Presidential Address by John Power, President of Engineers Ireland

29 September 2022

Good evening, friends and welcome to an event that has surprised me a lot more than any of you. As Director General of Engineers Ireland for eight years and enjoying the privilege of working closely with eight most deserving people who had the honour so serving as your President, never did I think that I would, one day, be counted among that august group.

In this Address, which will not be of a technical nature, I would like to try to encapsulate the impact Engineering had over my lifetime, and more importantly, **will have** on all of us in the future. I will draw on my own experiences to a very limited degree and largely on the ubiquitous nature of Engineering. Clearly what Engineers achieved in the generations before I was born is extraordinary, but I think we will all agree that since the end of WW2 the advances and pace of developments has been mind boggling.

I think it's important that I should say before continuing that, I am not an advocate for any cause other than Engineering, its importance, its contribution and its absolute necessity for todays and future generations AND what's right for Ireland.

We are here tonight against a backdrop of War, Covid, Climate Change, Brexit, ever increasing Energy costs, Energy vulnerability, political instability worldwide with no obvious Leader emerging, the highest inflation in many years and a work environment that has changed utterly - to mention but a few.

It is truly a remarkable time for us all to be alive.

But let's take a few moments to **look back**. The last time the world experienced a deadly pandemic, society responded with a decade of economic growth, innovation, and change.

I wonder if history is set to repeat itself?

"The parties were bigger. The pace was faster. The buildings were higher… Life was a dream, and everything was possible," is how Scott Fitzgerald described the Roaring 20s in The Great Gatsby, published in 1925. Yet it was only a few years earlier – from 1918 to 1920, immediately after World War 1 – that the Great Flu, shattered the global economy and killed up to 50 million people. **But as Fitzgerald noted, what came next was a decade of innovation and change.**

The 1920s represented a sudden sense of ambition for many in terms of what was possible. Advancements in medicine, including the discovery of penicillin in 1928, also laid the foundations of the antibiotic era that would transform healthcare. The 1920s saw innovations in infrastructure that changed the world. Indoor plumbing became common, telephone lines went up and electrification took hold of industries. The resulting gains in productivity and living standards were immense, lifting many people out of poverty.
Many of the changes to cities in the 1920s were the result of innovations in transport. There was the mass production of cars, spearheaded by Ford's Model T, which saw cars change from a luxury item to an affordable mode of transport. They allowed people to travel further from their communities and fuelled the rise of suburbs by removing the need for employees to live close to their workplace.

Could the roaring <u>2020s</u> cities be reborn just as they were in the 1920s?

Travel, retail, and hospitality were among the industries most affected by Covid and resulting lockdowns.

International travel ground to a halt, shops were shuttered, and large gatherings of people banned as countries across the world grappled with the pandemic. The society that emerges from this period could be very different to the one at the start. And there may be many parallels with the years that followed the pandemic of 100 years ago.

The coming decade could see a reversal thanks to new forms of transport.

For example, let us look at the new city of Neom.

Described as an urban blueprint for the next 150 years, Neom is a 170km-long proposed city in Tabuk, on the Red Sea. Powered by artificial intelligence, the development promises a 20-minute work commute and will have quote "zero streets and zero carbon emissions". Plans call for robots to perform functions such as security, logistics, home delivery, and caregiving and for the city to be powered solely with wind and solar power. The first phase of the project is scheduled for completion by 2025.

Elon Musk is trying to get his Hyperloop concept (transport between cities) realised, which will, in theory, run trains in sealed tubes at greater than 150mph.

However, the rise of working from home because of lockdown and the improvements in rural broadband could see another retreat from cities, after decades of booming urban populations. On the whole, the pandemic has made people think more about the spaces they live in, the attributes they value in a home and where geographically they want to be. But businesses and employees will almost certainly look for opportunities to connect, enjoying the unique stimulus that only cities can provide, and **so the office model is set to shift but is unlikely to die.**

People realise just how much they miss what I call the 'conviviality of community'.

In 2020, Anne Hidalgo, the mayor of Paris who has waged a war against cars in that city - **does that sound familiar?** - and who has thanked Parisians for "choosing a Paris that breathes, a Paris that is more agreeable to live in, a more caring city that leaves no one by the wayside", made 15-minute cities a centrepiece of her successful re-election campaign. Michael Biltz, managing director of Accenture Technology Vision, says the pandemic has quote "pushed a giant fast-forward button to the future, as many organisations have stepped up to use technology in extraordinary ways with the demand for Engineering skills

becoming more and more critical." The result is "the single biggest workforce shift in living memory."

The challenges and opportunities ahead are vast.

From supply chains to digital ecosystems, the pandemic showed just how brittle globe-spanning relationships can be. As we come to the end of a difficult period, there seems enough evidence to suggest that the coming decade could be just as revolutionary as the one a century ago with massive opportunities for more Engineers to make an even greater impact.

The last two years has shown us how technology can solve problems and improve our lives. Our consumption of streaming media and video calls may change, **but the accelerated deployment of technology will not.**

Tensions between the US, China, Russia, to name but three remain elevated and while a potentially combustible relationship between the most powerful countries in the world is not desirable, it could also result in a period of competitive investment, in areas such as semiconductors, renewable energy, and technology more broadly, again crying out for more Engineers.

Moving on to my own experiences I'd like to transport you through the last 60 years or so that has very clearly demonstrated some of the enormous impact Engineers and Engineering has had on mankind and on the quality of all our lives today.

You know it's so very easy for us as Engineers, let alone the general public to take this for granted or just forget.

This point is very important when our Profession is viewed against other Professions and particularly when compensation for our contribution is considered.

Unfortunately, not all the work of our Profession has always been put to the use for which it was intended but I think we can suggest with reasonable certainty that the abuse of the developments were largely decisions of other unscrupulous individuals and leaders – outside the control of the inventors and creators.

Having been born in 1953 – remember that year when:-

- The late Queen Elizabeth's coronation was on June 2nd
- Norgay and Hillary performed the 1st successful ascent of Mount Everest
- New York adopted tri colour traffic lights
- The final inhabitants of the Blasket Islands were evacuated; and
- On the day after I began to annoy people, Kerry won the All-Ireland Football title, beating Armagh in front of 86,000 people – that was when the Football Final was in late September. **Wouldn't it be nice to see that again ?**

The 1950s and 1960s was a time of **great change for Ireland and the world**. Having started in 1946, the Rural Electrification Scheme gathered pace through the 1950s and by 1965 had brought electricity to 81% of rural Ireland. This massive achievement involved erecting 1 million poles, 100,000 transformers and 75,000 miles of line under the direction of ESB Engineers and without the props available today.

One UCC academic called this "an enormous logistical, capital, technological and cultural project that transformed the Irish countryside".

Internationally, engineers and the wider public were gripped by the **Space Race** in the late 1950s and 1960s. The race heated up in 1961 when Yuri Gagarin became the first person in space and President Kennedy made the famous commitment "before this decade is out, of landing a man on the Moon and returning him safely to the Earth". The Apollo Space

Program, which of course achieved JFK's goal, was the "greatest engineering adventure ever taken" according to the American Society of Mechanical Engineers.

The Program involved "400,000 engineers, scientists and technicians from more than 20,000 companies and universities". **Today's world wouldn't be the same without many of the breakthroughs from that race.**

In 1969, as Armstrong and Aldrin walked on the moon, engineering in Ireland was taking its own giant leap. The passage of the Institution of Civil Engineers of Ireland (Charter Amendment) Act 1969 established **this Institution** as the unified body for engineers in Ireland and provided us with statutory backing for the professional title of Chartered Engineer.

After my school years in Tralee, in 1971, I "stumbled" into 1st Engineering in UCD.

That summer I was working on a construction project in Ballyvourney commissioned by our renowned late composer Sean O'Riada representing the local Community, when I called the late Brother Murray (the finest teacher I have ever had the pleasure of meeting) who gave me my Leaving cert results **(over the phone – can you imagine that happening today)** and who wondered what I might now pursue. Remember only a short 8 years prior to that time, in 1963, as last year's President, Orla informed us, only 4% of students went on to 3rd level, so that pursuit was not, by any means, as automatic as it appears today. Regardless, I advised Brother Murray that I intended studying Engineering in UCD.

To be totally honest I had little or no idea what I wished to study in college, but I did know that I wanted to go to university (if only for the freedom and social life) and I was also very sure of what I **did not** wish to study.

Without having any real appreciation of what might be involved – remember Career Guidance at that time was very limited, Engineering was the path I choose to follow. So off to UCD I went in September 1971. In 1975 when I graduated, Kerry, with 15 young

bachelors on the Team, were again Football Champions, beating the Dubs in front of 66,000 spectators.

The 1970s was a period globally, and in my own life, defined by energy. I was a Graduate Engineer with General Electric in the USA and South America working on a team designing DC Drive Systems in Salem, Virginia and then on the installation of Gas Turbines in Venezuela. Later in the 70s I returned home to join the ESB where my 1st role was in developing the Terms for Supply for new Industrial customers attracted to Ireland by the IDA.

Sadly, this was also a time marked by conflict in the Middle East and on our own island. The 1973 Arab-Israeli War, led to the 1973 Oil Crisis. An OPEC embargo saw the price of oil quadruple from $3 to $12 per barrel in 1974. The second oil crisis in 1979 following the Iranian Revolution and the Iran-Iraq War led to a further price surge to $40 a barrel.

The resulting inflation was felt everywhere. Does this sound familiar ?

The 1970s, partly inspired by the high oil price, witnessed the exploration of other forms of energy. In 1971, gas was discovered near the Old Head of Kinsale, and production began in 1978, meeting Ireland's gas needs until 1996 and ceasing production in 2020. This was also a time when many countries expanded nuclear power use. A nuclear plant was proposed for Carnsore Point in Wexford but was dropped following public opposition.
The Chernobyl disaster in 1986 put paid to any further consideration of Nuclear Power Plants in Ireland.

However, in the midst of our current climate crisis, perhaps it's time to reawaken this discussion in an informed, mature, and balanced manner and out of the glare of the Joe Duffy Show.

Moving into the 1980's, I began to enjoy different roles in the ESB, supporting industrial, commercial, and domestic customers in various parts of the country – most notably

Portlaoise and Limerick – two towns we would have rushed through when in earlier years we travelled to Dublin from Kerry for matches, but two wonderful places to live, as I discovered during the 80's and early 90's.

This was a time when industrial development was gathering pace in Ireland, particularly driven by Foreign Direct Investment and the work of the IDA. FDI grew from $100-200 million per year to $5 billion per year through the 80s.

Some of the companies that set up in Ireland then included electronics companies such as Apple and Fujitsu, pharmaceutical companies such as Allergan and Eli Lilly, and tech companies like Microsoft and Intel. These global leaders sowed the seeds for the arrival of Google, Facebook, Twitter and others in the 2000s. The evolution of the FDI sector started with assembly and test, moved into higher-value manufacturing and low-end services in the 1990s and finally to advanced manufacturing and high-end services in the 2000s.

Life sciences in Ireland has grown dramatically from very humble beginnings pre-1970 to today with the country being the world's 3rd largest exporter of pharmaceuticals.

Engineers not only run and maintain the 150+ related manufacturing facilities in Ireland but also are of vital importance in bringing the more than a billion euro in annual investment projects in the industry in Ireland to successful completion through Irish based design, specialist builders and construction teams.

We are now more than ever using our **home-grown** engineering expertise to expand into foreign markets and relatively new industries with a very significant amount of the R&D occurring here at home by Irish educated Engineering and other Technical graduates.

Ireland's membership of the EU (formerly EEC) also paid dividends during this time. European Structural and Cohesion Funds enabled significant investment in education and infrastructure such as the DART. Railways have been a major component of the engineering

profession in Ireland since the opening of the Dublin and Kingstown Railway in 1834 – one year before Engineers Irelands 1st manifestation.

The 1990s heralded fundamental change to the Irish economy and Irish society.

While the seeds of a boom had been sown in the 1980s, unemployment and inflation had remained high and economic growth relatively low. The Celtic Tiger from the mid-90s to 2007 has been well covered, the economy boomed, Irish society was transformed, and engineering played a key role.

In my own career I moved from Limerick back to Dublin where I enjoyed being included in a small Corporate Change Team in ESB charged with a fundamental redesign of the Company which included challenging the direction of operation in an everchanging external landscape. This time was hugely interesting and exposed me to challenges I would never have dreamed of. I was then appointed Manager, Human Resources in our biggest Business Unit – again something Engineers were not supposed to know much about but a role I embraced with enthusiasm before I moved on to ESB International where I was charged with responsibility for 6 separate companies for the next 3 years – another huge learning experience.

The internet arrived in Ireland in June 1991 with Trinity College becoming the first organisation to go online. By 1999, 18% of the Irish population were using the internet, the dot com bubble had inflated and we worried about Y2K. As time went by, Y2K fears were shown to be unfounded, the tech industry recovered from the dot com crash and fostered tech giants, and the Irish digital landscape changed forever.

The physical landscape of Ireland was also changing. Fuelled by a booming economy and EU funding, the Irish state began to invest heavily in the motorway network.

The National Roads Authority, later Transport Infrastructure Ireland was founded in 1993, set to work on the National Roads Needs Study published in 1998, which informed the

National Development Plan. Between 1990 and 2010, the length of motorways in Ireland increased from **26km to 900km** with transformative benefits for road safety, connectivity, and travel time – **although not without its environmental challenges either.**

The early 2000s saw increased attention to engineering and science education and research with bodies such as Science Foundation Ireland created. The STEPS programme was launched in Engineers Ireland in 2000 as the Science, Technology and Engineering Programme for Schools.

Over the last 22 years, STEPS has gone from strength to strength promoting interest and awareness in engineering as a future career to school students.

Now funded by Government and industry leaders including ARUP, EPA, ESB, Intel and TII, engagement with our STEPS programme continues to grow with 136,000 students involved in 2021.

The 2000s also brought an unprecedented boom in housing construction. Between 2000 and 2007, there were more than half a million private homes built – more than double the level of building of the previous decade and averaging over 60,000 houses per year. These homes facilitated a growing and diversifying population in the latter half of the Celtic Tiger. Employment in the construction sector grew rapidly to more than 230,000 in 2007.

However, there were many failings from this period that we continue to feel today.

A huge engineering feat of the 2000s was the Dublin Port Tunnel, which went to tender in 2000 and opened in December 2006. A contributor to the Engineers Journal summarised the Tunnel as "a unique road infrastructure achievement that facilitates safe and efficient vehicular access to Ireland's key marine port, while removing heavy vehicles from Dublin city centre to enhance air, noise and safety conditions for pedestrians and cyclists. With the continued reliance on vehicular transport for goods and passengers in Ireland, Dublin Port Tunnel will continue to play an important role in transportation at a regional and national

level." How right he was. And didn't it also demonstrate that very large infrastructure projects **can** be delivered on time when we put our minds to it.

The 2000s were also a significant decade for me on a personal level.

After spells as Head of Supply Chain for the €4bn refurbishment of the Medium Voltage Networks and Head of Corporate Affairs in ESB, I assumed the role of Director General of Engineers Ireland in September 2007, another journey out of my comfort zone which I thoroughly enjoyed until my departure in September 2015 - **the longest time I spent in any job during my career.**

Just as engineering played a key role in the Celtic Tiger boom, so did our engineering profession in the economic recovery over the last ten years. I have already spoken about the growth of advanced manufacturing and the tech sector during this time.

We also learned important lessons from building failures. The Building Control Amendment Regulations – known as BC(A)R – evolved from the horror stories of Priory Hall, Longboat Quay and other residential developments where it was obvious that insufficient attention had been given to an appropriate inspection regime during building works, with specific regard to fire safety in particular.

During the crash, capital investment was slashed resulting in major infrastructural deficits. Engineers Ireland responded by producing the 1st State of Ireland Report which, together with its successors has gained traction in government circles and the Houses of the Oireachtas, where its **independent stance** has meant that its recommendations can be embraced across the complete political spectrum.

In recent decades, the challenge of climate change mitigation has come to the fore, and Irish engineers have again been in the vanguard. The successful deployment of renewable electricity sources, primarily onshore wind, at scale over the past 20 years, and the integration of this variable resource on our synchronous power system has been world

leading. The electricity generated from renewables grew from just 6% in 2005 to 42% in 2020. Wind accounted for 37% of all electricity generated in 2020, representing the world's highest penetration for onshore wind. This engineering feat has already led to significant decarbonisation of our electricity grid, and it was built on the work of dedicated, ambitious, and dynamic engineering professionals working together across the public and private sectors. This is also steadily reducing our dependence on imported fossil fuels - crucially important in this time of resurgent geopolitical tensions.

But dare I suggest, as with other issues, a balanced, informed, rational and realistic discussion needs to take place quickly about the availability, accessibility, and affordability of energy in Ireland and decisions, sometimes requiring Political courage, devoid of short-termism, need to be taken.

Unfortunately, I see little evidence of any REALISM from those in decision making positions at the moment.

Without immediate action we are faced with power cuts and perhaps more importantly a doubt about our ability to manage our own affairs will significantly impact the confidence which has led to the massive FDI we have enjoyed over the last quarter of a century.

Allow me to go back to where I came in – that period post a pandemic and in particular what the next number of years may hold in store for our own organisation, engineers, and engineering. Engineers are **problem solvers**, we have been since time began and it is what attracts us to the Profession and given the current state of affairs on the Planet, **I think our skills and inputs are now needed as never ever before.**

Our main objective for the next 10 years must be to be more impactful – where it counts – with the decision makers and implementers.

We begin this next era in the life of Engineers Ireland with a New Director General – which is a time excitement for all the Team here in Clyde Road. I am very hopeful that the next

number of years will be a time of continued growth, development, and success for the Institution.

Moving on to priorities, as I see them:-

In February 2020, the Council of Engineers Ireland passed a motion to declare a Climate and Biodiversity Emergency, publicly recognising that climate breakdown and biodiversity collapse are among the most serious issues of our time. Specific actions underway include fostering collaboration between Engineers Ireland and biodiversity experts and organisations. As practitioners and experts, Engineers Ireland is well positioned to provide informed opinion backed by experientially gained knowledge to policy makers and other stakeholders.

Engineering is constantly faced with **Ethical** issues and decisions.

Engineering has the potential to change, modify and control the world around us but not without cost and consequence.

For our engineering students and young graduates, we need to ensure they appreciate that engineering is about **understanding the impact** their work has on the world around them and over the **whole lifecycle** of that work. Our bye-laws, and code of ethics affirm that engineering is about serving the needs of society and creating solutions that work. Engineers Ireland has an opportunity to take a lead position as a professional body to provide our **young engineers with opportunities to experience, explore, and resolve ethical dilemmas** and in doing so develop a deeper understanding of the impact of engineering on society.

Our **electricity system** is entering a period of change and engineers are driving all aspects of this **Transition**.

The media, policy makers and most importantly the public will need to understand the rationale for investment, lead-time, environmental implications, economic benefits etc of a wide variety of developments and recognise that we will **not** be able to **simply disconnect** one fuel source and employ another source of generation – most particularly given our record

with appalling delays on infrastructure projects and our planning laws that appear to favour the minority at a cost to the majority.

Engineers Ireland, and in particular our Sectors are extremely well placed to act as policy advisors, media spokespersons and to run knowledge-sharing events to support better understanding of this Transition.

Continuing Professional Development is critically important in our profession.

Engineers Ireland provides a wide and increasing range of **CPD** services to support the professional development of members and others, thus ensuring a high level of competence across industry.

Working in high-profile industries, especially those directly linked to public health, safety, risk and public investment, places an obligation on members to maintain and develop their knowledge, expertise and experience.

An area I think we have neglected is our **Seas and Coastline.**

Our geographical area, as a country, is approximately 9 times larger than our land area. We have an enormous resource in the seas around our coast – a source of huge pride and potential for our country.

I mention Pride because of the phenomenal work that has been done by those in Irish Lights and their predecessors in the construction of the Lighthouses around our coast. Thousands of lives have been saved as a result of their work as evidenced by the massive **reduction** in ship wrecks resulting from the development and strategic positioning of these lighthouses. Work that has largely gone unappreciated except by those directly affected. And let us never underestimate the huge contribution and input of Engineers in the sighting and construction of these. The work of George Halpin and William Douglass, to name but

two, is the stuff of legends – Halpin, generally regarded as the founding father of the Irish Lighthouse Service was responsible for the construction of 53 new lighthouses.

But perhaps the most famous and iconic lighthouse work was overseen by William Douglass – the Fastnet Lighthouse. The Fastnet is the quintessential tower lighthouse with construction commencing in 1896 and finishing in 1902.

When one considers just how inclement the seas around the rock can be (remember 21 people died in the 1979 Fastnet race) it's simple to imagine just **how** difficult and unsafe the construction work was and add to that the construction style and the equipment available **(or not)** at the time, makes the achievement all the more staggering.

Constructed of 2072 individual stones – each weighing between 1.75 and 3 tonnes – with each stone knitting perfectly with its surrounding stones, none of which were exactly the same and the fact that is stands proudly off our south coast and still delivers a hugely valuable service today is a perfect example of the lasting impact of the contribution of our engineering colleagues from yesteryear. 120 years of continuous Atlantic seas and storms have failed to blemish this inspired piece of engineering.

And as regards Potential I suggest we have a largely untapped resource in the seas around us, potential **for wealth creation, job creation, greater energy independence, further recreational facilities etc.** but **we must** address the ever-present planning roadblocks.

Engineers will be critical to the exploitation of this resource, and I intend establishing a working group in Engineers Ireland shortly, to advise on the real potential and what may be involved to exploit it to the full.

And let's not forget the wonderful work done by the Navy and the Air Corps, both significant employers of Engineers, in patrolling and protecting our coastline.

Engineers Ireland is first and foremost a **Membership** Body and this must always be uppermost in our thinking when considering the future of the Institution.

22 Clyde Road is our home and is a hugely valued facility by our Members since 1955 when it became our HQ. Unfortunately Covid deprived us of it for the last couple of years but I am delighted to advise that we are now fully open for business once again.

For many years our membership, excluding students, has hovered between 17,000 and 19,000.

We are a Membership organisation with everything that means – **how** we identify future members, **where** do we find them, **how** we reach out to them, **what** we have to attract them, how we **retain** them and how we **involve** them in making this Institution the true home of Engineers and Engineering on this island.

Heavily embedded in those questions has to be – What we **do** for our Members, what **service** we provide, what **value** they can gain from their involvement.

I believe our success depends on both **how** we communicate and **what** we can offer.

Answering the **How** question is very much dictated by the age of our target audience (for example young people don't tend to read hard copy and so we must channel our energies on to TikTok and Instagram, etc, - even Google is now becoming dated), the **What** piece must **constantly evolve** and we must be sure that our offerings are of value and regularly updated and enhanced.

I believe we need to really focus on our Engineering Schools – they now have Ireland's future Engineers in their classrooms, also, **our** future members. If we are able to convince them of the quality of our service offering they will join Engineers Ireland. And once in, we must **mind** them by way of providing **real** value.

Can I also involve a much broader community - the General Public, who employ the services of our members.

Why can't Engineers Ireland develop a really worthwhile service for both our members **and** the public by matching the skills of our members to the needs of the public on a geographical basis or any criterion that satisfies an unmet need of either the Member or the client.

Our ultimate goal in this space must be, that by providing worthwhile, meaningful services to our members we identify, liaise with, recruit, and retain the graduates of today and target a paying membership of 25,000 in 5 years' time.

Finally, major global issues such as climate change, securing future energy supply, ageing populations, creating sustainable cities and renewing infrastructure, are underpinned by engineering and the profession has a central role in creating solutions. The engineering skills required in the emerging sectors means that engineers possess not just technical skills but a range of enabling skills such as teamwork, effective communication, project management and financial appraisal. **The very welcome increase in the number of women pursuing careers in engineering adds a further positive dimension to the profession.**

The education of the engineer presents our third level institutions with particular challenges and Engineers Ireland has a central role through, our accreditation process, in helping shape tomorrow's engineers and through our CPD offerings, to promote their continuous professional development.

Engineering, during my lifetime, made our waters cleaner and safer, electrified our homes, changed transport out of all proportion and revolutionised the production of food. Our homes were made more comfortable and efficient with new appliances. The telephone, radio and television kept us in contact. We are now developing renewable forms of energy that are efficient and safe and designing new ways of using and storing energy. The internet, developed through a series of engineering innovations is now a global communication and

information system. Other contributions include shipping, bridges, tunnels and dams, electronics, the computer, nuclear technologies, agricultural mechanisation, robotics, biomedical advances and much much more. Engineers and Engineering have led **all** significant developments for mankind to date and we will continue to shape the future for a better more sustainable world – **if we don't nobody else will.**

As a much more famous person than I once said "Everything not invented by God is invented by an Engineer"

And as I look back on the evolution of Irish engineering over my career and look forward, I have enjoyed some very very rich experiences as an engineer, not because of my engineering qualifications **alone** but **also** because of the promptings of a couple of very wise coaches with whom I engaged along the way who always encouraged me to challenge myself and explore options outside of my own comfort zone. **To them I will be forever grateful.**

I am also reminded that unlike many from my generation who pursued careers without much guidance or appreciation of what might be involved, todays Gen Z and Millennials seek a positive, diverse, and inclusive workplace culture, a sense of purpose, an opportunity to make a difference, employment with a societal and environmental impact and fair compensation. **We, those of us with some grey hairs and experience,** have a big role to play in creating that kind of environment for our future engineers.

The recognition is growing among the public and decision makers of how increasingly important engineers are and engineering is in this most challenging environment in which we live**.**

Let's not disappoint them.

On that note I think it is time for me to end and to thank you all for your presence either physically or virtually and many thanks for your attention.

Go raibh mile maith agaibh go leir.

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