ENERGY & UTILITY SKILLS

Skills for a greener world

2023/24 Vocational & Academic Education Profiles

February 2025

Table of Contents

This paper provides a summary of the latest trends in starts and achievements across GCSEs, A Levels, higher education and apprenticeships in various STEM[1] subject areas that are relevant to the energy and utilities sector.

1. GCSEs

1.1.1 In 2023/24, nearly 6.2 million students sat their GCSE examinations. Of these, nearly 3.2 million students sat exams in subjects relevant to the energy and utilities sector.

Figure 1: Number of people that sat GCSEs by subject

Subject area	2018/19	2023/24	% change since 2019 (pre-COVID)	% change on previous year
All Subjects	5,547,447	6,186,879	11.5%	4.8%
Chemistry	170,034	185,274	9.0%	0.7%
Design & Technology	99,659	88,607	-11.1%	2.0%
Engineering	3,424	3,018	-11.9%	9.9%
English Language	765,332	845,834	10.5%	7.2%
Maths	778,858	878,165	12.8%	6.9%
Physics	168,330	185,035	9.9%	1.2%
Science: Double Award	839,258	980,786	16.9%	4.8%

Source: GCSE (Full Course), Results Summer 2024, Joint Council for Qualifications, 22 August 2022.

1.1.2 All STEM subjects saw an increase in the number of students sitting the exam compared to the previous year.

- Engineering saw the largest increase over the year – up 9.9%
- English Language (up 7.2%) and Maths (up 4 6.9%) also saw significant increases

1.1.3 Design & Technology and Engineering have yet to recover to pre-COVID (2019) levels

1.1.4 Of the students that sat an exam in any subject, 49.7% were female – slightly down on pre-COVD levels, and unchanged on the year before.

Figure 2: Proportion who were female (of those that sat the exam)

Subject area	2018/19	2023/24	% change since 2019 (pre-COVID)	% change on previous year
All Subjects	50.1%	49.7%	-0.4%	0.0%
Chemistry	49.3%	48.9%	-0.4%	-0.6%
Design & Technology	29.8%	31.2%	1.4%	1.3%
Engineering	10.4%	16.3%	5.9%	-5.8%
English Language	48.0%	48.0%	0.0%	0.0%
Maths	50.3%	50.0%	-0.3%	0.4%
Physics	49.0%	48.5%	-0.5%	-0.6%
Science: Double Award	49.8%	49.8%	.0%	0.4%

Source: GCSE (Full Course), Results Summer 2024, Joint Council for Qualifications, 22 August 2022.

1 Science, technology, engineering and maths.

1.1.5 Approximately, 42% of students that sat an exam in sector-relevant STEM subjects were female

1.1.6 Only Maths achieved gender equality in 2023/24, although Physics, Science: Double Award and Chemistry almost did so

1.1.7 Just 16.3% of students sitting an Engineering GCSE exam were female

1.1.8 While Design & Technology and Engineering reported the lowest proportion of female students, they are the only subjects to now be performing better than pre-COVID levels (although English Language and Science: Double Award have both recovered to that level).

1.1.9 Overall, 67.6% of students achieved a grade 4/C or higher – down half a percentage point over the year, but slightly better than pre-COVID levels.

Figure 3: Proportion that achieved Grade 4/C or higher by subject

Subject area	2018/19	2023/24	% change since 2019 (pre-COVID)	% change on previous year
All Subjects	67.3%	67.6%	0.3%	-0.6%
Chemistry	90.1%	90.5%	0.4%	0.7%
Design & Technology	63.8%	66.2%	2.4%	0.6%
Engineering	52.5%	55.2%	2.7%	-2.2%
English Language	62.0%	61.9%	-0.1%	-2.8%
Maths	59.6%	59.5%	-0.1%	-1.6%
Physics	90.9%	90.3%	-0.6%	0.1%
Science: Double Award	55.9%	57.3%	1.4%	0.2%

Source: GCSE (Full Course), Results Summer 2024, Joint Council for Qualifications, 22 August 2022.

1.1.10 Achievement of grade 4/C in sector-relevant STEM subjects varies greatly – from a low of 55.2% in Engineering, to a high of 90.5% in Chemistry

1.1.11 Of the seven STEM subject areas, four have recovered to pre-COVID levels of achievement – and the remaining three are less than one percentage point below pre-COVID levels

2. A Levels

2.1.1 In 2023/24, nearly 890,000 students sat their GCE A Level examinations. Of these nearly 224,000 students sat exams in subjects relevant to the energy and utilities sector

Figure 4: Number of people that sat GCE A Level by subject

Subject area	2018/19	2023/24	% change since 2019 (pre-COVID)	% change on previous year
All Subjects	801,002	886,514	10.7%	2.2%
Chemistry	59,090	62,583	5.9%	2.1%
Design & Technology	10,870	10,548	-3.0%	-0.9%
Maths	91,895	107,427	16.9%	10.9%
Physics	38,958	43,114	10.7%	12.3%

Source: GCE AS and A Level, Results Summer 2024, Joint Council for Qualifications, 15 August 2024.

2.1.2 Only Design & Technology has yet to return to pre-COVID levels in terms of numbers sitting the exam

2.1.3 Overall, the proportion of students that sat a STEM-related A Level exam in 2023/24 was higher than (i) pre-COVID levels and (ii) the previous year

Figure 5: Proportion who were female (of those that sat the exam)

Subject area	2018/19	2023/24	% change since 2019 (pre-COVID)	% change on previous year
All Subjects	55.0%	54.1%	-0.9%	-0.3%
Chemistry	53.7%	56.2%	2.5%	0.6%
Design & Technology	31.9%	31.8%	-0.1%	1.6%
Maths	38.7%	37.2%	-1.5%	-0.5%
Physics	22.6%	23.3%	0.7%	0.3%

Source: GCE AS and A Level, Results Summer 2024, Joint Council for Qualifications, 15 August 2024.

2.1.4 Approximately 37% of students that sat an exam in sector-relevant STEM subjects were female – lower than the 42% of students that sat a GCSE exam in a sector-relevant STEM subject

2.1.5 Maths is the only subject which is still some way short of pre-COVID levels (1.5 percentage points lower)

2.1.6 Overall, 76.4% of students that sat an A Level exam in any subject achieved a Grade C or higher – higher than both pre-COVID levels and the previous year

Figure 6: Proportion that achieved Grade C or higher by subject

Subject area	2018/19	2023/24	% change since 2019 (pre-COVID)	% change on previous year
All Subjects	75.8%	76.4%	0.6%	0.4%
Chemistry	72.2%	73.5%	1.3%	1.9%
Design & Technology	68.2%	71.4%	3.2%	2.5%
Maths	75.6%	76.7%	1.1%	0.2%
Physics	70.5%	69.7%	-0.8%	0.4%

Source: GCE AS and A Level, Results Summer 2024, Joint Council for Qualifications, 15 August 2024.

2.1.7 Maths is the only sector-relevant STEM subject that achieved a higher success rate (76.7%)

2.1.8 Only Physics has yet to reach pre-COVID levels

3. Higher education

3.1 Starts

3.1.1 Overall, 625,000 people started a first year, first degree HE course in 2021/22[2]; although this is down slightly compared to the previous year, it is substantially higher than in 2018/19

Figure 7: First-year First Degree starts on selected STEM subjects – total starts

Subject area	2018/19	2023/24	% change since 2019 (pre-COVID)	% change on previous year
All subjects	560,020	625,020	11.6%	-0.5%
Sector-Relevant STEM subjects	115,200	115,220	0.0%	-3.4%
Computer Sciences	28,910	30,680	6.1%	-3.7%
Engineering	30,550	30,640	0.3%	-2.2%
Geography and Related Subjects	6,550	7,930	20.9%	-3.6%
Mathematics	25,330	25,500	0.7%	-2.6%
Physical Sciences	23,860	20,470	-14.2%	-5.8%

Source: HESA Student Records, 2021/22.

3.1.2 There were 115,000 starts on sector-relevant STEM subject areas – with all subject areas showing a decrease on the previous year, but most (with the exception of Physical Sciences) increasing past 2018/19 levels

3.1.3 Starts in the Physical Sciences show a worrying decline – both on the year (-5.8%) and since 2018/19 (-14.2%)

3.1.4 Overall, 56.1% of HE First-year First Degree starts in 2021/22 were female

Figure 8: First-year First Degree starts on selected STEM subjects - % female

Subject area	2018/19	2023/24	% change since 2019 (pre-COVID)	% change on previous year
All subjects	56.3%	56.1%	-0.2%	-0.5%
Sector-Relevant STEM subjects	29.8%	28.9%	-0.9%	-0.3%
Computer Sciences	16.3%	17.6%	1.3%	0.7%
Engineering	17.2%	16.8%	-0.4%	-0.1%
Geography and Related Subjects	52.8%	52.7%	-0.1%	-0.6%
Mathematics	35.1%	33.1%	-2.0%	-1.4%
Physical Sciences	50.5%	49.4%	-1.1%	0.0%

Source: HESA Student Records, 2021/22.

3.1.5 29% of students on sector-relevant STEM courses were female

3.1.6 Only Computer Science is showing signs of increasing its female representation amongst its students

3.1.7 This highlights the continuing trend of reducing female participation on STEM courses from secondary, through to tertiary and higher education – 37% of STEM A Level students were female, and 42% of STEM GCSE students were female

3.1.8 Overall, 29.6% of HE First-year First Degree starts in 2021/22 were from an ethnic minority background – demonstrating that the HE student population is more ethnically diverse than the UK resident population of 16-24-year-olds (21%)

2 It should be remembered that the 2021/22 academic year was affected by COVID restrictions.

Figure 9: First-year First Degree starts on selected STEM subjects - % from an ethnic minority background

Subject area	2018/19	2023/24	% change since 2019 (pre-COVID)	% change on previous year
All subjects	26.7%	29.6%	2.9%	1.7%
Sector-Relevant STEM subjects	29.6%	33.2%	3.6%	2.4%
Computer Sciences	31.2%	39.6%	8.4%	3.6%
Engineering	32.3%	35.7%	3.4%	2.6%
Geography and Related Subjects	10.6%	12.8%	2.2%	0.5%
Mathematics	33.6%	36.6%	3.0%	1.2%
Physical Sciences	26.4%	26.0%	-0.4%	2.2%

Source: HESA Student Records, 2021/22.

3.1.9 In sector-relevant STEM subject areas, the proportion is even higher at 33.2% - the exceptions being Geography and Related Subjects (at just 12.8%) and Physical Sciences (26.0%)

3.1.10 The proportion of students that are from an ethnic minority background is generally increasing across the board, although Physical Sciences are still lagging behind pre-COVID levels

3.2 Graduates and progression into employment

3.2.1 Overall, in 2021/22, there were 258,000 graduates from first degree courses – although down on the year, this is higher that than in 2018/19

Figure 10: First degree STEM Graduates

Subject area	2018/19	2023/24	% change since 2019 (pre-COVID)	% change on previous year
All subjects	249,500	258,060	3.4%	-4.0%
Sector-Relevant STEM subjects	53,540	53,460	-0.2%	-0.4%
Computer Sciences	10,100	10,950	8.4%	4.1%
Engineering	12,840	12,520	-2.5%	-1.1%
Geography and Related Subjects	5,420	4,200	-22.4%	-7.7%
Mathematics	12,430	14,680	18.1%	1.4%
Physical Sciences	13,310	11,120	-16.4%	-3.1%

Source: HESA Student Records, 2021/22.

3.2.2 In sector-relevant STEM subject areas, there were 53,500 graduates – down on both the previous year and compared to 2018/19

3.2.3 However, there is growth in the number of graduates from both Computer Sciences and Mathematics

3.2.4 The decline in the number of Physical Sciences graduates reflects the reduction in starts (see Figure 7 above)

3.2.5 The following analysis relates to graduates economic activity approximately 15 months after completing their studies

3.2.6 By far the largest number of STEM graduates enter employment in the Computer programming, consultancy and related activities sectors

Figure 11: Number of First degree STEM Graduates entering employment by sector

Sector	Number of STEM Graduates entering employment
Computer programming, consultancy and related activities	5,341
Education	2,613
Architectural and engineering activities; technical testing and analysis	2,405
Financial service activities, except insurance and pension funding	2,296
Legal and accounting activities	2,003
Public administration and defence; compulsory social security	1,838
Retail trade (except of motor vehicles)	1,831
Activities auxiliary to financial services and insurance activities	1,053
Scientific research and development	851
Other professional, scientific and technical activities	799

Source: HESA Graduate Outcomes Survey, 2021/22.

3.2.7 The energy and utilities sector as a whole narrowly misses out on making it into the top ten sectors for recruiting STEM graduates (770 – see Figure 11 below)

3.2.8 Across all subject areas, 1,580 graduates entered employment in the energy and utilities sector in 2021/22 – an encouraging upward trend

Figure 12: First degree STEM Graduates that entered employment in the energy and utilities sector

Subject area	2018/19	2023/24	% change since 2019 (pre-COVID)	% change on previous year
All subjects	1,500	1,580	5.2%	0.7%
Sector-Relevant STEM subjects	700	770	10.2%	6.1%
Computer Sciences	50	70	42.0%	29.1%
Engineering	320	380	16.5%	18.4%
Geography and Related Subjects	70	90	38.5%	-15.9%
Mathematics	90	110	24.1%	-7.7%
Physical Sciences	180	130	-28.3%	-3.1%

Source: HESA Student Records, 2021/22.

3.2.9 These include 770 from sector-relevant STEM courses

3.2.10 It is encouraging to see the overall growth in the number of sector-relevant STEM graduates entering employment in the energy and utilities sector

3.2.11 Again, the decline in the number of Physical Sciences graduates entering employment in the sector reflects the reduction in starts (see Figure 7 above)

3.2.12 89% of STEM graduates that enter employment in the energy and utilities sector do so in an Associate Professional, Professional or Managerial level occupation – this is a much higher proportion than all graduates (no matter what subject they studied) that entered employment in the sector (75%) – and is higher than the proportion of all graduates that enter employment in any sector (86%)

Figure 13: Occupation of STEM graduates entering employment - 2021/22

Occupation	STEM Graduates entering the energy and utilities sector	All Graduates entering the energy and utilities sector	All Graduates entering employment
Managers, Directors and Senior Officials	2.8%	3.8%	3.2%
Professional Occupations	69.6%	50.5%	63.9%
Associate Professional and Technical Occupations	16.8%	20.8%	18.4%
Administrative and Secretarial Occupations	3.8%	9.1%	4.3%
Skilled Trades Occupations	2.9%	4.2%	1.9%
Caring, Leisure and Other Service Occupations	0.0%	0.0%	1.4%
Sales and Customer Service Occupations	3.0%	9.2%	2.9%
Process, Plant and Machine Operatives	0.4%	0.7%	0.9%
Elementary Occupations	0.7%	1.7%	3.1%
% entering Associate Professional, Professional or Managerial occupations	89.2%	75.1%	85.5%

Source: HESA Graduate Outcomes Survey, 2021/22.

3.2.13 70% of STEM graduates that enter the sector do so in a Professional occupation (i.e. at a RQF level 6 (SCQF level 9-10) occupation)

3.2.14 18% of all graduates that enter the energy and utilities sector, are employed in Administrative and Secretarial Occupations and Sales and Customer Service Occupations (much higher than the 7% of all graduates that enter employment in any sector)

3.2.15 Reflecting this, 44% of STEM graduates that enter employment in the energy and utilities sector, earn £30,000 or more – a much higher proportion than all graduates that enter the sector (no matter what subject they studied) (36%) – and substantially higher than the proportion of all graduates that enter employment in any sector (24%)

Figure 14: Salary band of Graduates entering employment - 2021/22

Occupation	STEM Graduates entering the energy and utilities sector	All Graduates entering the energy and utilities sector	All Graduates entering employment
Minimum wage - £15,000	0.3%	0.2%	1.5%
£15,001 - £20,000	3.3%	6.5%	12.3%
£20,001 - £25,000	19.2%	27.8%	32.0%
£25,001 - £30,000	33.2%	29.5%	29.7%
£30,001 - £35,000	23.2%	18.7%	12.6%
£35,001 - £40,000	8.5%	7.4%	5.2%
£40,001 - £45,000	4.4%	3.3%	2.5%
£45,001 - £50,000	3.0%	2.9%	1.6%
£50,001 - £55,000	1.8%	1.4%	0.7%
£55,001 - £60,000	1.4%	1.0%	0.6%
£60,001 - £65,000	0.8%	0.5%	0.3%
£65,001 - £70,000	0.6%	0.5%	0.3%
£70,001 - £245,000	0.3%	0.3%	0.7%
% of Graduates in employment earning at least £30,000	43.9%	35.9%	24.4%

Source: HESA Graduate Outcomes Survey, 2021/22.

4. Apprenticeships

4.1.1 In 2022/23, there were 13,212 starts on sector-relevant "technical" apprenticeship programmes across the UK – a significant increase on 2018/19

Figure 15: Starts on apprenticeship standards and frameworks relevant to the energy and utilities sector ("technical" programmes only)

Occupational Group	2018/19	2022/23	% change since 2018/19 (pre-COVID)	% change on previous year
Total sector-relevant starts	6,869	12,903	87.8%	0.7%
Proportion that are female	4.9%	4.4%	-0.4%	0.6%
Proportion that are from an ethnic minority background (England only)	5.9%	7.3%	1.4%	0.4%

Source: Department for Education (England), Department for the Economy (Northern Ireland), Skills Development Scotland (Scotland) and Welsh Government (Wales).

4.1.2 The proportion of starts that are female remains very low, at just 4.4%

4.1.3 While the proportion of starts that are from an ethnic minority background also is lower than total resident population (17%; and 21% of 16-24-year-olds), it is increasing

4.1.4 The largest number of apprenticeship starts in England[3] relate to gas utilisation (e.g. domestic gas engineering)

Figure 16: Starts on all apprenticeship standards (England only) by industry

Industry	2019/20	2021/22	% change since 2019/20	% change on previous year
Gas Networks	210	440	109.5%	37.5%
Gas Utilisation	3,220	4,120	28.0%	38.3%
Power	1,210	920	-24.0%	-15.6%
Waste Management & Recycling	710	810	14.1%	15.7%
Water	490	590	20.4%	1.7%
Energy and utilities sector	5,840	6,880	17.8%	21.3%

Source: Department for Education

4.1.5 Substantial growth has occurred in starts across the energy and utilities sector since 2019/20 (when these data were first released) – the exception being the power industry, which remains below 2019/20 levels

4.1.6 As the table below demonstrates (again for England only), across the Waste management and Water industries, the most popular apprenticeship standard is Team Leader or Supervisor

4.1.7 Within Electricity and Gas, the Dual Fuel Smart Meter Installer standard has the most starts

3 Data relating to starts by industry and individual apprenticeship frameworks is not available for Northern Ireland, Scotland or Wales.

Figure 17: Starts on the most common apprenticeship standards (England only) by industry

Industry & Apprenticeship	2019/20	2021/22	% change since 2019/20 (pre-COVID)	% change on previous year
Electricity and Gas				
Dual Fuel Smart Meter Installer	*	180	—	20.0%
Power Network Craftsperson	170	140	-17.6%	27.3%
Customer Service Practitioner	60	10	-83.3%	-50.0%
Waste collection, treatment and disposal activities; materials recovery				
Team Leader or Supervisor	120	120	0.0%	71.4%
Large Goods Vehicle (LGV) Driver C and E	60	60	0.0%	-33.3%
Business Administrator	50	50	0.0%	0.0%
Maintenance and Operations Engineering Technician	20	50	150.0%	25.0%
Operations or Departmental Manager	30	40	33.3%	0.0%
Heavy Vehicle Service and Maintenance Technician	30	30	0.0%	0.0%
Waste Resource Operative	20	30	50.0%	-50.0%
Water collection, treatment and supply				
Team Leader or Supervisor	40	120	200.0%	140.0%
Water Process Technician	140	90	-35.7%	-30.8%
Operations or Departmental Manager	30	60	100.0%	50.0%
Associate Project Manager	*	40	—	33.3%
Maintenance and Operations Engineering Technician	40	30	-25.0%	-25.0%
Utilities Engineering Technician	10	20	100.0%	-33.3%

Source: Department for Education

5. Conclusions

Starts

5.1.1 Across STEM-related GCSE subject areas, the number of students sitting the exam has recovered past pre-COVID levels – with the exception of Design & Technology and Engineering – all STEM subject areas increased when compared to the previous year

5.1.2 At A Level, the number of students sitting an exam in Chemistry, Maths and Physics is increasing, but not in Design & Technology

5.1.3 There were 115,000 starts on first year, first degree, sector-relevant STEM courses – with all subject areas showing a decrease on the previous year, but most (with the exception of Physical Sciences) increasing past 2018/19 levels

5.1.4 Starts in the Physical Sciences show a worrying decline – both on the year (-5.8%) and since 2018/19 (-14.2%)

5.1.5 Data relating to England only shows that, across the Waste management and Water industries, the most popular apprenticeship standard is Team Leader or Supervisor

5.1.6 Within Electricity and Gas, the Dual Fuel Smart Meter Installer standard has the most starts

Gender

5.1.7 Gender equality at GCSE level is particularly lacking in Engineering (16.3%) and Design & Technology (31.2%) – all other STEM subject areas are approaching gender equality, but only Maths achieves it

5.1.8 This analysis highlights the continuing trend of reducing female participation on STEM courses from secondary, through to tertiary and higher education:

- 42% of STEM GCSE students were female
- 37% of STEM A Level students were female
- 29% of first year, first degree students on sector-relevant STEM courses were female

5.1.9 This is a marked contrast to the levels of gender diversity on sector-relevant “technical” apprenticeship programmes – at 4.4%

Ethnicity

5.1.10 Overall, 29.6% of HE First-year First Degree starts in 2021/22 were from an ethnic minority background – demonstrating that the HE student population is more ethnically diverse than the UK resident population of 16-24-year-olds (21%)

5.1.11 This is a marked contrast to the levels of ethnic diversity on sector-relevant “technical” apprenticeship programmes – at 7.3%

Progression into employment into the energy and utilities sector

5.1.12 Of the 1,580 graduates entering employment in the energy and utilities sector in 2021/22, 770 were from STEM-related subjects – with both numbers on an upward trajectory

5.1.13 However, there is concern about a fall in the number of starts, graduates and graduates entering employment in the energy and utilities sector, from the Physical Sciences

5.1.14 By far the largest number of STEM graduates enter employment in the Computer programming, consultancy and related activities sectors – the energy and utilities sector as a whole narrowly misses out on making it into the top ten sectors for recruiting STEM graduates

5.1.15 STEM graduates entering employment in the energy and utilities sector are more likely to do so in an Associate Professional, Professional or Managerial level occupation (89%) than all graduates entering the sector (no matter what subject they studied) (75%) and all graduates that enter employment in any sector (86%)

5.1.16 Reflecting this, a higher proportion of STEM graduates entering employment in the energy and utilities sector earn £30,000 or more (44%) than all graduates that enter the sector (no matter what subject they studied) (36%) and of all graduates that enter employment in any sector (24%)

5.1.17 However, 18% of all graduates that enter the energy and utilities sector, are employed in Administrative and Secretarial Occupations and Sales and Customer Service Occupations (much higher than the 7% of all graduates that enter employment in any sector) – potentially under-utilising their skills and knowledge

6. Recommendations

6.1.1 This analysis provides continuing evidence of the need to take action in the following areas:

- To achieve greater female representation on STEM courses at A Level and higher education
- To achieve greater female and representation and ethnic diversity on “technical” apprenticeship programme relevant to the energy and utilities sector
- Address the falling number of starts in the Physical sciences at higher education level
- Promote the greater likelihood of STEM graduates who enter employment in the energy and utilities sector doing at a higher-level occupation and earning a higher salary
- Make the most of graduates that enter the sector’s workforce via administrative and customer services occupations – accounting for nearly one-in-five of graduates entering the sector

ENERGY &
UTILITY SKILLS

Visit euskills.co.uk

Energy & Utility Skills Limited
Avon House, 435 Stratford Road, Shirley, Solihull, B90 4AA
T 0121 713 8255 **E** workforceplanning@euskills.co.uk