

Engineering 2023

A barometer of the profession in Ireland

Foreword

Engineering 2023 – A Barometer of the Profession in Ireland is the sixth in a series of reports by Engineers Ireland tracking developments in the engineering profession in Ireland. The report covers insights relevant to all disciplines of engineering.

Engineering touches the lives of everyone, providing creative solutions to societal needs from tangible works such as bridges and flood defences, to heart stents and prostheses as well as the invisible technology that is all around us. But there is a problem: there are not enough skilled engineers to meet demand. The skills shortage is nothing new. In fact, it has been an issue for years. To try and retain or seek talent, companies are upskilling, maintaining hybrid working, where possible and attracting talent from overseas.

This is one such finding in this report. There are other findings; engineering is proving to be a robust industry in Ireland and has recovered strongly post the pandemic years and is predicting continued growth. We are all aware of the recent job cuts in the tech sector – many of them in the engineering area. It is important to stress that there are other sectors which are in urgent need of engineers e.g., construction and consultancy, with almost 8,000 new jobs anticipated in these sectors in 2023.

Experienced engineers are in high demand, in particular. Our Employer Survey has shown that 72% of member-respondents are majorly concerned about the shortage of engineers with the correct skills. These engineering employers see this shortage as the main barrier to business growth.

We will need to continue attracting skilled graduates into the profession in addition to engineers from overseas. Promoting STEM subjects in our schools has to be further prioritised to meet these opportunities now and into the future.

Ireland's restructured apprenticeship system may alleviate the issue of demand for engineers by providing both academic learning and hands-on training, providing students with excellent opportunities and career progression. An engineering apprenticeship can also be a proven way for employers to develop talent for their company, as well as opening up new and rewarding careers, with learning grounded in practical experience.



Damien Owens,
Chartered Engineer
Director General,
Engineers Ireland



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Engineers Ireland Advocacy

National development: Our members' skills are core to delivering a sustainable, green and digital future across all aspects of our society and realising the ambition of Project Ireland 2040.

The Big Challenge – sustainability: Engineers Ireland, collaborating with others, is a definitive voice on sustainable engineering solutions. Our members are encouraged to keep sustainability at the heart of their roles.

Engineering a Digital Future, Now: Engineers Ireland is a go-to organisation in ensuring the future workforce has the necessary digitalisation skills to succeed.

Standards protect Society: Engineers Ireland is passionate about ensuring that the quality of standards that impact our lives, is first class. We actively encourage members' participation in the continuous maintenance, development, and implementation of these standards

Introduction

This is the sixth in the series of engineering reports, a barometer of the engineering profession in Ireland. This report and previous reports, which are all available on the Engineers Ireland website, present indicators of engineering employment, perspectives and education, based on bespoke research and publicly accessible data.

This report is predominantly based on the results of data collected through three different surveys:

- A **Member Survey** undertaken by Engineers Ireland with 2,163 responses.
- An **Employer Survey** undertaken by Engineers Ireland with 86 responses.
- A **public poll** with 1,000 respondents undertaken by Behaviour & Attitudes.

More information on the methodology is available in the Appendix.

The purpose of Engineering 2023 is to measure, analyse and learn from trends in engineering employment and the perception of engineering in Ireland.

The analysis in this report focuses on changes to engineers' employment over the past year and on engineers' perspectives on the profession. These results are filtered by respondents' experience, gender, job position, work location, engineering discipline and sector. Due to limitations of the sample, some broad categories are used, e.g. location (provinces, Cork, Dublin, overseas) and broad engineering disciplines and sectors. The concluding section summarises trends and lessons for the engineering profession in Ireland.

A detailed breakdown of salary data is available in Engineers Ireland's Salary Survey 2023 report available to our members only.

Before delving into this information in Engineering 2023, it is useful to consider some broader economic, social and political developments.

Infrastructure in Ireland

Ireland's overall infrastructure is in need of upgrading. Ireland's economy has been growing rapidly over the past decade, but its physical infrastructure in several areas has fallen behind the growing requirements of a green future. This is particularly noticeable in housing and energy infrastructure.

Education

Engineering is vital to the growth of Ireland's economy and there is a clear shortage of engineers. More need to be done to encourage young people to consider a career in engineering. Action needs to be undertaken to inspire young children to get involved in STEM subjects.

The Climate Crisis

Sustainability must be key to all aspects of engineering to tackle the growing climate issues and reach our challenging sustainability goals. The Vision of Engineers Ireland is A community of creative professionals, delivering sustainable solutions for society.

At-a-glance

Almost **8,000**

new jobs will be **created** in Ireland **for engineers** in **2023**.

72% of employers

see the **shortage of engineers** with the **correct skills** as the **main barrier to business growth**.

92% of the public demonstrate

a **high opinion** of **engineering** and **engineers' competence**.

For 2023, **85%** of

members agree that there are **plenty of job opportunities** in the sector.

For 2023, **71%** of engineering employers

have told us that **they expect their financial position** to **greatly improve** or **slightly improve** this year.

The public response **mirrors**

the engineering response on the state of infrastructure in Ireland, with **housing** requiring the highest priority effort and **communications** infrastructure requiring the least.

63% of our members agree

that **apprenticeships** are an **attractive pathway** into **engineering**.

77% of the public agree that

engineering is a **rewarding career** for **young people**

70% of the public agree

that **engineers are critical** to **combating climate change** and **biodiversity loss**.

Employment



1. Engineering employment

2022 and into 2023

The results from our Employer Survey for our 2023 Barometer indicate that the profession of engineering remains robust in terms of remuneration, job opportunities and outlook, with recruitment opportunities for young engineers, mostly in Dublin and Cork, remaining strong.

Engineering employers in Ireland had a positive year in 2022. Sixty nine percent indicated to us that their financial position greatly improved or slightly improved during those 12 months, when compared to 2021. Just 3% felt that their position had disimproved. For 2023, 71% of engineering employers have told us that they expect their financial position to greatly improve or slightly improve this year.

Engineering directors and managers were confident about growth in their organisations in 2022, with 79% planning to recruit engineers. Utilities (which include electricity, water, gas, and telecommunications) expanded their engineering workforces in the year, with 94% of these companies looking to hire engineers.

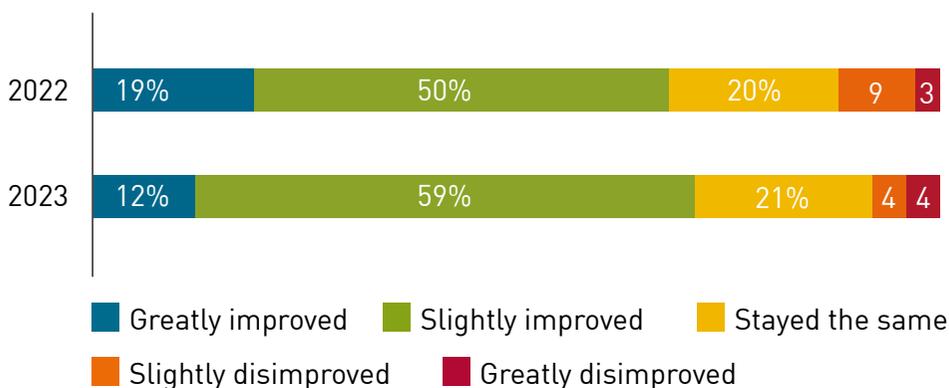


Figure 1 Reported change in financial position.

In relation to recruitment in 2023, the outlook is very positive. For 2023, 67% of engineering employers surveyed plan to recruit engineers. By extrapolating our results to the full engineering labour force (weighting by industry), we have estimated recruitment trends for the broader engineering sector (see Appendix 1 for the method). This research has revealed very high demand for engineers right across the economy. Almost 8,000 job openings for engineers will be created in 2023 (Table 1).

Table 1 Demand for engineers in 2023 by industry and discipline

2023	Construction	Consultancy	Manufacturing	Other	All industries
Chemical & Process	2	305	14	14	334
Civil & Building	740	492	48	739	2,019
Electrical & Electronic	587	195	457	651	1,889
Mechanical & Manufacturing	611	420	457	793	2,281
Other/General	16	516	48	892	1,471
All disciplines	1955	1928	1023	3088	7,994

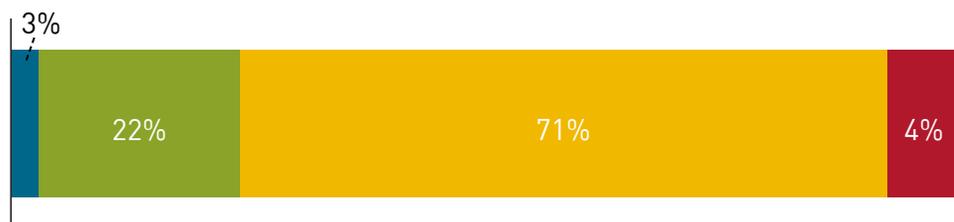
Ways of working

With working practices starting to stabilise for many industries, post pandemic, we have aimed to gauge any change in the working models of our engineering employers.

The results in a previous Barometer told us that before the pandemic (pre-March 2020), more than half of our members worked in the office five days a week (58%), and almost a quarter would spend one day a week on site.

For 2023 we asked engineering employers 'What will be your organisation's approach to work location?' 71% of those surveyed expect a hybrid model of working this year, with the flexibility to work from home, on site or the office, as required.

When it comes to retaining staff, flexible working opportunities were the second highest issue employers had in 2022, after salary expectations. For 2023 employers anticipate that the issue of salary expectation will continue to be the most important to retain staff.



- Majority working from home
- Full return to the office of all staff, i.e. as pre-Covid
- Hybrid working - Flexibility to work from home, site and the office as required
- Flexible start/finish times

Figure 2 Expected working model going into 2023



Apprenticeships

There are several ways to enter the engineering profession at different levels. In our Member Survey, members were asked to either agree or disagree with the following statement: 'Apprenticeships are an attractive pathway into the engineering profession in Ireland.'

Sixty-three per cent of members agree that apprenticeships are an attractive pathway into engineering, with a higher percentage of females (70%) than males (62%) agreeing, as indicated in the graph below.

Table 2: Apprenticeships are an attractive pathway into engineering

	Agree	Disagree	Neither
Experience			
1-2 years	51%	22%	26%
3-5 years	68%	16%	15%
6-10 years	64%	16%	20%
11-15 years	61%	19%	19%
16-20 years	62%	19%	20%
21-25 years	60%	13%	26%
26-30 years	67%	10%	22%
>30 years	63%	16%	20%
Gender			
Female	70%	15%	15%
Male	62%	16%	22%

Employers were also asked: 'Approximately how many apprentices does your organisation have in the Republic of Ireland?' The Employer Survey shows that 13% of the organisations who responded have apprentices.

This is expected to increase to 20% in 2023 as more companies take on apprentices. This will result in a 37% increase in apprentice positions in 2023.

Salary changes in 2022 compared to 2021

Each year, Engineers Ireland undertakes a member salary survey. This presents up-to-date information on salary levels and employment benefits received by engineers who are employed in Ireland.

Experience is the strongest predictor of an engineer's salary. Therefore, the number of years of experience is used to disaggregate salaries in the tables which follow. This number of years' experience is based on the number of years since graduation with a primary engineering qualification.

In 2022 many engineers received an increase in salary across all disciplines. Seventy percent of engineers with 3-5 years' experience received a salary increase of more than 5%. Forty-eight percent of young engineers, as the graph shows us, with just 1-2 years' experience also received an increase of more than 5%. Obtaining a promotion to a more senior role, entering management, and supervising more staff all typically result in a larger salary.

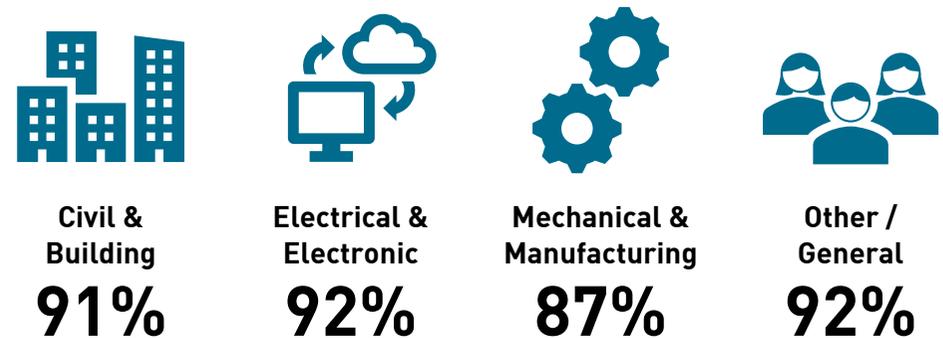


Figure 3 Any increase in salary by discipline of engineering

Table 3 Reported change in salary in the past year

Experience	Decrease	No change	< 2.5% increase	2.5-5% increase	> 5% increase	Any increase
1-2 years	1%	33%	7%	11%	48%	66%
3-5 years	1%	13%	4%	13%	70%	87%
6-10 years	1%	17%	9%	19%	54%	82%
11-15 years	1%	12%	14%	23%	50%	87%
16-20 years	1%	16%	17%	32%	34%	83%
21-25 years	2%	17%	18%	32%	30%	81%
26-30 years	2%	17%	18%	34%	28%	80%
>30 years	2%	21%	23%	37%	17%	77%



Figure 4 Any increase in salary by engineering sector

The Engineers Ireland Salary Survey 2023 report is an exclusive Engineers Ireland member benefit, available to download from www.engineersireland.ie. This report includes detailed analysis of salaries and other benefits (pensions, bonuses etc.) according to engineering discipline, sector, position, location and more.

Table 4 Median salary by years of experience and professional title

Experience	Member	Chartered Engineer (CEng)	Fellow (FIEI)
1-2 years	€36,000	-	-
3-5 years	€44,000	-	-
6-10 years	€52,250	€59,000	-
11-15 years	€63,250	€68,638	-
16-20 years	€71,100	€80,000	-
21-25 years	€80,000	€90,000	€100,000
26-30 years	€95,000	€95,000	€101,000
→30 years	€102,000	€100,000	€113,730

Note: The median is the number in the middle when a list of numbers is sorted from lowest to highest. Half of all engineers earn more than the median salary; half of all engineers earn less than the median salary.

A graduate engineer in Ireland can expect to earn €36,000, rising to approximately €63,000 with 11-15 years of experience. Remuneration levels rise more-or-less consistently with experience and most engineers with more than 30 years of experience earn more than €100,000. Engineers Ireland awards professional titles such as 'Chartered Engineer' and 'Fellow', recognising the career progression, ethical standards and achievements of our members. The value of these professional titles is recognised through increased remuneration.

A Chartered Engineer, for example, can expect to earn €5,000-€10,000 per year more than an engineer without a professional title with the same number of years of experience. While a typical engineer with 6-10 years' experience, without a professional title earns €52,000, a Chartered Engineer who graduates in the same year, typically earns €59,000. With more than 20 years' experience, Chartered Engineers who become Fellows of Engineers Ireland can expect to earn an additional €15,000 each year.

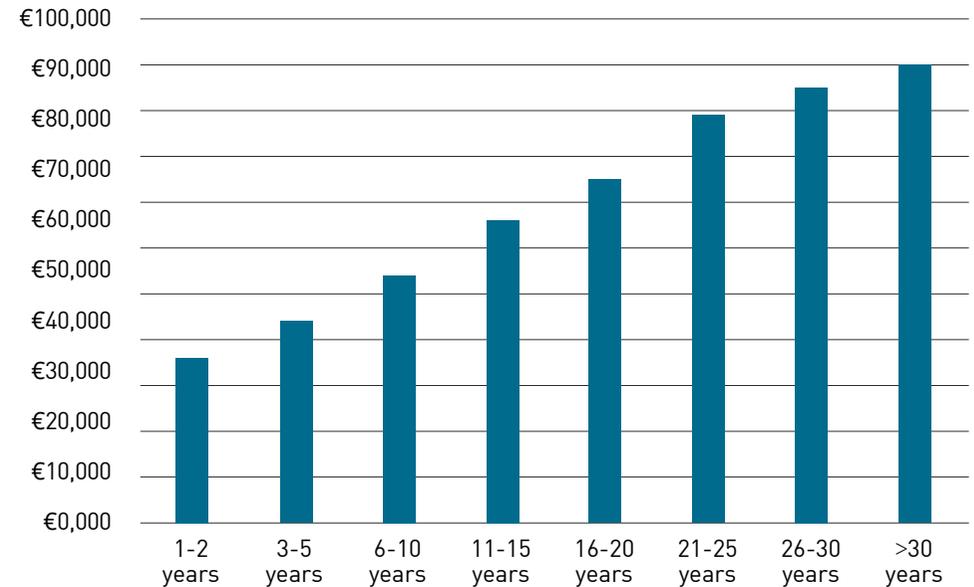


Figure 5 Median salary by experience

5 top sought-after skills

In relation to the skills sought by our engineering employers, in 2023, the five top sought-after skills in graduate engineers are:

1. Effective individual and teamwork
 2. Effective communication
 3. Fundamental engineering knowledge
 4. Professional ethics
 5. Design of solutions of complex problems
-

5 top barriers to recruitment

In relation to barriers to recruitment by our engineering employers, the top five issues expected to remain prominent:

1. Salary expectations
2. Housing shortage
3. Shortage of experienced engineers / engineers with the right skills
4. Shortage of engineering graduates
5. High staff turnover / competition for staff



Job opportunities

To better understand perspectives on the jobs market, respondents to our Member Survey were asked whether they agreed with this statement: 'There are plenty of job opportunities in the engineering sector in Ireland'. This question was also asked in Member Surveys over the last six years. In 2023, 85% of members agreed that there are plenty of job opportunities. This is highest level of job opportunities perceived since 2018.

The public was also asked in our Behaviour & Attitudes poll if they agreed with the statement: 'There are plenty of job opportunities in the engineering sector in Ireland,' with 69% agreeing, which is slightly less than from the previous poll in 2022.

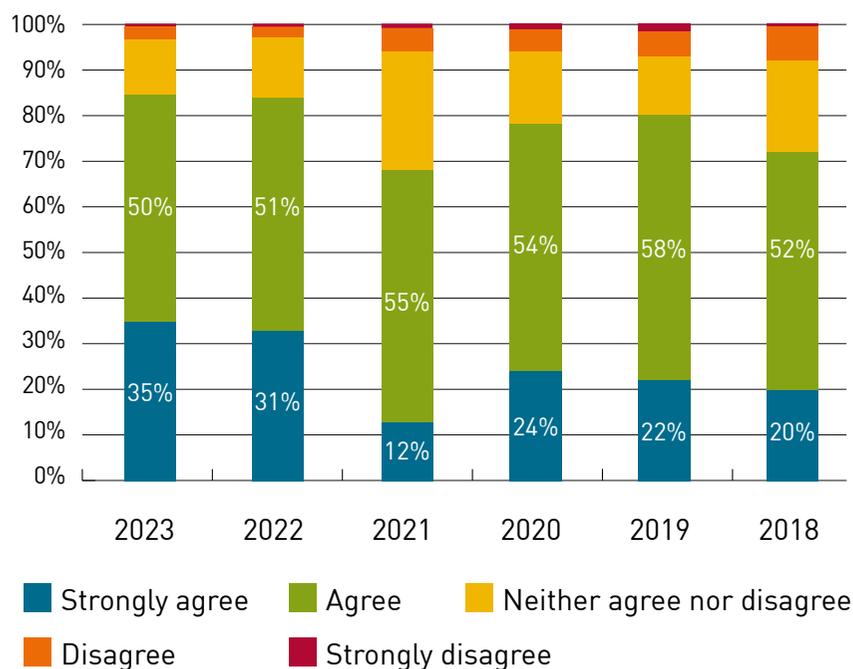


Figure 6 There are 'plenty of jobs in engineering' according to engineers

Table 5: There are plenty of job opportunities in the engineering sector

	Agree	Disagree	Neither
Survey year			
2023	85%	3%	12%
2022	84%	3%	13%
2021	67%	6%	26%
2020	78%	6%	16%
2019	80%	6%	13%
2018	73%	7%	20%
Experience			
1-2 years	89%	4%	7%
3-5 years	87%	1%	12%
6-10 years	88%	3%	9%
11-15 years	82%	5%	13%
16-20 years	84%	2%	14%
21-25 years	83%	1%	16%
26-30 years	86%	2%	12%
>30 years	86%	1%	12%
Gender			
Female	86%	4%	11%
Male	85%	2%	13%

The viewpoint that there are plenty of job opportunities is strongest among mechanical and manufacturing engineers, those working in utilities, and respondents based in Cork and in Leinster. Most overseas respondents selected 'neither agree nor disagree' as the question related to job opportunities in Ireland.

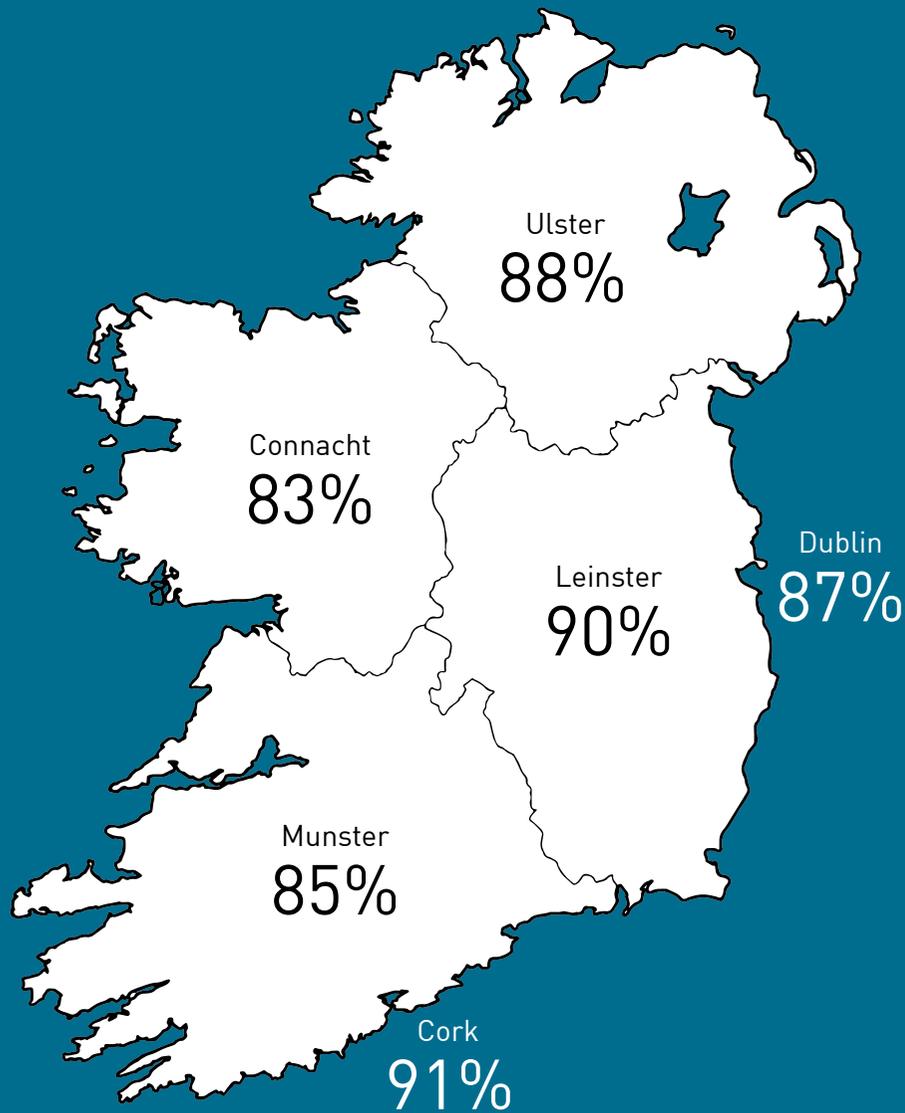


Figure 7 Agreement that there are 'plenty of jobs in engineering' by location

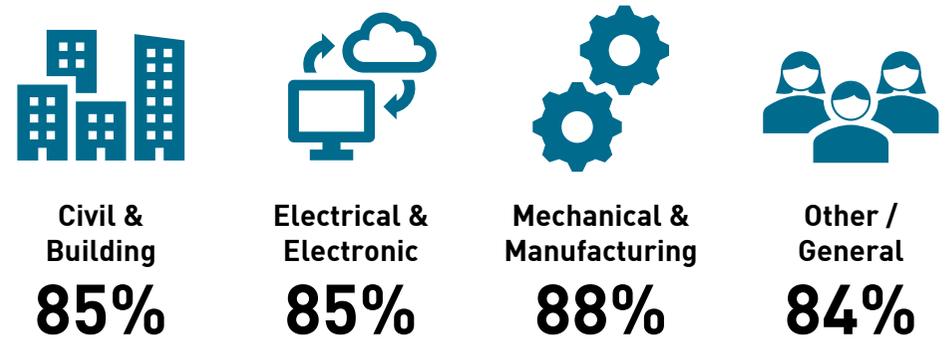


Figure 8 Agreement that there are 'plenty of jobs in engineering' by discipline

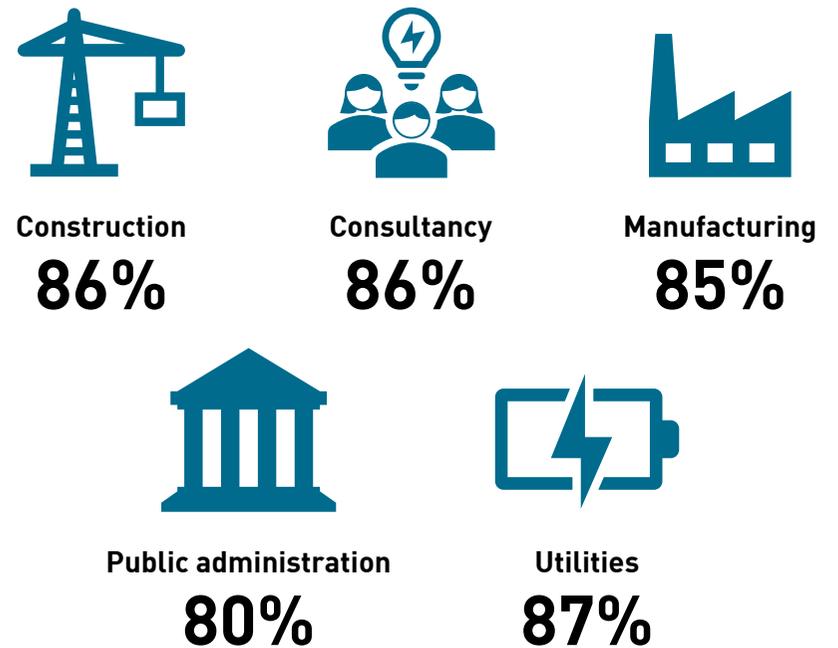


Figure 9 Agreement that there are 'plenty of jobs in engineering' by sector

Perspectives



2. Engineering perspectives

Engineering infrastructure in Ireland

Ireland's population is projected to increase from approximately 5 million in 2020 to approximately 6 million in 2050. In line with international trends, we must prepare for the majority of this population and jobs growth to be focused in urban centres. This will mean putting in place strategic systems of sustainable infrastructure to support growth, including housing, public transport, communications, water and wastewater services and flood defences.

To identify the condition and capacity of infrastructure in Ireland respondents in our Member Survey were asked the following: 'Ireland's infrastructure is in good condition with capacity for future development'. Fifty percent of our members disagreed with this statement showing there is a continued need to improve our infrastructure.

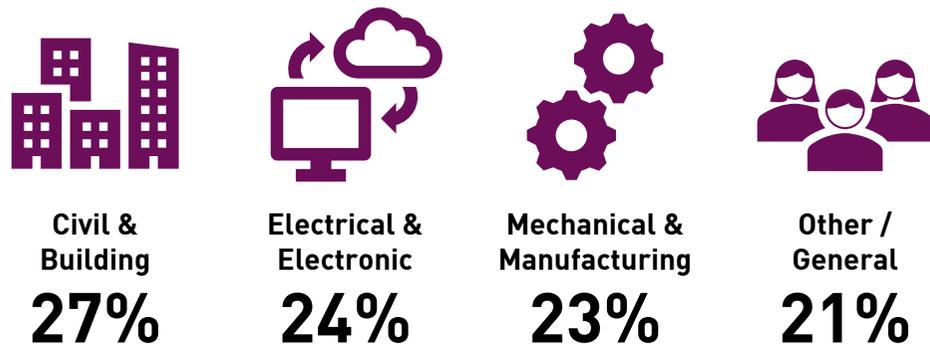


Figure 10 Agreement that 'Ireland's infrastructure is in good condition with capacity for future development' by discipline

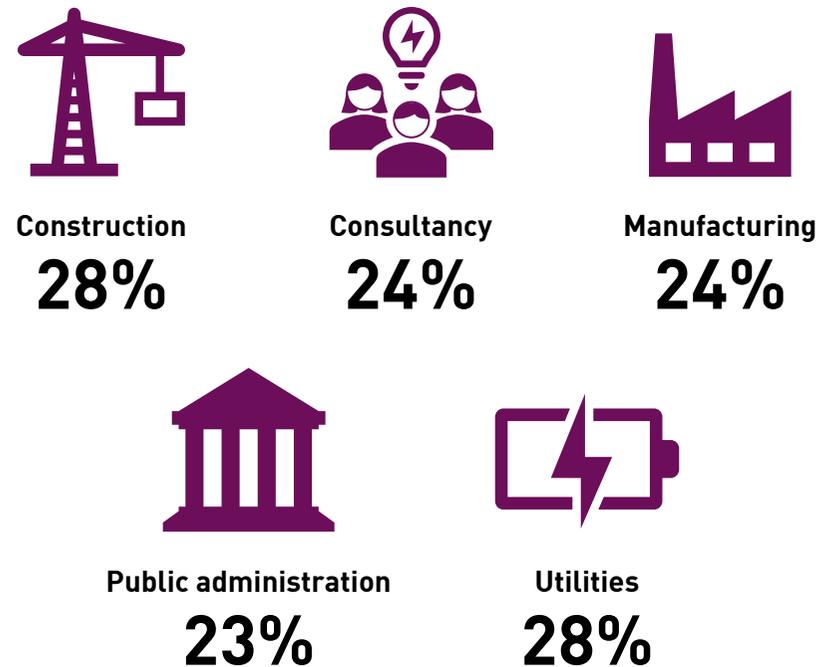


Figure 11 Agreement that 'Ireland's infrastructure is in good condition with capacity for future development' by engineering sector

To identify which areas of infrastructure that require the most attention, respondents were asked: 'How would you grade the condition and capacity of infrastructure in Ireland in the following sectors?'

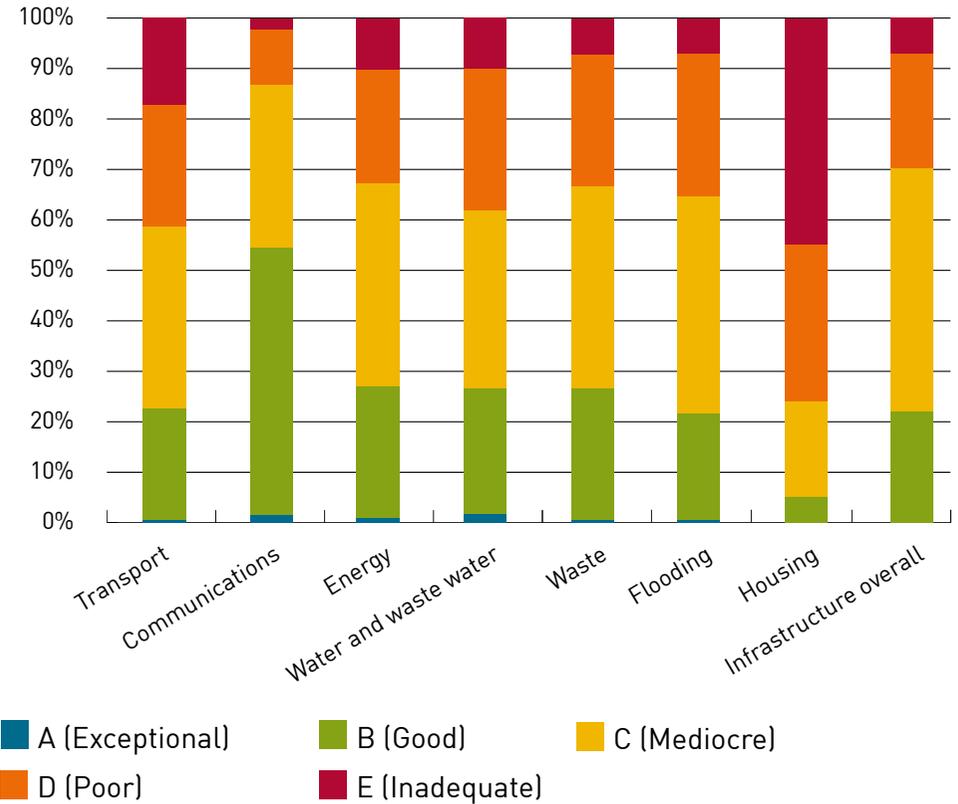


Figure 12 Engineers assessment of Ireland's infrastructure

Our information shows that the engineering community believes communication infrastructure in Ireland is 'good', with a score of 53% (a 10% increase from last year, 2022). However, all other areas require more development especially housing which was graded as 'inadequate' at 44% (a 7% increase from last year, 2022).

Engineering as a career

To benchmark views on engineering as a career, respondents in our Member Survey were asked whether they agree with the statement: 'Engineering is a rewarding career choice for young people'. This question was also posed in Member Surveys in the previous five years. In 2023, 79% agreed that engineering is a rewarding career choice for young people (up 2% from 2022). The cohort with the highest level of agreement were those with 1-2 years of experience, with 85% agreement. Male and female engineers generally agree that engineering is a rewarding career choice for young people, moving away from a slight male bias in previous years.

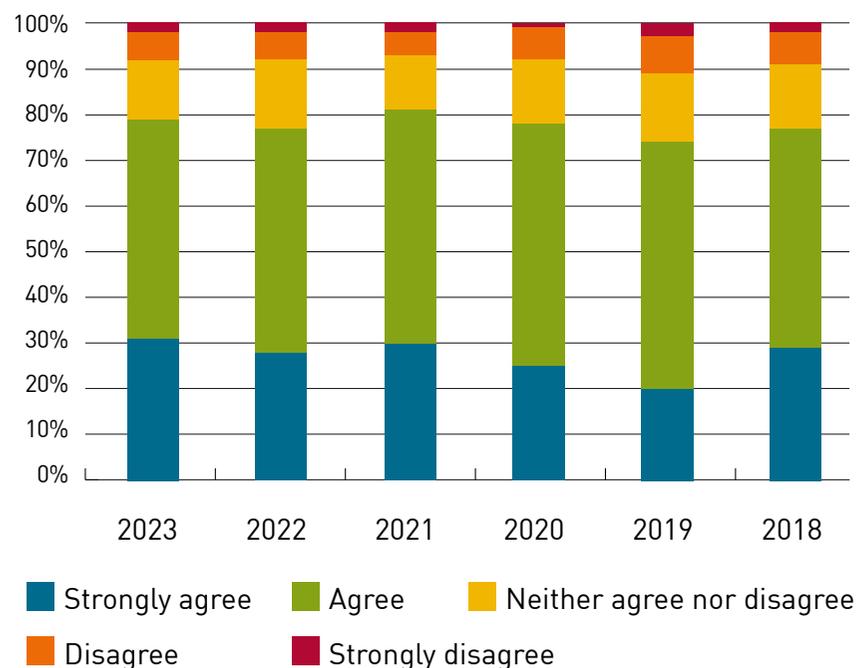


Figure 13 Engineering is a rewarding career choice for young people

Table 6: Engineering is a rewarding career for young people

	Agree	Disagree	Neither
Survey Year			
2023	79%	8%	13%
2022	77%	8%	15%
2021	81%	7%	12%
2020	78%	8%	14%
2019	74%	11%	15%
2018	77%	9%	14%
Experience			
1-2 years	85%	5%	9%
3-5 years	80%	8%	12%
6-10 years	74%	11%	15%
11-15 years	68%	14%	18%
16-20 years	78%	8%	14%
21-25 years	82%	7%	12%
26-30 years	86%	1%	13%
>30 years	88%	2%	9%
Gender			
Female	78%	10%	12%
Male	79%	8%	14%

Engineering is more likely to be viewed as a rewarding career for young people by mechanical and manufacturing engineers, those working in manufacturing and utilities, and respondents based overseas and in Ulster. The public also agree with the statement in our public poll, that engineering is a rewarding career choice for young people, with 77% agreeing with that statement.

Figure 14 Agreement that 'engineering is a rewarding career for young people' by location

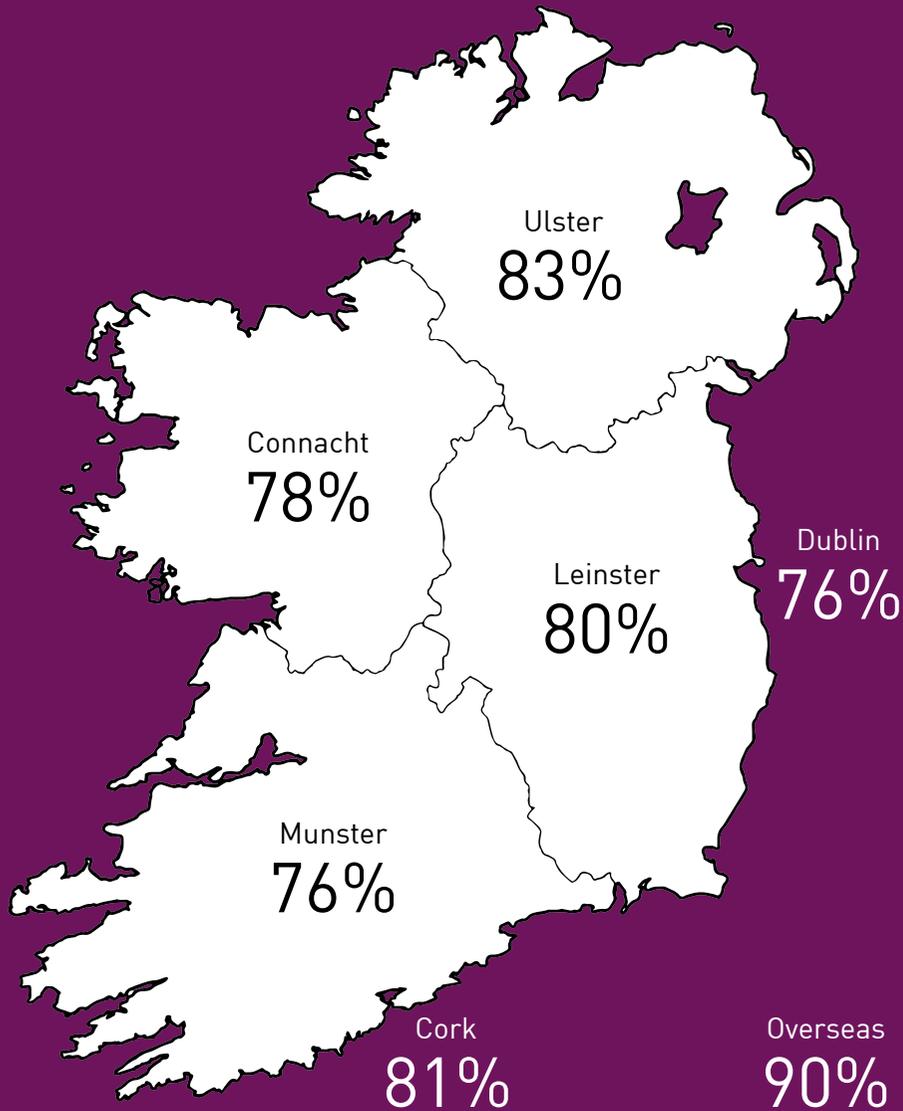


Figure 15 Agreement that 'engineering is a rewarding career' by discipline

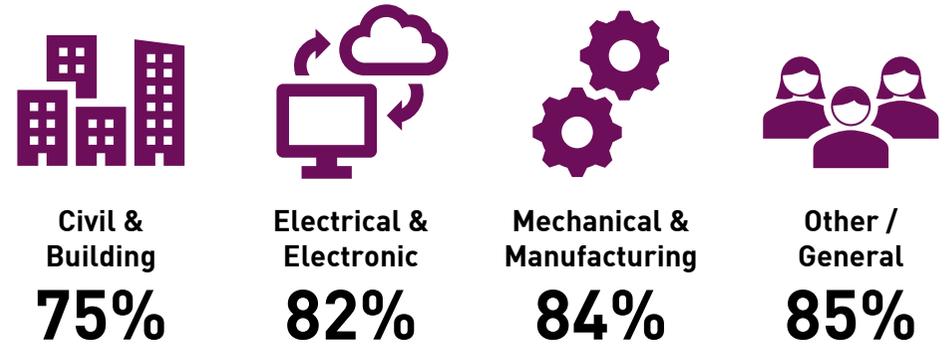


Figure 16 Agreement that 'engineering is a rewarding career for young people' by sector



The engineering sector has better opportunities for men than it does for women

Engineers Ireland asked the following question in our Behaviour & Attitudes public poll: 'Engineering is a highly technical discipline which offers a diverse range of career choices. Do you think the profession offers better career opportunities to Men, Women, Does not matter'.

Table 7: Engineering offers better career opportunities for:

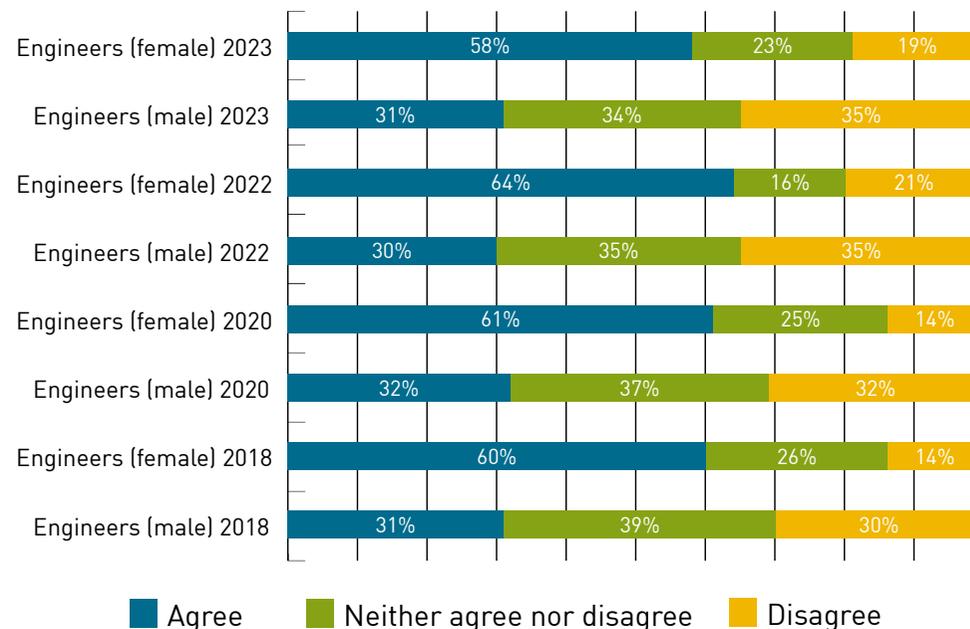
	%
Men	22
Women	1
Does not matter	76

Compared to 2022, the results have improved slightly (by 2%) for 2023. Seventy-six percent of the public in Ireland in 2023 believe gender does not matter when it comes to career opportunities in the sector.

A similar question has been posed in our Member Surveys each year. Where members have been asked: 'The engineering sector has better opportunities for men than for women,' overall 35% agree with this statement, with 33% disagreeing, with the remainder neither agreeing or disagreeing.

When this question is separated by gender however, there is a noticeable difference i.e. with 58% of female engineers agreeing that men have better opportunities in the sector. When compared to previous years this is a consistent difference of opinion between genders.

Figure 17 The engineering sector has better opportunities for men than it does for women by gender



Career breaks

Members were asked by us in our Member Survey: 'Have you taken a career break in the last five years? If so, please advise the purpose of the break'.

Maternity or paternity leave is main reason (48%) for taking a break from work.

Members were also asked within our Member Survey: 'Have you returned from a career break in the last five years? If so, did you experience any challenges with your organisation in returning?' Of those who responded, the majority experienced no issues in returning. Some did find it challenging, with people indicating a broad spectrum of reasons, such as managing a new work-life balance and finding changes in teams and networks when they returned.

Table 8 Reasons for career break

	%
Maternity/Paternity Leave	48%
Care of family/older person	6%
Further education	10%
Travel	16%
Other (please specify)	20%

Public perception of engineering

In January 2023, Engineers Ireland commissioned Behaviour & Attitudes to undertake a poll with 1,000 members of the public, representative of the Irish population aged 16 years old and over. The poll was commissioned to help us gain an insight into the general public's perception of engineering. The poll for 2023 has used the same methodology as in previous years, which enables direct comparisons. (Please see the Appendix for the methodological information). This poll is generally undertaken annually, but data was unavailable in 2021 due to the pandemic.

The following section of our Barometer analyses the public's perspective on aspects of the engineering profession. For some indicators, these perspectives are compared with those of engineers, their employers and academics.

We asked for example, the public, the following question: 'Highly competent professionals need to be able to apply expertise in their daily work. Which of the following professions do you consider to be highly competent?'

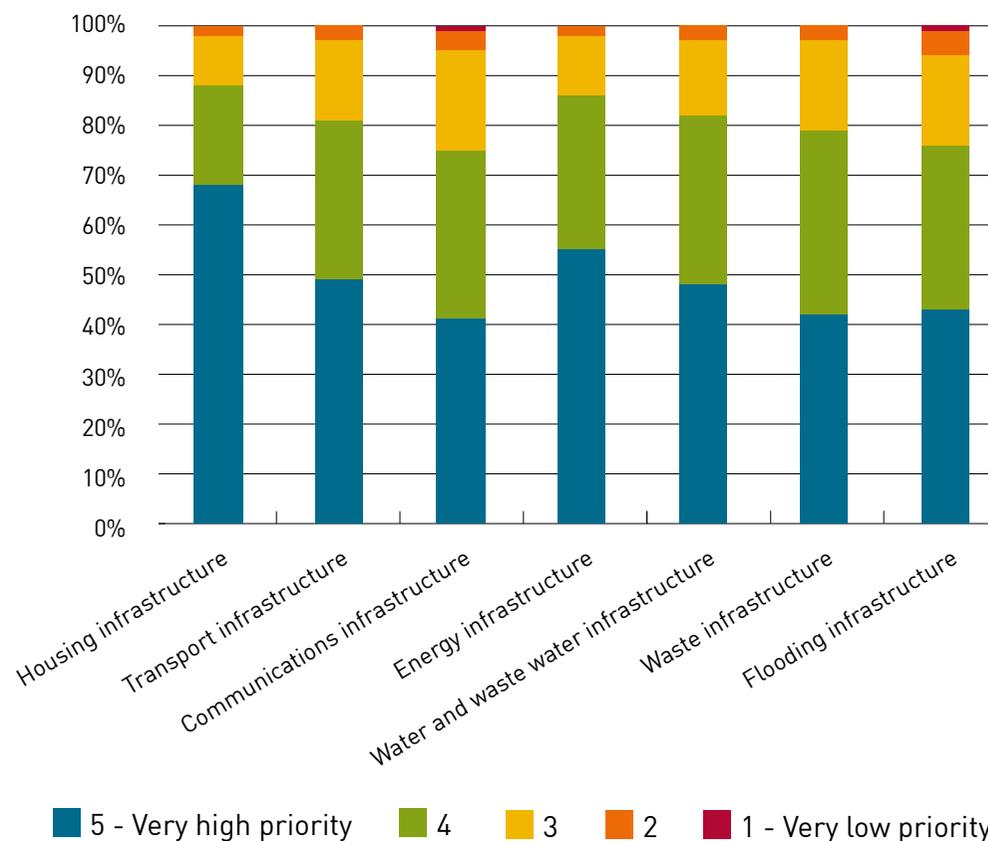
Table 9: Public opinion of competent professionals

All Adults	Highly Competent
Engineers	92%
Doctors	92%
Teachers	90%
Judges	77%
The Gardaí	71%
Civil Servants	70%
Trade Union Officials	64%
Business Leaders	71%
Journalists	63%
Politicians	41%

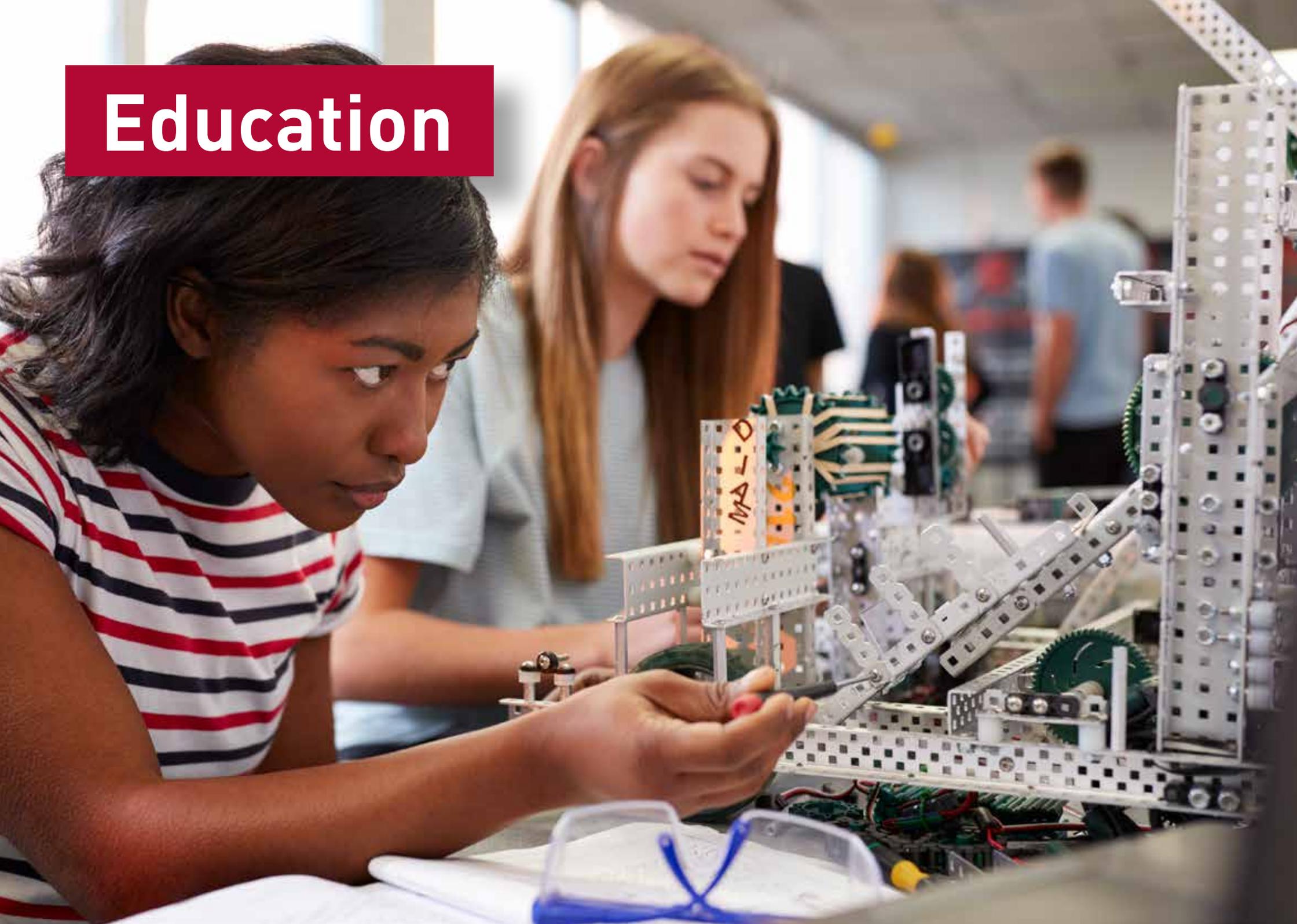
At 92%, the public demonstrate a high opinion of engineering and engineers competence, in joint position with doctors.

The public was also asked: 'How would you assess the need to prioritise spending on the various sectors of infrastructure in Ireland? Please use a scale from 1 to 5 where 1 means very low priority and 5 means a very high priority.' The public response mirrors the engineering response on the state of infrastructure in Ireland, i.e. with housing requiring the highest priority, and communications infrastructure requiring the least.

Figure 18 Public assessment of Irelands infrastructure



Education

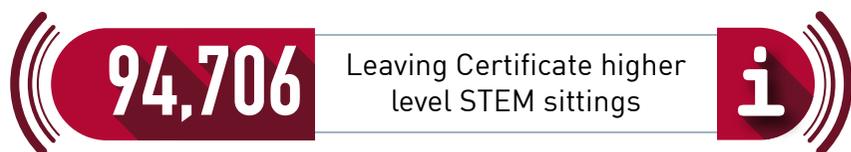


3. Engineering education

Leaving Certificate Examination

Separately to our surveys, we have analysed data from the State Examinations Commission (SEC).

Turning to the Leaving Certificate Examination, data obtained from the State Examinations Commission up to and including 2022, shows that the number of students sitting exams in STEM subjects at a higher level decreased by 7% (Table 10), while the overall number of students sitting the Leaving Certificate remained consistent to 2021. Compared to 2021, there were significant changes in the number of students taking higher level subjects related to engineering and construction, including mathematics (-1,653), and technology (+195). As the number of students studying STEM subjects at higher level in recent years has changed, there were corresponding changes at ordinary level (Table 11), showing an overall increase by 7%.



*Note: The Leaving Certificate subject 'engineering' is the study of a range of mechanical engineering materials, processes and technological applications. It is not a requirement for entry to engineering at third level, which is much broader in scope.

Table 10 Number of students sitting Higher level STEM subjects for the Leaving Certificate

Subject	2018	2019	2020	2021	2022	Year-on-year	5 year trend
Biology	26,543	27,063	29,575	30,677	28,671	-7%	7%
Mathematics	16,837	18,153	20,522	22,918	21,265	-7%	30%
Chemistry	7,943	8,244	8,689	8,794	8,481	-4%	4%
Construction Studies	7,105	7,896	8,568	9,124	8,792	-4%	18%
Agricultural Science	6,543	6,605	7,371	7,553	6,218	-18%	-2%
Physics	6,258	6,583	7,032	7,210	6,487	-10%	3%
Engineering*	4,668	4,765	5,327	5,555	5,354	-4%	17%
Design & Communication	4,480	4,566	4,721	5,010	5,035	0%	13%
Applied Mathematics	1,826	1,988	2,115	2,276	2,032	-11%	9%
Technology	1,430	1,685	1,696	1,807	2,002	11%	46%
Physics & Chemistry	415	464	461	382	369	-3%	-23%
Total STEM sittings	84,048	88,012	96,077	101,306	94,706	-7%	13%

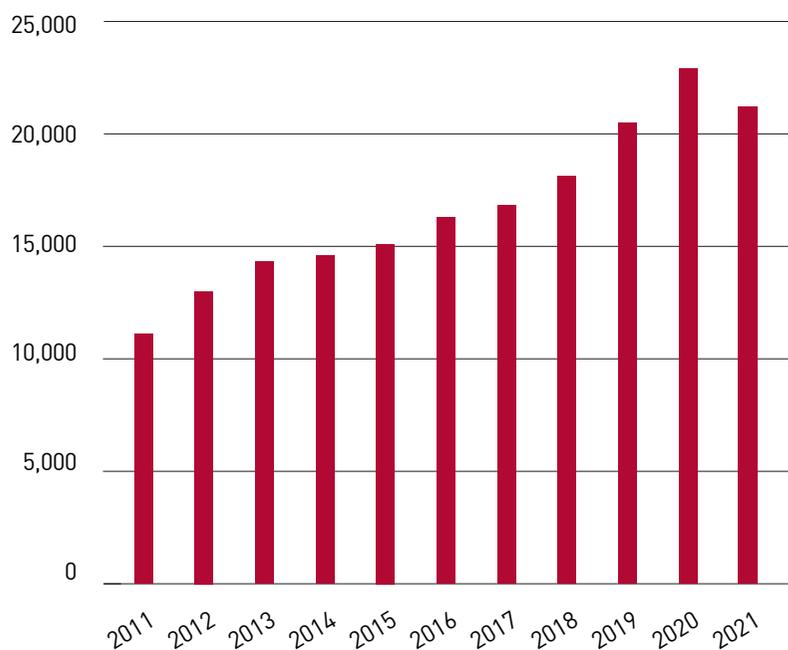


Figure 19 Number of students sitting higher level mathematics for the Leaving Certificate for the Leaving Certificate

The take-up of higher-level maths has seen a reduction after a period of continued growth over the past 10 years, decreasing to 21,265, a decrease of 7% on 2021. This is still a significant increase since 2011 (Figure 19). Today, 37% of mathematics students undertaking the Leaving Certificate Examination take the subject at higher level.

There has been an average 3% increase in female students taking up STEM subjects over the past five years, with biology, chemistry and mathematics being the most popular choices.

Table 11 Number of students sitting ordinary level STEM subjects for the Leaving Certificate

Subject	2018	2019	2020	2021	2022	Year-on-year	5 year trend
Mathematics	31,336	31,474	33,862	32,320	32,792	1%	1%
Biology	7,006	7,046	5,270	4,211	5,409	28%	-29%
Physics	1,277	1,359	1,060	778	1,280	65%	-3%
Chemistry	1,224	1,262	966	857	1,198	40%	-8%
Construction Studies	1,143	1,114	1,144	1,003	1,167	16%	-10%
Agricultural Science	1,237	1,140	1,130	915	1,195	31%	-7%
Design & Communication	913	1,025	926	856	735	-14%	-35%
Engineering	586	650	779	691	675	-2%	-2%
Technology	104	176	161	153	142	-7%	-11%
Physics & Chemistry	103	74	69	57	61	7%	-45%
Applied Mathematics	128	116	67	40	90	125%	-10%
Total STEM sittings	45,057	45,436	45,434	41,881	44,744	7%	-5%

Third level education

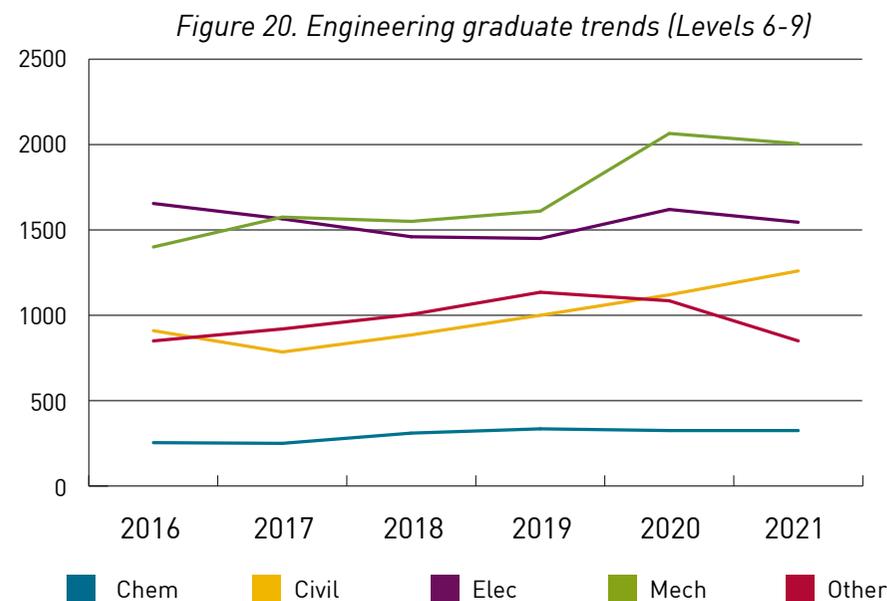
Engineers Ireland accredits engineering qualifications at Higher Certificate (Level 6), Ordinary Bachelor's degree (Level 7), Honours Bachelor's degree (Level 8) and taught Master's (Level 9). HEA information shows that there were 5,985 engineering graduates from these levels of programmes. This is a 4% decrease on 2020, yet represents an 18% rise since 2016. In terms of broad disciplines, Mechanical & Manufacturing graduates are up 43% and Civil & Building graduates are up 38% on the levels of five years ago.

Engineers Ireland actively works to engage engineering students within our HEIs and support them in whatever way we can. We have over 7,000 student members across the country and Young Engineer Societies in Dublin, Cork, Limerick and in Galway.

Table 12. Engineering graduates (Levels 6-9)

Broad discipline	2016	2017	2018	2019	2020	2021
Chemical & Process	245	250	310	335	325	325
Civil & Building	910	785	885	1000	1130	1260
Electrical & Electronic	1655	1565	1460	1450	1620	1545
Mechanical & Manufacturing	1400	1575	1550	1610	2065	2005
Other / General	850	920	1005	1135	1085	850
Total	5060	5095	5210	5530	6225	5985

Figure 20 Student data of broad field of study breakdown



Despite the public in Ireland feeling that gender is not an issue in relation to career opportunities available, third level education shows a limited gender balance in engineering courses. 18% of engineering graduates are women and this figure has been steady for the last four years (Table 13). The majority (51%) of Chemical & Process graduates are female, this percentage having grown over the past five years. The disciplines with the lowest female participation are Civil & Building and Electrical & Electronic.

We must continue to focus our efforts on encouraging more young people, especially young women, to pursue a career in engineering. Engineers Ireland has an Inclusion and Diversity Society amongst its sector groups and a specific Women in Engineering Group.

Table 13. Percentage of engineering graduates (Levels 6-9) who are women

	2016	2017	2018	2019	2020	2021
Chemical & Process	42%	42%	45%	45%	45%	51%
Civil & Building	9%	8%	11%	9%	11%	10%
Electrical & Electronic	10%	8%	10%	10%	10%	10%
Mechanical & Manufacturing	18%	17%	21%	20%	22%	22%
Other / General	18%	19%	23%	24%	24%	25%
Total	15%	15%	18%	18%	18%	18%

STEM and the STEPS programme

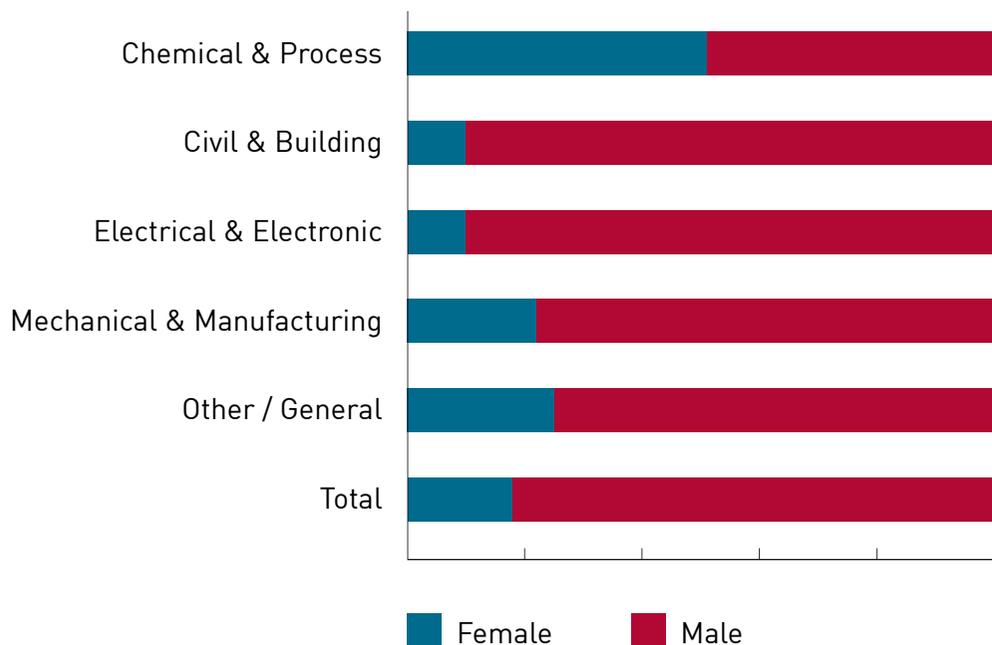
Engineers Ireland through our STEPS programme is a leading advocate for STEM education, STEM career pathways and public engagement with engineering. Our work in this area, supported by our members, is fundamental to supporting the Government’s ambitious development and growth agenda.

STEPS is an established, volunteer-led outreach programme and its core activity includes: STEPS Engineers Week, (nationwide annual festival), STEPS Engineering your Future, (a week long immersive experience for transition year students which takes place at Higher Education Institutes throughout the country and also industry), STEPS Young Engineers Award (initiative for 3rd and 4th class pupils directly engaging engineers with pupils) and the Irish Girl Guide Engineering Badges, (partnership with Guides and Brownies involving fun engineering challenges based on creative thinking, curiosity and team-work).

In 2022, over 160,000 children participated in STEPS Engineers Week and almost 600 entries were received for our STEPS Young Engineers Award. Over 590 students were involved in our Transition Year programme in 2022 with 22 TY collaborators – including many of Ireland’s Higher Education Institutions and industry bodies. For 2023, this figure has increased to 29.

STEPS is funded by the Department of Further and Higher Education, Research, Innovation and Science. Sponsors from industry are Arup, the EPA, ESB, Intel and Transport Infrastructure Ireland.

Figure 21. Engineering graduates in 2021 by gender and broad discipline



Engineering and Sustainability



Conclusion



6. Conclusion

Engineering employment

Engineering is proving to be a robust industry in Ireland and has recovered strongly post the pandemic years and is predicting continued growth.

There are almost 8,000 new job opportunities anticipated for the sector this year. Experienced engineers are in high demand. We will need to continue attracting skilled global engineers and promoting STEM subjects in our schools to meet these opportunities now and into the future.

Salaries have increased in all disciplines of engineering consistently each year. Number of years of experience is still the largest factor in terms of salary level. Seventy percent of engineers with 3-5 years of experience received more than a 5% increase in their salary in 2022.

When it comes to recruiting staff, the housing shortage was the second highest issue employers had in 2022, after salary expectations.

Engineering perspectives

In 2023, 85% of members agreed that there are plenty of job opportunities in the sector.

Ninety two percent of the public surveyed have said that engineers are highly competent professionals.

A total of 79% of our members surveyed agreed that engineering is a rewarding career for young people and 76% of members believe the profession offers equal career opportunities for women and men.

Infrastructure overall is seen as 'mediocre' in our country, with opportunities to improve in many areas. Housing is showing a particular need for improvement with 44% of members highlighting it as 'inadequate'.

Engineering education

Separately to our surveys, we have analysed data from the State Examinations Commission. Turning to the Leaving Certificate Examination, data obtained from the Commission up to and including 2022, shows that the number of students sitting exams in STEM subjects at higher level, decreased by 7% while the overall number of students sitting the Leaving Certificate remained consistent to 2021.

As a small island nation and a knowledge-based economy, we have a dependency on the quality and quantity of our STEM graduates. We therefore must work harder at focusing our efforts on encouraging more young people, especially young women, to pursue a career in engineering.

Engineering and sustainability

Engineers are critical to combating climate change and biodiversity loss according to 70% of the public.

In 2020, Engineers Ireland declared a Climate and Biodiversity Emergency and generated a Sustainability Plan. 62% of our member respondents were already aware of Engineers Ireland's commitment to sustainability.

Data sources

- CAO (Central Applications Office)
- HEA (Higher Education Authority)
- SEC (State Examination Commission)

Broad engineering disciplines

The broad engineering disciplines used in Sections 2 and 4 of this report are:

- Chemical & Process (Chem)
- Civil & Building (Civil)
- Electrical & Electronic (Elec)
- Mechanical & Manufacturing (Mech)
- Other / General (Other)

Engineers Ireland Employer survey

Our Engineers Ireland engineering Employer Survey was conducted online between 1-22 December 2022. A link to the survey was emailed to Engineers Ireland corporate partners and other affiliated businesses and contacts. There were 86 useable responses, of which 38% of responses came from engineering firms based in Dublin, with the second largest at 17% being from the rest of Leinster. Fifty percent of the responses came from organisations in the consultancy sector, 17% from construction, 5% from manufacturing, and 28% from other industries.

The main fields of engineering in which responding employers specialise in was as follows: 64% Buildings/Structures, 37% Energy, 14% Manufacturing, 27% Transport and 22% Water. Of the people responding to the survey, 55% worked in management, 24% worked as engineers and 21% worked in HR/Training.

The forecast for the demand for engineers in 2023 was developed by extrapolating results to the full engineering labour force. Using a conservative estimate of 44,993 engineering professionals from the Census 2016, the demand results of the survey were extrapolated to the full engineering labour force in the Republic of Ireland, weighted according to industry (manufacturing/construction/consultancy/other).

Engineers Ireland Member Survey

The Engineers Ireland member survey was conducted online between 24 January – 7 February 2023. A link to the survey was emailed to members of Engineers Ireland on 22 January. There were 1,916 responses, of which 86% were men and 14% were women. The breakdown of the sample according to experience was: 1-2 years (6%), 3-5 years (10%), 6-10 years (17%), 11-15 years (18%), 16-20 years (14%), 21-25 years (12%), 26-30 years (9%) and 30+ years (13%). The breakdown of the sample according to membership type / professional title was: untitled Member (49%), Chartered Engineer (40%), Fellow (5%) and other/student/non-member (6%). A full Engineers Ireland Salary Survey 2023 report is available to Engineers Ireland members only and can be downloaded from the members' area of www.engineersireland.ie.

Public poll

The public poll was conducted face-to-face by Behaviour & Attitudes between 19 - 31 January 2023. One thousand adults (aged 16 and over), statistically representative of the adult population in Ireland (in terms of age, gender, region and socio-economic class), were polled at randomly chosen sampling points. For more information, see www.banda.ie/techniques/barometer/

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Engineers Ireland, 22 Clyde Road, Ballsbridge, Dublin 4, Ireland, D04 R3N2
T: +353 (0)1 6651334 | **E:** info@engineersireland.ie | **W:** www.engineersireland.ie