such as SQL and JavaScript – seeing a sharp decline in demand in the past number of years, while IT user support technicians (an occupation less focused on these skills) have seen their demand grow strongly.

Figure 40. Growing demand for programming language skills, beyond ICT

Thematic career grouping, UK, Oct-Sep 2016/17 – Oct-Sep 2021/22

[Bracketed values are the absolute number of postings within group featuring that skill in 2021/22]



Source: Lightcast job postings

[16] Among the most demanded specialised skills of this group are 'JavaScript', 'SQL', 'Python', 'Java', 'C#', 'C++ ', 'Go' and 'R.'

Beyond ICT, it is clear from Figure 40 that programming languages are appearing in proportionately more job postings across almost all thematic career groups of the engineering footprint, but particularly those in quality assurance, design and development, and civil. Given the applicability of programming languages to so many computer-based tasks (including automation) this increase in demand for programming language skills is understandable, although its prevalence in career groups outside of those related to ICT, at this point, is by no means pervasive.

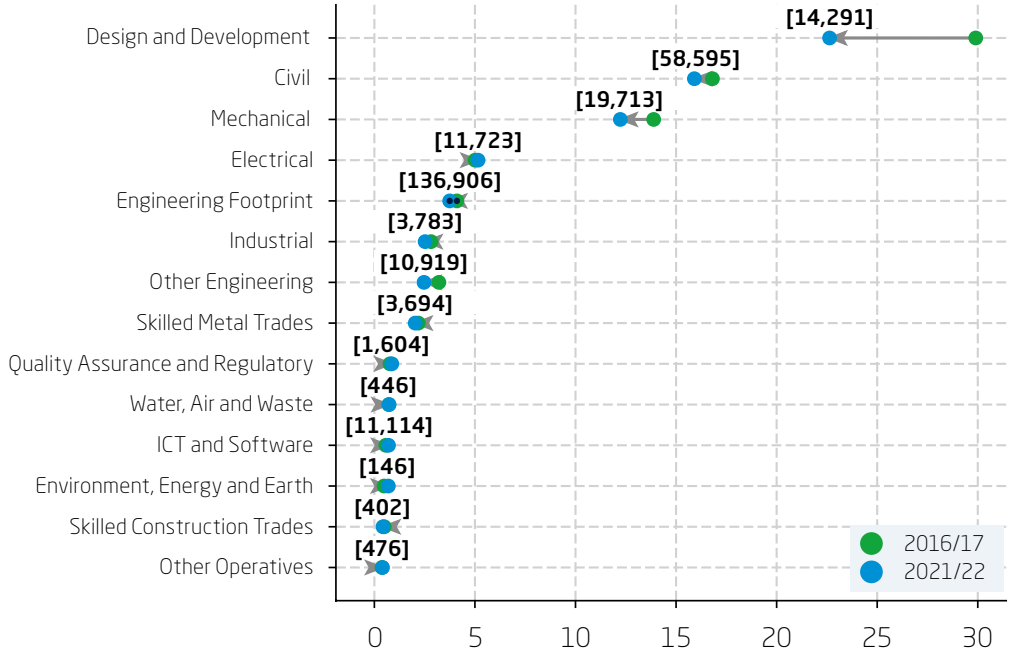
3. Computer Aided Design (CAD)

Among the most demanded specialised 'engineering' skills by employers, Computer Aided Design (CAD) refers to the use of computers to aid in the creation, modification, analysis, or optimization of a design. Within this grouping are a host of specific CAD and 3D modelling programmes used by various different occupations of the engineering footprint.[17]

Figure 41. Slight decline in demand for CAD skills

Thematic career grouping, UK, Oct-Sep 2016/17 – Oct-Sep 2021/22

[Bracketed values are the absolute number of postings within group featuring that skill in 2021/22]



Source: Lightcast job postings

Relative to 2016/17, the proportion of job postings within the engineering footprint requiring CAD skills has declined from 4.1% to 3.7%, as shown in Figure 41. This decline, while particularly acute in the design and development group, is seen across the majority of the footprint's thematic career groups, albeit a marginal proportional decrease in most cases. This finding might suggest that while CAD remains integral to many occupations, such as those involved in design, civil and mechanical engineering fields, its specialised purpose means it has limited wider applicability to more areas of the engineering footprint.

[17] Among the most demanded specialised skills of this group are 'AutoCAD', 'Computer-Aided Design', 'Autodesk Revit', '3D Modelling', 'SolidWorks (CAD)' and 'SketchUp (3D Modelling Software)'.

5.4. The impact of automation

In planning for the long-term future of engineering, one central question that must be assessed is the potential impact, if any, of emerging technologies and automation. 'Automation', in this context, can broadly be understood as the creation and application of a wide range of technologies that reduce the need for human intervention in the production process. While there are many clear benefits to task automation in the labour market including increased efficiency, higher productivity and reduced human error, its rapid rise also presents a number of challenges. Among these is the risk of job disruption and significant change in day-to-day activities for those working in areas where automation is introduced.

In this section, using Lightcast's UK Automation Index, the report examines the extent to which automation and technological advancement may disrupt or change the activities of the occupations within the engineering footprint. The index does this by examining the proportion of working time spent in each occupation performing tasks which are deemed to be 'high-risk' of change through automation and other technological change anticipated over the next 20 to 30 years.[18] It is important to state clearly that a higher automation index score should not be interpreted as meaning job replacement, but rather the potential for substantial change to current work activities or tasks.

With respect to the engineering footprint, the majority of its jobs are not likely to be significantly impacted by automation, with 27% of total working time spent on highly automatable tasks; just slightly lower than the national average of 28%. However, as shown in Figure 42, the split is not equal across the footprint.

Comparing the potential disruptive impact of automation across thematic career groups reveals that skilled construction and metal trades, as well as other operatives, spend the most time performing potentially automatable or routine tasks (60%+).[19] Moreover, from a specific job activity perspective, occupations within these groups such as welding trades, carpenters and joiners, and assemblers are among the most likely to have a significant aspect of their work changed by automation or other technological advances in the future. The top specialised skills shared by these three thematic groups include routine machinery operation and the use of different tools for construction or manufacturing/production purposes. This suggests that these types of routine skills may be most likely to be changed or replaced by automation in the future.

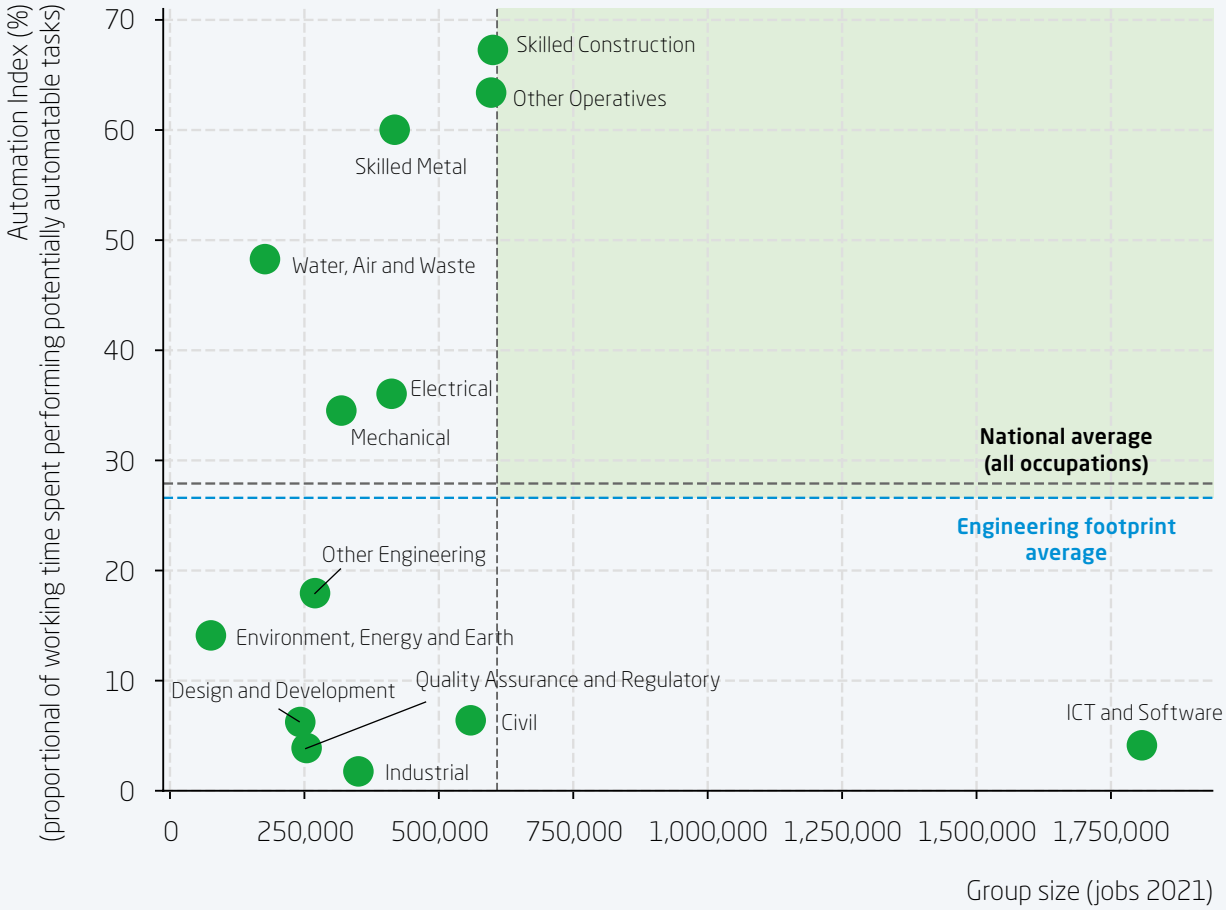
Large occupations of note from other thematic groups with a higher-than-average Automation Index score include electricians and electrical fitters, as well as vehicle technicians and mechanics. Similarly, these occupations are likely to have a relatively high proportion of routine-based tasks.

[18] Estimates of how much time is spent performing 'high risk' tasks are constructed using the frequencies for different Work Activities in the US O*NET database, and mapped across to UK SOC. The relationship between different 38 task categories and Frey and Osborne's estimates of the 'probability of computerisation' is used to classify each task category as high, middle, or low risk, depending on the significance and direction of that relationship. Note: automation index is unavailable for Legislators, Military, and Unclassified occupations, so they are excluded from aggregate indexes for higher-level occupations. **https://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf**

[19] The Automation Index score for each thematic career group was calculated using an employment weighted approach, whereby the automation index score of larger SOC4 occupations in thematic career groups held a higher weight in determining the group's aggregate score.

Figure 42. Potential for automation to disrupt and change roles

Thematic career grouping, engineering footprint, UK, 2021 (%)

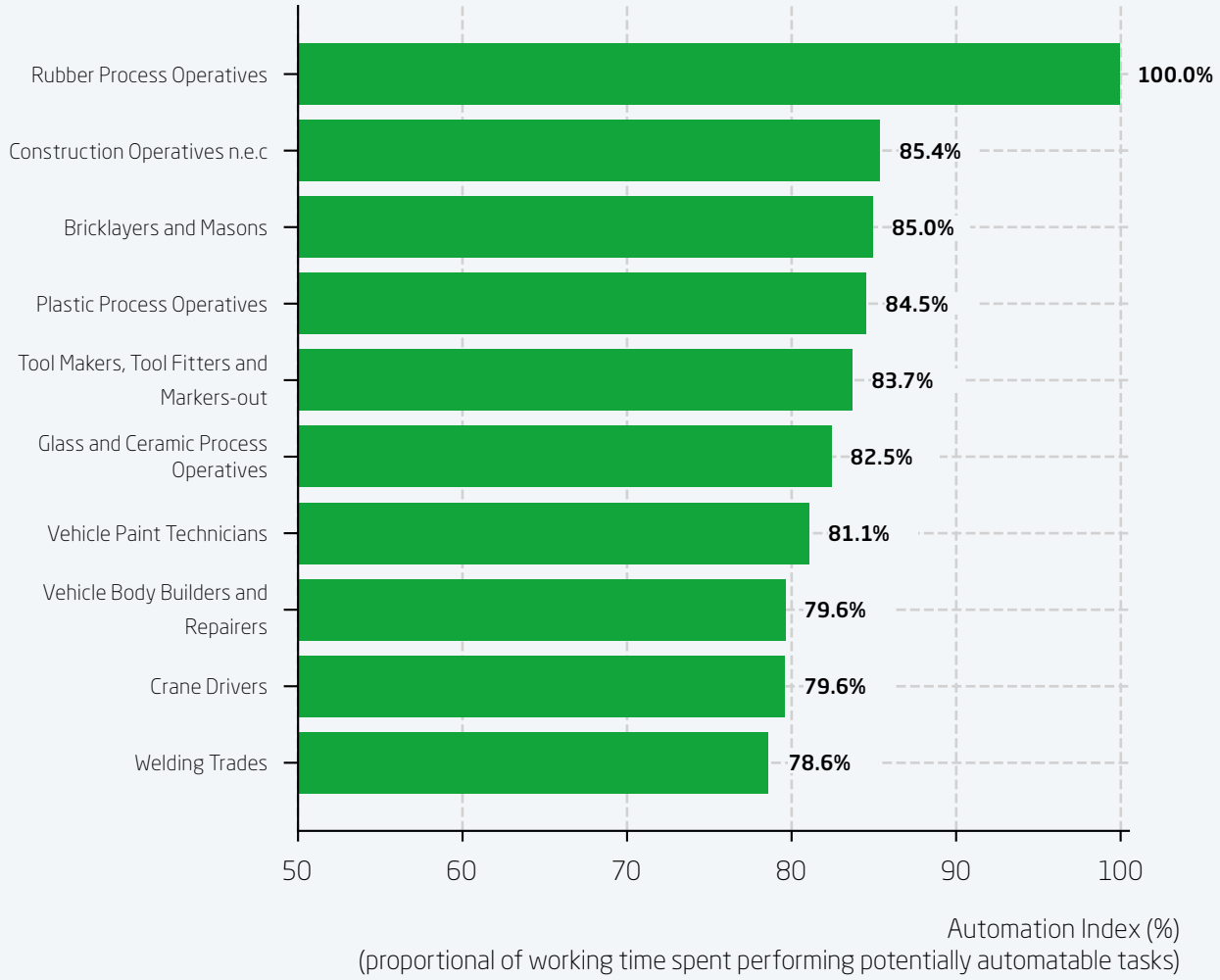


Source: ONS APS and Lightcast calculations

In comparison, other roles in the design, civil engineering, and ICT groups, where working time is spent more on innovative engineering design, creative problem-solving, or imparting expert knowledge are less likely to have their roles disrupted by automation. These 'creative intelligence tasks' are much more difficult to automate.

Within the footprint, some specific occupations are particularly susceptible to changes as a result of automation, as shown in Figure 43. These include rubber process operatives (Automation Index = 100), general construction operatives not elsewhere classified (Automation Index = 85.4) and bricklayers and masons (Automation Index = 85). While these occupations are more predisposed to the implementation of automation technology and practices because of the routine or repetitive nature of many of their associated tasks, it does not necessarily mean that they will be automated or indeed that demand for these occupations will decline. Automation may indeed make the work of these occupations more productive and impactive, freeing workers up to focus on their other duties.

Figure 43. Occupations most susceptible to change as a result of automation
Engineering footprint, SOC4, UK (%)



Source: Lightcast calculations and occupational data

It is important to note that the shape, or form, automation is forecast to take varies across occupations. For example, the activities of some occupations are more likely to be changed by new, more efficient machinery and robotics, while others will be disrupted by the application of new methods and processes (such as modular building in the construction space), or the creation of new forms of interaction. Moreover, while the occupations in Figure 43, are forecast to be the most susceptible today, the rapid emergence of increasingly advanced artificial intelligence and specialised machinery implies that this will may well change in future as the application of automation principles and technologies spread throughout the economy.

Chapter 6
The engineering footprint and the green economy

Key Insights

- The activities and skills of those employed in the engineering footprint will be critical in achieving the UK's net zero carbon emissions targets.
- The engineering footprint is becoming 'greener'. Within the footprint and across each of its thematic career groups, demand for both 'green skills' and 'green jobs' have grown steadily and were, as of September 2022, at record levels.
- 'Environmental engineers', 'renewable engineers' and 'environmental consultants' are among the most frequently appearing green job titles across the footprint. However, there has been strong growth recently for other roles such as 'carbon analysts'. These more analytical and advisory roles are suggestive of more businesses seeking to measure the environmental impact of their work, or that of others.
- 'Environment health and safety', 'water treatment' and 'environmental laws' are among the top demanded green skills across the footprint, although, similar to green jobs, the last 5-years has seen rapid growth in a plethora of new skills such as those relating to electric vehicles, achieving net zero emissions and ESG reporting standards. Many green skills are niche and therefore, are typically concentrated within their specific industry and related occupations.

Possibly the greatest challenge facing our world today is global climate change. Tackling it necessitates both a radical and rapid transition to a decarbonised economy over the coming decades. Only through achieving the most ambitious net zero carbon emission targets, both at a national and international level, can the worst effects of climate change be mitigated. However, if this transition to a 'greener' economy is indeed managed effectively, it will not only protect our environment but also help drive wider economic growth into the future through the provision of more high-skill, high-value and sustainable job opportunities.

Central to initiating and achieving the green transition in the UK will be the activities of the engineering footprint, particularly in the areas of renewable energy generation and sustainable design solutions. Ensuring that the engineering workforce has the necessary skills to enable this transition should therefore be a central concern to employers, policymakers and education providers alike. Unfortunately, however, as identified in a previous EngineeringUK report, the 'green' economy is notoriously difficult to define, with no single or standard definition as to what constitutes a 'green job' or associated 'green skills'. [20]

To help overcome this, Lightcast has developed its own working taxonomy of almost 230 unique 'green skills' and over 370 'green job titles'. These skills and job titles were selected for their relevance to sustainability, environmental protection, and decarbonisation activities. Using these taxonomies, this report analyses UK job postings to get a sense as to the level of green recruitment activity and prevalence of green skills. In doing so, this chapter offers some initial estimates of the degree and direction of employer demand for both green skills and green jobs and how they are affecting the composition of the overall engineering footprint compared to the national average. Further research will be needed in this space as data and definitions availability evolve over time.

[20] **www.engineeringuk.com/netzero**

6.1. Green job postings in the engineering footprint over time

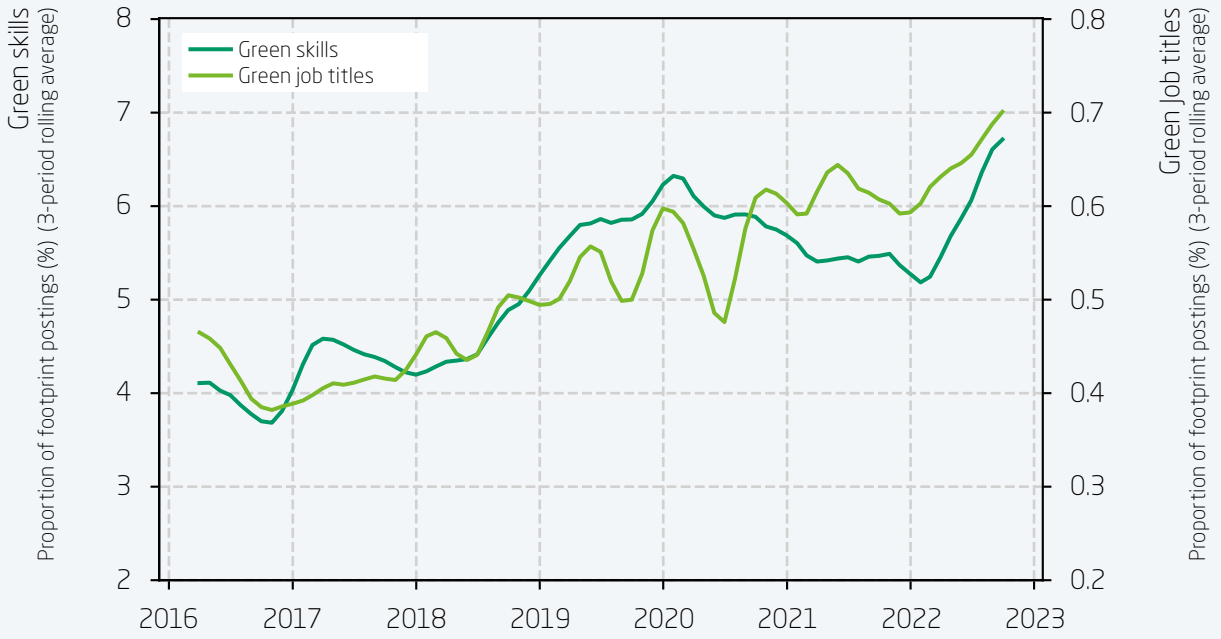
There is growing evidence of demand for both 'green job titles' and 'green skills' among employer job postings, each of which are currently at record levels within the footprint (both in absolute numbers and proportionally) and growing strongly.

In the year October 2021 – September 2022, approximately 212,000, or almost 6% of all job postings related to the engineering footprint included at least one green skill in their description.[21] For the same period, there were over 23,000 green job titles advertised, equivalent to 0.65% of all footprint postings, as shown by Figure 44. Relative to their 2016/17 levels, each of these have proportionally grown strongly in prevalence, with job titles increasing by 55% and green skills by 48%. The top specific green job titles and green skills for the engineering footprint can be found in sections 6.3 and 6.4 below, respectively.

The prevalence of both green skills and green job titles is also substantially higher within the footprint than compared to national average levels.

Figure 44. 'Greening' job postings

Engineering footprint, UK, Jan 2016 – Sep 2022



Source: Lightcast job postings

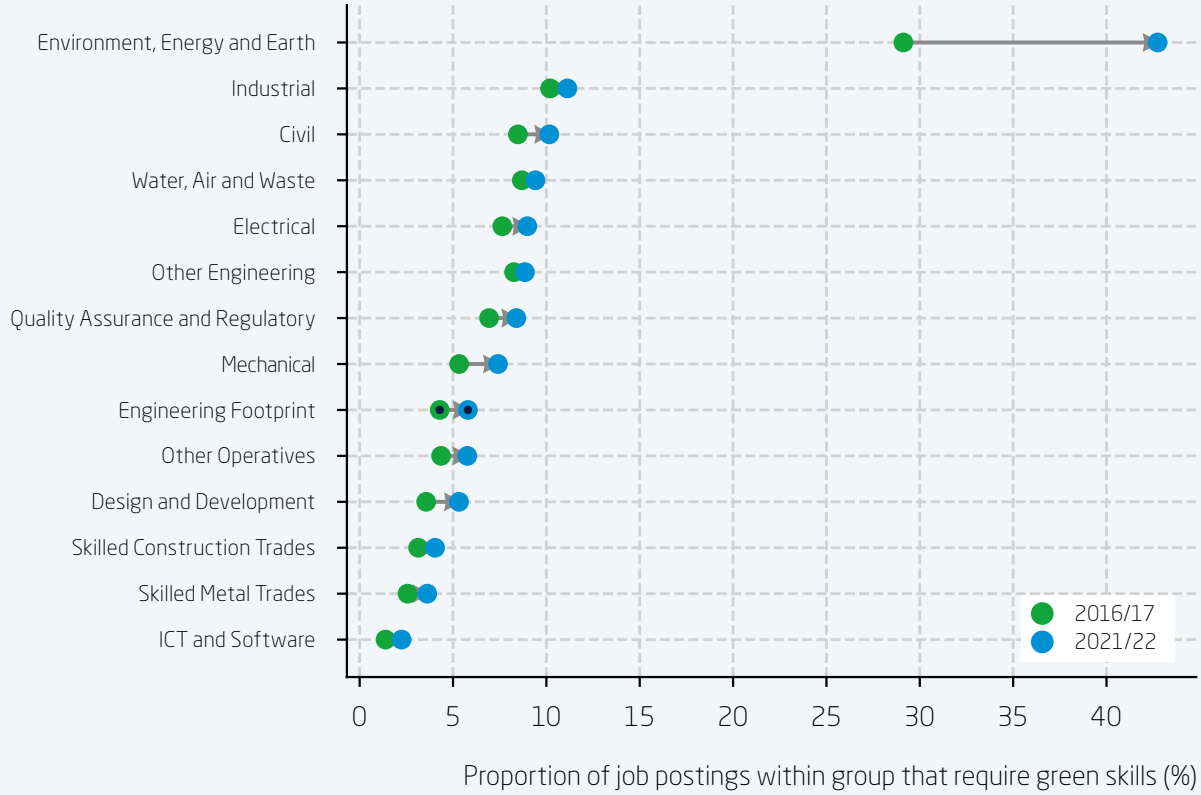
6.2 Green skills in the engineering footprint

This 'greening' of the necessary skills required in the occupations of the engineering footprint is seen across all thematic career groups, albeit to varying degrees. Figure 45, shows the proportion of postings within each group that require green skills and how this has changed relative to 2016/17. Unsurprisingly, the environment, energy and earth sector, which includes a range of environment professionals such as 'environmental scientists' and 'environmental compliance specialists', is the 'greenest' group with the highest concentration of green skills. Moreover, it has also seen the largest green skill demand growth, increasing from 29% to 43%. Industrial and civil follow with both at 11.5%, while groups including mechanical, ICT and software, and design and development experiencing the largest proportional increases in green skill prevalence, albeit from a relatively low level in the case of ICT.

[21] While 6.1% of postings related to the engineering workforce required green skills it is important to remember the relative weightings of the different thematic career groups. For example, ICT has the largest share of postings but relatively few require green skills. Excluding ICT from the footprint, approximately 10% of engineering postings require green skills.

Figure 45. Growing demand for green skills

Thematic career grouping, UK, Oct-Sep 2016/17 – Oct-Sep 2021/22



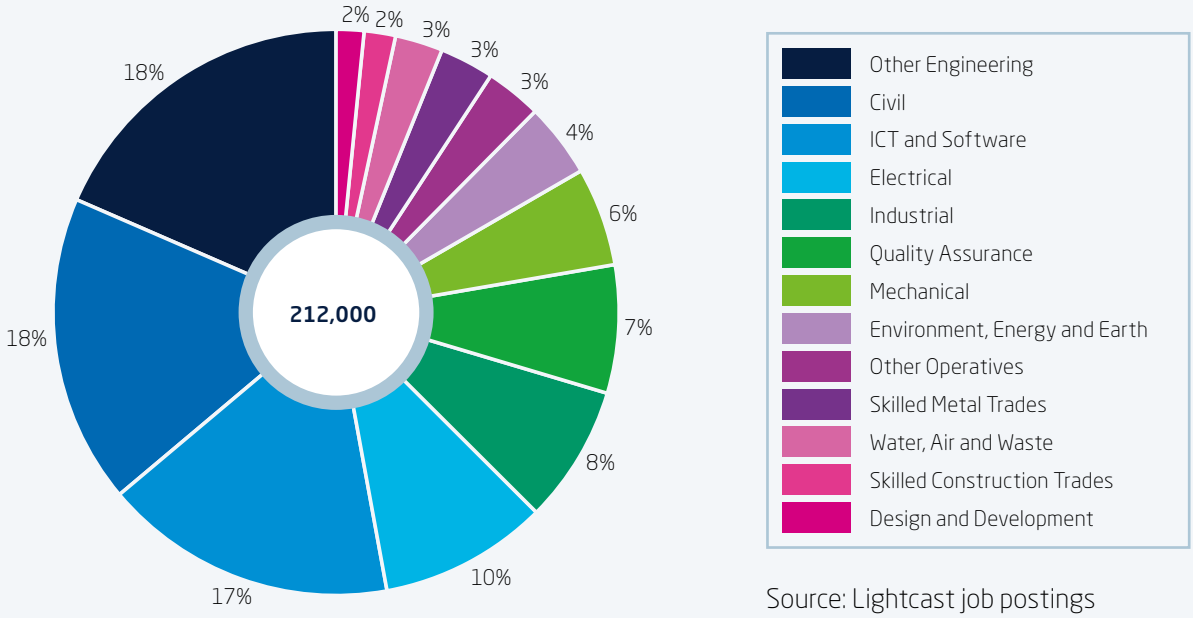
Source: Lightcast job postings

In absolute terms, Figure 46 shows that the civil engineering and 'other' engineering (unspecified) thematic groups account for the largest shares of all engineering postings requiring at least 1 green skill, 18% respectively. The top specific green skills for the engineering footprint can be found in sections 6.4 below.

Within the civil group, geotechnical engineers, quantity surveyors and lead/site/principal engineers are the top job titles requiring greens skills. This might suggest that an awareness and understanding of environmental practices, standards and regulations is particularly valued for more experienced roles in this career space. For the diverse 'other' engineering group, maintenance engineers, production operatives and environmental engineers are the largest role groups requiring green skills in this category.[22] It is also interesting that ICT, the thematic group with the least proportional demand for green skills, is the third largest in absolute terms by virtue of its overall size, accounting for 17%. Top job titles requiring green skills from this group include software engineers, systems engineers and data analysts.

[22] Other engineering is a diverse group which includes a host of engineering roles, many of whom are in emerging areas and often not easily classifiable into other engineering SOC codes.

Figure 46. Proportion of all job postings requiring 'green' skills
Thematic career grouping, UK, Oct 2021 – Sep 2022

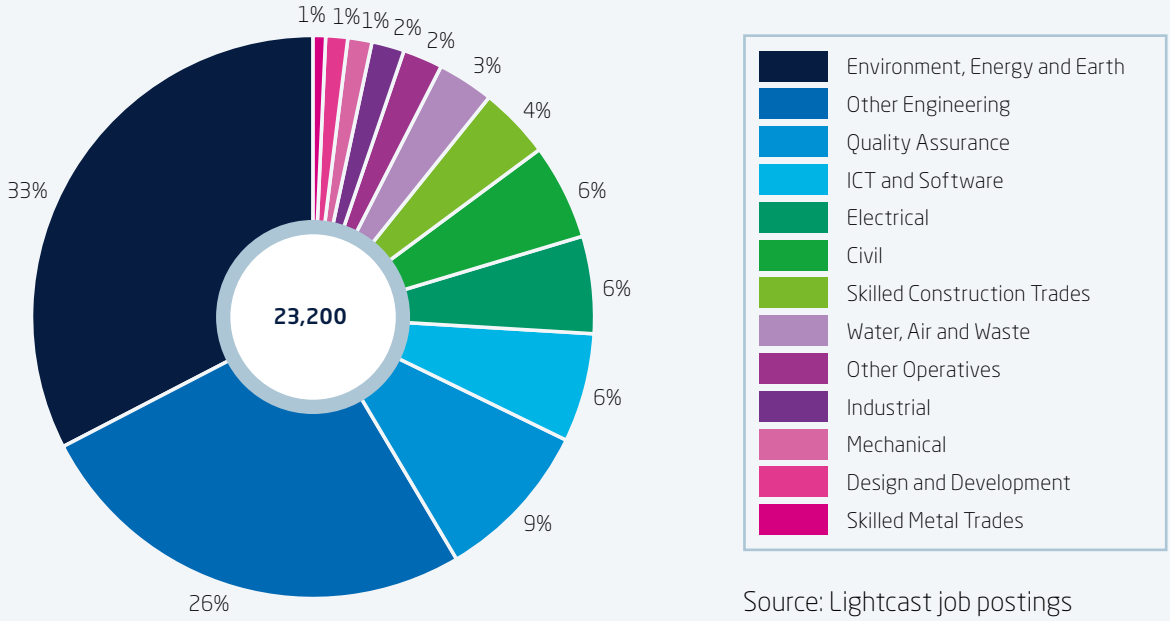


Source: Lightcast job postings

With respect to green job titles, the largest numbers are found in the environment, energy and earth category, approximately 33% or 7,600, as shown in Figure 47. Environmental consultants, environmental health officers and environmental/energy managers are the job titles within this group that account for the largest share of green jobs.

The 'other' engineering category is the next largest accounting for 26% of green job titles. As mentioned previously, this group includes a diverse mix of engineering occupations not elsewhere classified and as such, it includes a large share of the newer engineering disciplines, with environmental engineers, renewable energy engineers and wind turbine technicians the most frequently occurring green job titles in this category.

Figure 47. Proportion of all 'green' job title postings
Thematic career grouping, UK, Oct 2021 – Sep 2022



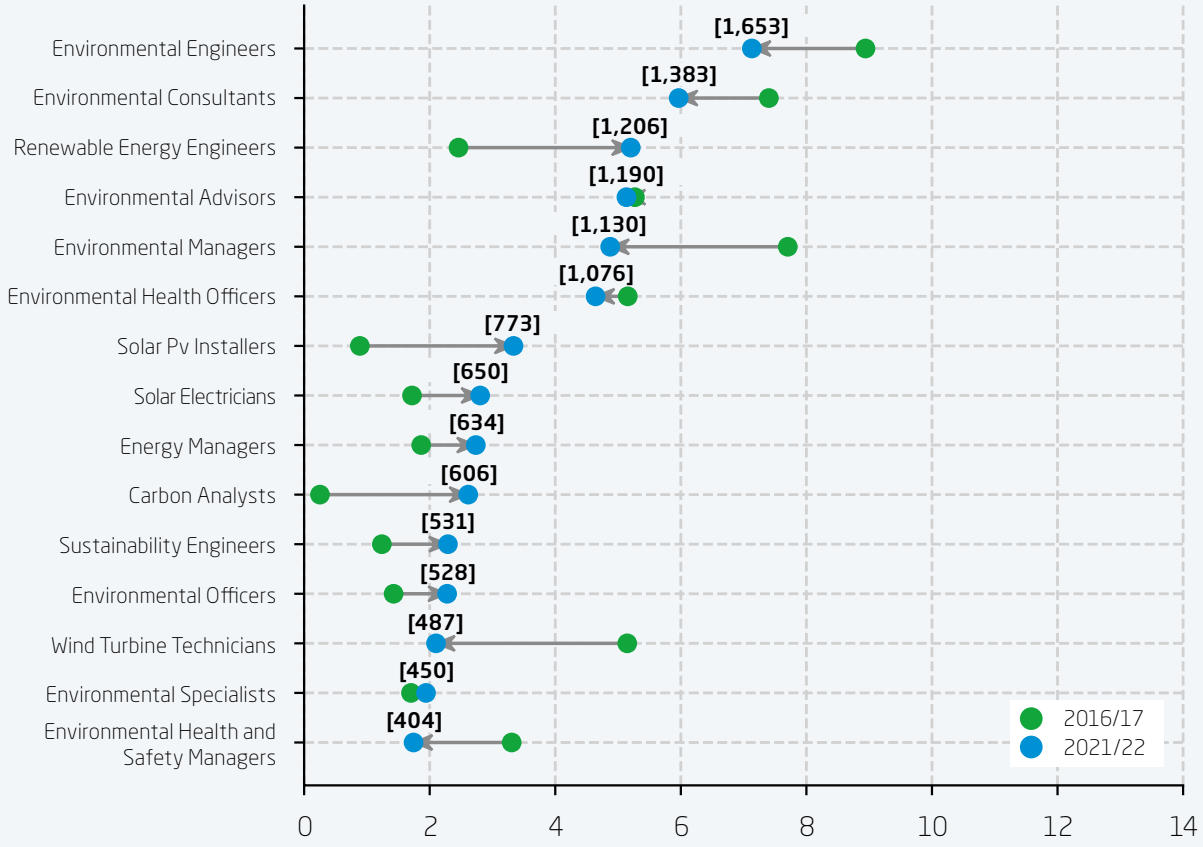
Source: Lightcast job postings

6.3. Green job titles within the engineering footprint

Environmental engineers, environmental consultants and environmental advisors were the three largest green job titles advertised in the engineering footprint between October 2021 and September 2022, accounting for 7.1% (1,650), 6% (1,380) and 5.2% (1,200) of all green job titles respectively (Figure 48). This suggests a high demand for green design solutions as well as quality strategic advice on issues relating to the environment and eco-friendly practices.

Figure 48. Top 15 green jobs and change over time

Engineering footprint, UK, Oct-Sep 2016/17 – Oct-Sep 2021/22



[Bracketed values are the absolute number of engineering footprint postings with green job titles in 2021/22]

Source: Lightcast job postings

Interestingly, while most of these job titles have grown in absolute terms over the last 5 years, the shares of some of the relatively larger roles have proportionately declined as newer, more specific, green job titles have emerged. Among the top 15 jobs, the strong growth in renewable energy generation, and specifically jobs titles related to solar energy, is particularly pronounced. This increase in demand reflects the growing share of the UK's overall energy production which is generated through renewable sources. Distinct from traditional energy production methods, renewable energy requires different specialised skills to design, install and maintain its necessary infrastructure and systems.

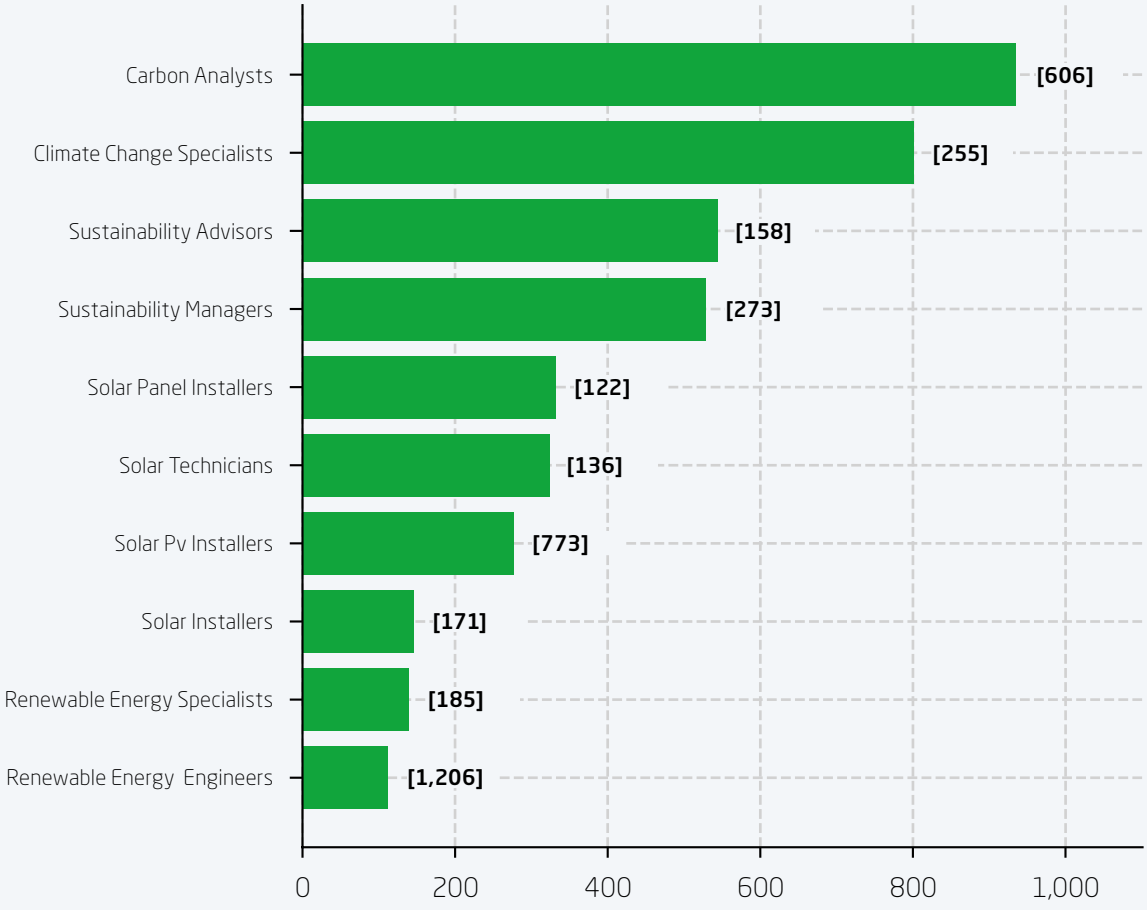
Some advertised green job titles in the footprint have also declined in absolute frequency, such as wind turbine technicians (490 jobs advertised in 2021/22 compared to 630 in 2016/17). While lower demand may be part of the reason, it may also be that employers are now recruiting for similar positions using different advertised job titles, such as renewable or wind energy engineers. A lower number of postings may also suggest that these types of jobs are becoming more established and churn of employees in these positions is relatively low.

Perhaps the most notable change in the composition of green job titles, however, is the shift towards carbon measurement and sustainability management. As shown in Figure 49, the share of green job titles relating to carbon analysts has grown by almost 930% relative to 2016/17, accounting for 2.6% of all advertised green job titles over the last 12 months (600 job postings advertised). While relatively unheard of just a few years ago, some engineering companies are now actively seeking these roles and associated skills to help them measure and reduce the environmental impact of their work and outputs, in line with Environmental, Social and Corporate Governance (ESG) regulatory changes. Similarly, this can explain the continued growth in demand for specialist advisory roles on issues relating to climate change and sustainability.

In more practical occupational fields, renewable engineering and energy roles are also found to be growing quickly within the footprint (particularly solar-related roles as alluded to above).

Figure 49. Fastest growing green job titles

Engineering footprint, UK, Oct-Sep 2016/17 – Oct-Sep 2021/22 (%)



[Bracketed values are the absolute number of engineering footprint postings with green job titles in 2021/22]

Source: Lightcast job postings

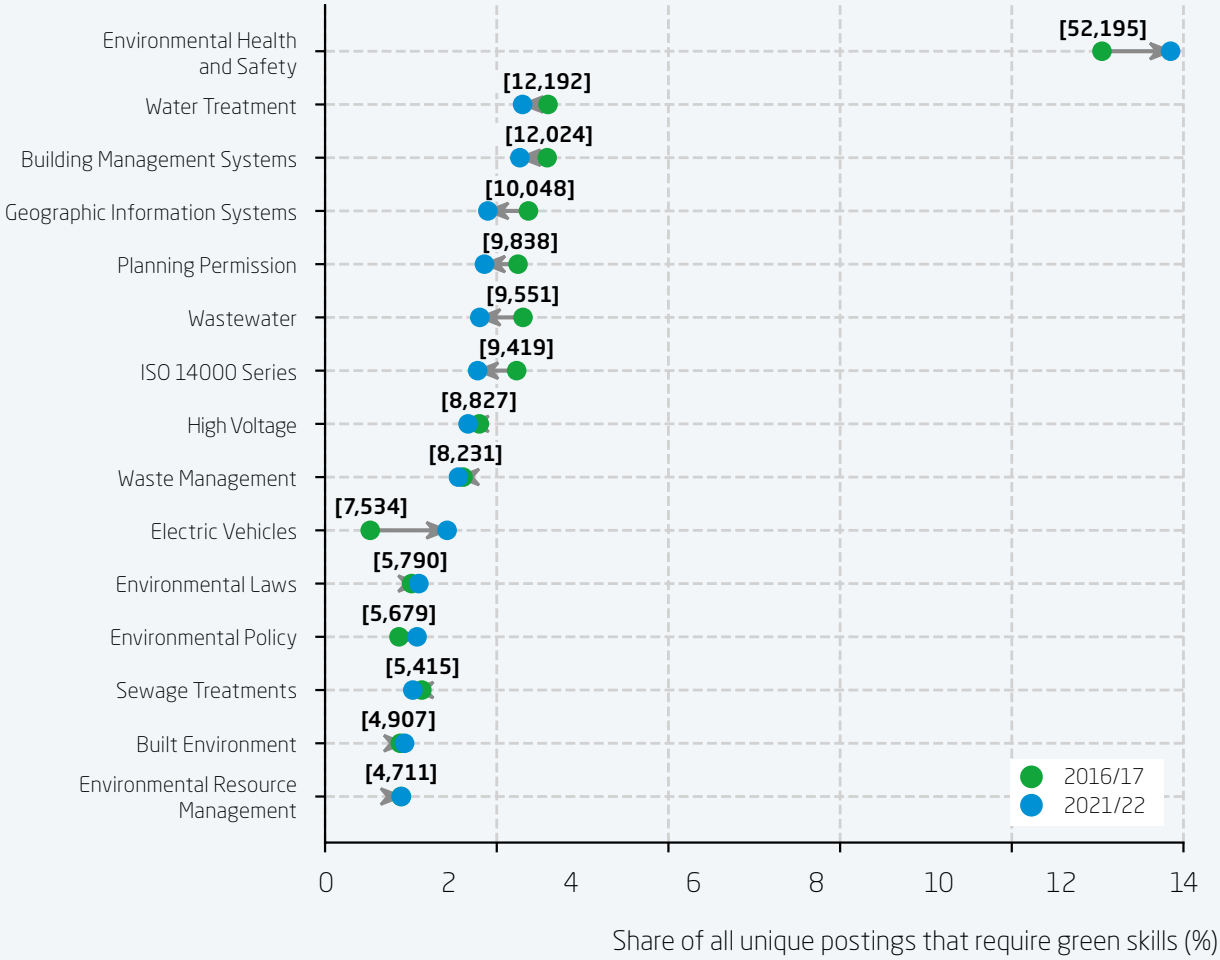
6.4 Green skills over time within the engineering footprint

Figure 50, shows the top 15 most frequently occurring green skills within the engineering footprint and how their frequency has changed relative to 2016/17 levels. Looking at these, it is interesting that very few are particularly common across all advertised engineering jobs that require green skills. In other words, although there are many green skills sought after across the footprint's occupations, they remain, in many cases, quite specific to their career/subject area.

Being more general in nature, Environment Health and Safety (EHS) is the only clear outlier in this regard. It is the most prevalent green skill in the engineering footprint, appearing in over 1.4% of all postings or almost 25% of all job postings requiring green skills (52,000 job postings). While the skill principally concerns the practical aspects of protecting the environment and maintaining the health and safety within an occupation, from an environmental standpoint, it can also be interpreted as including systematic organisational approaches to complying with environmental regulations. Other top skills relate to water and waste management, knowledge of environmental law and regulation (incl. ISO 14000),[23] efficient building management systems and environmental policy, amongst others. These top green skills in the engineering footprint are also broadly aligned with the composition of the top green skills from job postings for all occupations in UK economy, reflecting their more general nature.

Figure 50. Top 15 green skills and change over time

Engineering footprint, UK, Oct-Sep 2016/17 – Oct-Sep 2021/22



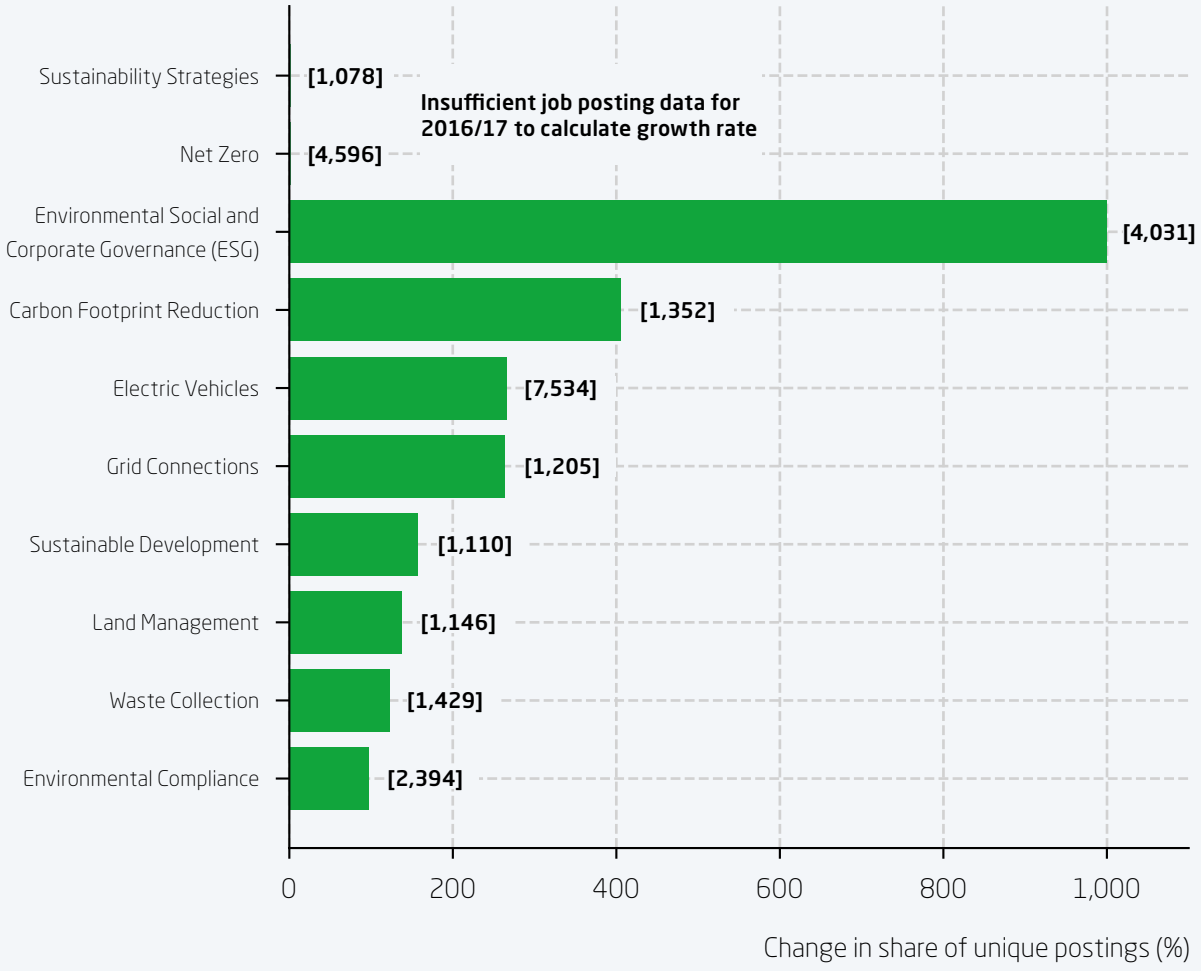
[Bracketed values are the absolute number of engineering footprint postings requiring specific green skill in 2021/22]

Source: Lightcast job postings

[23] ISO 14000 is a family of standards related to environmental management that exists to help organisations minimize how their operations negatively affect the environment; comply with applicable laws, regulations, and other environmentally oriented requirements; and continually improve in the above.

Figure 51. Fastest growing green skills

Engineering footprint, UK, Oct-Sep 2016/17 – Oct-Sep 2021/22 (%)



[Bracketed values are the absolute number of engineering footprint postings requiring specific green skill in 2021/22]

Source: Lightcast job postings

While these skills were the most commonly appearing in 2021/22, most have appeared in proportionately fewer job postings that require green skills compared to 2016/17. Instead, similar to the trends in green job titles, new green skills are emerging at a rapid pace, including skills relating to electric vehicles and achieving net zero emissions[24]. This is further illustrated in Figure 51 which shows the most rapidly growing green skills within the footprint in terms of share.

In addition to a focus on achieving net zero emissions, the exponential growth of ESG reporting and carbon footprint reduction practices highlights how businesses have become increasingly conscious of their environmental responsibility and are actively seeking through their work to measure and effectively mitigate harmful externalities. This is further exemplified by the rapid growth of skills relatedly to sustainability, renewables, and environmental compliance.

Building on these recent changes in green skills composition, it is likely that in the future, as the decarbonisation agenda continues to take hold, an even more diverse and nuanced plethora of green skills will emerge that are increasingly specific to different activities and areas of the economy.

[24] Between October 16 – September 17 there was no job postings within the engineering footprint that included reference to net zero or sustainability strategies. This is likely because the terms only emerged in the last number of years in the context of addressing climate change and environmental science/policy. In comparison, in 2021/22, almost 4,600 and 1,100 postings respectively from the engineering footprint referenced net zero or sustainability strategies.

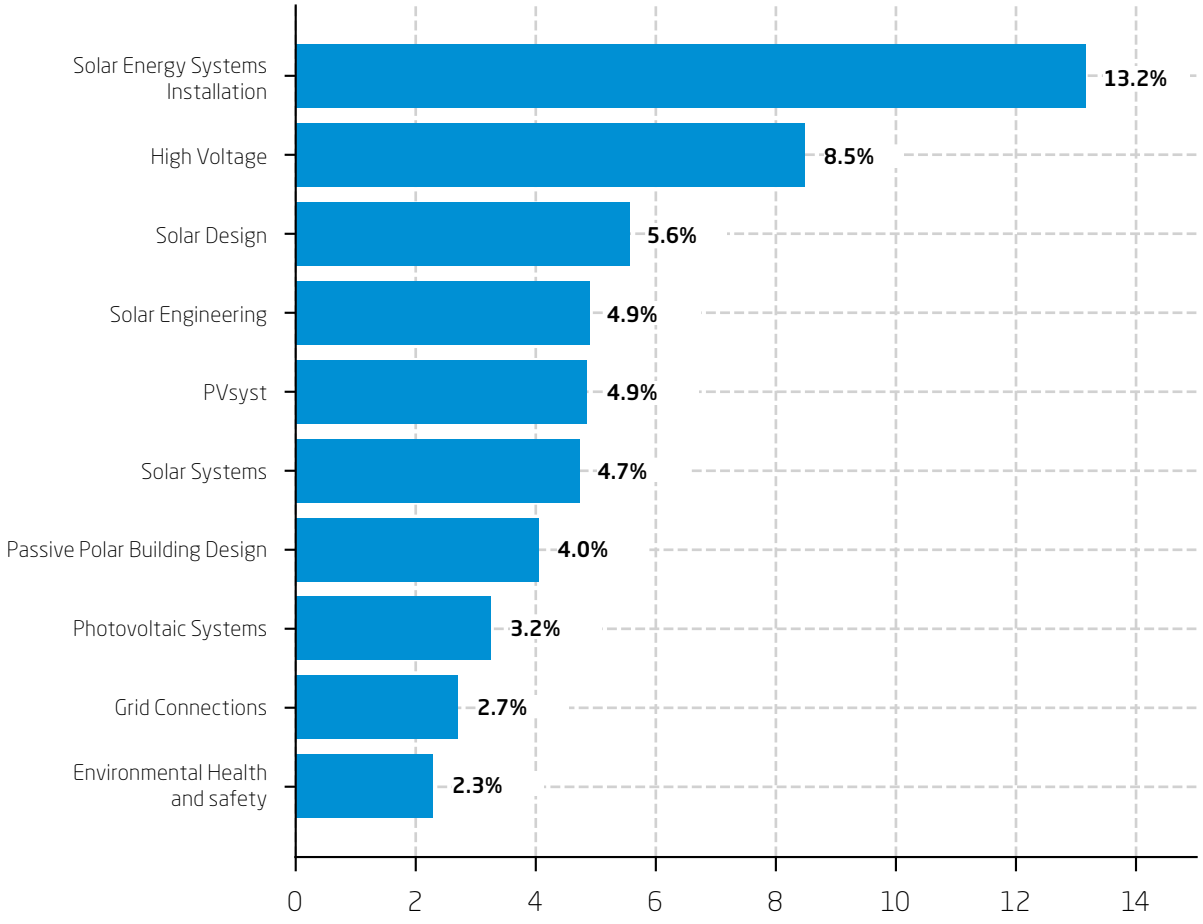
Box 6: Top Green Skills for Solar

As shown above in Figure 49, job titles relating to solar are among the fastest growing green titles in the engineering footprint. Figure 52, provides further insight for this group by showing the top green skills sought after by employers recruiting for solar-related job titles.

This case study also serves to illustrate the degree of green skill specialisation within specific occupations. While these are the most important green skills for this field, they are unlikely to be commonly requested elsewhere.

Figure 52. Solar - top 10 green skills

Engineering footprint, solar-related green job titles, UK, Oct 2021 – Sep 2022



Source: Lightcast job postings

Proportion of all solar green job postings (%)

Chapter 7
The regional shape of the engineering footprint

Key Insights

- Consistent with wider UK population and labour market trends, the absolute number of jobs relating to the engineering footprint are most heavily concentrated in London and the South East.
- However, the occupational composition of the engineering footprint is not standard across the UK's regions, with each area having its own unique make-up and relative strengths.
- London and the South East are particularly specialised in ICT and civil roles, while there is more of a mechanical and electrical focus in the south and midlands. Similarly, Scotland has a very high degree of specialisation in environment, energy and earth occupations, whereas skilled trades, industrial and general operative roles are most specialised to Northern England, Wales and Northern Ireland.
- Thames Valley Berkshire, G First (Gloucestershire) and D2N2 (Derby, Derbyshire, Nottingham and Nottinghamshire) are the Local Skills Improvement Plan (LSIP) areas with the highest concentration of engineering jobs.
- The number of engineering jobs in all regions is projected to grow by 2030, with most new jobs being added in the south (South East and South West) and East of England regions.
- While recruitment activity remains concentrated in London and the South East, its proportional share of all engineering job postings has declined significantly since 2016/17 with equivalent rises in shares seen across the more northerly regions of the UK. This suggests that demand for engineering roles is growing faster outside of the capital and surrounding areas.
- Median advertised salaries for engineering-related positions are highest in London and the South East (driven by high share of ICT roles) but are also significantly higher than the regional average everywhere.

While much of the analysis in this report has been conducted at the national level, it is important to emphasise that the composition of the engineering profession is not homogenous across the UK. This chapter will therefore endeavour to uncover some of the key trends and relative strengths for engineering emerging across regions.

The majority of the analysis is conducted at the UK NUTS1 regional level[25]. However, where possible, supporting complementary analysis is also included to cover Local Skills Improvement Plan (LSIP) areas for England and the NUTS 2 regional level for the devolved nations of Scotland, Wales and Northern Ireland, to give additional context. [26, 27]

[25] Note: For job posting analysis it is important to be aware that not all postings give detailed location information about the role beyond that it is located within the UK. For the engineering footprint between October 2021 and September 2022 detailed location information is available for approximately 70% of relevant postings (approx. 2,550,000).

[26] **Statutory Guidance for the Development of a Local Skills Improvement Plans (LSIPs)**

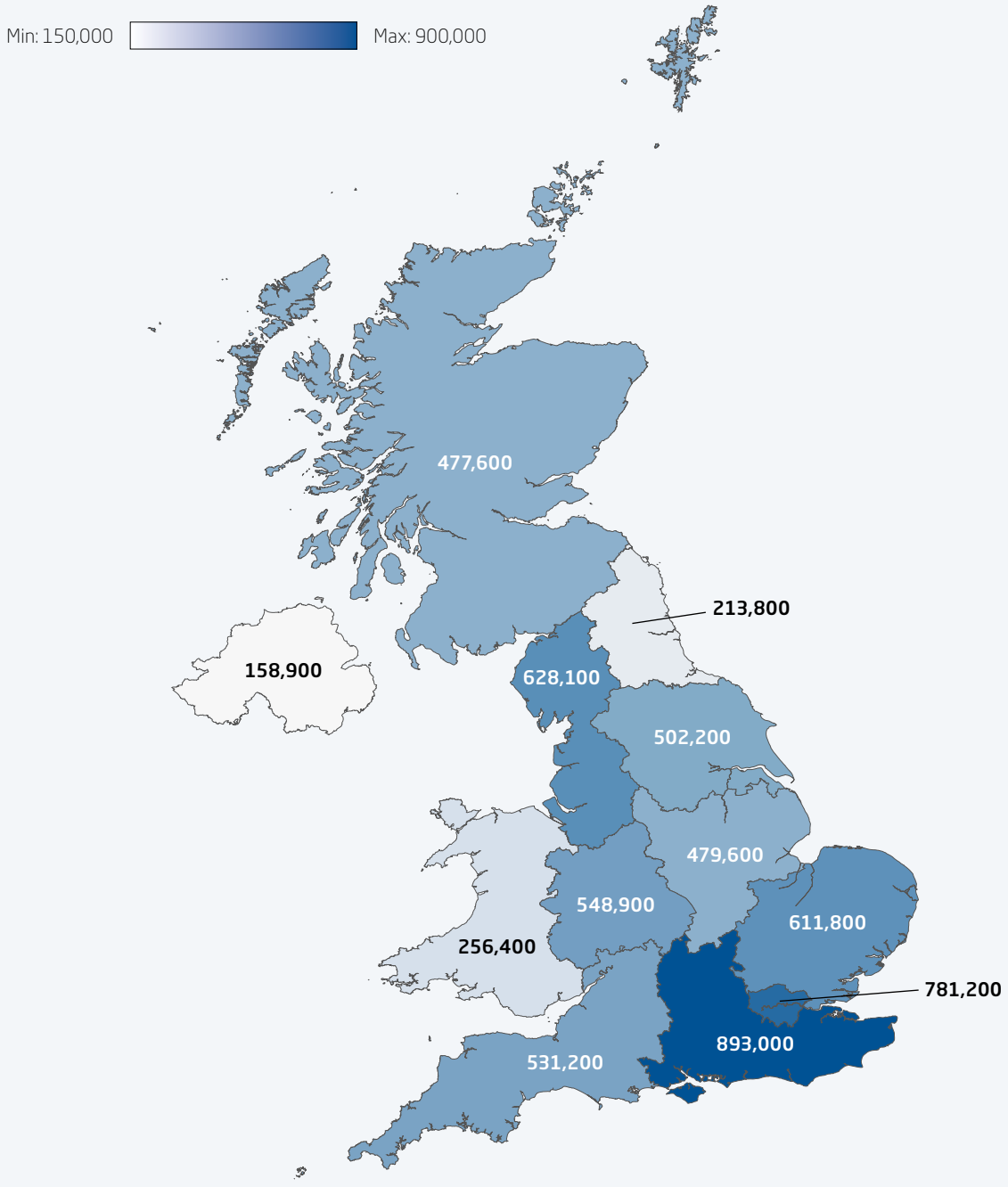
[27] **ONS classification of UK NUTS regions (ITLs)**

7.1 Engineering jobs by regions

Consistent with wider UK population and labour market trends, total job numbers relating to the engineering footprint are most concentrated in the South East and Greater London regions with each accounting for 893,000 (14.7%) and 781,000 (12.8%) jobs respectively (Figure 53).[28]

Outside of the South East, most jobs relating to the engineering footprint are located in England's North West (10.3%). Regions accounting for relatively few engineering jobs, in absolute terms, are Wales, Northern Ireland and North East England. It is worth noting that these are absolute numbers, and not reflective of the regions' relative size. See section 7.2 for location quotient methodology, where this is taken into account.

Figure 53. Regional distribution of engineering footprint jobs
Engineering footprint, NUTS1 regions UK, jobs 2021



[28] The regional job numbers presented in this chapter are based on the average of four quarters of data from the Office for National Statistics Annual Population Survey.

Looking at each region's engineering job composition by thematic career group helps add context to these figures. Figure 54 shows that a large factor behind both London's and the South East's high job counts is their disproportionately high concentration of ICT and software related jobs. In London specifically, almost 48% of engineering footprint jobs are ICT and software related. Moreover, these two regions combined account for over 38% (687,000) of all ICT and software jobs within the footprint.

Figure 54. Occupational composition of UK regions

Thematic career grouping, NUTS1 regions UK, jobs 2021

Source: ONS APS and Lightcast calculations

7.2 Engineering jobs by type across regions

Regions and the devolved nations

In addition to the relative concentration of ICT and software jobs in London and the South East, there are also a number of other notable regional occupational group specialisations, as shown by the location quotient matrix (Figure 55). Lightcast's location quotient methodology uses jobs data to quantify how concentrated a particular occupational group is in a region as compared to the nation, and in doing so reveals what makes the region "unique".[29]

[29] For each of the location quotient matrices, values above 1 mean that a particular thematic group is more concentrated at that 'local' level relative to the national level.

Relative to the national average in 2021 for example, Scotland has a particular specialisation in environment, energy and earth occupations, while the West Midlands is particularly specialised in skilled metal trades and mechanical occupations. The North East and Yorkshire and the Humber regions also appear to have a particular strength in skilled metal. In contrast, London is skewed strongly towards the ICT and civil areas of engineering compared to the UK average, and has a disproportionally low proportion of jobs relating to most other thematic career groups, particularly operatives and skilled trades.[30] Conversely Wales and Northern Ireland have amongst the lowest proportional share of ICT related roles whilst simultaneously having particularly strong specialisations in general operative roles.

Looking at the engineering footprint as whole shows that the Midlands (both east and west) have proportionally the highest concentration of engineering jobs, with London and Northern Ireland accounting for the lowest.

Figures 56 and 57 further deepen this analysis by focusing in on smaller sub-regional geographies (LSIP and NUTS2 regions respectively) to provide more nuanced insights and highlight the extent of regional diversity.

Local Skill Improvement Plan areas (LSIPs - England only)
Considering the LSIP areas first at the overall engineering footprint level shows that the Thames Valley Berkshire region has the highest degree of engineering occupation specialisation, driven in large part by its high concentration of ICT and electrical related roles. G First (Gloucestershire) follows in close second with relative specialisations in almost all thematic career groups.

Considering trends across the other career groups shows that civil is generally evenly distributed across the LSIP regions although specialisation, where it exists, is largely clustered in London and the surrounding South East. Oxfordshire and Cambridgeshire are the most specialised regions for engineering design-related occupations, a trend likely driven by agglomeration effects. Similarly, likely driven by research, Oxfordshire again has amongst the highest degree of relative specialisation of environment, energy and earth roles alongside Cornwall and the Isles of Scilly. Similar to civil, both electrical and mechanical occupations are relatively well distributed across the country although with particular strengths in midland and southern LSIPs, such as D2N2 (Derby, Derbyshire, Nottingham and Nottinghamshire), Solent, Gloucestershire, and Stoke on Trent and Staffordshire.

A clear geographic split is also evident when examining relative specialisations in industrial, operative and skilled trades occupations. These occupations are proportionally most concentrated in the northern half of the country, particularly Cumbria, Hull and East Yorkshire, and the North-East, all areas which have a strong history of heavy industry.

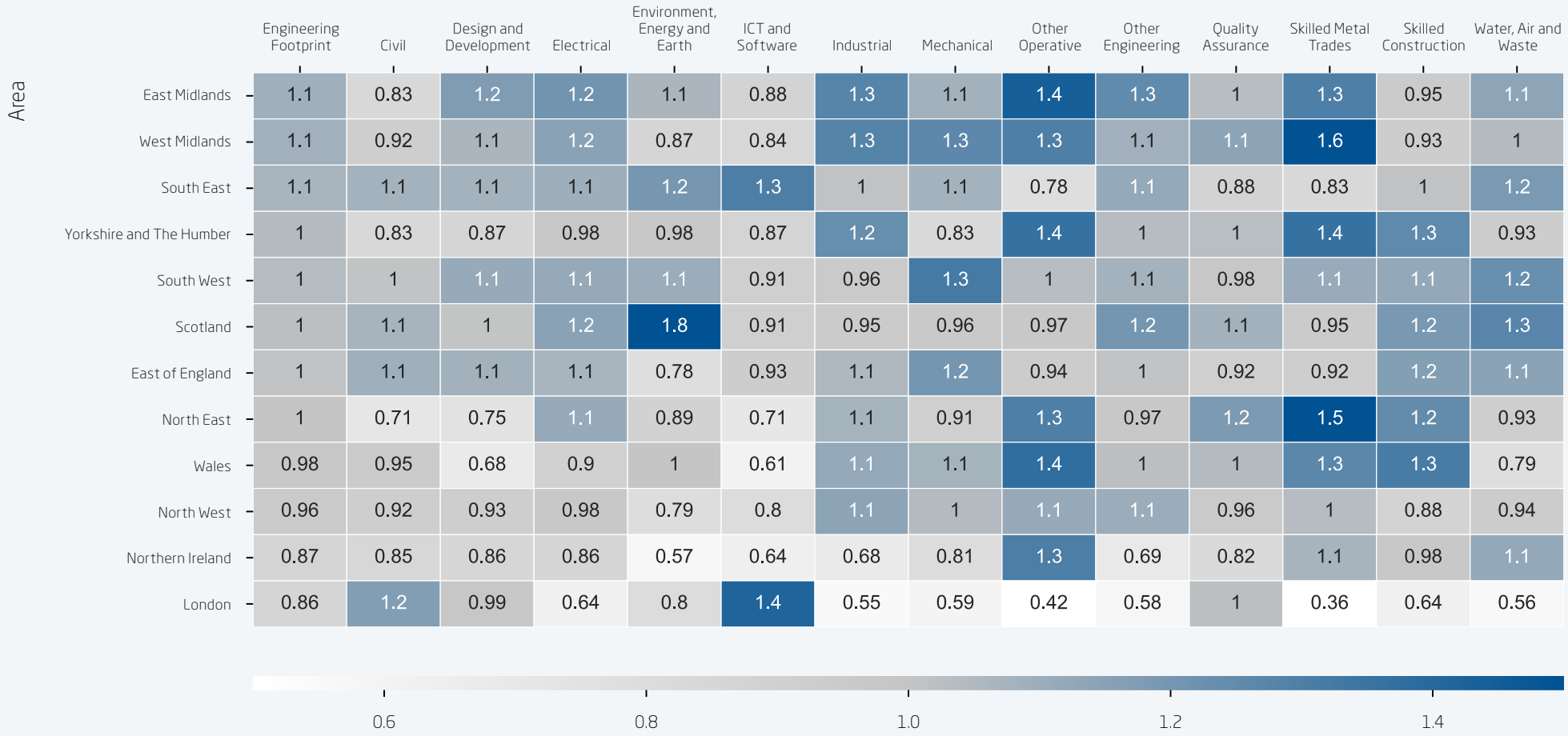
There are also a number of LSIP regions with no significant degree of relative specialisation in any of the engineering footprint's thematic career groups, such as Liverpool and Greater Manchester. This suggests that these local economies are specialised in other occupations outside of those related to engineering.

Devolved Nations
Looking in more detail at the devolved nations of the UK (Figure 57), it is clear that the North Eastern area of Scotland, which includes Aberdeen, has a very high degree of specialisation in almost all thematic career groups, relative to the UK. While a relatively small area in absolute job terms, the high concentration is indicative of the region's established speciality in energy production (oil, gas and renewables) which requires engineers from across a broad spectrum of the profession. This observation is further reinforced by North Eastern Scotland's particular specialisation in environment, energy and earth roles, a characteristic that is also shared by the other regions of Scotland. This suggests Scotland is a major hub for this career group in the UK overall.[31]

[30] Given its large size and unique occupational composition compared to the national average, where London accounts for a disproportionately large (or small) share it can somewhat inflate or deflate the relative occupational specialisations of other regions. Example: skilled metal trades in Figure 55.

[31] Given its size and population density, Northern Ireland is classified as both a NUTS 1 and NUTS 2 region.

Figure 55. Regional distribution of engineering footprint jobs Thematic career grouping, NUTS1 regions UK, 2021, location quotient



Source: Lightcast occupational data

Location quotient – region's occupational specialisation relative to UK average (=1)

Figure 56. Engineering occupational specialisation by LSIP region Thematic career grouping, England LSIP regions, 2021, location quotient

Area	Engineering Footprint	Civil	Design and Development	Electrical	Environment, Energy and Earth	ICT and Software	Industrial	Mechanical	Other Operative	Other Engineering	Quality Assurance	Skilled Metal Trades	Skilled Construction	Water, Air and Waste
Thames Valley Berkshire	1.3	0.95	1.2	1.3	1.2	2.3	1.1	0.84	0.69	1.2	0.94	0.72	0.78	1
G First (Gloucestershire)	1.2	0.98	1.3	1.3	1.2	1.2	1.3	1.3	1.1	1.3	1.1	1.4	1.1	1.4
D2N2 (Derbyshire and Nottinghamshire	1.2	0.89	1.2	1.3	1.2	0.93	1.4	1.2	1.4	1.5	1.1	1.4	0.97	1.1
Cumbria	1.2	1.1	1.4	1.3	0.76	0.51	1.9	1.1	1.5	1.9	1.3	1.4	1.2	1.4
Enterprise M3 (including all of Surrey)	1.1	1.2	1.1	1.1	1.3	1.6	1	1	0.71	1.2	0.9	0.8	1	1.3
Hull and East Yorkshire	1.1	0.85	0.86	0.94	0.9	0.72	1.5	0.96	1.7	1.1	1.1	1.6	1.7	1.1
The Marches	1.1	0.94	0.96	1.1	0.97	0.76	1.4	1.3	1.6	1.1	1.2	1.6	1.1	1.1
North-East	1.1	0.72	0.77	1.2	0.83	0.58	1.3	1	1.7	1	1.3	2	1.5	1.1
Cambridgeshire and Peterborough	1.1	0.99	1.5	1	1.1	1.3	1.2	1.2	0.93	1.2	1.1	0.93	0.87	0.98
Stoke on Trent and Staffordshire	1.1	0.86	1.1	1.3	0.73	0.78	1.2	1.3	1.4	1.2	1	1.7	0.96	1.1
Buckinghamshire	1.1	1.2	1	1.1	1.2	1.2	1.1	1.1	0.84	1.1	0.84	0.93	1.2	1.1
West Midlands	1.1	0.94	1.1	1.1	0.91	0.87	1.3	1.3	1.2	1.1	1.2	1.6	0.86	0.98
Greater Lincolnshire	1.1	0.78	0.91	1.1	1	0.62	1.3	1	2	1.1	1	1.4	1.1	1.1
Leicester and Leicestershire	1.1	0.78	1.3	1.2	1.2	0.92	1.3	1	1.4	1.1	1.1	1.2	0.89	1.2
Worcestershire	1.1	0.87	1.1	1.1	0.71	0.86	1.3	1.1	1.3	0.99	1.1	1.5	1	1.2
Swindon and Wiltshire	1.1	0.92	1.2	1.2	0.94	0.99	0.99	1.3	1.3	1.1	1.1	1.1	0.94	1.1
West of England	1.1	1.1	1.3	1.1	1.1	1.2	0.85	1.4	0.79	1.2	1.1	0.93	0.96	1
Oxfordshire	1.1	1.2	1.6	0.96	1.4	1.2	1.1	1	0.82	1.2	0.92	0.82	1.1	1
Lancashire	1.1	0.93	1	1.2	0.74	0.7	1.3	1.3	1.4	1.5	0.93	1.4	0.96	0.88
Solent	1	0.98	1	1.4	1.2	0.96	1.1	1.3	0.87	1.3	0.92	1.1	0.96	1.4
South Yorkshire	1	0.81	0.86	0.97	0.89	0.87	1.2	0.8	1.2	1.1	1	1.5	1.3	1
South East Midlands	1	0.88	1.1	1	0.74	1	1.1	1.2	1.1	1	0.9	1.1	0.95	0.91
Essex, Southend-on-Sea and Thurrock	1	1.2	0.98	1.2	0.7	0.82	1.1	1.4	0.9	0.94	0.81	0.96	1.4	1.3
West Yorkshire	1	0.81	0.86	0.98	0.94	0.99	1.2	0.75	1.2	1	1	1.2	1.1	0.89
Hertfordshire	1	1.1	1.2	1.1	0.79	1.2	0.89	0.93	0.75	0.93	0.92	0.77	1.1	1.1
York and North Yorkshire	1	0.93	0.87	0.98	1.2	0.77	1.3	0.83	1.3	0.99	0.95	1.2	1.3	0.78
Tees Valley	1	0.74	0.8	1.2	1.2	0.69	1.1	0.92	1.2	1.1	1.2	1.5	1.3	0.91
Heart of the South-West	1	0.99	1	1.1	1.2	0.66	1	1.4	1.1	1.1	0.95	1.2	1.2	1.3
Cheshire and Warrington	1	1	0.92	0.99	1	0.98	1.1	1.1	1.1	1	0.94	1	0.83	0.78
Dorset	0.99	0.94	1	1	0.74	0.87	0.89	1.1	0.94	1	0.87	1.2	1.2	1.3
Kent and Medway	0.98	1.2	0.9	1.1	1.2	0.85	0.95	0.94	0.91	0.95	0.79	0.87	1.3	1.3
New Anglia	0.94	0.99	0.86	1	0.67	0.67	1.1	1.1	1.2	0.93	0.87	0.98	1.2	1.2
Brighton and Hove, E. Sussex, W. Sussex	0.93	0.98	0.94	0.95	1.1	0.97	0.91	1.3	0.72	1	0.87	0.75	0.97	1.1
Greater Manchester	0.93	0.94	0.89	0.92	0.74	0.9	1	0.97	1	0.93	0.92	0.9	0.86	0.96
Cornwall and the Isles of Scilly	0.89	0.99	0.67	0.91	1.5	0.53	0.73	1.2	1.1	0.8	0.69	0.89	1.4	1.5
North of Tyne	0.87	0.67	0.69	0.92	0.73	0.87	0.85	0.78	0.92	0.85	1	0.99	0.97	0.79
Greater London	0.86	1.2	0.99	0.64	0.8	1.4	0.55	0.59	0.42	0.58	1	0.36	0.64	0.56
Liverpool City Region	0.8	0.74	0.78	0.77	0.75	0.64	0.95	0.9	0.94	0.88	0.95	0.87	0.79	0.92

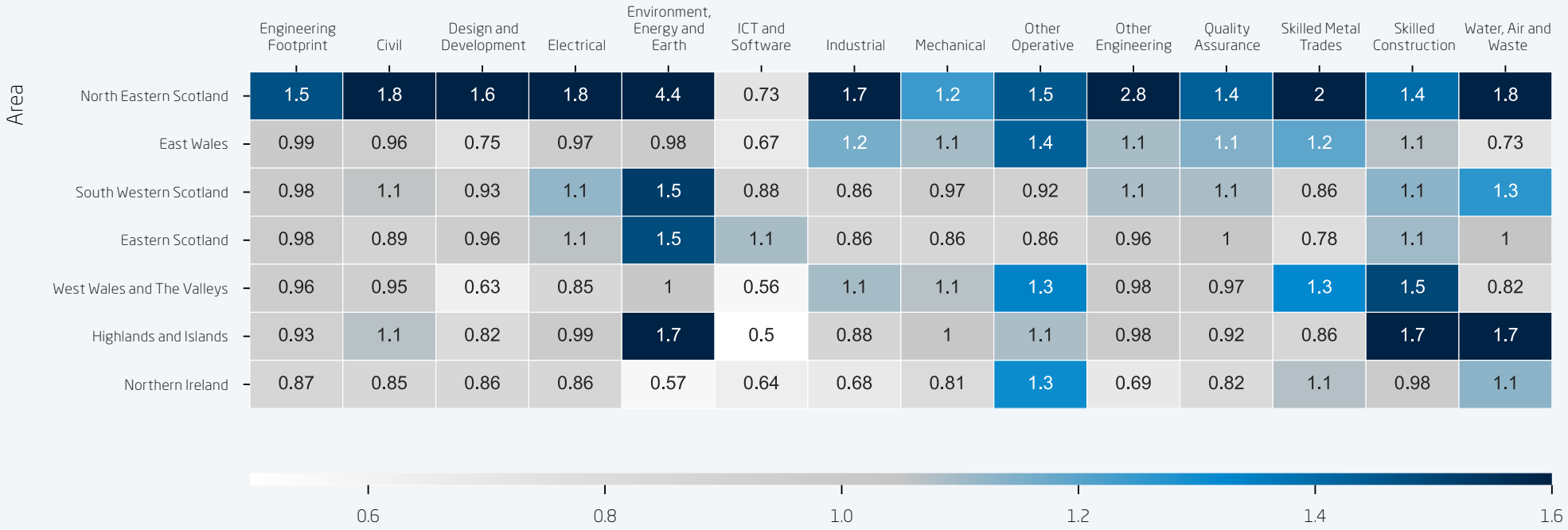
0.6 0.8 1.0 1.2 1.4 1.6

Source: Lightcast job postings

Location quotient – region's occupational specialisation relative to UK average (=1)

Figure 57. Engineering occupational specialisation by NUTS2 region

Thematic career grouping, devolved nations NUTS2, 2021, location quotient



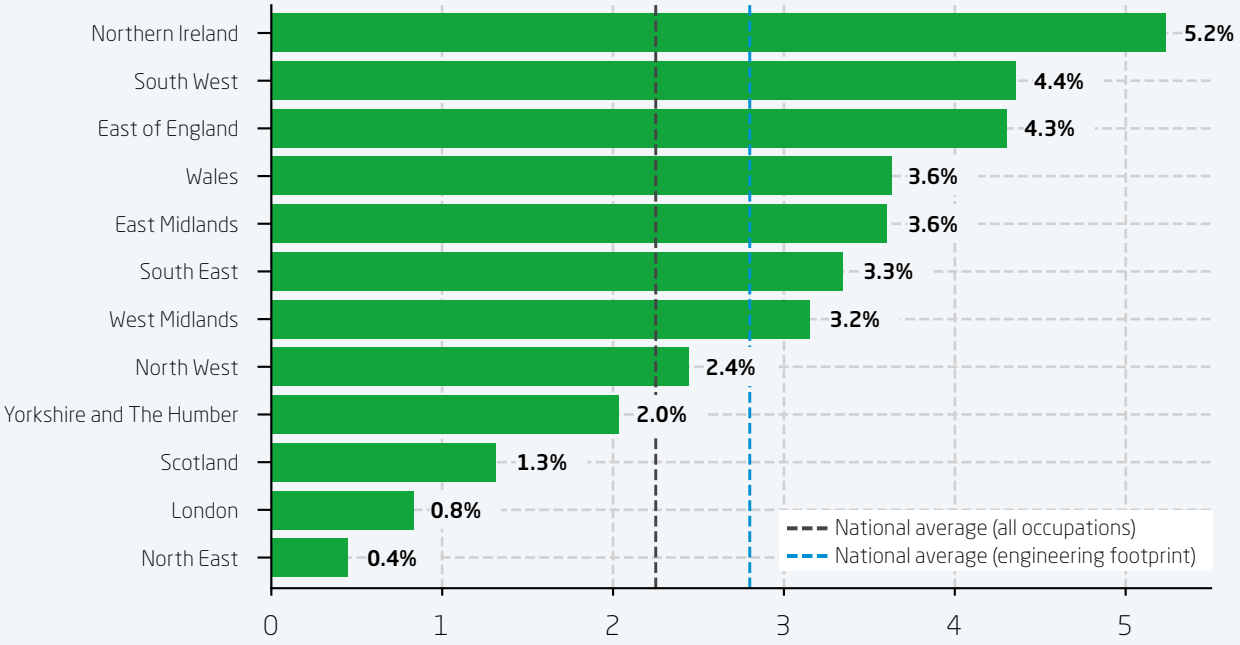
Source: Lightcast occupational data

Location quotient – region's occupational specialisation relative to UK average (=1)

7.3 Jobs projections for engineering roles by region

Looking at job projections for the engineering footprint out to 2030 through a regional lens shows that jobs numbers are expected to grow across all NUTS1 regions, albeit at different rates. Figure 58 shows that Northern Ireland is projected to grow proportionately the most over the period (5.2%) although it is starting from a relatively low base. The eastern and southern areas of England however, are also projected to grow strongly and, as shown in Figure 59 are also expected to contribute 45% of new engineering jobs. At the other end of the spectrum, the North East, London and Scotland are expected to grow proportionally the slowest and add the fewest new jobs to the engineering footprint.

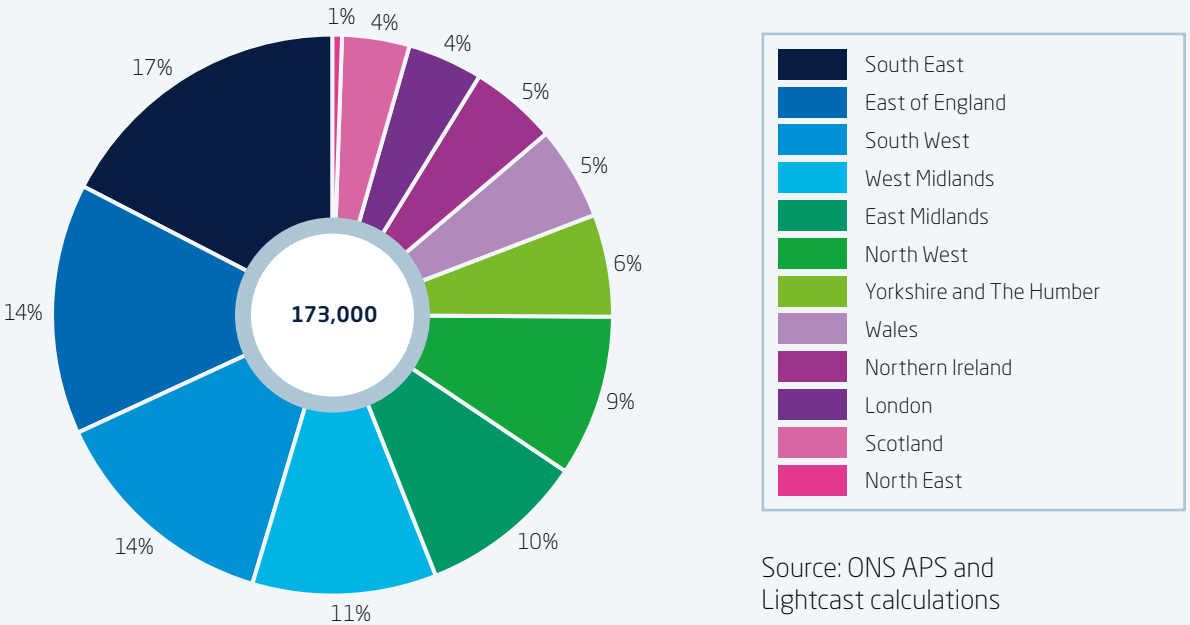
Figure 58. Projected regional growth rates
Engineering footprint, NUTS1 UK, jobs 2021-2030



Source: Lightcast calculations

Growth in Job numbers by 2030 (%)

Figure 59. Regional distribution of new jobs by 2030
NUTS1 UK regions, UK, jobs 2021-2030



Source: ONS APS and Lightcast calculations

[31] Given its size and population density, Northern Ireland is classified as both a NUTS 1 and NUTS 2 region.

7.4 Recruitment activity for engineering roles by region

Similar to the trend of jobs overall, job postings relating to the occupations of the engineering footprint between October 2021 and September 2022, have been most heavily concentrated in the South East of the country, particularly the Greater London area.

Indeed, as shown in Figure 60, London alone accounted for almost 24% of all engineering relating postings, a disproportionately high-level. This can partly be explained by the occupation composition of London's postings (skewed towards ICT and software which are most likely to advertise vacancies online) but is also likely to be the result of employers citing 'London' in the job description, when in reality, the job itself might be situated just outside of London in the wider South-East region or indeed, sometimes advertised as 'London or remote'.

Considering engineering job posting distribution at an LSIP and devolved NUTS2 regional level, the gap between London and the rest of the UK is again striking. In absolute terms, the next largest areas after London are two other major metropolitan areas, Greater Manchester and the West Midlands (Birmingham), reflective of the size of the overall labour markets of these areas.

While recruitment is naturally highest in major urban centres, other smaller regions can have a recruitment scene more geared towards engineering, suggestive of increasing specialisation and/or growth (see Figure 61). In Cambridgeshire and Peterborough for example, over 30% of postings between October 2021 – September 2022, related to engineering-related occupations. Other regions, with above average engineering recruitment activity included West and South Yorkshire, West of England, Thames Valley Berkshire, and Greater London. At the other end of the spectrum, it is clear that the most rural locations across Britain do not have particularly active or concentrated recruitment of engineering roles.

Figure 60. Regional distribution of engineering footprint job postings

Engineering footprint, NUTS1 regions UK, job postings Oct 2021 – Sep 2022

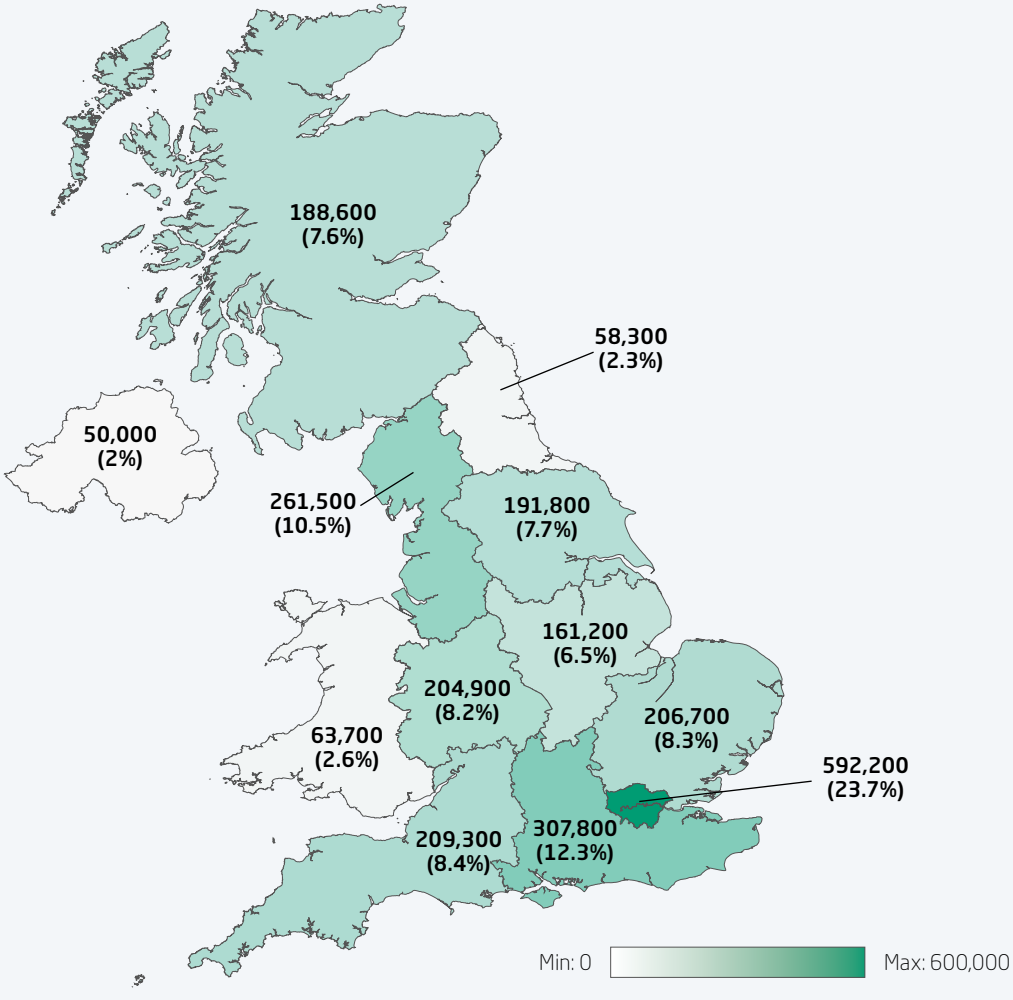
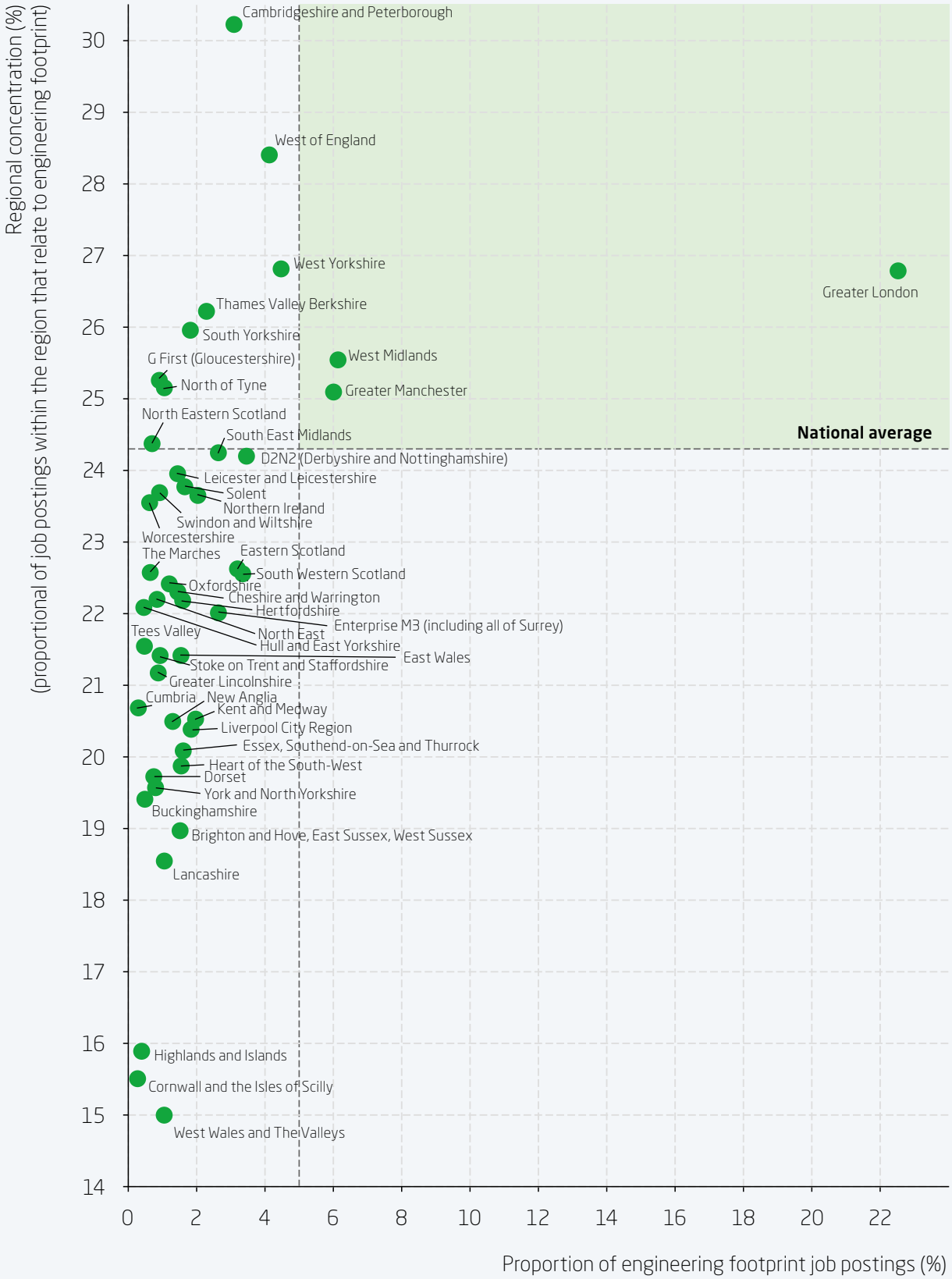


Figure 61. Sub-regional composition of engineering job postings

Engineering footprint, England LSIP and devolved NUTS2 regions UK, Oct 2021 – Sep 2022



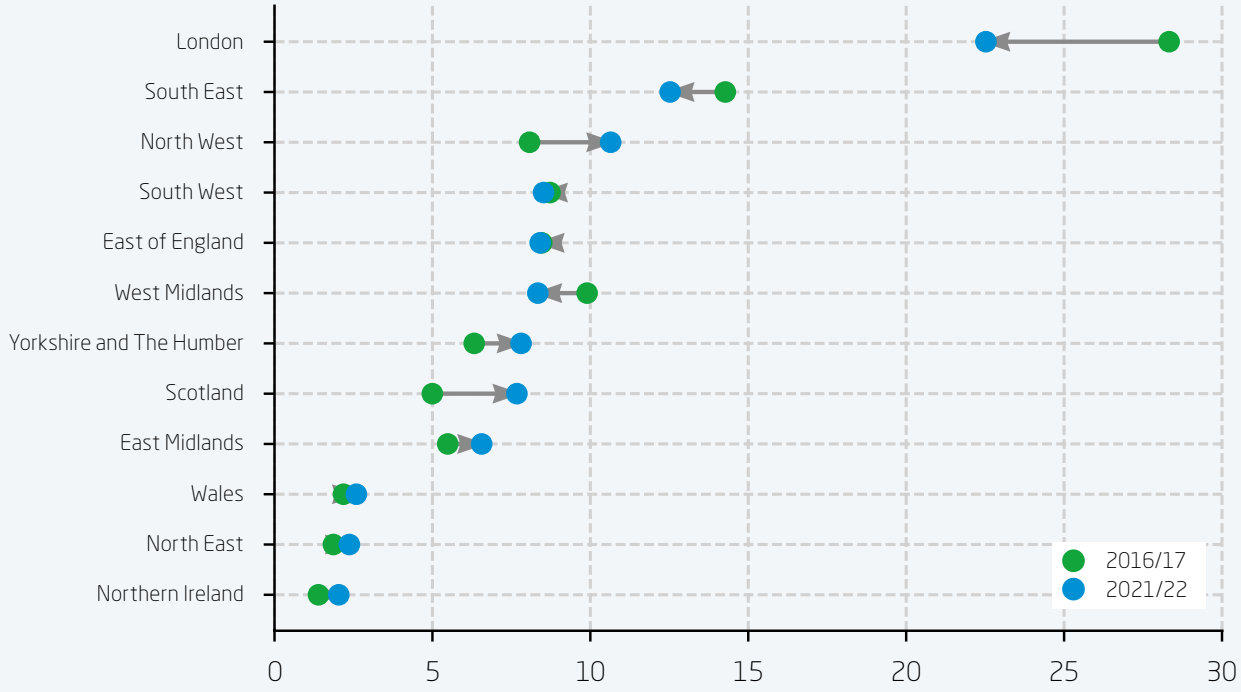
Source: Lightcast job postings

7.5 Change in job postings demand for engineering roles over time by region

While London and the surrounding South East continue to account for the bulk of engineering footprint recruitment activity it is clear from Figure 62, that their proportional share of postings is declining over time. Relative to 2016/17 for example, London's share has fallen by 5 percentage points.

Figure 62. Changing regional concentration of engineering job postings

Engineering footprint, NUTS1 regions UK, Oct-Sep 2016/17 – Oct-Sep 2021/22



Source: Lightcast job postings

Share of total engineering footprint job postings accounted for by region (%)

As London's and the South East's share has reduced, employer demand for engineering occupations and skills has shifted North with equivalent proportional increases seen in recruitment for the North West, Scotland and Yorkshire and the Humber regions. This suggests that engineering-related employers (at least among areas of the footprint) in these regions are either relocating existing operations here or, that they are seeking to grow their engineering workforce capabilities at a faster rate than those in the South-East.

7.6 Median advertised salaries of engineering job postings by region

Median advertised salaries for engineering related roles are highest in Greater London and the South East, as shown in Figure 63. In part this is reflective of typical labour market trends where average costs-of-living are higher in the capital and surrounding areas. However, it is also likely to be the result of the disproportionately high share of ICT and software roles concentrated in the region, a group who typically command the highest average salaries (Section 3.2). Engineering vacancies in the UK's North West also offers high salaries, again likely driven by the above average costs associated with large metropolitan areas.

While there are differences in median advertised salaries across the UK, engineering roles in all regions offer median salaries above that of the national average. Moreover, as shown in Figure 64, in every region advertised salaries are at least 20% higher, with London and Scotland over 30%.

Figure 63. Median advertised salary of engineering job postings

Engineering footprint, NUTS1 regions UK, Oct 2021 – Sep 2022

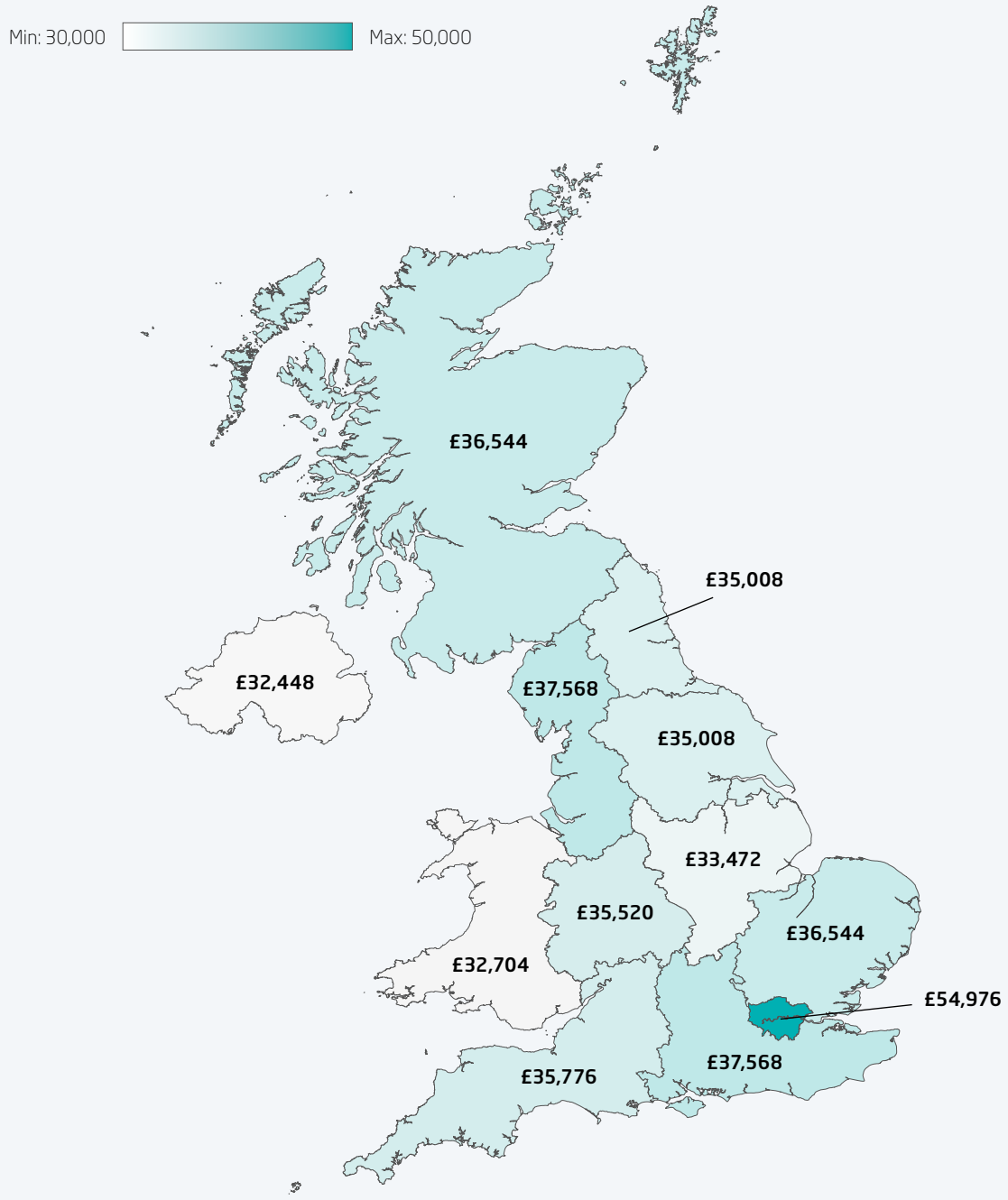
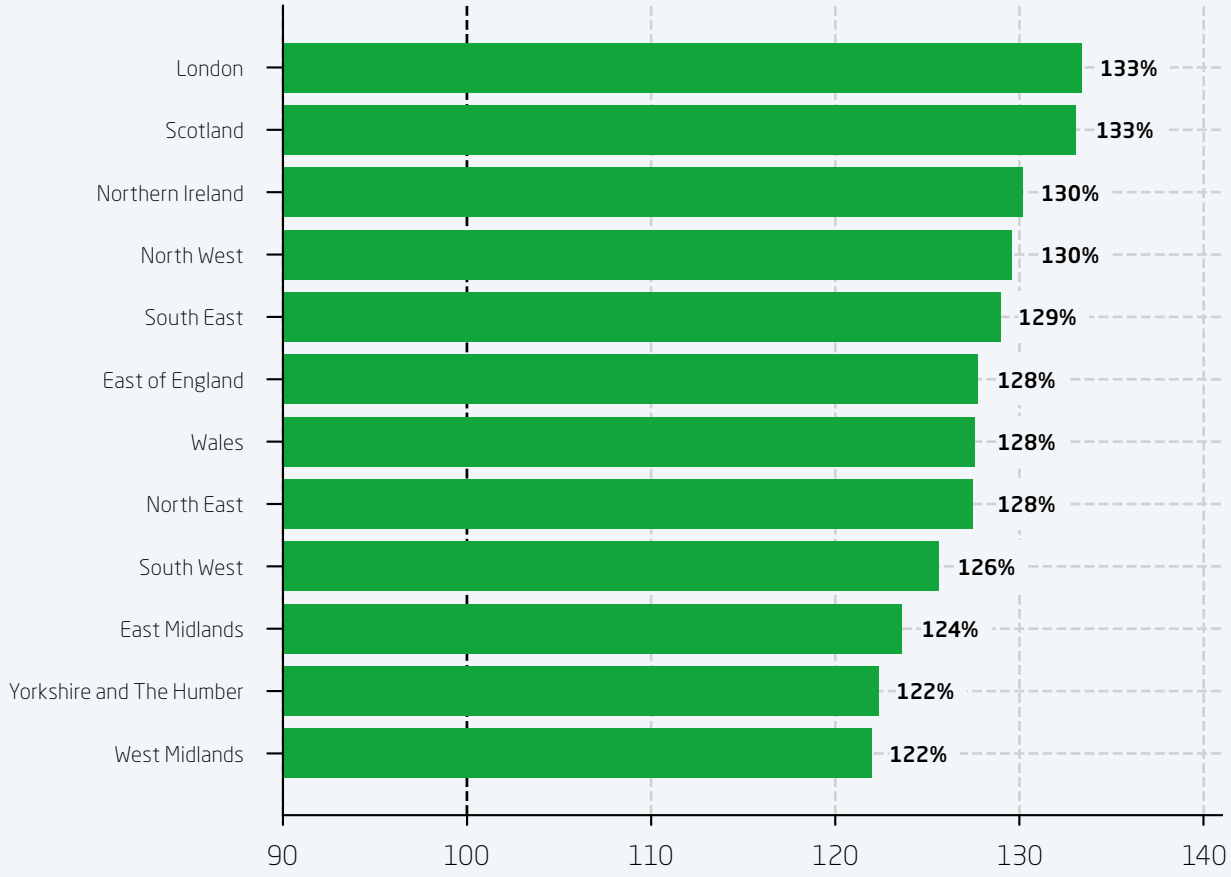


Figure 64. Median advertised salary of engineering job postings relative to regional average

Engineering footprint, NUTS1 regions UK, Oct 2021 – Sep 2022



Source: Lightcast job postings

Annexe 1
Skills snapshots for each engineering thematic grouping

This annexe presents a skill snapshot for each of the 13 engineering thematic grouping. Each snapshot includes the most popular specialist and software skills most sought after by recruiting employers between October 2021 and September 2022 in the UK. It also shows the top SOC occupations within each group that employers have been recruiting for over the past year.

Note:
The 'specialist' skills lists included in these snapshots have been extracted by their relative importance to each of the thematic career groups and then ranked by the frequency with which they appear in job postings related to that group.

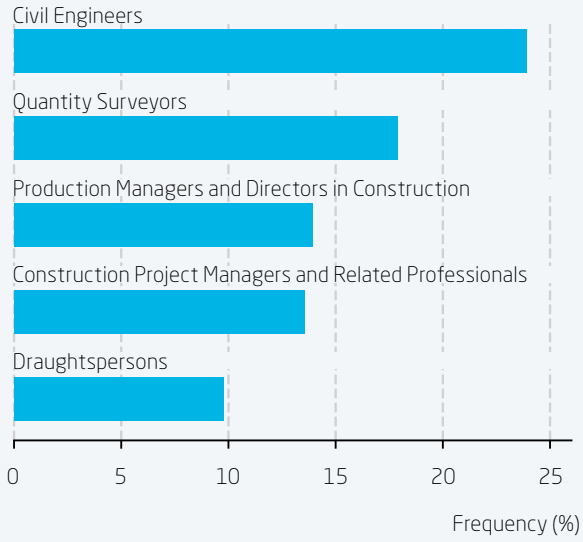
For some groups, software skills may overlap with specialist skills, depending on prevalence. For the ICT and Software group, all of the top software skills are also in the top specialist skills and so, the software skill chart has been omitted.

Skills snapshot

Civil

Top SOC occupations

Civil, UK, Oct 2021 – Sep 2022



Key job posting figures

(Oct 2021 – Sep 2022)

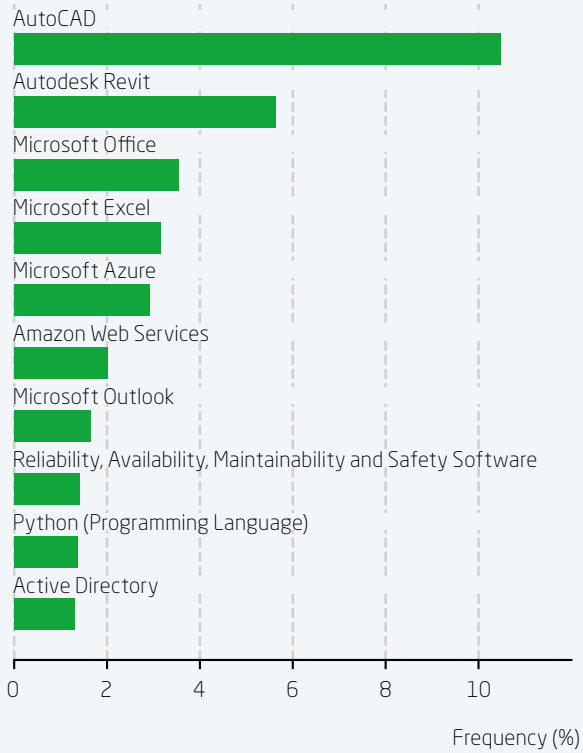
Unique postings:	**368,300**
Median advertised salary:	**£44,992**

Key labour force figures

Jobs 2021:	**559,300**
Job growth (%) 2030:	**3.2%**

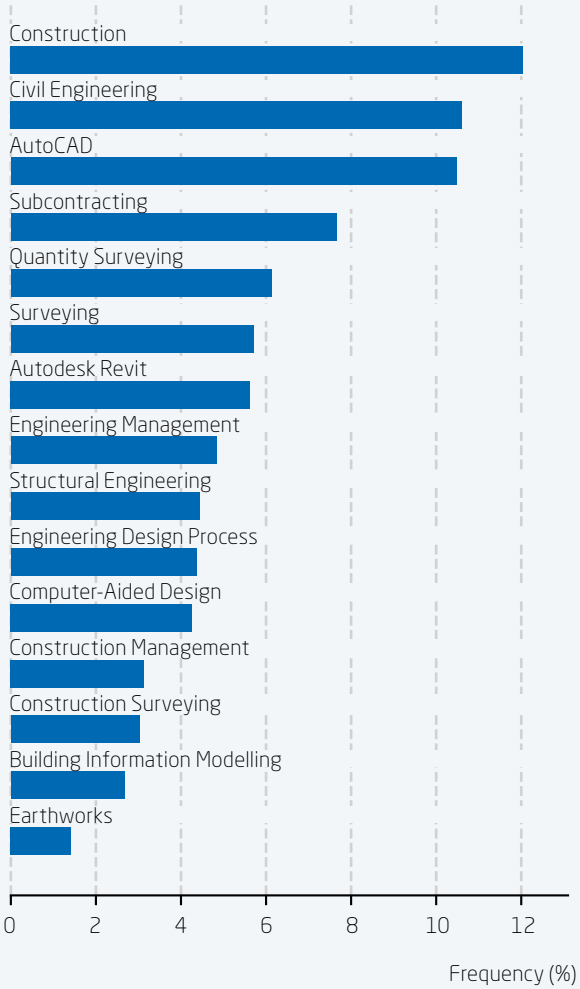
Top 10 software skills

Civil, UK, Oct 2021 – Sep 2022



Top 15 specialist skills

Civil, UK, Oct 2021 – Sep 2022



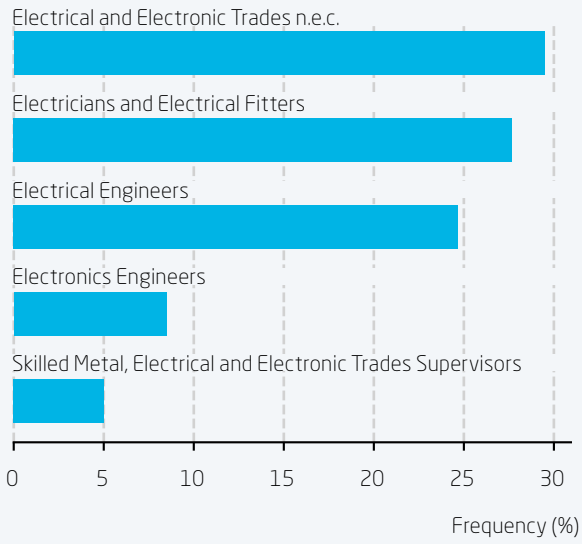
Source: Lightcast job postings

Skills snapshot

Electrical

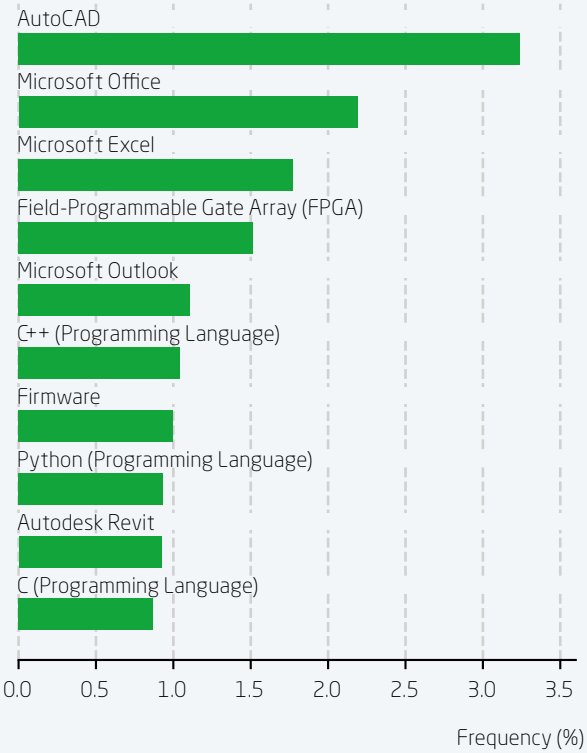
Top SOC occupations

Electrical, UK, Oct 2021 – Sep 2022



Top 10 software skills

Electrical, UK, Oct 2021 – Sep 2022



Key job posting figures

(Oct 2021 – Sep 2022)

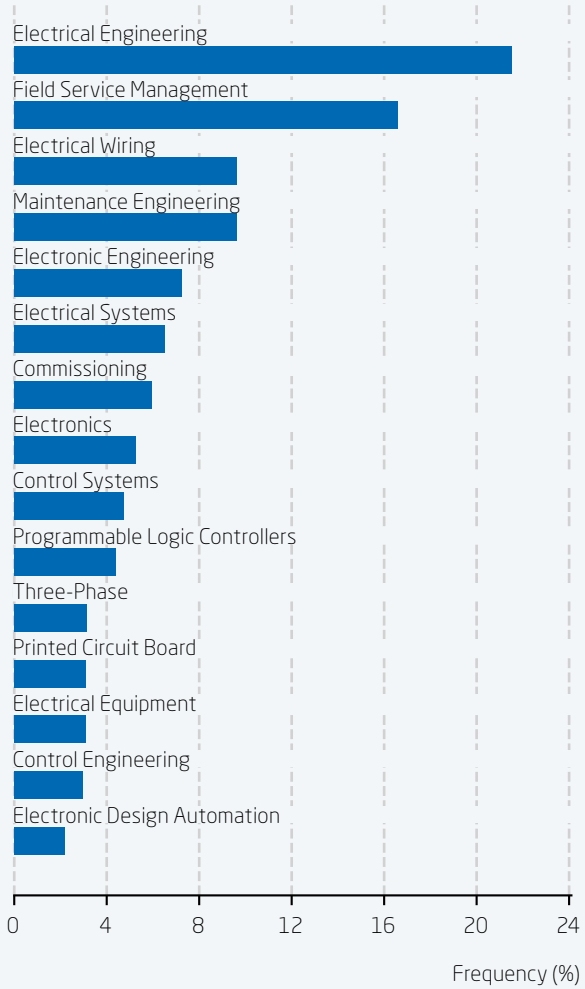
Unique postings:	**227,400**
Median advertised salary:	**£35,776**

Key labour force figures

Jobs 2021:	**412,100**
Job growth (%) 2030:	**2.6%**

Top 15 specialist skills

Electrical, UK, Oct 2021 – Sep 2022



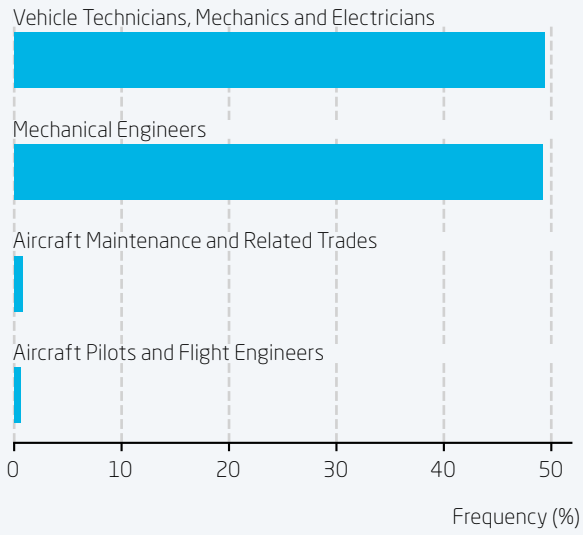
Source: Lightcast job postings

Skills snapshot

Mechanical

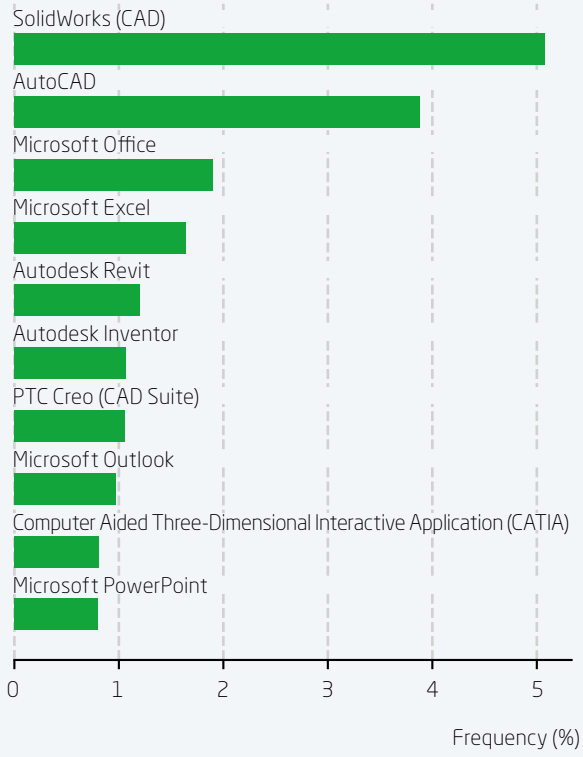
Top SOC occupations

Mechanical, UK, Oct 2021 – Sep 2022



Top 10 software skills

Mechanical, UK, Oct 2021 – Sep 2022



Key job posting figures

(Oct 2021 – Sep 2022)

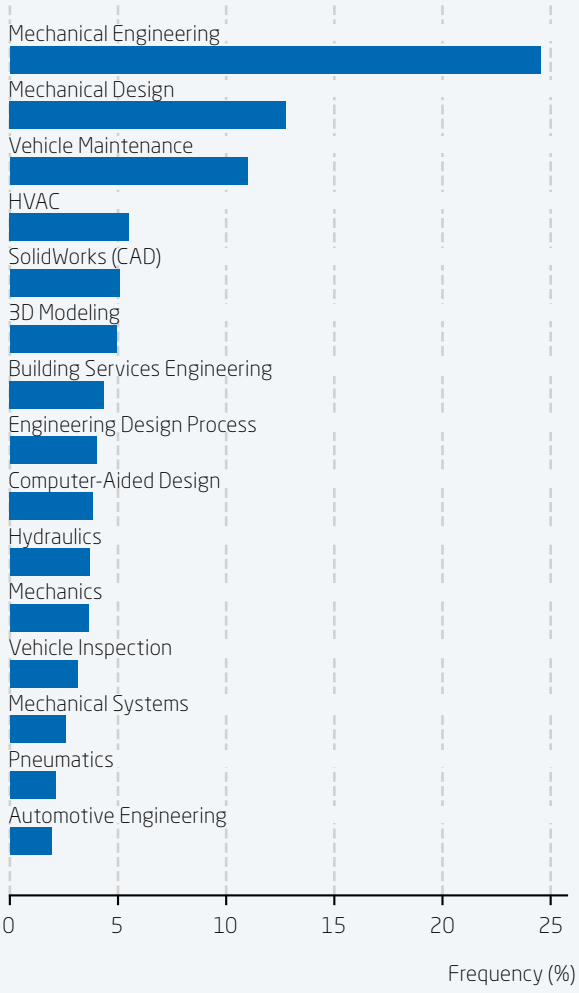
Unique postings:	**161,200**
Median advertised salary:	**£34,752**

Key labour force figures

Jobs 2021:	**318,700**
Job growth (%) 2030:	**2.1%**

Top 15 specialist skills

Mechanical, UK, Oct 2021 – Sep 2022



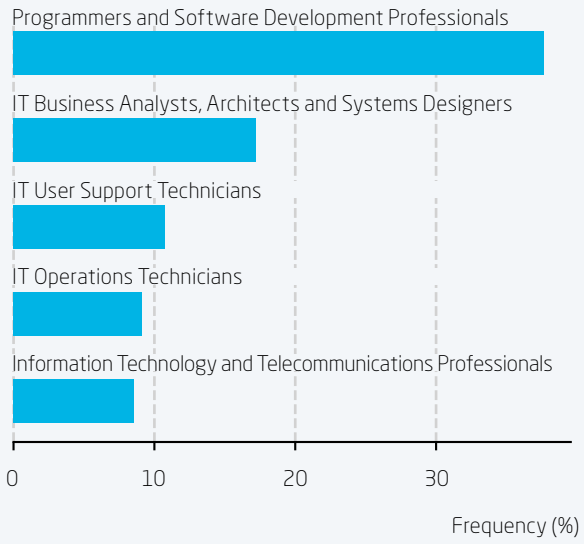
Source: Lightcast job postings

Skills snapshot

ICT and Software

Top SOC occupations

ICT, UK, Oct 2021 – Sep 2022



Top 10 software skills

ICT, UK, Oct 2021 – Sep 2022

Software chart omitted given for this TCG as all software skills are found to overlap with top specialist skills.

This is understandable given the nature of work activities within the ICT and Software group.

Key job posting figures

(Oct 2021 – Sep 2022)

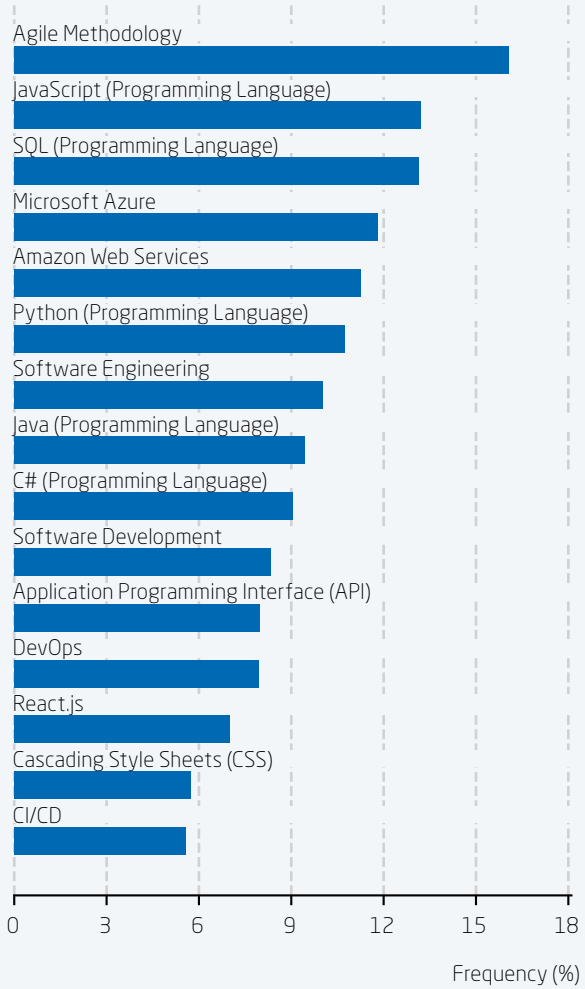
Unique postings:	**1,582,000**
Median advertised salary:	**£50,112**

Key labour force figures

Jobs 2021:	**1,807,600**
Job growth (%) 2030:	**3.0%**

Top 15 specialist skills

ICT, UK, Oct 2021 – Sep 2022



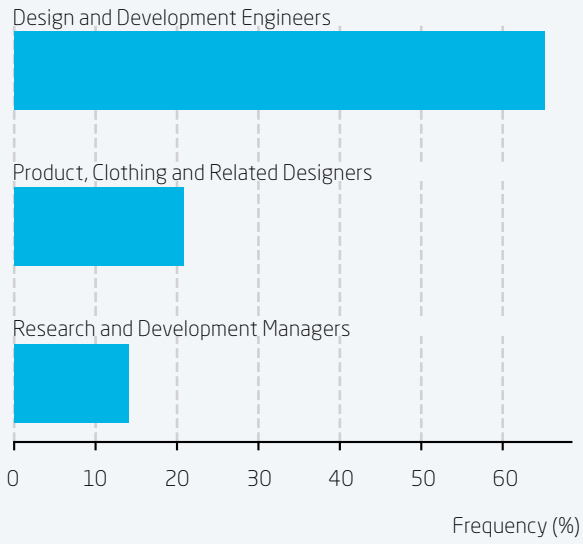
Source: Lightcast job postings

Skills snapshot

Design and Development

Top SOC occupations

Design, UK, Oct 2021 – Sep 2022



Key job posting figures

(Oct 2021 – Sep 2022)

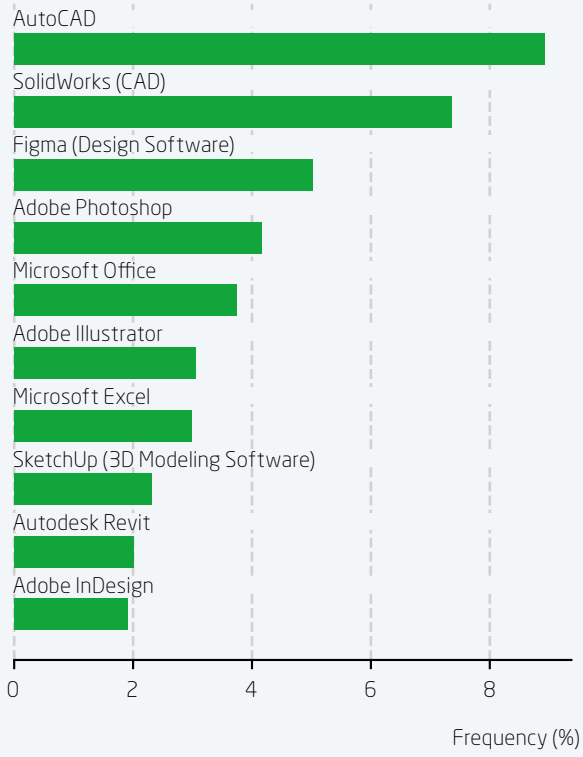
Unique postings:	**63,100**
Median advertised salary:	**£41,152**

Key labour force figures

Jobs 2021:	**242,300**
Job growth (%) 2030:	**2.5%**

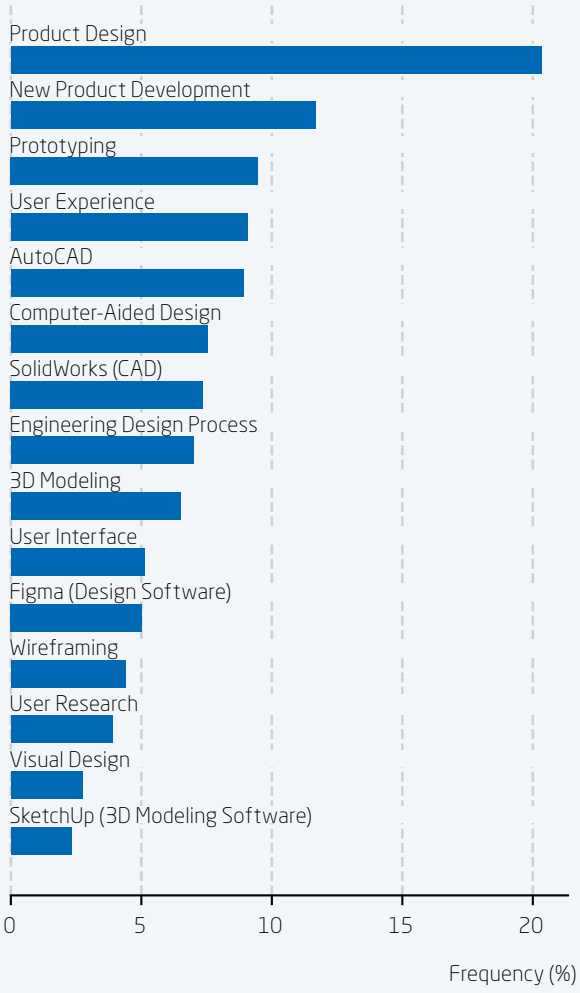
Top 10 software skills

Design, UK, Oct 2021 – Sep 2022



Top 15 specialist skills

Design, UK, Oct 2021 – Sep 2022



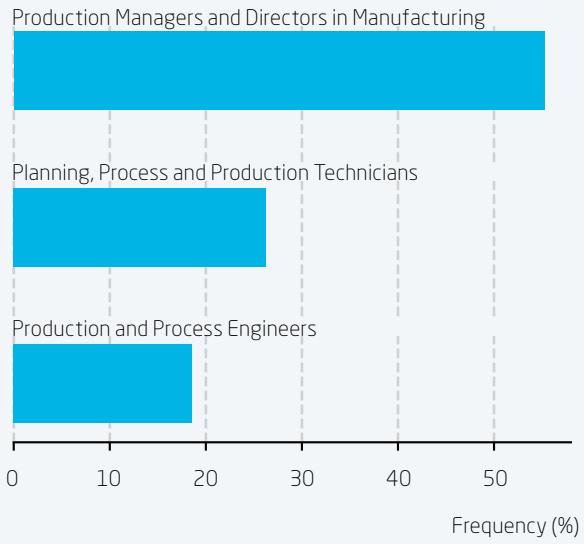
Source: Lightcast job postings

Skills snapshot

Industrial

Top SOC occupations

Industrial, UK, Oct 2021 – Sep 2022



Key job posting figures

(Oct 2021 – Sep 2022)

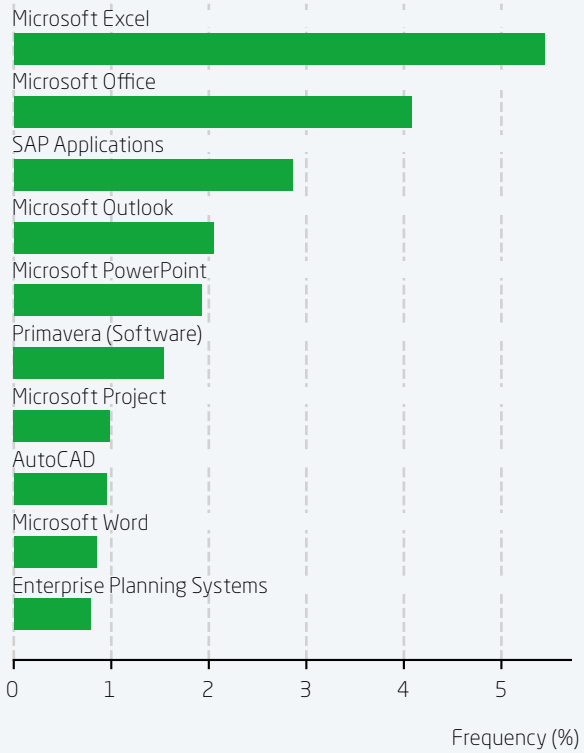
Unique postings:	**149,900**
Median advertised salary:	**£34,240**

Key labour force figures

Jobs 2021:	**350,400**
Job growth (%) 2030:	**2.1%**

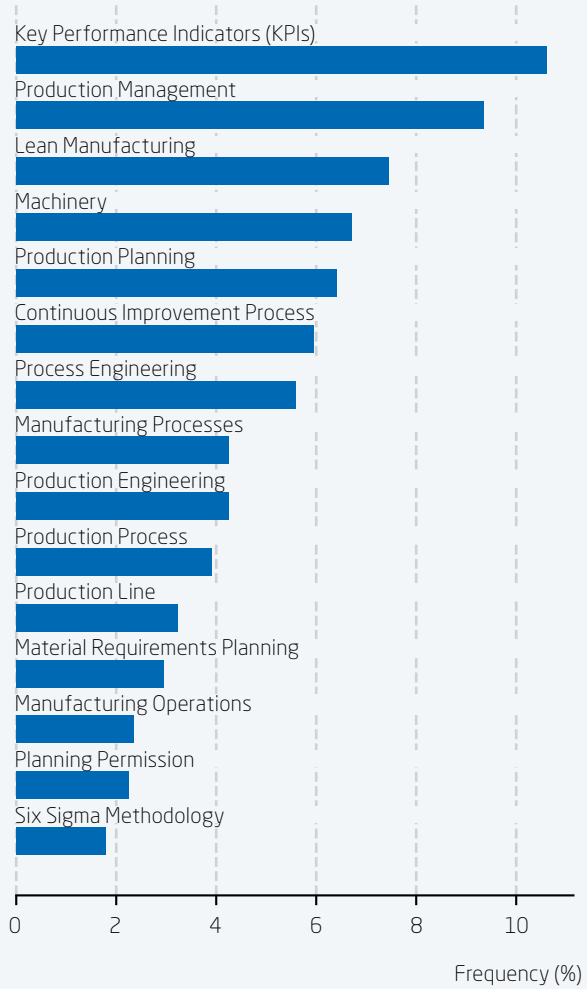
Top 10 software skills

Industrial, UK, Oct 2021 – Sep 2022



Top 15 specialist skills

Industrial, UK, Oct 2021 – Sep 2022



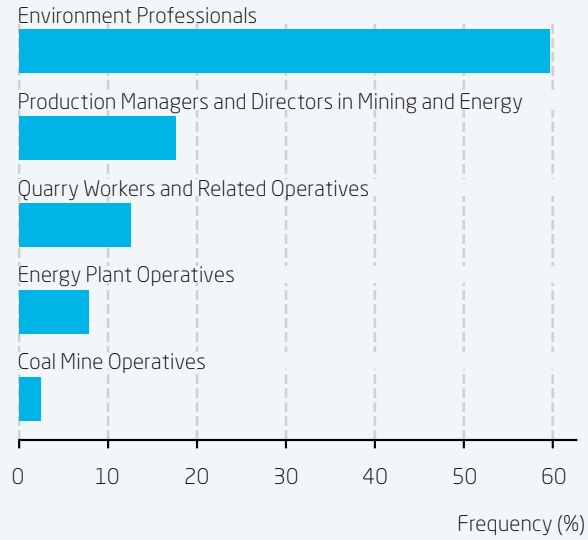
Source: Lightcast job postings

Skills snapshot

Environment, Energy and Earth

Top SOC occupations

Environment, UK, Oct 2021 – Sep 2022



Key job posting figures

(Oct 2021 – Sep 2022)

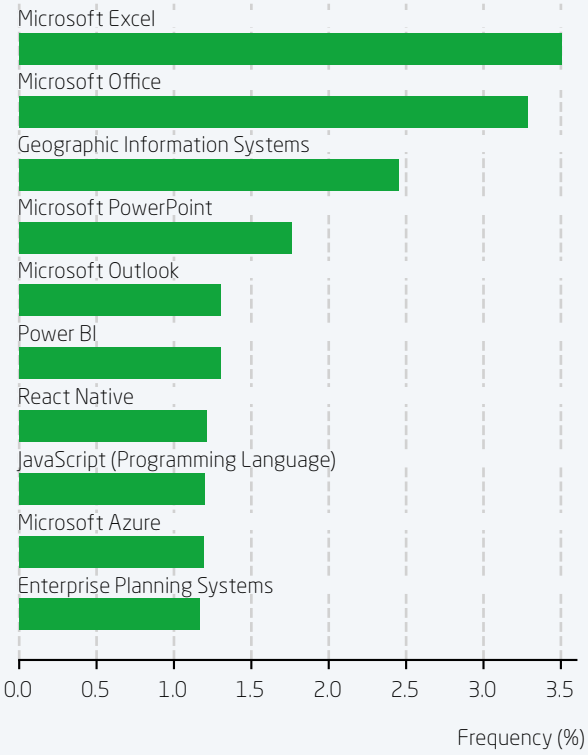
Unique postings:	**21,000**
Median advertised salary:	**£37,568**

Key labour force figures

Jobs 2021:	**76,100**
Job growth (%) 2030:	**3.2%**

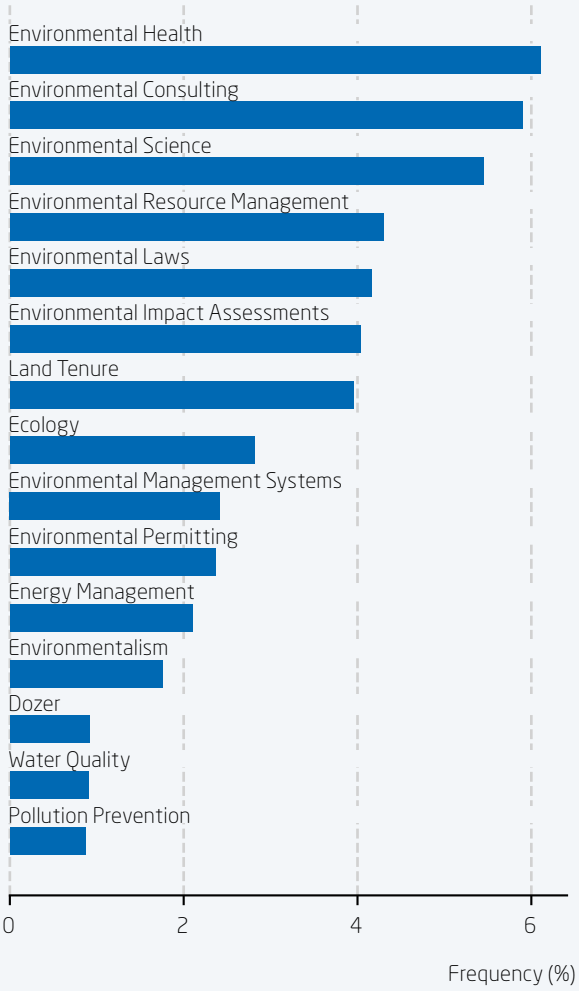
Top 10 software skills

Environment, UK, Oct 2021 – Sep 2022



Top 15 specialist skills

Environment, UK, Oct 2021 – Sep 2022



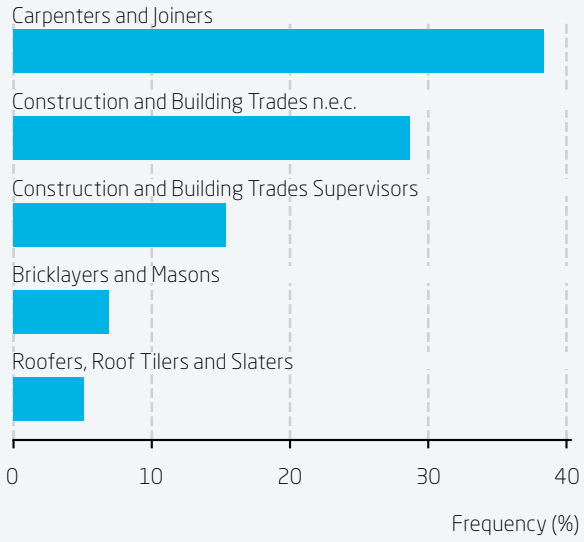
Source: Lightcast job postings

Skills snapshot

Skilled Construction Trades

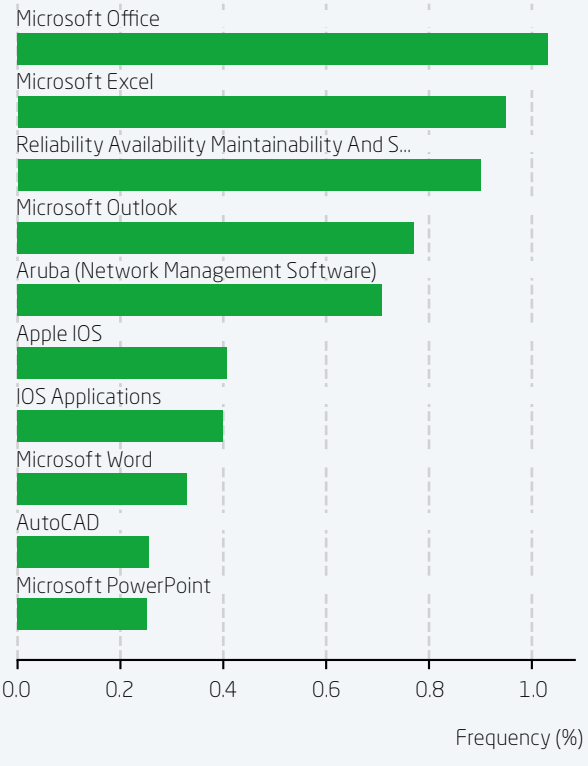
Top SOC occupations

Construction, UK, Oct 2021 – Sep 2022



Top 10 software skills

Construction, UK, Oct 2021 – Sep 2022



Key job posting figures

(Oct 2021 – Sep 2022)

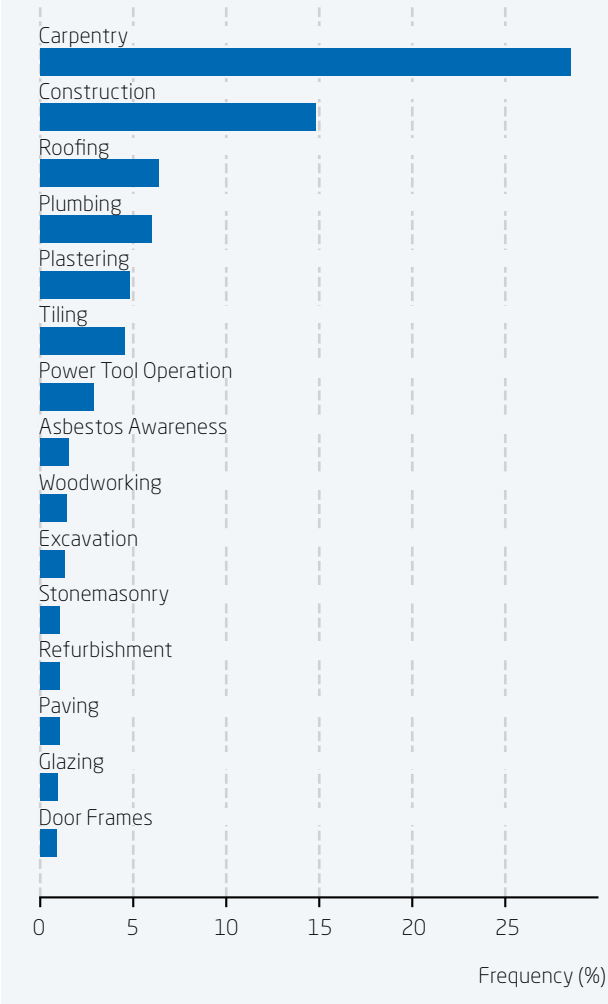
Unique postings:	**94,100**
Median advertised salary:	**£37,056**

Key labour force figures

Jobs 2021:	**600,500**
Job growth (%) 2030:	**4.3%**

Top 15 specialist skills

Construction, UK, Oct 2021 – Sep 2022



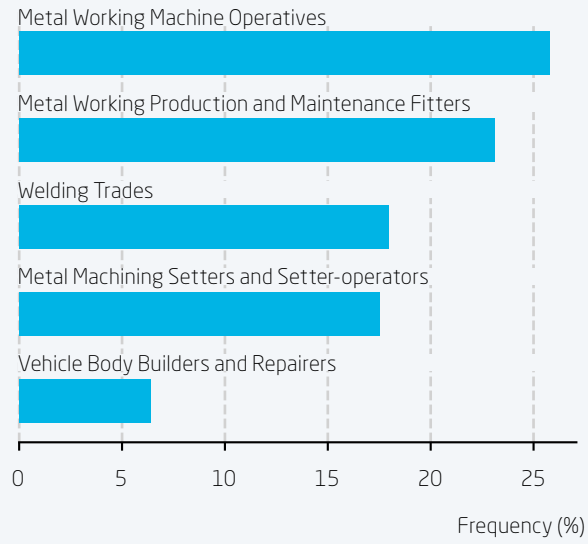
Source: Lightcast job postings

Skills snapshot

Skilled Metal Trades

Top SOC occupations

Metal, UK, Oct 2021 – Sep 2022



Key job posting figures

(Oct 2021 – Sep 2022)

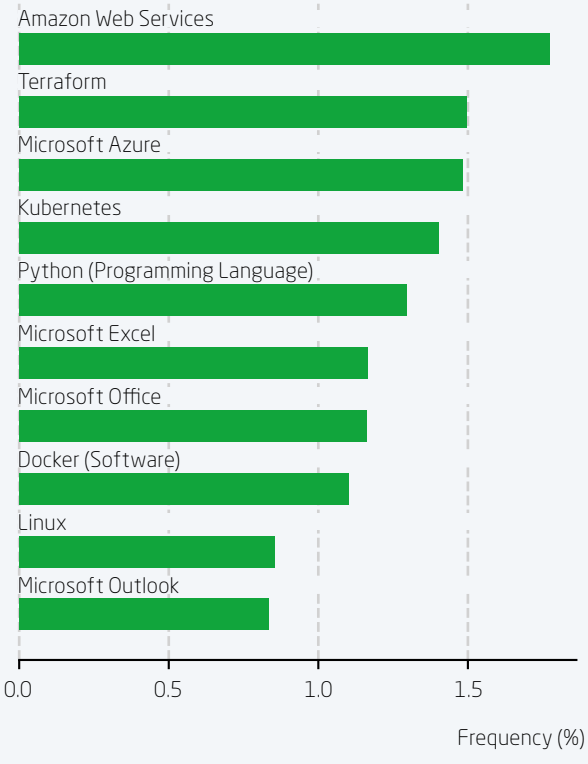
Unique postings:	**182,000**
Median advertised salary:	**£28,608**

Key labour force figures

Jobs 2021:	**417,900**
Job growth (%) 2030:	**2.1%**

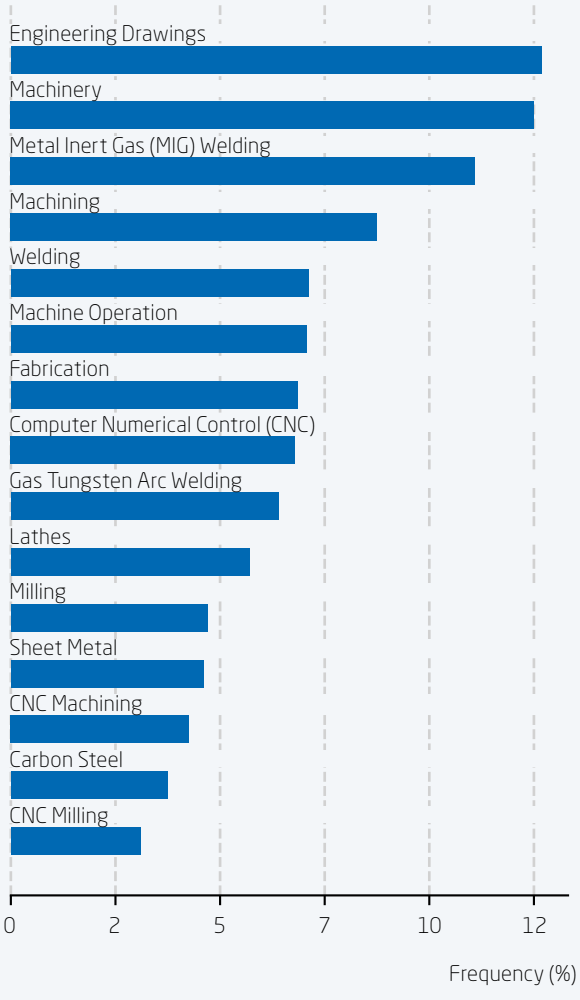
Top 10 software skills

Metal, UK, Oct 2021 – Sep 2022



Top 15 specialist skills

Metal, UK, Oct 2021 – Sep 2022



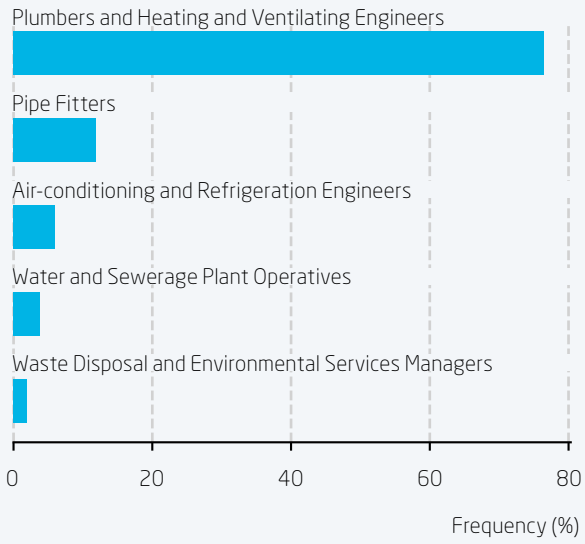
Source: Lightcast job postings

Skills snapshot

Water, Air and Waste

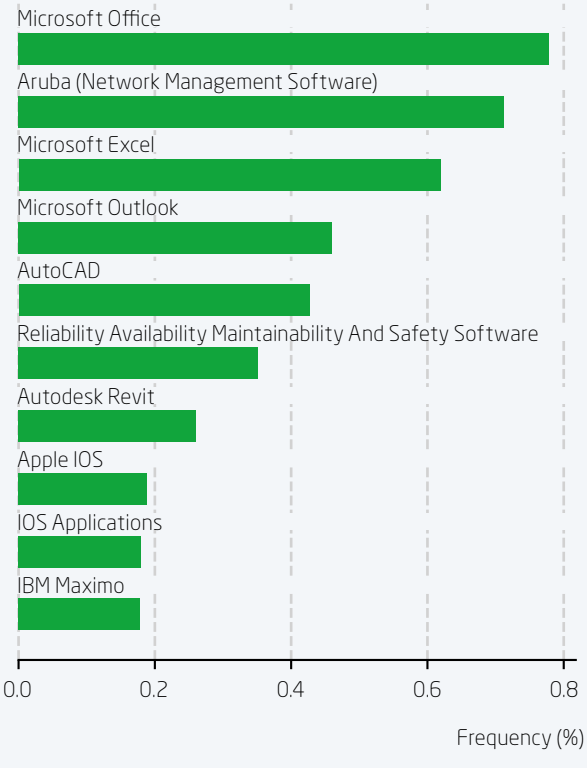
Top SOC occupations

Water, UK, Oct 2021 – Sep 2022



Top 10 software skills

Water, UK, Oct 2021 – Sep 2022



Key job posting figures

(Oct 2021 – Sep 2022)

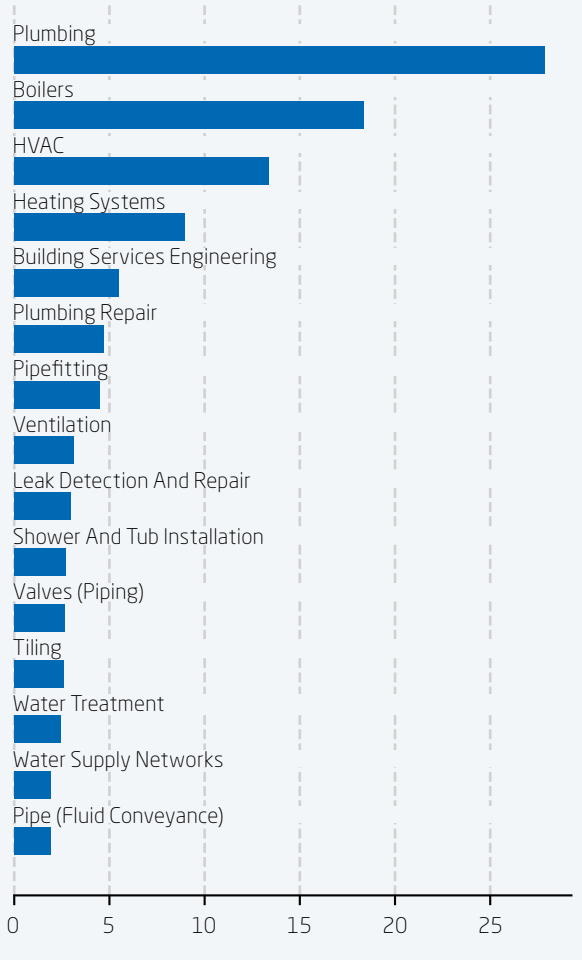
Unique postings:	**61,400**
Median advertised salary:	**£36,032**

Key labour force figures

Jobs 2021:	**176,700**
Job growth (%) 2030:	**4.3%**

Top 15 specialist skills

Water, UK, Oct 2021 – Sep 2022



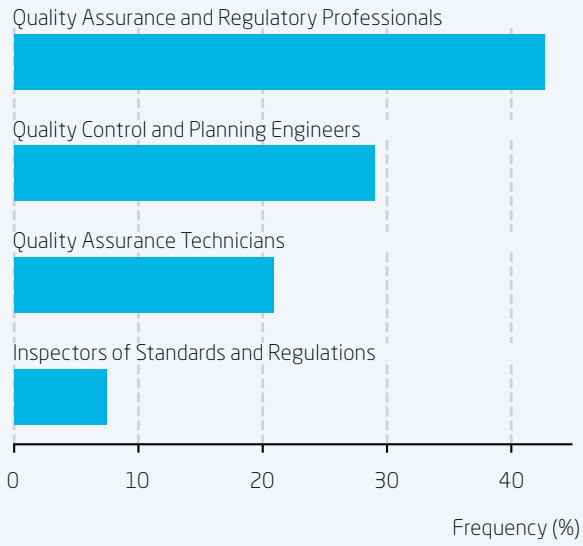
Source: Lightcast job postings

Skills snapshot

Quality Assurance and Regulatory

Top SOC occupations

Quality Assurance, UK, Oct 2021 – Sep 2022



Key job posting figures

(Oct 2021 – Sep 2022)

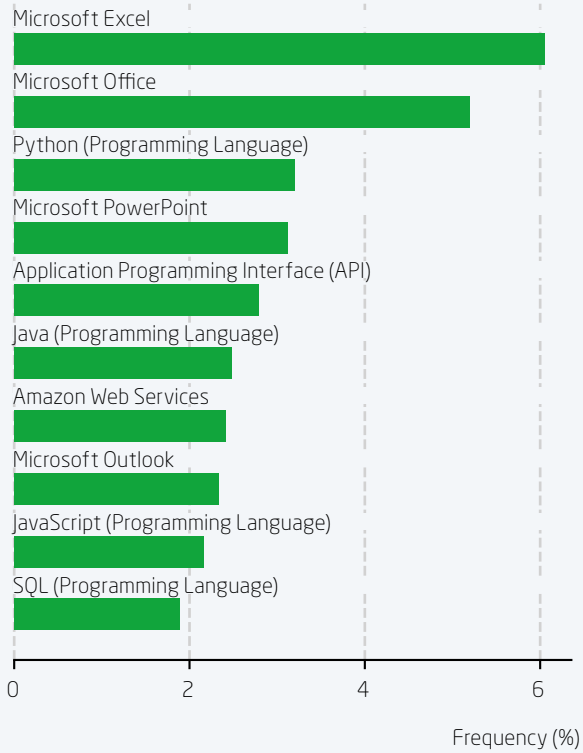
Unique postings:	**184,800**
Median advertised salary:	**£36,032**

Key labour force figures

Jobs 2021:	**254,100**
Job growth (%) 2030:	**2.4%**

Top 10 software skills

Quality Assurance, UK, Oct 2021 – Sep 2022



Top 15 specialist skills

Quality Assurance, UK, Oct 2021 – Sep 2022

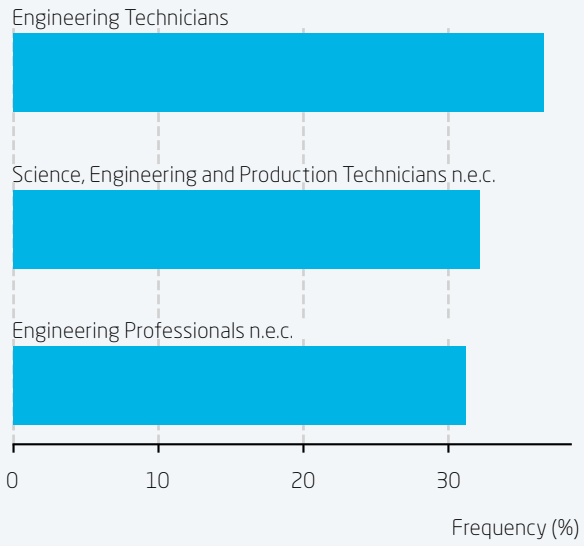
Source: Lightcast job postings

Skills snapshot

Other Engineering

Top SOC occupations

Other Engineering, UK, Oct 2021 – Sep 2022



Key job posting figures

(Oct 2021 – Sep 2022)

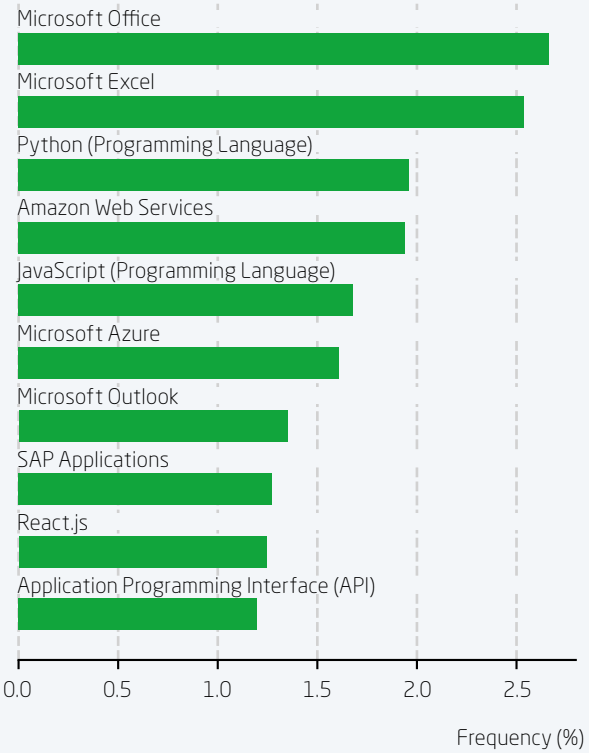
Unique postings:	**442,500**
Median advertised salary:	**£30,528**

Key labour force figures

Jobs 2021:	**269,800**
Job growth (%) 2030:	**2.4%**

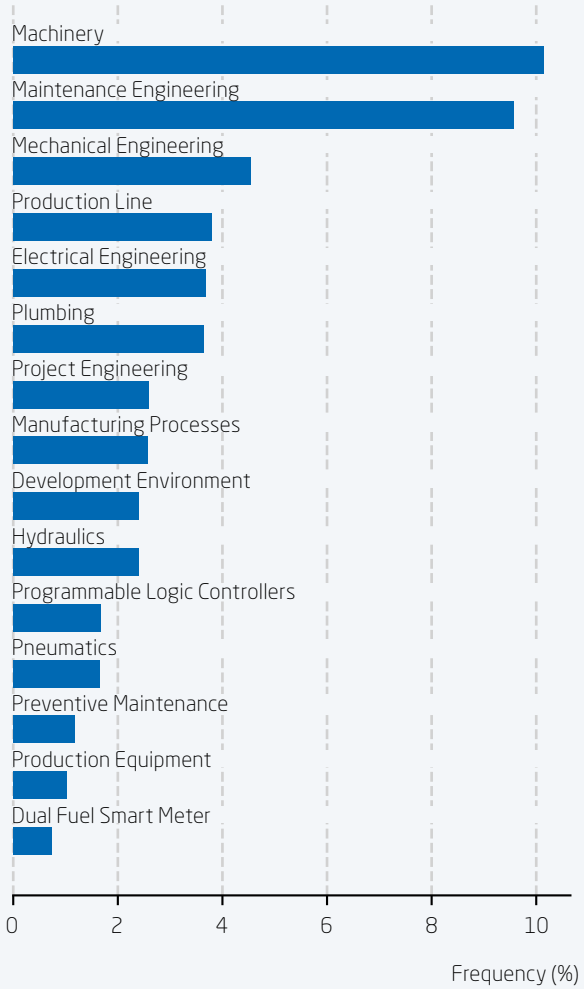
Top 10 software skills

Other Engineering, UK, Oct 2021 – Sep 2022



Top 15 specialist skills

Other Engineering, UK, Oct 2021 – Sep 2022



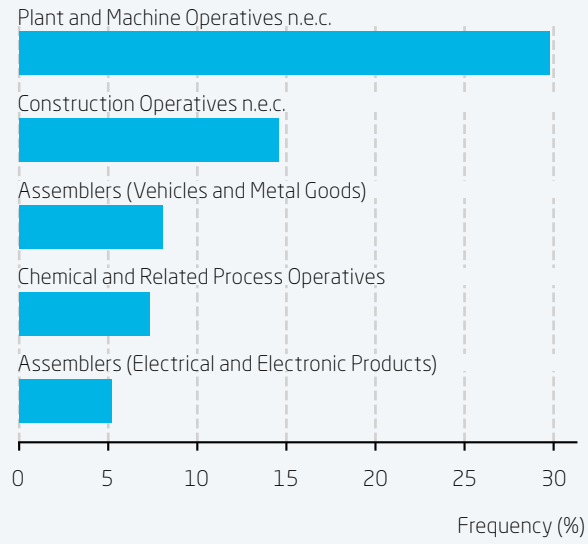
Source: Lightcast job postings

Skills snapshot

Other Operatives

Top SOC occupations

Other Operatives, UK, Oct 2021 – Sep 2022



Key job posting figures

(Oct 2021 – Sep 2022)

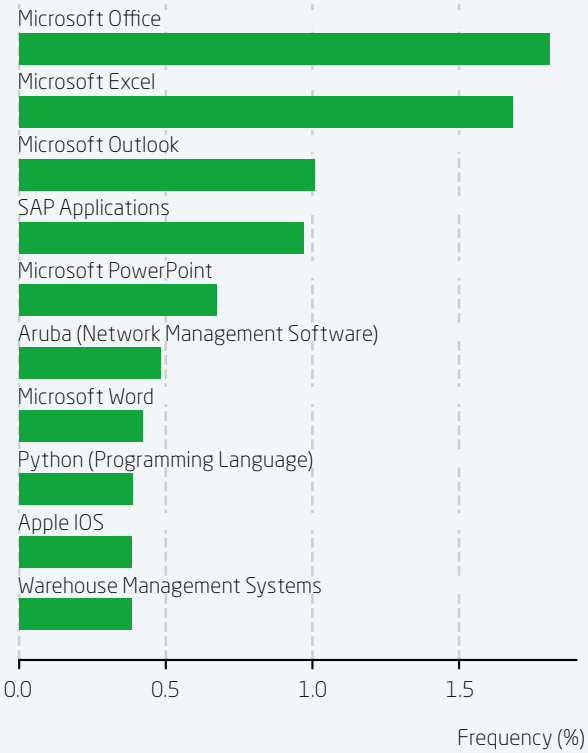
Unique postings:	**117,900**
Median advertised salary:	**£26,432**

Key labour force figures

Jobs 2021:	**597,300**
Job growth (%) 2030:	**2.1%**

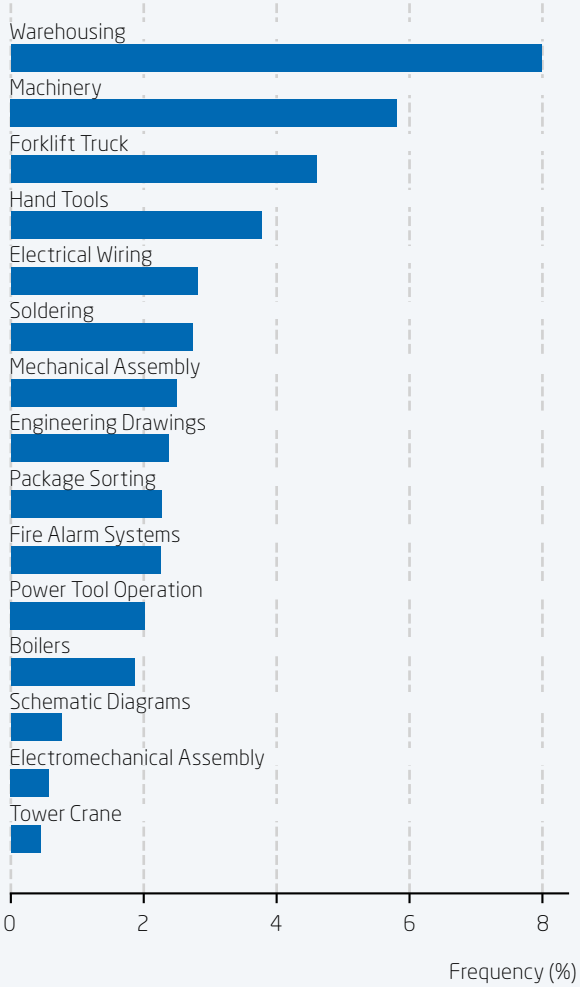
Top 10 software skills

Other Operatives,, UK, Oct 2021 – Sep 2022



Top 15 specialist skills

Other Operatives,, UK, Oct 2021 – Sep 2022



Source: Lightcast job postings

Appendix 1
Occupational definitions of engineering

This appendix sets out the 97 specific SOC4 occupations included in the 'engineering footprint' as defined by EngineeringUK, the Royal Academy of Engineering and the Engineering Council. Moreover, it disaggregates these occupations according to the footprint's definition of 'core' and 'related' engineering and also by the 13 broad 'thematic career groupings', which form much of the basis of the analysis in this report.

SOC4 code (2010)	SOC4 name	Classification (Core or Related)	Thematic career group name
1122	Production managers and directors in construction	Core	Civil
2121	Civil engineers	Core	Civil
2431	Architects	Related	Civil
2433	Quantity surveyors	Related	Civil
2434	Chartered surveyors	Related	Civil
2435	Chartered architectural technologists	Related	Civil
2436	Construction project managers and related professionals	Related	Civil
3114	Building and civil engineering technicians	Core	Civil
3121	Architectural and town planning technicians	Related	Civil
3122	Draughtspersons	Core	Civil
2126	Design and development engineers	Core	Development and Design
2150	Research and development managers	Core	Development and Design
3422	Product, clothing and related designers	Related	Development and Design
2123	Electrical engineers	Core	Electrical
2124	Electronics engineers	Core	Electrical
3112	Electrical and electronics technicians	Core	Electrical
5241	Electricians and electrical fitters	Core	Electrical
5249	Electrical and electronic trades n.e.c.	Core	Electrical
5250	Skilled metal, electrical and electronic trades supervisors	Core	Electrical
1123	Production managers and directors in mining and energy	Core	Environment, Energy and Earth
2142	Environment professionals	Core	Environment, Energy and Earth
8122	Coal mine operatives	Core	Environment, Energy and Earth
8123	Quarry workers and related operatives	Core	Environment, Energy and Earth
8124	Energy plant operatives	Related	Environment, Energy and Earth
1136	Information technology and telecommunications directors	Related	ICT and Software
2133	IT specialist managers	Related	ICT and Software
2134	IT project and programme managers	Related	ICT and Software
2135	IT business analysts, architects and systems designers	Core	ICT and Software
2136	Programmers and software development professionals	Core	ICT and Software
2137	Web design and development professionals	Related	ICT and Software
2139	Information technology and telecommunications professionals n.e.c.	Core	ICT and Software
3131	IT operations technicians	Related	ICT and Software

SOC4 code (2010)	SOC4 name	Classification (Core or Related)	Thematic career group name
3132	IT user support technicians	Related	ICT and Software
5242	Telecommunications engineers	Core	ICT and Software
5244	TV, video and audio engineers	Core	ICT and Software
5245	IT engineers	Core	ICT and Software
1121	Production managers and directors in manufacturing	Core	Industrial
2127	Production and process engineers	Core	Industrial
3116	Planning, process and production technicians	Core	Industrial
2122	Mechanical engineers	Core	Mechanical
3512	Aircraft pilots and flight engineers	Related	Mechanical
5231	Vehicle technicians, mechanics and electricians	Core	Mechanical
5235	Aircraft maintenance and related trades	Core	Mechanical
8111	Food, drink and tobacco process operatives	Related	Other Operatives
8112	Glass and ceramics process operatives	Related	Other Operatives
8114	Chemical and related process operatives	Related	Other Operatives
8115	Rubber process operatives	Core	Other Operatives
8116	Plastics process operatives	Core	Other Operatives
8117	Metal making and treating process operatives	Core	Other Operatives
8118	Electroplaters	Related	Other Operatives
8119	Process operatives n.e.c.	Related	Other Operatives
8121	Paper and wood machine operatives	Core	Other Operatives
8129	Plant and machine operatives n.e.c.	Core	Other Operatives
8131	Assemblers (electrical and electronic products)	Related	Other Operatives
8132	Assemblers (vehicles and metal goods)	Related	Other Operatives
8133	Routine inspectors and testers	Core	Other Operatives
8135	Tyre, exhaust and windscreen fitters	Related	Other Operatives
8139	Assemblers and routine operatives n.e.c.	Related	Other Operatives
8141	Scaffolders, stagers and riggers	Related	Other Operatives
8142	Road construction operatives	Related	Other Operatives
8143	Rail construction and maintenance operatives	Core	Other Operatives
8149	Construction operatives n.e.c.	Related	Other Operatives
8221	Crane drivers	Related	Other Operatives
8232	Marine and waterways transport operatives	Related	Other Operatives

SOC4 code (2010)	SOC4 name	Classification (Core or Related)	Thematic career group name
2129	Engineering professionals n.e.c.	Core	Other Engineering
3113	Engineering technicians	Core	Other Engineering
3119	Science, engineering and production technicians n.e.c.	Core	Other Engineering
2461	Quality control and planning engineers	Core	Quality Assurance and Regulatory
2462	Quality assurance and regulatory professionals	Core	Quality Assurance and Regulatory
3115	Quality assurance technicians	Core	Quality Assurance and Regulatory
3565	Inspectors of standards and regulations	Core	Quality Assurance and Regulatory
5311	Steel erectors	Related	Skilled Construction and Building Trades
5312	Bricklayers and masons	Related	Skilled Construction and Building Trades
5313	Roofers, roof tilers and slaters	Related	Skilled Construction and Building Trades
5315	Carpenters and joiners	Related	Skilled Construction and Building Trades
5316	Glaziers, window fabricators and fitters	Related	Skilled Construction and Building Trades
5319	Construction and building trades n.e.c.	Related	Skilled Construction and Building Trades
5330	Construction and building trades supervisors	Core	Skilled Construction and Building Trades
5211	Smiths and forge workers	Core	Skilled Metal Workers
5212	Moulders, core makers and die casters	Core	Skilled Metal Workers
5213	Sheet metal workers	Core	Skilled Metal Workers
5214	Metal plate workers, and riveters	Core	Skilled Metal Workers
5215	Welding trades	Core	Skilled Metal Workers
5221	Metal machining setters and setter-operators	Core	Skilled Metal Workers
5222	Tool makers, tool fitters and markers-out	Core	Skilled Metal Workers
5223	Metal working production and maintenance fitters	Core	Skilled Metal Workers
5224	Precision instrument makers and repairers	Core	Skilled Metal Workers
5232	Vehicle body builders and repairers	Core	Skilled Metal Workers
5234	Vehicle paint technicians	Related	Skilled Metal Workers
5236	Boat and ship builders and repairers	Core	Skilled Metal Workers
5237	Rail and rolling stock builders and repairers	Core	Skilled Metal Workers
8125	Metal working machine operatives	Core	Skilled Metal Workers
1255	Waste disposal and environmental services managers	Related	Water, Air and Waste
5216	Pipe fitters	Core	Water, Air and Waste
5225	Air-conditioning and refrigeration engineers	Core	Water, Air and Waste
5314	Plumbers and heating and ventilating engineers	Core	Water, Air and Waste
8126	Water and sewerage plant operatives	Core	Water, Air and Waste

About EngineeringUK

Who we are

Established in 2001, EngineeringUK is a not-for- profit organisation, funded predominantly via the professional registration fees of individual engineers, as well as the support of a range of businesses, trusts and foundations, and a corporate membership scheme. Our ambition is to enable more young people from all backgrounds to be informed, inspired and progress into engineering and technology.

Working in partnership to inspire more young people from a greater range of backgrounds to pursue the exciting career opportunities in modern engineering and technology is at the heart of EngineeringUK's purpose. Collaboration is essential to reach our long-term vision: that the UK has the workforce needed for engineering and technology to thrive, to improve sustainability and to achieve net zero.

www.engineeringuk.com

Driven by data

Our work is rooted in our understanding of the current and future needs of the engineering and technology workforce. We complement that understanding by establishing which activities help increase the number and diversity of young people choosing engineering, technology and technician careers, especially those in sustainability and net zero.

We base everything we do on evidence and we share our analysis and insight widely. We publish comprehensive data on all aspects of engineering and technology in the UK – providing a detailed examination of the economic contribution, the workforce composition, as well as the extent to which workforce supply through education and training is likely to meet future demand for engineering and technology skills.

We evaluate all our activity to help ensure our engagements with young people are as effective as possible. It is through evaluation that we can identify the extent to which our programmes are winning the hearts and minds of young people, increasing their understanding of engineering and technology, and changing their perceptions of a career in it as something they'd consider for themselves, regardless of background and gender.

About Lightcast

Lightcast (formerly Emsi Burning Glass) is the world's leading authority on job, skills, workforce talent, and labour market dynamics.

With engineers and data specialists collecting and analysing data from thousands of job boards, company websites, online resumes, employee profiles, and traditional government sources, the company produces the most comprehensive and up-to-date picture of the labour market available. Organisations across the globe use Lightcast market research, analytical software, and data expertise to better understand their own workforce and identify skilled and diverse talent for future growth.

Headquartered in Boston, Massachusetts, and Moscow, Idaho, Lightcast is active in more than 30 countries and has offices in the United Kingdom, Italy, New Zealand, and India.

This report was produced by Lightcast for EngineeringUK by Jeff Dwan-O'Reilly and Elena Magrini, who would like to thank Duncan Brown and Mauro Pelucchi from Lightcast, as well as Becca Gooch, Claudia Mollidor, Beatrice Barleon, Michael Hardisty and Marie Horton from EngineeringUK, for their input.

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