



ENGINEERS
AUSTRALIA



Victorian Energy Jobs Plan Consultation



Engineers Australia's submission

Victorian Energy Jobs Plan Consultation - Engineers Australia's Submission

Engineers Australia
11 National Circuit, Barton ACT 2600
Tel: [+61 2 6270 6555](tel:+61262706555)
Email: policy@engineersaustralia.org.au

engineersaustralia.org.au

Contents

Introduction.....	4
About Engineers Australia.....	4
Contact	4
Workforce	5
1. What are the barriers to attracting more students, apprentices, and workers to the energy sector? How can the energy sector use the transition to renewable energy to increase awareness of energy workforce opportunities?	5
2. How can the energy sector better attract and retain underrepresented and diverse workers, particularly in leadership, governance, trade, technical and regionally based roles?	6
Gender diversity	7
3. Are you aware of any industry-led actions, including from other sectors, that could be adapted to make the Victorian energy sector more attractive to students, apprentices, and workers?	10
4. What resources could best support employers to attract and retain workers, while also ensuring safe and positive workplace cultures?.....	12
Education Pathways	13
1. How can education pathways and providers further support students to successfully complete their qualifications?.....	13
2. How can education and training offerings adapt flexibly to the evolving skills need of the energy sector? Could this include, or do you have any examples, of continuous learning and skill development opportunities?	14
3. How can the education and training system attract more trainers to support energy education pathways? How can gaining experience as a trainer be appropriately recognised by employers and contribute to a rich and fulfilling energy sector career?	15
4. What are the key barriers for transitioning workers, and underrepresented groups, including First Peoples, people with disabilities and women, accessing training pathways in the energy sector?	16
5. Are you aware of any successful partnerships between the energy industry and the education system to train energy sector workers?	17
a. How can this be applied to other training initiatives, including the forthcoming Wind Worker Training Centre and Hydrogen Worker Training Centre?	17

Introduction

Engineers Australia commends the Victorian Government for developing a strong Clean Economy Workforce Development Strategy 2023-2033 . This consultation has underscored the challenges the energy sector and industry are facing but also the opportunities available to achieve the ambitious targets set to avoid the worst the consequences of climate change.

“The global shift towards renewable energy sources is not just a change in the way we power our world; it is a transformation that requires the re-evaluation and adjustment of our workforce and skills.”
Romilly Madew AO FTSE HonFIEAust EngExec, CEO, Engineers Australia.¹

The transition from fossil energy sources to clean technologies remains one of this century’s greatest challenges for which engineering is critical. This will start with addressing the critical skill shortages impacting the whole industry.

As the peak body for the engineering profession, Engineers Australia has been working on these issues on behalf of the profession for many years. The comments and recommendations below come from a series of research and consultations we have conducted with our expert members and provides solutions for the Department’s consideration .

About Engineers Australia

Engineering is the essential link between thinking and doing. Between idea, and implementation. It is our means for positive, sustainable change, with an influence on every aspect of modern society. Engineers are the enablers of productivity because they convert smart ideas into new products, processes and services.

As Australia’s national body for engineering, we are the voice and champion of our 125,000-plus members. We provide them with the resources, connections, and growth they need to do ethical, competent and high-value work in our communities.

A mission-based, not-for-profit professional association, Engineers Australia is constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community. We back today’s problem-solvers, so they can shape a better tomorrow.

As Australia’s signatory to the International Engineering Alliance, Engineers Australia maintains national professional standards, benchmarked against international norms. Under the Migration Regulations 1994, Engineers Australia is the designated assessing authority to perform assessment of potential migrant engineering professionals’ skills, qualifications, and/or work experience to ensure they meet the occupational standards needed for employment in Australia.

Contact

Engineers Australia welcomes the opportunity to engage further with the Victorian Department of Energy, Environment and Climate Action to support the Victorian Energy Jobs Plan and provide our expertise to assist. We look forward to discussing the content of this submission further; please email policy@engineersaustralia.org.au.

¹ Engineers Australia, *Sparking A Smooth Transition To A Green Workforce*, March 11th, 2024, https://www.linkedin.com/pulse/sparking-smooth-transition-green-workforce-romilly-yahhe?trk=public_profile_article_view

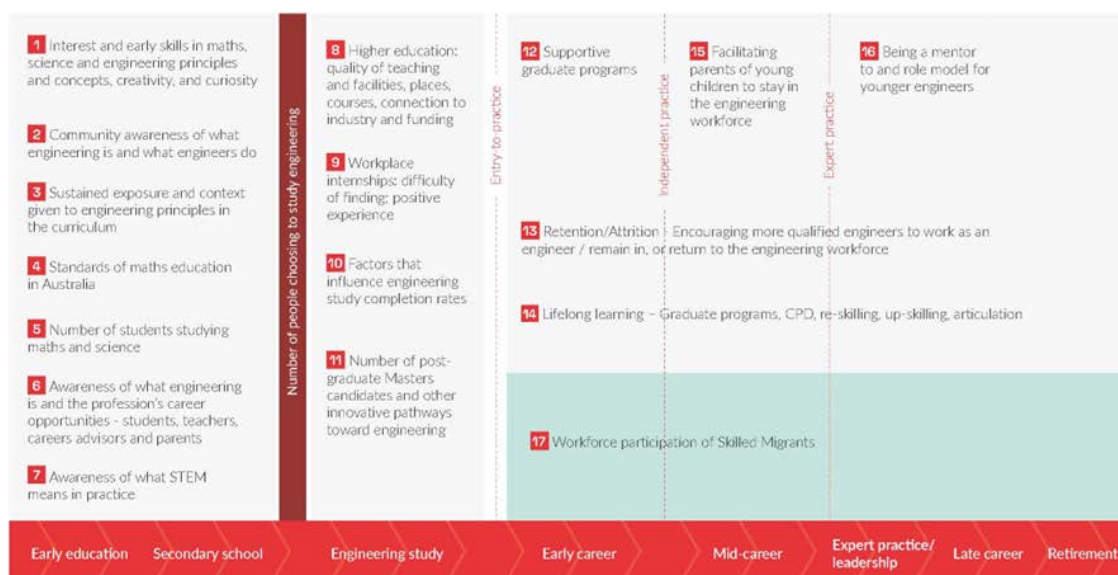
Workforce

1. What are the barriers to attracting more students, apprentices, and workers to the energy sector? How can the energy sector use the transition to renewable energy to increase awareness of energy workforce opportunities?

Engineers are critical to the energy sector, and for the transition to clean energy. However, shortages of engineering skills persist in Australia. Our research² has shown there are five main categories of factors that influence the engineering workforce:

1. **School education (primary and secondary)** - the factors that influence how many young Australians choose to study engineering for their higher education.
2. **Engineering study (vocational and higher education)** - the factors that influence engineering graduation rates and skillsets.
3. **Retention in the engineering workforce** – the factors that influence how many qualified engineers stay in the engineering workforce (work in an engineering role).
4. **Skilled migrant engineering workforce participation** – the factors that influence how many skilled migrant engineers work in an engineering role.
5. **Demand forecasting** – how data on current and future demand of engineering skills can enable better workforce planning and inform career choices for Australians.

Table 1: Summary of factors influencing the profession



The research indicates there is a long-term (chronic/structural) and cyclical shortage of engineers in Australia. The shortages of engineering skills is chronic in the sense that Australia has relied on

² Engineers Australia, *Strengthening The Engineering Workforce In Australia: Solutions To Address The Skills Shortage In The Short, Medium And Long Term*, August 2022, pp6, 11 & 18

overseas-born engineers to provide capability over many decades. Over 62 per cent of Australia's engineering workforce were born overseas and most are skilled migrants, up by 33 per cent from 2016³. However, this cohort of engineers are significantly more likely than their Australian-born counterparts to be under or unemployed.

Based on our research⁴, we find that migrant engineers are currently perceived by employers as requiring more investment and carrying more risk when compared to local engineers. There is an existing perception that employers need to invest more time and money to familiarise migrant engineers with the Australian engineering landscape. There is also a greater perceived risk with migrant engineers, with perceived 'flight risk' ranked as a major concern.

Seven main barriers to engineering workforce participation for migrant engineers were identified:

1. A lack of local knowledge and experience
2. Perceived cultural differences in soft skills
3. Visa or sponsorship working rights issues
4. A lack of people who can 'vouch' for them locally
5. Certification queries
6. 'Flight risk' concerns, and
7. Tendency to hire 'networks' at senior-level roles.

Broader understanding across the general public about what an engineer does and the enormous contribution they make to society is a common thread within our research findings. One of the key aspects in attracting more students, apprentices, and workers to engineering and the energy sector is to create that understanding and raise awareness of the opportunities in the energy workforce at all levels of the population, including among parents of young career seekers.

Discussions during the Victorian Energy Jobs Plan Actions Workshop organised by the Department highlighted how the energy sector is in a better position compared to other sectors as the public is far more aware and concerned about the challenges humankind is facing with climate change. Renewable energy is a common topic across media and greatly supported by the population, with a workforce that is often intrinsically motivated by a strong sense of social and environmental purpose and pride.

Awareness campaigns which highlight the renewable energy work underway to achieve the ambitious sustainability goals set by the Victorian Government and which invite all Victorians to become change agents could further attract and retain more students, apprentices and workers to the energy sector.

2. How can the energy sector better attract and retain underrepresented and diverse workers, particularly in leadership, governance, trade, technical and regionally based roles?

Overcoming the diversity challenges facing the engineering profession in Australia is critical to alleviating current and future skills shortages and enhancing productivity and innovation by bringing in fresh perspectives and experiences and solving the complex problems facing our future. Below are a series of recommended actions targeting underrepresented and diverse workers to increase the energy sector's attractiveness and retention.

³ Engineers Australia, *The Engineering Profession: A statistical overview*, Fifteenth Edition, November 2023, p9, <https://www.engineersaustralia.org.au/sites/default/files/2023-11/engineering-profession-statistical-overview-fifteenth-edition.pdf>

⁴ Engineers Australia, *Barriers To Employment For Migrant Engineers*, October 2021, p31

Intersectional Analysis

Intersectionality is the idea that categories such as gender and ethnicity do not operate independently of one another. Looking at elements of diversity as separate issues will not address all the issues and ignores the compounding impacts of marginalisation. The experience of a woman with a disability may be completely different from those of other women. Using intersectionality as a framework to consider these issues will provide a better understanding of people's lived experiences by thinking about the cultural, structural and organisational barriers to participation in the engineering workforce. Intersectional thinking also allows us to consider that we are all intersectional in our advantages and disadvantages and that it can change depending on context.

Engineering problems are complex and getting more so. At the same time, engineering does not attract enough young people and loses too many along the way. The reasons are complex and interrelated. However, a workplace that values diversity and inclusion is more likely to attract and retain people.

Gender diversity

Engineers Australia's [Women in Engineering](#) report provides an accurate summary of the under-representation of females in the engineering talent pool despite remaining the biggest employer of the STEM professions.

Diversity in the workplace is an essential component of a productive workforce. About 80 per cent of female engineers surveyed agree that they bring a unique perspective to their team; that their daily work is dynamic, challenging, and has a positive impact on broader society; and that they are passionate about their work. One concerning pattern observed is that female engineers have a disproportionately high rate of "imposter syndrome". Over 56 per cent agree that they feel like an imposter at work, doubting their own skills, abilities and/or accomplishments – compared to just 34 per cent of men, and 38 per cent of women in other fields. The incidence of imposter syndrome appears consistent across different engineering sectors.

In general, it seems that workplace challenges are more prevalent in larger companies (defined here as organisations with 100 or more employees). While larger companies seem more likely to have infrastructure in place offering flexible work arrangements and tend to have greater female representation in their workforce, they are also more likely to suffer from issues around gender inequality and poor workplace culture. About 21 per cent of female engineers working in larger companies report that there is bullying, harassment and/or exclusion of women in their workplace (triple the incidence of the same in smaller companies). Women working in larger companies are also significantly less likely to agree that they have equal opportunities to men (52 per cent, compared to 73 per cent of those working in smaller companies). They are also less likely to feel that they can be themselves at work.

Retention of female engineers in the workforce is directly impacted by the issues outlined above. About two in three of the surveyed women who left the engineering profession did so as they felt that their opportunities for career progression were limited, and/or they experienced gender discrimination, bullying or sexual harassment. Our research⁵ shows that the key issues driving women out of the engineering profession are:

- A non-inclusive culture in the workplace
- Unequal opportunities in the workplace
- Imposter syndrome
- Poor work-life balance, and
- Lack of female role models.

⁵ Engineers Australia, *Women In Engineering: Identifying Avenues For Increasing Female Participation In Engineering, By Understanding The Motivators And Barriers Around Entry And Progression*, 2022, pp55-56

Below are some areas where industry and others can develop and implement initiatives:

- Gender bias training
- “Reversed mentoring”: young women mentoring senior leadership
- Supportive female mentorships and networks
- Workshops and resources for women to navigate gender-based issues in the workplace and progress their careers (e.g., salary negotiation skills),
- Policy improvements: escalation processes for bullying and harassment; leave and flexible working arrangements, and
- Investment in the industry / profession (e.g. creating more and higher-value jobs).

Diversity and inclusion go hand in hand. To employ a diverse workforce is only half the effort, to then create a culture of inclusivity where that diversity of thought is embraced and encouraged is the other half. Diversity and inclusion efforts are most successful when they are driven by a commitment from organisational leaders. For this commitment to be meaningful, it requires leaders to understand why diversity and inclusion matter. Engineers Australia encourages more Australian companies to join initiatives such as the Champions of Change Coalition.

Reducing barriers and disincentive to work, especially for working parents, is necessary to increase retention in the engineering profession. A considerable proportion of female engineers (29%; 59% among women in construction) say that their work hours are long and/or inflexible. These issues do not appear unique to women or to the engineering field; however, a lack of flexibility is likely to disproportionately affect women given that women with children are likely to take greater responsibility for childcare.

Anecdotally, we hear from our members, tertiary and industry partners how more businesses are looking into solutions to reduce that barrier by offering day care subsidies or creating in-house day care capability to help STEM returners. Similarly, more employers have policies or initiatives in place to enable flexible access to parental leave for parents, like 97.2 per cent of the Champions of Change Coalition members⁶.

Engineers with a disability

Many engineers with a disability face challenges in both study and the workplace. This is often based on false assumptions about what they are capable of achieving. There are many successful engineers with a disability and many limitations can be overcome with reasonable adjustments to the work environment or the use of technological aids. The Engineers Australia community, Engineers with Disabilities Australia, reports that one in five Australians report having a disability. Reasonable adjustments to include people with a disability would encourage diversity, but also innovation and project outcomes.

The Victorian Government should promote training on how to implement reasonable adjustments in the workplace and financial incentives to encourage disability employment.

Nonbinary gender inclusion

Gender dynamics can cause some people to feel they have to mask their true selves to fit in and succeed at work. There are some simple steps that can be taken such as gender expansive language and expanding the gender options in administrative systems.

⁶ Champion of Change Coalition, 2021 *Impact Report Summary*, *Men Stepping Up Beside Women On Gender Equality*, 2021, p9

Engineers Australia is proud to be a founding partner of InterEngineer, a community designed to provide an avenue for LGBTQIA+ engineers and allies to communicate, network and advocate. However, governments can also lead by example by implementing nonbinary gender inclusion awareness programs and promoting the expansion of gender options in all Australian administrative systems.

Cultural Diversity

Greater support can be provided to migrant engineers to improve employment outcomes, which will increase the pipeline of experienced engineers available to the energy sector.

Better utilisation of the skills currently in Australia from unemployed and underemployed migrant engineers should be sought in the short term. Engineers Australia's [Barriers To Employment For Migrant Engineers](#)⁷ outlines six key opportunities to do so:

- Positioning migrant engineers as a collective talent pool and talking to the size of the opportunity for employers
- Providing credible, trusted information on employment pathways for migrant engineers
- Increasing local networks by developing networking and sponsorship programs/opportunities for migrant engineers
- Coordinating initiatives to build local knowledge and experience of migrant engineers
- Assisting humanitarian visa holders with their credentials assessment, and
- 'Making it easy' for employers to access the talent pool.

The Victorian Government should provide targeted support to employ skilled migrants in roles in the energy sector commensurate with their skills and qualifications, and which provide greater opportunities for them to engage in leadership roles across the energy sector. One avenue could be to support a roll-out in Victoria of Engineers Australia's Global Engineering Talent (GET) Program which is currently being piloted in the Northern Territory and Queensland (see box). Where similar support or programs exist, they should be subject to regular review to determine efficacy and allow for continuous improvement⁸.

Global Engineering Talent (GET) program

The Global Engineering Talent (GET) program is an outcome of Engineers Australia's *Barriers to employment for skilled migrant engineers* research. It is designed to support the 47 per cent of migrant engineers actively seeking an engineering job. The program targets migrant engineers who are currently in Australia on a skilled migration visa unable to find work or are working in an engineering position not commensurate with their skill and experience level.

The pilot GET program includes a six-week preparatory course through Engineering Education Australia with engineering standards-specific training, and a 12-week paid internship at an engineering firm. The Northern Territory and Queensland Governments have funded the pilot program⁹ ¹⁰to help initial cohorts of overseas-born engineers with a pathway to engineering employment in Australia. Infrastructure Australia has also listed the GET program as one of the future

⁷ Engineers Australia, *Barriers To Employment For Migrant Engineers; Research Report*, 2021, p6

⁸ Engineers Australia, *Enhancing Productivity In Infrastructure Delivery: Policy Directions Paper*, 2022, p9

⁹ [NT government funds Engineers Australia migrant work placement program | Engineers Australia](#) media release, 7 July 2023

¹⁰ [Engineers Australia launches Queensland migrant work placement program | Engineers Australia](#) media release, 25 Oct 2023

actions needed to be taken and supported by governments in solving the current workforce challenges.¹¹

3. Are you aware of any industry-led actions, including from other sectors, that could be adapted to make the Victorian energy sector more attractive to students, apprentices, and workers?

Students/apprentices

Engineers Australia encourages the Victorian Government to support innovative programs to address current and future engineering skills shortages for the clean energy sector. This includes dual degrees and degree apprenticeship models in an Australian setting.

One example is Federation University's [Dual Electrical Qualifications Program](#), supported by the Victorian Government and industry partners. The 'earn while you learn' approach enables students to combine an A-Grade Electrical Apprenticeship (Certificate III in Electrotechnology – Electrician) and Bachelor of Engineering (Electrical and Information Engineering) (Honours), achieving this combined qualification in a six-year timeframe. Industry benefits from a certified, practically-skilled tradesperson with advanced STEM knowledge who is able to design, install, commission and maintain advanced systems.

Supportive graduate programs

Engineers Australia's [Strengthening the Engineering Workforce](#)¹² outlines how supportive graduate programs can help retain recent graduates in the engineering workforce and help to provide a positive first few years in the profession, as well as provide the opportunities required for a graduate to progress to an experienced engineer who is competent to practice independently.

One of the many examples of successful graduate programs implemented for the engineering industry is the [Engineers Australia/Australian Power Institute Graduate Learning Program – Power and Renewable Energy](#), a professional development program specifically designed to equip graduates with the skills needed in the energy sector.

Below are some further initiatives the Victorian Government could consider for its graduate energy workforce:

- A graduate practice guide to inform positive graduate experiences in industry
- Improved funding to support graduate programs (this could include financial or tax incentives for small and medium enterprises (SMEs) to employ graduates)
- Mentoring programs, and
- More government graduate programs.

Make better use of the skilled migrant pool

Engineers Australia commends the Victorian Government for its Engineering Pathway Industry Cadetship (EPIC) program targeting refugee and asylum seeker engineers. Engineers Australia recommends the Victorian Government consider pairing or expanding the EPIC program with other programs like Engineers Australia's GET program, to support its ambitious plans in the energy sector

¹¹ Infrastructure Australia, *Market Capacity Report 2023*, p16

¹² Engineers Australia, *Strengthening The Engineering Workforce In Australia: Solutions To Address The Skills Shortage In The Short, Medium And Long Term*, August 2022, p25

and help attract more engineering talent despite the interstate competition to meet 2030 emission reduction targets.

Gender neutral parental leave

The energy sector can increase its attractiveness by implementing more modern approaches to its employee benefit programs. One initiative taken by one of Engineers Australia's industry partners, EnergyAustralia, was to implement innovative policies offering gender neutral parental leave.

At EnergyAustralia, one in two people identify as a caregiver at home. With a Family Leave policy that focuses on supporting employees to succeed at work and at home, they are seeing improvements in dads taking up parental leave.¹³

Their innovative policies offer a combination of benefits including:

- 20 weeks' paid parental leave that is completely gender-neutral
- Superannuation on all parental leave periods – whether paid or unpaid. Plus, a full-time super benefit to all employees working part-time after parental leave, up to the child's fifth birthday, and
- Flexibility to take paid parental leave over two years.

The Victorian Government can encourage companies in the energy sector to offer similar types of employee benefits; but it should also consider funding more solutions to help employers delivering on essential projects for the state support and retain their experienced workforce.

STEM returners programs

[STEM Returners](#) programs have proven successful in several engineering sectors, like in Defence with BAE Systems Australia or Bechtel in Construction, to provide pathways for STEM-qualified primary carers to return to work, tapping into their skills and expertise that might otherwise be underutilised. By encouraging individuals from diverse backgrounds to return to STEM roles, these programs promote diversity and inclusion within the workforce, which is beneficial for innovation and problem-solving in the energy sector.

BAE Systems Australia was the first company to join the STEM Returners Australia program in 2021, offering 12 weeks internships to Returners, with formal job offers being made in many cases. Its UK business has seen clear success with this scheme with 96 per cent of STEM Returner interns being offered full-time position with the firm.¹⁴

The Victorian Government should incentivise energy sector employers to implement STEM returner programs to help in replenishing the talent pipeline and addressing skill shortages, while also promoting diversity and inclusion.

¹³ Circle In, *The Fatherhood trap: Why Australian Dads Want To Take Parental Leave But Don't (Or Can't)*, 2023, p13

¹⁴ CrEAte Digital, *How One Program Is Helping STEM Workers Return To Field*, July 14th 2022, <https://createdigital.org.au/helping-stem-workers-return-to-the-field/>

4. What resources could best support employers to attract and retain workers, while also ensuring safe and positive workplace cultures?

Engineers Australia's *Strengthening the Engineering Workforce in Australia* report¹⁵ outlines seven possible initiatives employers could implement to support better retention of engineers:

- Address imposter syndrome (particularly for women) in the workplace
- Consider incentives to retain engineers in an engineering role
- Development of a credential to recognise technical expertise
- Encourage sectors (such as energy) to provide visibility of career pathways
- Industry to address culture of excessive hours and low pay to be more appealing to the next generations (some sectors)
- Monitor and address the gender pay gap, and
- Raise awareness of unequal workplace opportunities and non-inclusive workplace culture (given 2 in 3 female engineers who leave engineering roles cite these as reasons) and develop/implement programs to address.

Additionally, attracting and retaining workers while ensuring safe and positive workplace cultures can be further supported by the following resources for employers:

- Delivering training to employees, particularly in SMEs and among male-dominated workforces, to lift awareness and familiarity of diversity and inclusion matters and elevate the workplace to be a more inclusive, safe and positive culture. Engineers Australia recommends that the Victorian Government could invest in 'train the trainer' programs, providing the appropriate and necessary resources to all energy sector employers.
- Resources that increase the visibility of career pathways, upskilling and re-skilling opportunities.
- Scholarships/internships to engineering students to help lift engineering study completion rates, reduce time-to-completion and retain engineers in the engineering workforce. Engineers Australia's [internships hub](#) is an example of a resource designed to help link internship opportunities in industry with students and tertiary education institutions. This is one of the most important ways industry can strengthen the engineering workforce because it helps keep engineering students in the profession and provides valuable work-integrated learning opportunities. Many students find it very difficult to find internship opportunities.
- Partnerships with local schools to provide support to school STEM programs and provide opportunities for early career engineers to engage with and inspire the next generation.
- Resources that support industry to facilitate work experience opportunities to school students who are interested in finding out more about the energy sector and/or particular occupations (such as engineering). For example, Engineers Australia's guidelines to [Providing work experience to engineering students](#) can help industry to offering a rewarding experience.

¹⁵ Engineers Australia, *Strengthening The Engineering Workforce in Australia: Solutions To Address The Skills Shortage In The Short, Medium, And Long Term*, 2022, p25

Education Pathways

1. How can education pathways and providers further support students to successfully complete their qualifications?

Engineers Australia's *Strengthening the Engineering Workforce in Australia* report¹⁶ outlines seven actions the tertiary education sector could take to support students to successfully complete their qualifications and work in the engineering profession:

1. Advocate for Commonwealth Supported Places (CSPs) for the two-year postgraduate conversion masters, to encourage graduates from other STEM fields to become professional engineers.
2. Contact engineering students who withdraw from their course to determine if further support can retain them in their studies and/or inform these students of other engineering occupational categories (Associate, Technologist) that may appeal to them and retain them in the profession.
3. Explore other innovative pathways to engineering qualifications.
4. Help students to find graduate program employment opportunities by working with industry and government.
5. Promote the utility of engineering associate and technologist qualifications individually and as pathways to four-year degrees for those who choose to extend their qualifications.
6. Provide support to engineering students to strengthen inclusivity, to diminish imposter syndrome (especially for female students) and to alleviate financial burden (e.g. through scholarships).
7. Use the Engineers Australia Internships Hub (described above) and other linkages to industry to assist students to find internship opportunities.

Several factors impact an individual's choice to undertake and successfully complete a tertiary engineering qualification. These need to be addressed to boost the pipeline of domestically trained engineers entering the market:

- **Higher education:** quality of teaching and facilities, availability of Commonwealth Supported Places (CSP), courses, connection to industry, funding.
Initiatives for the Victorian Government to consider addressing this factor:
 - Develop and communicate demand signal from industry to help promote the areas of engineering that will be in demand when students graduate.
 - Establish a conduit for industry to provide guidance to the tertiary sector about evolving workplace requirements.
 - Government incentives for students to undertake engineering associate and technologist qualifications.
 - Incentives for students to undertake mathematics teaching qualifications.
- **Workplace internships** - Many engineering students find it difficult to find internships. Internships need to be designed so they are positive experiences and help retain graduate engineers in the engineering workforce.
Initiatives for the Victorian Government to consider addressing this factor:
 - Industry and governments to offer internships to students in all years of study to showcase the breadth of engineering and help retain.
 - Advocate for internships to be paid to support students who are working and studying.

¹⁶ Engineers Australia, *Strengthening The Engineering Workforce in Australia: Solutions To Address The Skills Shortage In The Short, Medium, And Long Term*, 2022, p9,23 & 24

- **Factors that influence engineering study completion rates** - Only ~25 per cent of professional engineering students complete their qualification in the minimum time of four years and only ~50 per cent of engineering students graduate with an engineering qualification).

Initiatives for the Victorian Government to consider addressing this factor:

- Encourage more support and inclusion for engineering students, for example, addressing imposter syndrome early.
 - Improved financial support for engineering students. A large proportion of engineering students work out of economic necessity and the high number of contact hours for an engineering qualification together with the difficulty of finding their internship, means that the time to complete their studies can extend well beyond the minimum time.
 - Encourage universities to engage students who have discontinued engineering study to find out how they can be supported to graduate, e.g. explore ways students can consider another field of engineering or occupational category and recognise prior learning.
- **Number of postgraduate Masters candidates and other innovative pathways.**
- Initiatives for the Victorian Government to consider addressing this factor:
- Building more awareness of Associate and Technologist occupational categories.
 - Explore other innovative educational pathways to engineering (e.g. NUW Alliance program, dual degree/apprenticeship model).
 - Promote or advocate for incentives for scientists or other STEM professionals to undertake two-year conversion masters to become qualified professional engineers, thus providing relatively short timeframes to produce qualified engineers.

2. How can education and training offerings adapt flexibly to the evolving skills need of the energy sector? Could this include, or do you have any examples, of continuous learning and skill development opportunities?

Engineering is not just a profession but a lifelong commitment to learning, growth, and adaptation. Engineers embrace continuous learning to navigate the complexities of our ever-changing world and make meaningful contributions to society. New technologies, materials, and methodologies constantly emerge, necessitating engineers to stay abreast of the latest developments. Whether it is advancements in renewable energy, artificial intelligence, or materials science, engineers must continuously learn and adapt to remain at the forefront of their field.

As the peak body for the engineering profession in Australia, Engineers Australia supports the engineering profession in every capacity, such as recognition (Chartered credentialing), continuous professional development (CPD) and skills training that keeps on evolving and adapting to match the profession's needs and reflect industry change.

As the engineering sector navigates the transition to renewable energy, fostering a growth or change mindset will be vital. Engineers and other professionals must be open to learning and adapting, embracing the challenges and opportunities that the clean energy transition presents.

An example of this adaptation is Engineers Australia's creation of a new area of practice (AoP) dedicated to the clean energy sector. The Clean Energy AoP will allow provide engineers working in the energy sector with:

- Better recognition of their unique skillset and expertise through the Chartered credential, and

- Creation of a dedicated community of practice to develop CPD specific to the Clean Energy workforce.

CPD is also a mandatory requirement for registered engineers in Victoria; each re-registered engineer must demonstrate 150 hours of CPD over a 3-year period. This further reinforces the importance for employers to provide appropriate access to quality CPD to their engineering staff.

To aid a successful energy transition, it is crucial we map out the existing roles within thermal energy production and align them with the requirements of clean energy roles. By providing evidence of current and future skills requirements, we support the mechanisms required to enable the economy to transition from thermal energy production to renewables. This process involves finding immediate, short-term, and medium-term pathways for skill transferability and outlining a range of policy instruments that may address the gaps/challenges and leverage opportunities. Immediate pathways will require no further training, short-term pathways may require on-the-job training or short courses, and medium-term pathways may mandate further qualifications.

The availability of training and educational opportunities is essential for resolving the skills gap. Developing 'bridging' courses, adapting existing curriculum, and increasing the accessibility of vocational and higher education are important steps. Introducing career advice and information tailored to young people and career changers can inspire and guide them towards roles in the clean energy sector.

Effective policy instruments and measures are critical for smoothing the transition. These include promoting awareness of transferable skills, developing re-skilling options, and retaining skilled workers for decommissioning fossil fuel infrastructure. Adding incentives for upskilling, training, and further education can motivate workers and organisations to invest in this change.

Tailored training programs like the examples listed previously and other microcredential programs have an important role to play in ensuring flexibility and adaptability of the education and training offering needed to support the energy sector in facing its current and future challenges.

3. How can the education and training system attract more trainers to support energy education pathways? How can gaining experience as a trainer be appropriately recognised by employers and contribute to a rich and fulfilling energy sector career?

With an estimated 10,000 additional jobs created per year from now until 2030 to support the energy transition¹⁷, finding the training capacity needed to sustain these jobs is critical. Engineers Australia's [Engineering Skills – Supply and Demand](#) report¹⁸ revealed how the domestic supply of engineers is directly hindered by a reduction in year 12 science and mathematics participation, which can find clear correlation with teacher shortages particularly in learning areas of mathematics, technology and science.

¹⁷ Victoria State Government, *Clean Economy Workforce Development Strategy 2023-2033*, p7

¹⁸ Engineers Australia, *Engineering Skills – Supply And Demand*, March 2022, p7

Attracting trainers to the energy sector will require the collaboration of the Victorian Government, universities, industry groups, energy industry and peak bodies to activate sufficient avenues to sustain the industry needs.

Engineers Australia also recommends that the Victorian Government consider the following avenues:

1. **Empowering hands-on experience** – support the energy industry by supporting on-the-job training by empowering senior staff and training them on how to best train workers as not everyone can improvise themselves as trainers.
2. **Mentoring programs** – encourage and support mentoring programs to be created so that mentors can share their passion, knowledge and experience.
3. **Industry lesson learned** – replicating what has been seen in the rail industry and many others, especially on large projects like the Level Crossing Removal Project (LXRP) where all companies involved are sharing regularly their learnings with one another during dedicated events to elevate everyone's capabilities.
4. **Hiring recently retired engineers as trainers** – by providing flexible working hours and training skills, passionate retired technical experts would rapidly become an important part of the Victorian energy sector's training capabilities, sharing their valuable knowledge and passion with all energy workers.

Trainers' contributions and efforts need to be appropriately recognised. Avenues to provide this appropriate recognition could be:

- **Skills endorsement** – the Victorian Government could create a training skill endorsement program that recognises the contribution brought to the energy sector by trainers.
- **Peak/industry body credentialling** – allowing their own technical skills and experience to be assessed against industry standards and/or international benchmarks.

4. What are the key barriers for transitioning workers, and underrepresented groups, including First Peoples, people with disabilities and women, accessing training pathways in the energy sector?

The transition from thermal energy sources to cleaner, greener technologies means the engineering sector must adapt and evolve. Engineers Australia, like other industry bodies, will be a central player in this transition, advocating for the necessary changes and helping engineers through the evolution.

We know that engineering skills are versatile by nature, offering a solid foundation for adaptation and growth in various sectors. On the surface, this appears to bode well for the transition to renewable energy, which demands a wide range of competencies, from technical knowledge and problem-solving to innovation and project management.

However, the perception that all engineering skills seamlessly transfer to new green technology sectors is not realistic. Industry feedback and Engineers Australia member experience suggest a more nuanced reality, where certain skills are directly transferable, and others will require significant upskilling or reskilling. It will also be important to be cognisant of the fact that some workers may not be interested in making that transition.

In addition to these barriers, consideration needs to be given to the additional hurdles underrepresented groups are facing. Engineers Australia supports the Australian Academy of

Technological Sciences & Engineering (ATSE) recommendation¹⁹ for the need to invest in programs to improve and provide culturally appropriate and engaging delivery of STEM education for Aboriginal and Torres Strait Islander students, particularly acknowledging Traditional knowledge, and including mathematics instruction ‘in language’.

As stated previously, simple and reasonable adjustments can be implemented to encourage engineers with a disability or neurodiverse engineers. This applies to training pathways as well as within the workplace. Similar flexibility and adjustments can be implemented to cater for STEM returners and primary carers, who can be working reduced hours with limited access to training.

5. Are you aware of any successful partnerships between the energy industry and the education system to train energy sector workers?

Engineers Australia has a long partnership and collaborative history with the energy industry on delivering customised training and CPD to support energy workers’ professional development. One recent example of a successful partnership with the energy industry is the aforementioned [Engineers Australia/Australian Power Institute Graduate Learning Program – Power and Renewable Energy](#), a professional development program specifically designed to equip graduates with the skills needed in the energy sector.

Co-designed with the Australian Power Institute (API), a not-for-profit organisation established as an initiative of the power industry, the EA/API graduate learning program – power and renewable energy is the perfect example of a successful partnership between the energy industry, their industry body, the peak body for the engineering profession and its specialised training arm, Engineering Education Australia. First delivered in March 2023, it has been successfully delivered to graduate engineers from Western Power, Horizon Power, Territory Generation, Power, Water Corporation and Essential Energy.

“Over the course of the program, graduates will rotate through various functional areas of the business with supported development through Engineers Australia. (...) Bringing fresh perspectives and cutting-edge knowledge from their field of study, graduates and trainees provide a diverse skill set enabling us to solidify our future capability requirements,” Sally Kay, Essential Energy’s Organisational Development Senior Program Specialist.²⁰

a. How can this be applied to other training initiatives, including the forthcoming Wind Worker Training Centre and Hydrogen Worker Training Centre?

The examples provided throughout this submission illustrate how collective partnerships can create innovative education pathways to address specific industry needs and attract and retain a diverse and inclusive workforce. Engineers Australia recommends both training centres to establish robust communication channels with industry, industry bodies, peak bodies, tertiary education and unions to create a collaborative environment bringing innovation and support to the energy industry.

¹⁹ Australian Academy of Technological Sciences & Engineering, *Our STEM Skilled Future: An Education Roadmap For An Innovative Workforce*, 2022, p14

²⁰ Essential Energy, *Graduates And Trainees Get First Look At Essential Energy*, 05 February 2024, Media Release, <https://www.essentialenergy.com.au/media-centre/media-release/news-05022024-graduates-first-look>

