

Skills
Development
Scotland

Sectoral Skills Assessment

Engineering

October 2023



Sectoral Skills Assessments

First launched in 2017, the purpose of the Sectoral Skills Assessments (SSAs) is to provide a robust evidence base to support partners in strategic skills investment planning. Skills Development Scotland (SDS) has worked with key partners and stakeholders in the production of SSAs to ensure an inclusive approach to their development, dissemination and utilisation.

SSAs include published data sets. Inevitably, when using published data there is a time lag, but the data contained is the most up-to-date available at the time of writing.

SSAs also include forecast data that has been commissioned through Oxford Economics. The Technical Note¹ provides full detail on the caveats that must be applied when using forecast data, but broadly, it should be noted that:

- Forecasts are based on what we know now and include past and present trends projected into the future.
- The more disaggregated they become, especially at smaller geographical units, the less reliable they are likely to be.
- Their value is in identifying likely directions of travel rather than predicting exact figures.
- The forecasts do not account for national or sectoral activities, initiatives or investments that are planned.

Industries and occupations used in the SSAs are defined by standard industrial classifications (SIC) and standard occupational classifications (SOC). The Office for National Statistics have SIC² and SOC³ hierarchy tools that can be used to understand the classifications in more detail.

This SSA infographic is for the Engineering key sector.

The sector encompasses: Manufacturing of Metals, Electrical Products, Machinery/Equipment and Vehicles, Repair and Installation of Machinery/Equipment, Architectural and Engineering activities, and Research. Please see Appendix 1 for the SIC definition used in this report.

Key Sectors are central to our Skills Investment Planning approach. Each Key Sector has a tailored Skills Investment Plan (SIP) which outlines trends in skills and qualification supply and employers' perspectives on the skills issues affecting the sector. Regional SIPs have also been developed and are available alongside SIPs on the SDS website.⁴

The SSAs are part of a suite of Labour Market Insight publications by SDS. Other products in the suite include:



Economy, People and Skills provides succinct and up-to-date evidence on Scotland's economy, business and people. It is updated monthly.



Regional Skills Assessments provide a coherent evidence base to inform future investment in skills, built up from existing datasets and forecasts for Regional Outcome Agreement areas, Rural Scotland and all City and Growth Deals regions. They are updated annually.



The **Data Matrix** is an interactive tool offering data from a variety of sources in a visually engaging format. It is updated frequently.

Alongside the suite of Labour Market Insight publications, SDS also produces a wide range of reports such as statistics on the Apprenticeship Family and the Annual Participation measure for 16-19 year olds. Further information can be found on the [Publications and Statistics](#) section of the SDS corporate website.

For any further information or queries on the SSAs or any of our other products, please contact: RSA@sds.co.uk

We value user feedback on the Sectoral Skills Assessments.



If you would like to provide feedback on the SSAs please do so [here](#).

We held a series of sectoral webinars to complement the publication of the Sectoral Skills Assessments.



The recording of the Engineering webinar can be found on the SDS YouTube Channel [here](#).

You can also watch the webinars for other key sectors and regions in Scotland [here](#).

The Context for Scotland's Labour Market and Sectoral Insight

Within the last 10 years, the economy has faced disruption due to events such as the pandemic, Brexit, the war in Ukraine, and the cost of living crisis. In addition to these events, megatrends around demography, technology, and the environment have continued to shape Scotland's economy and labour market.

This section provides an overview of five key drivers of the Scottish labour market, highlighting that an agile and responsive skills system is vital to respond to the challenges and opportunities that exist in the economy, to support and attract inward investment, to increase productivity and to tackle inequality and deprivation.



The Economy

Scotland and the UK have been hard hit by rising inflation, tight monetary policy, and subdued economic performance. The impact of the war on Ukraine, increased energy prices, and a tight labour market have resulted in inflation reaching a 40-year high in 2022. At the time of writing, inflation has started to fall, but at a slower pace than previously anticipated. By the end of 2023, the Bank of England expect inflation to be 4.9%, falling to within the 2% target by Q2 of 2025.¹

Interest rates have increased to combat rising inflation, and rates are likely to remain higher for longer than expected as inflation proves challenging to address. This has weighed on economic growth and the outlook for Scotland and the UK remains uncertain, with downside risks.

Forecasts predict Scotland² and the UK³ will see weak economic growth between 2023 and 2026.³ International growth is also expected to be weak by historical standards, with global growth of 3% forecast for both 2023 and 2024.⁴ However, the success of Scotland's economy is not solely based on GDP. There has been growing commentary on the need to evaluate the economy on measures other than GDP growth, such as how the economy serves society and sustains the environment. The Scottish Government's National Strategy for Economic Transformation (NSET) noted a commitment to a 'Wellbeing Economy' – '*a society that is thriving across economic, social and environmental dimensions*'.⁵

Skills Shortages and Skills Gaps



The [Employer Skills Survey 2022 \(ESS\)](#) provides insight on skills supply, skills gaps and training across Scotland and the UK. The published findings are timely; however, they do not capture the very recent cooling of the labour market that has taken place during 2023. The ESS shows:

- **Supply challenges have worsened** across Scotland and the UK, and vacancies have become harder to fill.
- **There has been a sizeable rise in skills shortages**, 10% of establishments in Scotland reported a Skills Shortage Vacancy (up from 6% in 2017).
- **Skills gaps have decreased slightly in Scotland**, 15% of establishments reported a skills gap (-1 pp) while 4.8% of employees in Scotland were not fully proficient, which was the lowest level recorded.
- **Training activity has decreased across Scotland**, access to training offered by employers was at the lowest recorded level since the survey began in 2011.



Technology and Automation

Technology and automation have been major disruptors and drivers of the Scottish labour market and economy over the past few decades. Ongoing advances and technological change are expected to continue to have a great impact on the global economy, particularly with the prominence of Artificial Intelligence.⁶ This will shape consumer behaviour, modify commercial models, and drive innovations in ways of living, working and learning.

While Artificial Intelligence is expected to result in changes to the world of work, many jobs are expected to evolve rather than disappear.⁷ However, around a third of jobs may see a large share of their tasks being automated and changed. The technological revolution has highlighted the importance of uniquely human meta-skills around self-management, social intelligence and innovation.⁸

As well as risks to certain jobs, technology may also create new jobs and enhance existing roles to support smarter and more agile ways of working. However, employers are already reporting digital skills gaps in the workforce.⁹ The [Digital Economy Skills Action Plan](#) aims to address the digital economy skills challenge through upskilling and reskilling, to help realise the potential of Scotland's digital economy.¹⁰

SDS is exploring the potential labour market impact of Automation and Artificial Intelligence through new research. The findings from the research will be published at the beginning of 2024 and will include breakdowns of the risk of automation by gender, income and occupation.



Climate Change

The Climate Emergency has been recognised by governments across the world, with the Scottish Government being one of the first to do so in 2019. Recognising the gravity of the situation, the Scottish Government has set a target to achieve a net zero carbon economy by 2045.¹

Growing recognition of the importance of protecting the environment will have a significant impact on the labour market. Changes in legislation and consumer behaviour will mean growing demand in some areas and a fall in others. Demand for green jobs (and green skills) is expected to increase rapidly as a result of policy and legislative drivers, and consumer choice.²

Scotland's skills requirements for the Climate Emergency are set out in the [Climate Emergency Skills Action Plan](#). It outlined the need for action to ensure that current and future skills investment in support of net zero is strongly evidence based.³

The CESAP Pathfinder is a direct response to this, led by Skills Development Scotland (SDS) in collaboration with the Scottish Funding Council (SFC) and forms part of the [Shared Outcomes Framework](#). The CESAP Pathfinder advances the evidence base used to identify current and future skills demand, establishes a baseline of green skills provision and identifies nine opportunities for action needed across the skills system. A suite of reports to share insights, intelligence and lessons learned is due to be published in Autumn 2023.



Demographic Change

Scotland's population is ageing. By 2045, the number of people of pensionable age in Scotland is expected to increase, while the working-age population is projected to decline, and migration is expected to be the only source of population gain in Scotland.⁴ Demographic change could contribute to a tighter labour market in the future, and increase pressure on the demand for public services and the funds available from tax and National Insurance to provide them.

Whilst it was initially thought that Brexit would lead to falling levels of migration, the Office for National Statistics estimated that net migration to the UK hit a record high in 2022.⁵ Migration has been driven by non-EU citizens, while more EU citizens left than arrived in the UK. Migration from outside of the EU has been driven by a number of factors, including humanitarian schemes such as those available to Ukrainians; higher levels of migration for study; and people coming to the UK for work. Changes to migration policy and the UK's points-based migration system could further impact migration flows.

With populations ageing, the global economy is likely to see more people working for longer due to increases in the state pension age.⁶ Advances in medicine and technological innovations are expected to enhance the health of the older population, which in turn will likely change working habits and preferences. As a result, some targeted upskilling and reskilling may be required to enhance older workers' experience and knowledge to enable the transition into new and growing careers.⁷



Scotland's Census 2022⁸

Scotland's population was estimated to be 5,436,600 in March 2022, which marks the highest population ever recorded by Scotland's Census. The Scottish population has **grown by 2.7% since the previous census**, however, this growth rate was slower than the period between 2001 and 2011, when the population grew by 4.6%.

Although Scotland's population increased over the past ten years, this growth was largely driven by migration, as the number of deaths exceeded the number of births. **Without migration, Scotland's population would have declined by around 49,800.**

The proportion of females (51.4%) and males (48.6%) in Scotland has remained relatively unchanged compared to the previous census in 2011 (51.5% and 48.5% respectively). However, **there are now more older people in Scotland than ever before**. The number of people aged 65 and over increased by 22.5% between 2011 and 2021, while the population aged 0-14 and 15-64 decreased by 2.5% and 1.1% respectively.

The Context for Scotland's Labour Market and Sectoral Insight



Inclusive Growth and Equality

Across Scotland, significant economic inequalities exist, especially for disadvantaged groups. For example, more women than men earned less than the Real Living Wage in 2022¹, the disability employment gap² remained high (29.6 percentage points) in 2023, meaning people with a disability are less likely to be employed, and in the same year, the employment rate gap for the ethnic minority population compared with the white population was 9.2 percentage points.³

The Scottish Government's commitment to fairness and greater equality is reiterated in the National Strategy for Economic Transformation (NSET). One of the strategy's key ambitions is creating a fairer society – 'Ensuring that work pays for everyone through better wages and fair work, reducing poverty and improving life chances'.⁴

A 'Fairer and More Equal Society' is also one of the five programmes of action outlined in the NSET. This programme of action looks to 'reorient our economy towards wellbeing and fair work' with key aims including higher rates of employment and wage growth, and reducing poverty.⁵

The Scottish Government's targets are set against the challenging backdrop of the cost of living crisis and the pandemic, affecting groups already impacted by inequality the most: low-income households, young people, disabled people, and people from ethnic minority backgrounds.⁶ Research from the Joseph Rowntree Foundation found that eight in ten single parents, large families and low-income households in Scotland had to go without one or more essentials (such as food or heating) in spring 2023.⁷



Sectoral Insight⁸

The sector continues to be in a strong position thanks to growth and inward investment.

The trade body, [Scottish Engineering](#), reports: "Our third quarterly review of 2023 halts the run of increased orders that we have enjoyed since the middle of 2021, however with output remaining positive at around a similar level to optimism and forecasts, a watching brief with some patience might be recommended."

The sector continues to invest in staff training and recruitment. However, increases in energy costs alongside labour and skills shortages risk medium-term business sustainability.

Skills shortages in fabrication and welding have resulted in challenges in Engineering sub-sectors such as Shipbuilding. In the future, this could cause similar issues for manufacturers in Renewable Energy. In response, a pre-apprenticeship programme in Fabrication and Welding skills is now being delivered in the Glasgow region and a Production Support Operator role has been introduced in Fife.

Modern Apprenticeship Engineering standards and frameworks have recently been reviewed through extensive employer, provider and stakeholder engagement and are expected to be available from April 2024. Additionally, registration levels for MAs have returned to pre-pandemic levels and there is

anticipation for a high demand for places from employers.

The Space Sector is continuing to grow, with increasing demand for skills in engineering, design and manufacturing, data science and software development. Similarly, the Photonics, Marine and Aerospace Sectors continue to grow and are demanding skills across all levels.

The drive to Net Zero manufacturing continues, and the SDS supported Scottish Engineering Net Zero Skills and Road map programme continues to be popular with industry.

It is important to note that the forecasts used in this Sectoral Skills Assessment are policy and investment neutral. This means the figures present a baseline outlook that takes into account historical trends and external economic conditions, but the figures do not reflect investment or policy that is unconfirmed or at planning/development stage. Therefore, the forecasts should be used in conjunction with other sources, and readers are encouraged to overlay the forecasts with their own local and sectoral knowledge.

The Economy¹

Gross Value Added (GVA, £m) (2013-2033)²



In 2023, GVA in the Engineering sector was forecast to be £9,942m, generating 6.7% of Scotland's total economic output. Between 2013 and 2023, GVA in the sector contracted by 1.3% on average each year, compared to growth of 1.0% across Scotland over the same period.

In 2022, the Engineering sector experienced economic contraction of 2.1%, compared to growth of 4.3% across the Scottish economy. The contraction was expected to continue in 2023, with a decline of 3.1% across the Engineering sector, reflecting the challenging economic conditions.

GVA in the Engineering sector is forecast to grow by an average of 1.2% per year between 2023 and 2033, slightly behind the Scotland average of 1.3%. In 2033, the Engineering sector is still forecast to account for 6.7% of Scotland's total economic output.



Engineering forecast GVA in 2026:
£10,472m

↑ up 5.3% from 2023

Scotland forecast GVA in 2026:
£155,521m

↑ up 5.1% from 2023

Engineering forecast GVA in 2033:
£11,246m

↑ up 7.4% from 2026

Scotland forecast GVA in 2033:
£168,475m

↑ up 8.3% from 2026

Productivity (GVA per job)³

In this report, we have used Oxford Economics measure of productivity, which is calculated by dividing total sectoral GVA by total sectoral employment (measured by jobs). Please note, there are different ways of calculating productivity, and the pandemic has created new challenges in how productivity is accurately measured. Caution is needed when interpreting productivity data presented in this report, and it must be considered in the context of other data and insight.

In 2023, productivity in the **Engineering** sector was forecast to be **£65,700**. In comparison, the Scottish average was £52,600.



Engineering forecast productivity in 2026:
£69,100

↑ up 5.2% from 2023

Scotland forecast productivity in 2026:
£54,100

↑ up 2.9% from 2023



Engineering forecast productivity in 2033:
£77,600

↑ up 12.3% from 2026

Scotland forecast productivity in 2033:
£58,200

↑ up 7.6% from 2026

1. Forecasts by Oxford Economics (unless otherwise stated). See Page 11 for full list of source references

2. GVA is the measure of the value of goods and services produced within the economy and is an indicator of the sector's health. GVA in constant 2019 prices.

3. Productivity is the measure of goods and services produced per unit of labour input. The Oxford Economics forecasts of productivity shown here have been calculated by dividing total sector GVA by total sector employment (measured by jobs).

Current Demand¹



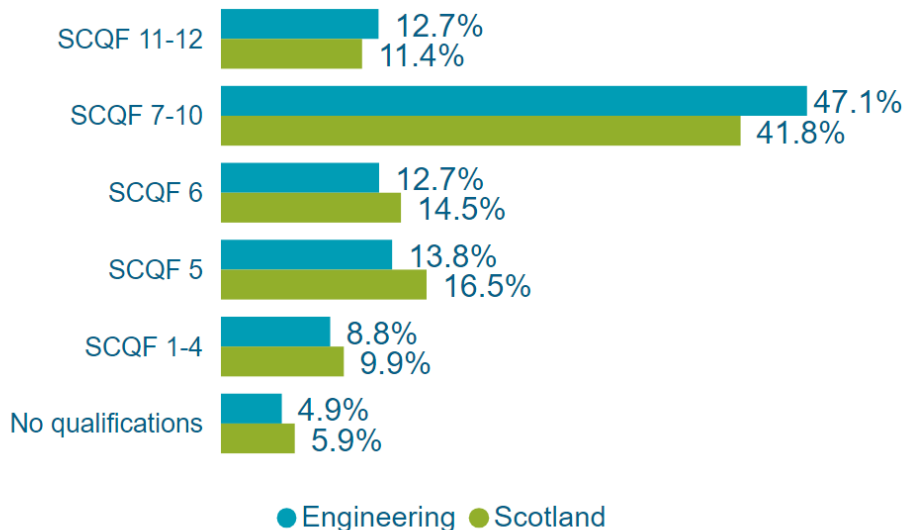
Workforce size 2023: **135,700** people

The workforce **declined** by **-9.0%** or **-13,400** people between 2013 and 2023. During this 10 year period, the pandemic had a notable effect on the workforce, as it **declined** by **-10.1%** or **-14,900** people between 2019 and 2021.

This compares to a Scotland wide increase of **4.0%** or **99,400** people between 2013 and 2023. Between 2019 and 2021, the workforce declined by **-2.2%** or **-56,900** people across Scotland.

Workforce Qualifications, 2023

Workers in the **Engineering** sector have higher qualifications than the Scottish average. In 2023, an estimated 59.8% of workers in the sector were qualified to SCQF Level 7 and above.²



The proportion of workforce in the Local Authorities employed in Engineering, 2023³

In 2023, the **Engineering** sector accounted for 5.2% of Scottish employment.

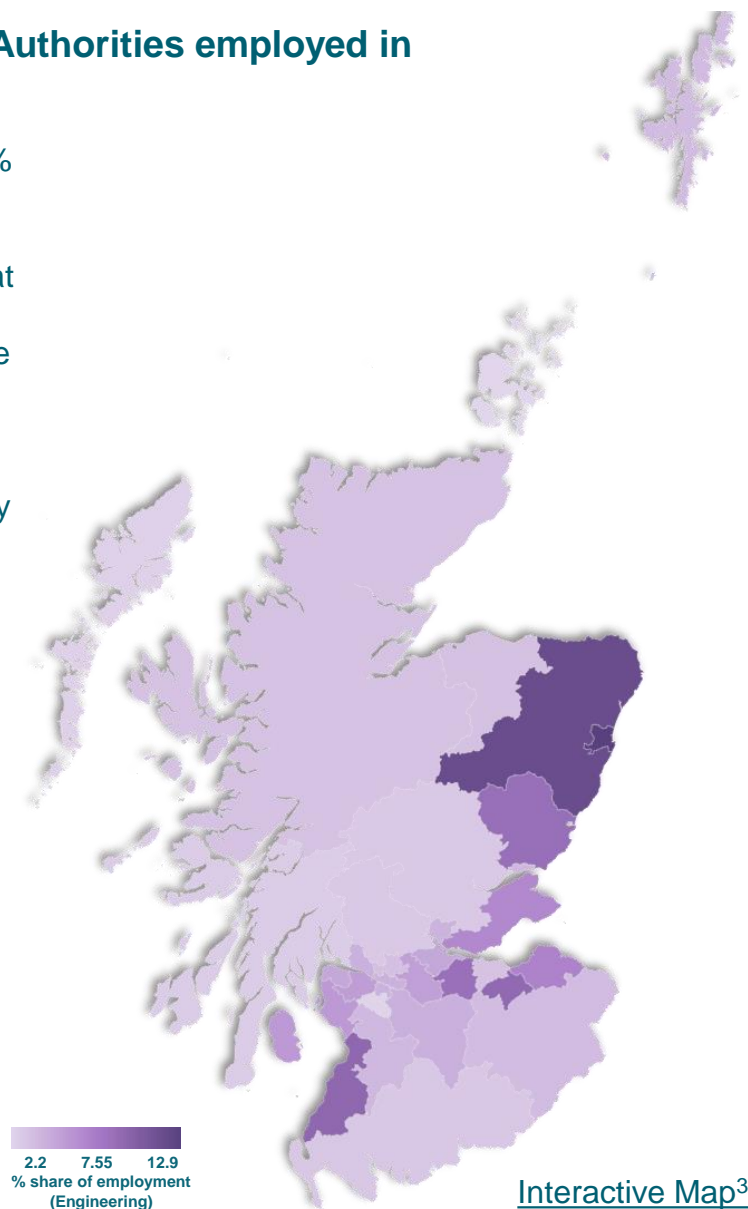
Scottish local authorities have sectoral strengths that make them unique. This means that the **Engineering** sector may be more important to some local economies, as a higher proportion of the local workforce is employed in the sector.

The sector was most prominent in the Aberdeen City (12.9%), Aberdeenshire (11.8%), South Ayrshire (9.3%) and Midlothian (9.1%) local authorities.

Employment by Region (people), 2023

The greatest number of people employed in **Engineering** were in:

Aberdeen City and Shire	34,700
Glasgow College Region*	21,900
Edinburgh, East and Midlothian	17,600
Lanarkshire	12,000



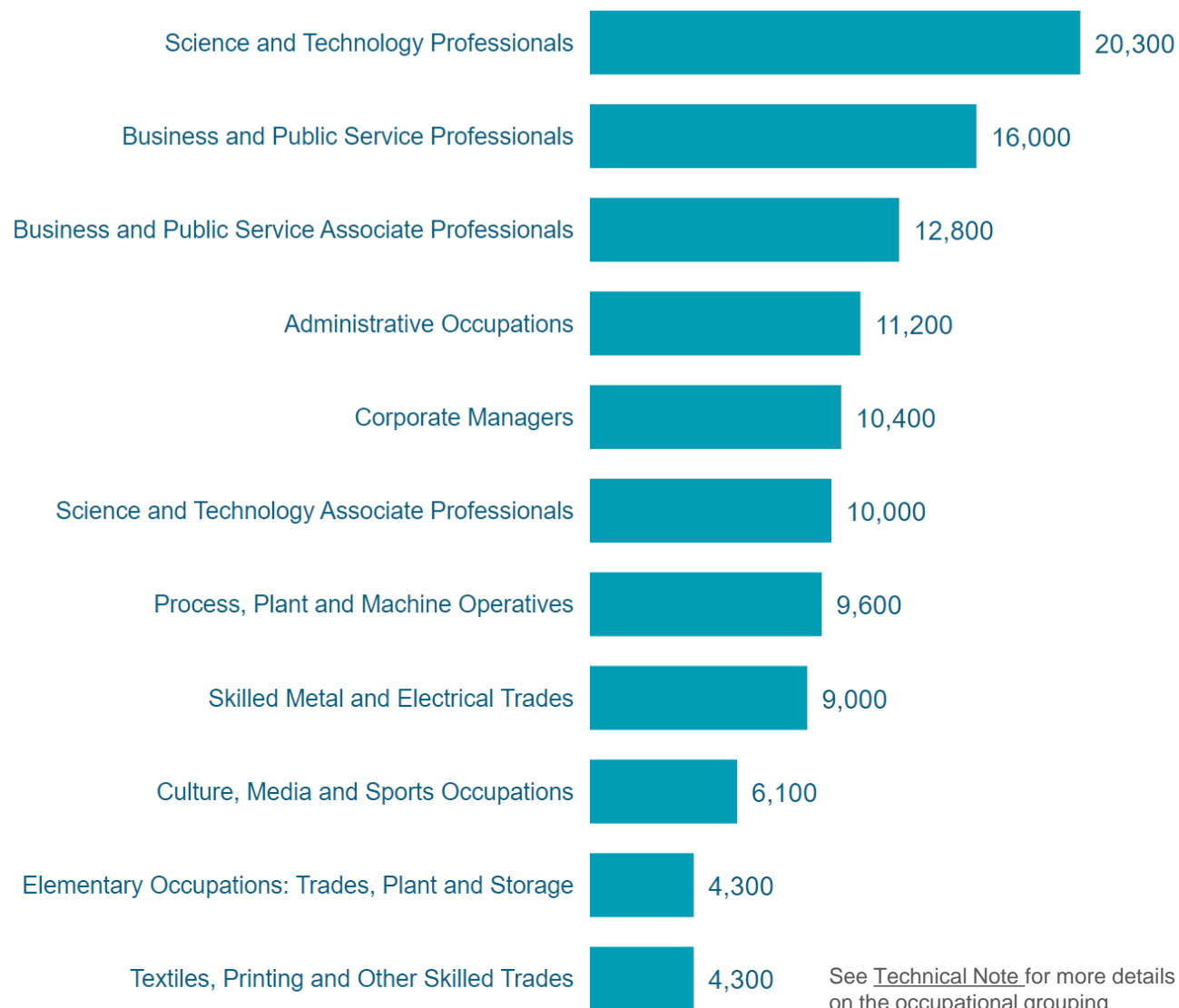
1. Forecasts by Oxford Economics (unless otherwise stated).
2. See [SCQF Framework](#) for further information on SCQF qualification levels

3. The proportion of the workforce in the Local Authority employed in sector is calculated by dividing the sectoral employment in the area by total employment in the area.

*Glasgow College Region covers East Dunbartonshire, East Renfrewshire and Glasgow City local authorities.

Current Demand¹

Top Employing Occupations (people), 2023



1. All Forecasts by Oxford Economics (unless otherwise stated)
 2. Due to data availability, a 'best fit SIC code approach' has been used, so the sectoral definitions and totals in this section may vary from those we have used elsewhere.

Real Living Wage and Gender Pay Gap^{2,3}

Individuals earning Real Living Wage or more:⁴

In April 2022, the real living wage rate for employees who did not work in London was £9.90.



Manufacturing

2021: 87.2% 2022: 91.1%

All sectors

2021: 85.5% 2022: 91.0%

Professional, scientific, and technical activities

2021: 92.1% 2022: 94.6%

Gender Pay Gap for median full-time hourly earnings:^{5,6}



Manufacturing

2021: 12.0% 2022: 17.2%

Scotland

2021: 3.0% 2022: 3.7%

Professional, scientific, and technical activities

2021: 21.6% 2022: 24.6%

Due to data availability, a 'best fit SIC code approach' has been used, so the sectors definitions may not fully match key sector definitions.

Modern Apprenticeships⁷



MAs starts for Engineering and Energy Related*:

Q4 2021/22: 1,448

Q4 2022/23: 1,853

Q1 2023/24: 53



MAs in training for Engineering and Energy Related*:

Q4 2021/22: 4,597

Q4 2022/23: 4,875

Q1 2023/24: 4,501

* Based on [SDS Occupational Groupings](#).

For data on FAs and GAs please see the Publications section of our [website](#). For data on colleges and universities please see [Scottish Funding Council](#) and [Higher Education Statistics Agency](#).

3. 2022 data is provisional.

4. The real living wage rates have been independently calculated by the Resolution Foundation according to the cost of living based on household goods and services and are overseen by the Living Wage Commission.

5. A 4% gender pay gap denotes that women earn 4% less, on average than men. Conversely, a -4% gender pay gap denotes that women earn 4% more, on average, than men.

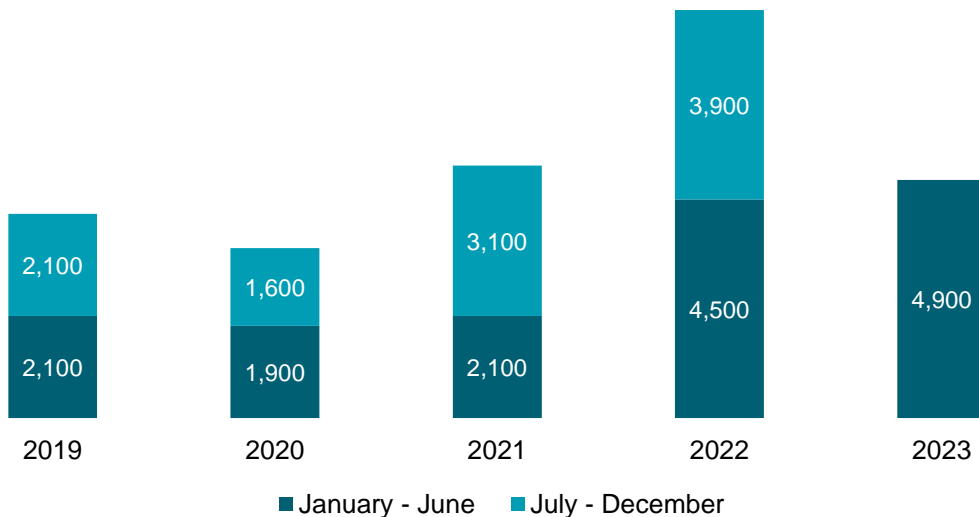


Spotlight on... Engineering Technicians

Online job postings data provides a useful barometer for the health of the jobs market. It is important to note that the data does not capture all activity, so it should be considered as an estimate only.




In 2021, job posting numbers for Engineering Technicians recovered from the impact of the Covid-19 pandemic. Between 2021 and 2022, job postings increased by 61%. Job postings for the first half of 2023 indicate a sustained demand for Engineering Technicians.

Job Postings 2019 – 2023, Engineering Technicians



Between January 2023 and June 2023, there were **4,900 job postings** for **Engineering Technicians**

Top Locations:

-  **Glasgow City**
1,000 job postings
-  **Aberdeen City**
700 job postings
-  **Edinburgh City**
600 job postings

Specialised skills and knowledge:

- **Maintenance and Repair**
- **Engineering**
- **Project Management**
- **Critical Thinking and Problem Solving**



Median real-time advertised salary:
£33,000*

Environmental Engineers



Between January 2023 and June 2023 there were 80 job postings for **Environmental Engineers**.

Of these postings, 40 were in Glasgow City and 20 were in Edinburgh City.

The top skills and knowledge for these jobs included Environmental Engineering and Restoration, Geology and Geotechnical Engineering, and Environmental Science.

1. Lightcast 2023.
2. Job postings are rounded to the nearest 10 or 100.

3. Data for Engineering Technicians is on SOC 3113 for the whole of Scotland. Data for Environmental Engineers is based on job titles for the whole of Scotland.

* Median salary based on the following proportion of job postings that contain salary information: Engineering Technicians: 36%

Future Demand: Mid-term (2023-2026)¹

In the mid-term (2023-2026), the number of people in employment is forecast to grow by 0.3% (400 people) in the **Engineering** sector. This is a smaller percentage growth than is forecast overall across Scotland where employment is predicted to rise by 2.2% (57,000 people).

In 2026, the top employing regions in the sector are forecast to be **Aberdeen City and Shire** and **Glasgow College Region**, the same as in 2023. Similar to 2023, the largest proportion of the workforce employed in the sector is forecast to be educated to **SCQF 7-10**, and the top employing occupation is forecast to be **Science and Technical Professionals**.

Forecasts for the mid-term (2023-2026) suggest there could be demand for **5,300 people in the sector**, primarily as a result of the need to replace workers leaving the labour market. Whilst positive, caution is needed as a wide range of factors may impact the future labour market.

Workforce (people), 2026



Workforce size 2026: **136,100** people



The workforce is expected to **grow** by **0.3%** or **400** people between 2023 and 2026



Compared to a Scotland wide increase of **2.2%** or **57,000** people

Total Requirement*



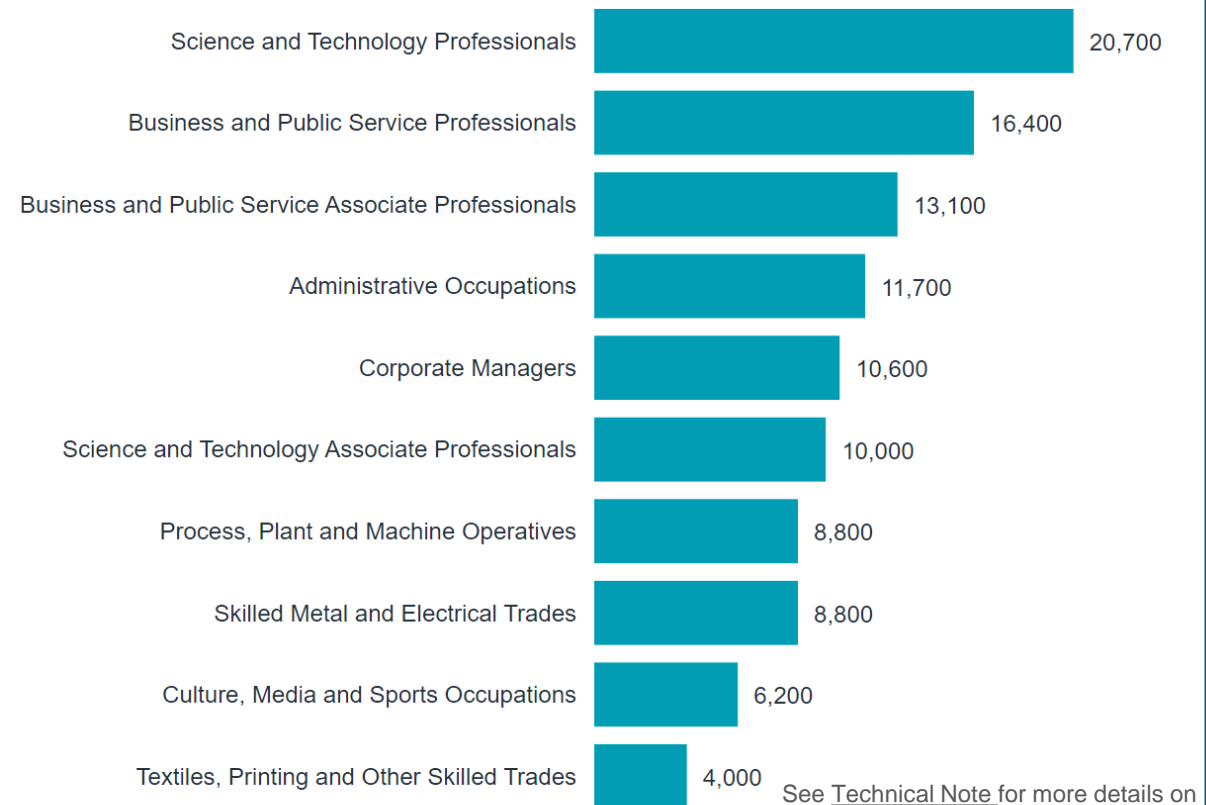
Expansion demand:
400 people

Replacement demand:
5,000 people

Total requirement:
5,300 people

Engineering is forecast to account for **1.6%** of Scotland's total requirement for people in the mid-term (2023-2026)

Top 10 Employing Occupations (people), 2026²



See [Technical Note](#) for more details on the occupational grouping

1. Forecasts by Oxford Economics (unless otherwise stated).

* Total requirement for people is made up of expansion and replacement demand.

The expansion demand is the number of people required as a result of economic growth or contraction;

The replacement demand is the number of people required to replace workers leaving the labour market (i.e. those who retire, move away or change jobs). Please note, figures are rounded to the nearest 100 and as a result totals may not equal the sum of the constituent parts

Future Demand: Long-term (2026-2033)¹

Continued automation and improvements in productivity in the Engineering sector are forecast to result in **employment contraction, with a decline of 4.4% (-6,000 people)** in the long-term (2026-2033).¹ This contrasts with the growth that is forecast overall across Scotland where employment is predicted to rise by 0.9% (22,700 people).

In 2033, **Aberdeen City and Shire** and **Glasgow College Region** are forecast to remain the top employing regions in the sector. The largest proportion of the workforce employed in the sector is **forecast to be educated to SCQF 7-10**, and **Science and Technology Professionals** is forecast to remain the most in-demand occupation within the sector.

It is also expected that there **could be an ongoing requirement for skilled people to fill opportunities created by people leaving the labour market**. This feature of the labour market is known as the replacement requirement. Forecasts for the long-term (2026-2033) estimate that **5,400 people** could be required in the sector.

Workforce (people), 2033



Workforce size 2033: **130,100** people



The workforce is expected to **decline** by **-4.4%** or **-6,000** people between 2026 and 2033



Compared to a Scotland wide increase of **0.9%** or **22,700** people

Total Requirement*



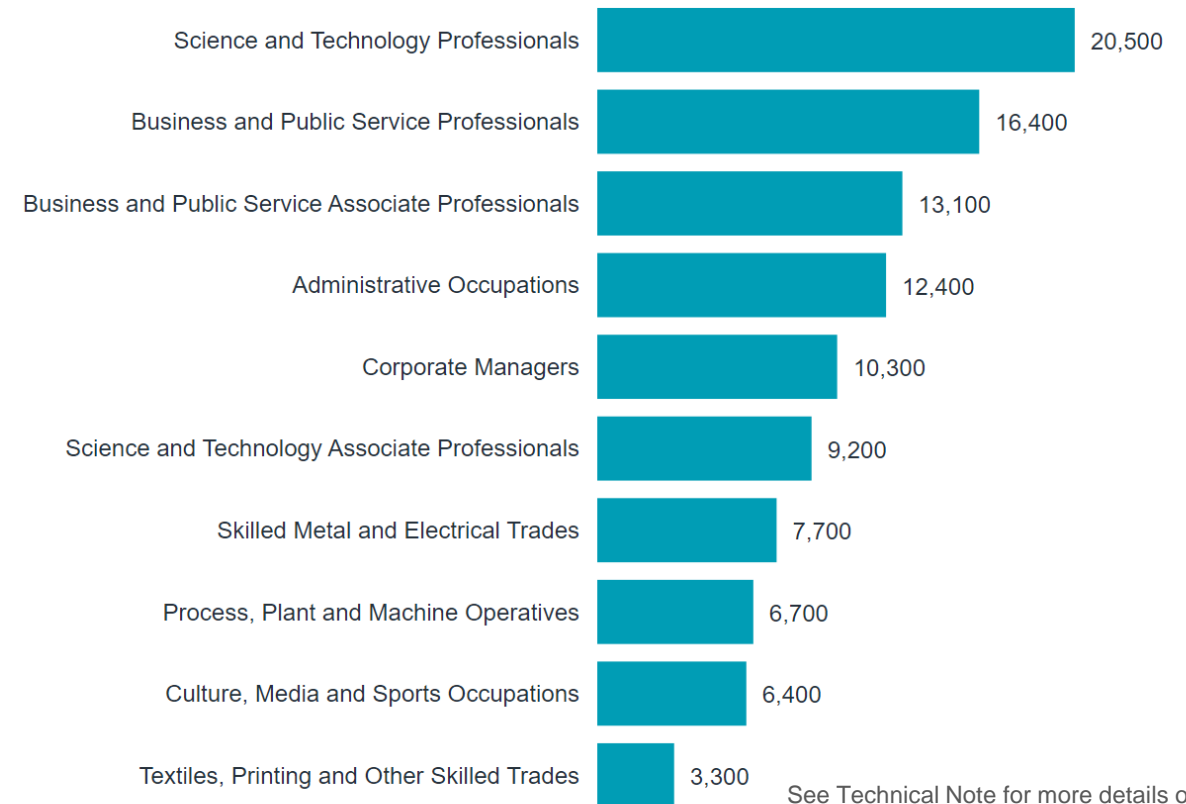
Expansion demand:
-6,000 people

Replacement demand:
11,400 people

Total requirement:
5,400 people

Engineering is forecast to account for **0.7%** of Scotland's total requirement for people in the long-term (2026-2033)

Top 10 Employing Occupations (people), 2033²



See [Technical Note](#) for more details on the occupational grouping

1. Forecasts by Oxford Economics do not account for planned initiatives or investments in the sector.
* Total requirement for people is made up of expansion and replacement demand.
The expansion demand is the number of people required as a result of economic growth or contraction;

The replacement demand is the number of people required to replace workers leaving the labour market (i.e. those who retire, move away or change jobs). Please note, figures are rounded to the nearest 100 and as a result totals may not equal the sum of the constituent parts

Appendix 1: Engineering Sector Definitions (SIC 2007)

SIC	Name
24	Manufacture of basic metals
25	Manufacture of fabricated metal products, except machinery and equipment
26	Manufacture of computer, electronic and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment n.e.c.
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment
33	Repair and installation of machinery and equipment
71	Architectural and engineering activities; technical testing and analysis
72.19	Other research and experimental development on natural sciences and engineering
13.94	Manufacture of cordage, rope, twine and netting
38.31	Dismantling of wrecks

References

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