

Pre-Budget Submission (2024)

From Engineers Ireland for the attention of the: Minister for Public Expenditure, National Development Plan Delivery and Reform (Paschal Donohoe, TD) and the Minister for Finance (Michael McGrath TD)

Date: 27 July 2023

Engineering is at the heart of a sustainable and prosperous society, improving lives and opportunities for all citizens. Engineers shape our world; from clean water and waste-water management, through to the supply of housing and other infrastructure, green energy and healthcare. Engineering transforms our lives for the better. Through the provision of transport systems, communication technologies and medical advances such as prosthetics and robotic surgery, few professions have such a direct and positive impact on the world around us and the people in it.

The challenges we face, including improving efficiency and making use of evolving digital technologies, and the effects of climate change and rising sea levels will all require and benefit from engineering.

Engineers Ireland is committed to focusing the expertise of our professional engineering membership in finding practical and cost-effective solutions to the significant societal challenges, in the national interest. This underpins the importance of having the voice of the engineer heard in public policy by providing evidence on a wide range of engineering issues, as well as sustainability, wellbeing, and innovation more broadly.

With over 25,000 members, we are one of the largest professional bodies in the country and our members come from every discipline of engineering. They range from engineering students to fellows of the profession. By way of background, our Vision statement is a: *A community of creative professionals delivering sustainable solutions for Society.*

Our Budget 2024 priorities are underpinned by our core policy values:

- Advancing the safety, health, and well-being of the public
- Promoting the principles and practices of sustainable development and the needs of present and future generations
- Leading rapid and transformational developments in digital and other technologies for the benefit of all
- Promoting knowledge and skills, professional standards, diversity, and public confidence in the engineering profession
- Acting with integrity, objectivity, evidence, authority, and transparency as an organisation

Our Budget 2024 priorities draw on our published policy resources linked throughout this document, such as our Engineering barometer series and our recent Powering Ireland report on electrical energy.

Context

Engineers Ireland has been generally supportive of the Government's budgetary approach in recent years, which has used an informed and strategic method to overcoming major challenges facing our society and economy.

We have also welcomed other Government policy initiatives including:

- Summer Economic Statement 2023
- Revised National Development Plan (2021 - 2030)
- Climate Action Plan 2023
- Housing for all – a new Housing Plan for Ireland
- STEM Education Policy Statement Implementation Plan to 2026

Summer Economic Statement 2023

We welcome the commitment in the [Summer Economic Statement](#) that Budget 2024 will deliver an overall package of €6.4 billion and that additional public spending will amount to €5.2 billion.

We were also pleased to note that to increase the pace of delivery of enhanced infrastructure, €2.25 billion of windfall corporation tax receipts will be utilised to boost delivery of critical infrastructure over the period 2024 to 2026.

Revised National Development Plan (2021 - 2030)

Our population is set to grow by approximately 1 million people by 2040.

The Government's Revised [National Development Plan](#) sets out the ten year capital ceilings to 2030 which aim to support economic, social, environmental and cultural development across all parts of the country under Project Ireland 2040. We particularly welcome the climate action target of the retrofitting programme of 500,000 homes to BER B2; the sustainability targets for Commuter Rail – Regional Cities, MetroLink and Dart+ and the Green Transition Fund and Digital Transition Fund to support a strong economy, supported by innovation and skills.

Climate Action Plan 2023

We welcomed the [Climate Action Plan 2023](#), launched in December 2022, the first to be prepared under [the Climate Action and Low Carbon Development \(Amendment\) Act 2021](#). It follows on from the introduction, in 2022, of economy-wide carbon budgets and sectoral emissions ceilings. It is positive to note the [progress report](#) (of May 2023), with movement made on 36 actions.

This Act provides the framework for Ireland to meet its international and EU climate commitments. Ireland is on a legally binding path to net-Zero emissions no later than 2050, and to a 51% reduction in emissions by the end of this decade. Engineers are critical to finding solutions to the challenge of climate change. We must be innovative and act quickly to decarbonise our society.

Member obligations under our [Code of Ethics](#) include safeguarding human life and welfare, and the environment.

Housing for All – a new Housing Plan for Ireland

We are supportive of [Housing for All](#), which provides four pathways to support home ownership and its affordability; i.e. *eradicate homelessness*; increase *new housing* supply and *address vacancy* and better *use of existing stock*, with in excess of €20 billion available.

STEM Education Policy Statement Implementation Plan to 2026

Regarding education and training, which is a core function of Engineers Ireland, we also support improving awareness of STEM career paths and examine the scalability of existing pilot projects to

encourage diversity in STEM subjects in line with the [STEM Education Policy 2017-2026](#). We also look to develop a long-term sustainable funding model for Higher Level Education in collaboration with the sector and support for research and researchers. We welcome the March 2023 STEM Education Policy Statement [Implementation Plan](#) out to 2026. Through our year-round youth-focused STEM outreach programme for primary and secondary pupils (STEPS), which is funded by the Department of Education, Engineers Ireland has been a long-term advocate for STEM careers.

Engineers Ireland's priorities

Engineers Ireland is highlighting four priorities for Budget 2024

1. Invest in infrastructure for economic stimulus, decarbonisation and quality of life
2. Build safe and sustainable homes and communities
3. Energy: we must ensure we increase sustainability and keep our energy secure and affordable
4. Skills Shortage: encourage and provide financial support to STEM education outreach. Embrace further and higher education and lifelong learning

This submission is designed around delivering on the overall ambition and the specific measures outlined above. Driving our economy - but in a sustainable way - and achieving the ambition of Government will require substantial investment in infrastructure and education to act as an economic stimulus, create jobs and overcome ongoing challenges in housing, climate, digitalisation and global uncertainties - for example, the ongoing Russian invasion of Ukraine and the rise of AI. Such investments will provide vital social, environmental and economic facilities for our citizens and our natural environment, and will enhance our country's wellbeing, inclusion and competitiveness.

Additionally, new technologies and ways of working are rapidly changing our society and economy. Engineers Ireland will work with Government to ensure that engineers can lead in the innovative use of new technologies and take advantage of digital transformation. Investment in education at third level will be critically important to safeguarding Ireland's engineering graduate pipeline – there is a huge demand for engineers in our country. Our engineering graduates will play a central role in the ongoing strengthening of our economy and in creating a sustainable future. Budget 2024 represents a major opportunity to further power our economy and to make the transformation towards a cleaner, safer and sustainable future.

1. Infrastructure

Invest in infrastructure for economic stimulus, decarbonisation and quality of life

Infrastructure's benefit to society

High-quality infrastructure is an important element of a modern society and economy. It strengthens economic growth through job creation and enhancing efficiency, productivity and competitiveness. Correctly targeted infrastructure investment also underpins social cohesion in our towns and cities through providing vital facilities for citizens, including recreational facilities and amenities, public transport and broadband, and helps to tackle challenges in climate change and demographics. Engineering and infrastructure delivery can therefore play a central role in stimulating the economy and improving the quality of life.

Capital investment fell dramatically during the last recession. It is positive to note the commitment of this Government to investing in our nation's infrastructure through the [revised National Development Plan \(NDP\) to 2030](#) (incorporating an overall investment package of €165 billion). The revised NDP sets out the ten-year capital ceilings to 2030 which will support economic, social, environmental and cultural development under [Project Ireland 2040](#). Its implementation will bring many benefits for Irish society, our economy and environment. We need to ensure that our infrastructure meets the growing needs of our nation.

Although Budget 2023, allocated €6.29 billion to the Department of Housing, Local Government and Heritage and €3.5 billion of current expenditure and €2.6 billion in capital expenditure to the Department of Transport, (the latter figure representing the highest level of investment since 2008), there remain ongoing deficits in many sectors, including housing, health, energy, water and waste. As well as physical infrastructure, Ireland also needs to expand our digital networks (e.g. telecoms, high-speed broadband, smart grids for energy management).

Competitiveness

Ireland currently ranks 2nd out of 64 economies in the Institute for Management Development (IMD), [World Competitiveness Yearbook 2023](#), gaining nine places from 2022. This is extremely positive. However in relation to our infrastructure and rankings, in June 2023 the National Competitiveness and Productivity Council's [Bulletin 23-1](#), NCPC, stated:

"Ireland's performance in Infrastructure improved marginally in 2023 (ranked 19th up from 23rd in 2022). It remains the pillar which most significantly drags on Ireland's competitiveness position."

Increased and targeted capital investment is needed for economic stimulus.

Capacity

Engineers contribute to the development of infrastructure and the built environment from many perspectives: preliminary concepts, pre-planning and design, scope and design of civil/structural/building services projects, project management, inspection and certification, health and safety supervision, and much more. Engineers Ireland asked our members in [Engineering 2023: A Barometer of the profession in Ireland report](#) for their views on the current state of Ireland's infrastructure.

Of the 1,916 engineers who responded to the statement 'Ireland's infrastructure is in good condition with capacity for future development', just 50% agreed. Housing was graded as 'inadequate' but communication infrastructure was graded 'good'. These results highlight the need for action to improve the current level of service provided by our infrastructure, but also to build capacity for future needs. (See chart overleaf).

Engineers Ireland supports IBEC's recent call for Government to use a significant portion of tax revenues to establish a new national infrastructure fund and fund an expansion of the public infrastructure ambition of €30 billion over the next decade, as we improve our capacity to take projects on.

In addition to infrastructure directly funded by the State, appropriate policy measures de-risk major projects and can attract large-scale private investment in areas like wind energy. We should seek to maximise available non-Exchequer financing opportunities such as the European Recovery Fund, European Green Deal, European Investment Bank and Public Private Partnerships.

Figure 1. Engineers' views for 2023 on the condition and capacity of Ireland's infrastructure (1,916 responses)

Ireland's infrastructure is in good condition with capacity for future development

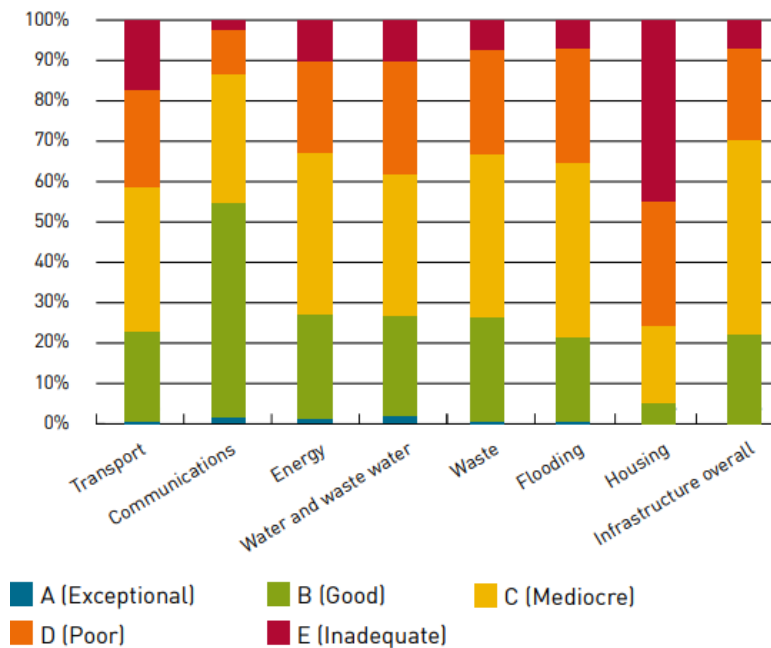


Figure 12 Engineers assessment of Ireland's infrastructure

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).

Decarbonisation

According to [Deloitte](#), the construction sector accounts for 37% of global carbon emissions, of which 16% represents embodied carbon mainly from material manufacturing. Significant carbon reduction needs decisive action. It looks at the whole value chain and aims to reduce carbon and cost through intelligent design, construction and use. Concrete is one of the most common construction materials, but it is also a potent source of greenhouse gas emissions. Engineers Ireland is committed to supporting its members working in infrastructure to help drive the carbon out of concrete.

We are a member of the [Government's Construction Sector Group](#), with the aim of ensuring regular and open dialogue between Government and industry on how best to achieve and maintain a sustainable and innovative construction sector.

Under the Construction Sector Group's Innovation and Digital Adoption [Subcommittee report](#) (Sustainability Consultation Group Report), some survey solutions focused the area of decarbonisation included: easily accessible design tools/BIM technology for whole of life carbon

analysis; the decarbonisation of local existing material and the manufacturing of novel sustainable materials; the affordability of existing renewable systems (heat-pumps etc) and mainstreaming mass timber or hybrid systems in the Irish context. So it's very positive to see solutions so clearly identified. But also according to this report, 'there is a need for significant, focused, and long-term funding on decarbonising the Irish Construction Sector to meet national objectives'.

Engineers Ireland also believes that increased use of timber is vital to helping achieve net-Zero in construction. We have very good growing conditions for timber in Europe and its use must be further encouraged. Engineers Ireland provides a [training course](#) for structural and civil engineers in Eurocode 5, the design standard for the design of elements in timber construction.

2. Housing

Build safe and sustainable homes and communities

Public infrastructure

While home completions have increased in recent years - for example the [Central Statistics Office](#) (CSO) has stated that 6,716 new homes were completed in the first three months of this year – an 19.1% increase on the same quarter in 2022 - the level of residential output is far below the estimated level of housing demand based on demographic trends.

A constraint to delivering housing is often the unavailability of public infrastructure, such as transportation, water and wastewater, telecommunications and energy. A holistic approach to our complex built environment is needed if we are to overcome our current and future housing challenges. There should be increased funding and coordination of the planning and delivery of public infrastructure to improve stability of supply and affordability of new homes. The Land Development Agency (LDA) must have a strong mandate and resources to actively manage State-owned land. We also welcome the [announcement](#) on Friday 21 July 2023 that the LDA now has the option of buying privately-owned land to deliver affordable housing and it has identified the need and opportunity to do this.

Retrofitting

Our housing stock requires immediate retrofitting to improve living conditions and to achieve climate targets. Vacant buildings should be brought back into active use. The Government's commitment to upgrade 500,000 homes by 2030 to a BER rate of B2 is welcome, however in 2022, the Government, according to an SEAI [annual report](#), supported just over 27,000 home energy upgrades. Additionally, the SEAI's proactive One Stop Shop regime of information provision, has been offset somewhat by the lack of labour, impact of inflation and supply chain delays, meaning there was 'an unmet demand for home energy upgrades' according to the SEAI in 2022.

The building regulatory regime could be reinforced by increasing the resources of local authorities for inspection and enforcement. We welcome that legislation was published in 2022 to put the Construction Industry Register Ireland on a statutory footing to promote a greater commitment to compliance, safety and quality.

Modern methods of construction (MMC)

Modern methods of construction have the potential to increase housing output, quality and innovation. We would like to see greater understanding, support and development of modern methods of construction. The Government's [Build Digital](#) project is an excellent initiative, structured around 5 pillars of interconnected activities, and aiming to transform Irish construction and the built environment. Construct Innovate, Ireland's Construction Technology Centre, is a partnership between Trinity College Dublin, University College Dublin, University College Cork, the Irish Green Building Council and University of Galway. Our members are very supportive of these initiatives with several civil and structural engineering-members integral to the governance of these groups.

Deleterious materials

According to the Building Control (Amendment) Regulations (SI 9 of 2014 & Code of Practice) [henceforth BC(A)R], Chartered Engineers are one of the three professions which may act as Assigned Certifiers.

Engineers Ireland has also established and maintains registers of suitable qualified persons in specialist areas including:

- IS 398 Pyrite Assessment and Remediation
- Historical Landfill (Code of Practice: Environmental Risk Assessment for Unregulated
- Waste Disposal Sites (EPA, 2007).
- IS 465 Mica and Pyrite

Our understanding of the process of deterioration of defective concrete blocks continues to evolve. Engineers Ireland works with stakeholders to implement a register of experts for the implementation of IS 465 and provide feedback from registrants to enable continuous improvement.

We have long advocated for stronger oversight of the sector and recommend a regulatory system is established to deal with such matters given their complexity.

Based on current estimates the defective concrete block remediation scheme alone will cost the State in excess of €2 billion. As mentioned during the institution's [attendance](#) at the Joint Oireachtas Committee on Housing, Local Government and Heritage (13 July 2023), the annual cost of providing 5-10 engineers within each Local Authority to provide inspections and oversight to construction projects would equate to a small percentage of this figure and help to prevent future failures in the sector.

3. Energy

We must ensure we increase sustainability and keep our energy secure and affordable

As part of our policy work, we reviewed electrical energy in Ireland in 2023. Our subsequent report – [Powering Ireland: An Electrical Energy Review](#), seeks to give a broad overview of Ireland's electrical infrastructure and the current level of demand versus supply for electrical energy.

Energy trilemma

Ireland needs to move from our current situation of being heavily dependent on imported energy to becoming much more self-sufficient and ultimately aim to become a net exporter of energy; we should also look beyond our island to the possibility of us playing a part within a European Super Grid and

becoming a net exporter of sustainable energy. Delivering on these ambitions will require a combination of technical expertise, planning and political determination.

The target of net Zero by 2050 was first set out in the Paris Agreement, signed in 2016 and ratified by the European Union (EU). The EU has taken steps to achieve this 2050 goal through the European Energy Strategy and European Green Deal. The European Union's energy policy includes the need for a secure energy supply, sustainable energy consumption, lower fossil fuel dependence and improvements in energy efficiency.

The biggest challenge in energy which our country faces is known as the energy trilemma; we must ensure we increase sustainability and keep our energy secure and affordable. In 2018, nearly half (45.5%) of the net electricity generated in the EU was from combustible fuel, and a mix of renewables accounted for 28.6%.

When comparing Ireland to the EU-27 averages, Ireland used about 20% more conventional thermal power generation and, in a positive development, double the EU average of wind generation. Ireland is the 3rd most prominent user of wind energy in the EU, behind Denmark and Lithuania.

Diverse portfolio

Ireland has significant potential to be a leader in renewable electrical energy production and a net energy exporter. Wind energy can and should be a majority stakeholder in energy production in Ireland in the future. However, no one technology can meet all of Ireland's electrical needs. Ireland must have a diverse portfolio of sustainable energy options to ensure future energy security. Wind and solar will be significant parts of our green future. Additionally, serious consideration must be given to the remaining conventional thermal power plants around the country needed as a backup supply, and other energy sources such as international interconnectors, biomass, and nuclear energy.

Adaptable electrical grid

Developing energy sources in Ireland is only part of the challenge to a green future. A robust and adaptable electrical grid is needed to harness this energy to ensure electricity can be delivered efficiently where required. Linking our grid via interconnections to the UK and Europe will provide additional flexibility and allow excess electrical energy to be exported. The EU has set a target of 15% of demand to be available through interconnectors by 2030. This level of infrastructure will be required to secure Ireland's place as a leader in the proposed European Super Grid project. Ireland historically has created a sizeable low-level electrical grid. As demand for electrical energy has increased, this low-level grid is no longer fit for purpose and requires additional high-level infrastructure to support it. However, significant planning delays as well as public and political challenges have hindered the development of this infrastructure, e.g. the delay in completing the North South Interconnector.

We must develop our green energy sources and grid infrastructure. Engineers in Ireland require public and political support to achieve this potential. An ongoing and urgent dialogue is needed to inform and assure all stakeholders, including the general public and policymakers.

Our [Powering Ireland](#) report makes several recommendations found on pages 6 and 7. They include:

Supply of electricity

- ✓ Ireland must identify its electrical requirements for 2050 and develop a system looking at a diverse portfolio of green energy zero-carbon sources, a broad collection of interconnections with neighbouring countries, and a robust and flexible electrical energy grid.

- ✓ Conventional thermal generation power stations have historically provided a significant proportion of our electricity supply. As we move towards 2050, most of these power stations will need to be shut down or retrofitted to burn green fuels such as green hydrogen or biomass to become carbon-neutral plants.
- ✓ Green hydrogen should first be used for difficult-to-electrify sectors. A rapid scale-up in green hydrogen production and its use is required to support electrical generation. This must be actively managed to ensure the displacement of fossil fuels, which will determine the location of hydrogen research, development and commercialisation activities in Ireland.
- ✓ We must accelerate the route to market for innovative energy solutions such as offshore wind, supported by Government policy centering on procurement, planning and execution.

Energy Infrastructure

- ✓ Prioritise completing the North-South Interconnector Project and other outstanding grid development projects. The North-South Interconnector will provide an addition of a 400 kV overhead line to our grid, connecting the electricity grids of Ireland and Northern Ireland, ensuring we can transmit large amounts of electricity across the border in both directions.
- ✓ Consideration must be given to the use of hybrid grid connections. These connections allow the synergy of conventional energy generation and new renewable energy. They provide a near-term solution to adding additional capability to the grid. These must be endorsed and expanded to support additional energy sources such as wind, green hydrogen, and solar farms.
- ✓ The Government should support the provision of an LNG (Liquified Natural Gas) and regasification units as part of the near to medium-term solution to providing energy security for Ireland to prevent possible future disruptions to gas supply.

4. Skills Shortage

Encourage and provide financial support to STEM education outreach; embrace further and higher education and lifelong learning

Demand for engineers

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 job cuts in the tech sector in 2023 – 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 for 2023. Experienced engineers are in high demand. Our Employer Survey for 2023 (published as part of our [Engineering 2023: A Barometer of the Profession in Ireland Report](#)) has shown that 72% of our 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 - Science, Technology, Engineering and Maths - in our schools, has to be further prioritised to meet these opportunities now and into the future.

STEM skills are vital to achieving a knowledge-based, sustainable future for Ireland. As a small island nation we have a reliance on the quantity and quality of our STEM graduates.

In June 2023 the [Institute for Management Development](#) (IMD) published its World Competitiveness Yearbook 2023. In recent years, the IMD Executive Opinion Survey has asked additional questions related to executives' concerns about the economies in which they operate. This year's report examined what they perceived as Ireland's key attractiveness factors. The five factors for Ireland were its skilled workforce, high education levels, policy stability and predictability, competitive tax regime and business friendly environment. These factors underscore Ireland's value proposition as a place to do business.

However, in terms of rankings within that survey, Ireland significantly underperformed in total public expenditure on **education** (60th).

Hence is it extremely important that the Government continues to invest in education at all levels in Ireland.

STEM, our STEPS programme and Young People

Engineers Ireland contributed to Minister Norma Foley TD's consultation process which informed the March 2023 publication of the [STEM Education Policy Statement Implementation Plan to 2026](#). Engineers Ireland welcomes within this Plan, that 'further enhancing the partnerships between schools and business/industry and our research community' will be part of the Department of Education's programme to 2026. In addition, our organisation, through our STEPS education programme, provides information 'on stem careers' and aims to have 'equitable access' to STEM role models, as the Plan encourages.

We must continue to work together to ensure that young people from all social backgrounds have an opportunity to consider a career in engineering, so that the diversity of our profession properly reflects the society it serves.

This implementation plan links to the Government's original [STEM Education Policy Statement](#). Its overall implementation needs to continue i.e. targeting an increase by 20% the total students taking Chemistry, Physics, Technology and Engineering for Leaving Certificate; increase by 40% the number of females taking STEM subjects for Leaving Certificate; Learners have access to co-curricular and out-of-school STEM learning opportunities with a 20% increase in extra-curricular STEM activities in schools in every region.

The engineering industry is very willing to engage with young people (and their teachers) to help spark their imagination about engineering and to provide them with careers information. Engineers Ireland STEPS programme receives some funding from the Department of Education, which we acknowledge. However more Government funding is absolutely required to support and encourage STEM based outreach initiatives with industry.

It is extremely encouraging to read in [Engineering 2023: A Barometer of the Profession in Ireland](#) report that in our Public Poll finding (Behaviour and Attitudes), 77% of the public agree with the statement that 'engineering is a rewarding career choice for young people'.

Higher education in engineering

Core funding per student at higher level has decreased detrimentally in the recent period and, in some institutions, laboratory equipment and other facilities have almost become obsolete. Inadequate resourcing undermines teaching, learning and research and the ability of our higher education institutions to be globally competitive. A sustainable funding model for higher education is urgently needed, including core funding, programmatic funding, infrastructure investment and industry-academic collaboration. Funding is also needed to support our former Institutes of Technology as they consolidate and become technological universities – and to also develop apprenticeship programmes.

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.

A ready supply of engineers will be crucial for the delivery of Project Ireland 2040, the Climate Action Plan and Housing for All. However, the number of students moving into third-level engineering and technology sectors needs to be much larger to meet our country's current and future needs. Ireland's National Skills Strategy 2025 highlights that there are 'skills shortages for Professionals and Associate Professionals across sectors in areas of ICT, Science and Engineering'.

The [National Skills Bulletin](#), published by SOLAS, in October 2022, talks about the demand for engineers and it states that "the shift towards a low carbon economy is expected to result in a demand for additional skills amongst scientists (e.g. ecology, environmental, conservation), electrical engineers (e.g. renewable and high voltage) and technicians (e.g. solar/wind).

There is a significant gender gap in the engineering profession and additional efforts should be made to encourage women to enter and remain in engineering. Engineers Ireland has a specific 'Women in Engineering Group' to support female engineers and it is part of our Inclusion and Diversity Society.

In an era of digitalisation and rapidly-changing skills needs, lifelong learning is becoming increasingly important and should be promoted and supported. For example, on joining Engineers Ireland, all members make a fundamental commitment to ongoing self-improvement. It is this underpinning ethos – the professional obligation to learn – that is a decisive contributor to the credibility in society of the engineering profession. Lifelong learning should not only include new technical competences, but it should also explore skills in emotional intelligence, creativity, communication, ethics, and leadership.

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