



ENGINEERS  
AUSTRALIA

**Clean Energy Workforce Section**

Department of Climate Change, Energy, The Environment and Water  
GPO Box 3090, Canberra ACT 2601, Australia  
[cleanenergyworkforce@dcceew.gov.au](mailto:cleanenergyworkforce@dcceew.gov.au)

Via [online submission form](#)

13 September 2024

**Re: National Energy Workforce Strategy**

Dear Clean Energy Workforce Section,

As Australia's national body for engineering, Engineers Australia is the voice and champion of our 127,000-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.

Under the *Migration Regulations 1994*, Engineers Australia is the designated assessing authority to perform the assessment of the potential migrant engineering professionals' skills, qualifications, and/or work experience to determine if they meet the occupational standards needed for employment in Australia.

Engineers are essential enablers of the clean energy transition. Their involvement encompasses all aspects of energy policy, governance, management, and compliance ensuring the efficient, safe and sustainable use of energy resources and optimal management of Australia's energy system.

Engineers Australia is a strong supporter of the development of a National Energy Workforce Strategy. Our response to this consultation paper can be found in the attached appendices ([Appendix 1: General Comments and Recommendations](#) and [Appendix 2: Theme-specific Comments](#)).

Engineers Australia is available to participate in future opportunities to discuss the issues raised in this submission. Please contact Caitlyn Baljak – Senior Policy Advisor, Climate Change ([cbaljak@engineersaustralia.org.au](mailto:cbaljak@engineersaustralia.org.au)) to continue the discussion.

Sincerely,

Jenny Mitchell

General Manager, Policy and Advocacy

# Appendix 1: General Comments and Recommendations

Engineers Australia is pleased to see progress towards the development of a National Energy Workforce Strategy. Engineers Australia has consistently advocated at state and federal levels for developing local<sup>1</sup> and sourcing international<sup>2</sup> skills, workforce diversity<sup>3</sup> and a timely energy transition<sup>4</sup>. The National Energy Workforce Strategy presents the potential to deliver on the entirety of Engineers Australia's policy agenda to engineer a sustainable future, a skilled future and an innovative future.

Engineers Australia has extensively investigated the dynamics of the broader engineering workforce and the transferability of engineering skills specific to the clean energy transition. Our research, [due to launch](#) in September 2024, has uncovered influences on the clean energy workforce as well as the structural factors that impact the engineering profession more broadly. Addressing both the challenges specific to the clean energy transition and structural challenges faced by engineering at large will be key enablers of developing a robust clean energy workforce in time to meet the needs of our rapidly decarbonising economy.

We have summarised our key recommendations below. Further detail on Engineers Australia's understanding of the challenges and potential actions to develop a skilled and diverse clean energy workforce is outlined in [Appendix 2](#). We have grouped our responses thematically (attracting and retaining, workforce data and information, and improving coordination) for ease of interpretation.

## Recommendations

### Attracting and retaining

- 1. Establish a Chief Engineer role within the Australian Government to provide strategic and technical advice to government on national systems challenges reliant on Australia's engineering capability, including the clean energy transition**
- 2. Promote clean energy skills for new and existing workers**
  - 2.1 Promote diverse learning opportunities for new and existing workers, with the government leading by example
  - 2.2 Develop a 'skills passport' to support skills recognition and transferability in the engineering sector
  - 2.3 Develop training to cross vocational and higher education divides for clean energy knowledge and skills
  - 2.4 Incentivise training providers and employers to promote the benefits of working in the renewables sector through work experience, outreach and training pathways

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<sup>1</sup> Engineers Australia (2024), [Australian Tertiary Education Commission \(ATEC\)](#), accessed 6 September 2024, Engineers Australia (2023), [The Engineering Profession: A Statistical Overview Fifteenth Edition](#), accessed 6 September 2024, Engineers Australia (2022), [Strengthening the engineering workforce in Australia: Solutions to address the skills shortage in the short, medium and long term](#), accessed 6 September 2024, see also; Engineers Australia (2022), [Inquiry into Victorian universities' investment in skills](#), accessed 6 September 2024

<sup>2</sup> Engineers Australia (2024), [Core Skills Occupation List consultation](#), accessed 6 September 2024, see also; Engineers Australia (2024), [Regional Migration Settings](#), accessed 6 September 2024, see also; Engineers Australia (2024), [Australia's Migration Program: Review of the points test](#), accessed 6 September 2024, see also; Engineers Australia (2024), [National Skills Passport Consultation](#), accessed 6 September 2024, see also; Engineers Australia (2022), [Enhancing Australia's migration program](#), accessed 6 September 2024, see also; Engineers Australia (2021), [Barriers to employment for migrant engineers](#), accessed 6 September 2024

<sup>3</sup> Engineers Australia (2023), [Strengthening diversity in STEM](#), accessed 6 September 2024, see also; Engineers Australia (2022), [Women in Engineering](#), accessed 6 September 2024

<sup>4</sup> Engineers Australia (2024), [Accelerating the energy transition](#), accessed 6 September 2024, see also; Engineers Australia (2024), [Victorian Energy Jobs Plan Consultation](#), accessed 6 September 2024, see also; Engineers Australia (2023), [National Battery Strategy](#), accessed 6 September 2024, see also; Engineers Australia (2022), [National Electric Vehicle Strategy submission](#), accessed 6 September 2024

- 2.5 Incentivise training providers to include sustainability in all engineering courses and degrees, in preference to creating bespoke clean energy engineering courses
- 2.6 Develop scholarship and/or internship programs to help lift engineering completion rates in clean energy relevant disciplines
- 2.7 Facilitate partnerships between industry and educational institutions
- 2.8 Allocate Commonwealth Supported Places (CSPs) for the two-year postgraduate engineering conversion masters
- 2.9 Commission Jobs and Skills Australia to analyse demographic data on the latent engineering workforce
- 2.10 Explore strategies for removing barriers to employment for overseas-qualified engineers and re-engaging women in engineering and older workers to alleviate workforce shortages

### **3. Consider the local contexts and locations for renewables**

- 3.1 Co-locate renewable projects, either with one another or in areas where skills can be transferred from thermal industries
- 3.2 Encourage innovative labour models such as remote work and automation

### **4. Make the clean energy workforce more attractive, especially to diverse audiences**

- 4.1 Target clean energy skills through Australia's migration program and support overseas-qualified engineers to enter the clean energy workforce
- 4.2 Mandate diversity practices at large firms
- 4.3 Lead by example by prioritising workplace flexibility

### **5. Make the sustainability aspect of clean energy roles more visible, for example in job ads and careers information**

### **6. Educate industry and training providers on the transferability of thermal energy and clean energy skills**

- 6.1 Fund the development and rollout of familiarisation training including short micro-credentials that elevate consistency and transferability of skills across the industry, demystify the differences between sectors and include information on key aspects of renewables, including jargon and standards

## **Workforce data and information**

### **7. Reclassify and refine existing sources of data**

- 7.1 Continue to refine existing and develop new ANZSCO categories to reflect the evolving landscape of engineering for the clean energy transition
- 7.2 Develop a dynamic dashboard of existing and projected clean energy workforce data.
- 7.3 Align the National Energy Workforce Strategy with significant long-term funding opportunities (see 7.3 below)

## **Improving coordination**

### **8. Centralise information about the array of investment opportunities for clean energy**

- 8.1 Support Jobs and Skills Australia to validate emerging skill profiles and develop additional occupational profiles for emergent roles

### **9. Investigate policy inhibitors and enablers in other areas of government, including in the remit of the Department of Education, Department of Home Affairs and the Department of Employment and Workplace Relations**

# Appendix 2: Theme-specific comments

## Attracting and retaining

Recom. #	Challenge	Proposes Action(s)
1	<p><b>Lack of engineering expertise in clean energy policymaking.</b> Thirty years ago, there were significantly numbers of engineers in the public service. Today, the number is around 27,000. Engineering expertise is essential for all aspects of planning for the energy transition, from major infrastructure projects to procurement. Further, the different types of engineering expertise necessary for the energy transition are often opaque to those outside of the profession.</p>	<p><b>Establish an Office of the Chief Engineer within the Australian Government to advise on the engineering expertise required to support the clean energy transition.</b> A Chief Engineer could serve as principal advisor to the government and other senior officials on matters of clean energy engineering workforce needs as well as the technical readiness and execution of energy policies, programs and major projects.</p>
2.1	<p><b>A greater breadth of capabilities are required for clean energy compared with other sectors.</b> Engineering in the clean energy sector relies on many of the same technical skills employed in thermal energy. Still, it requires a greater breadth of capabilities, including soft skills such as stakeholder management, community engagement and negotiation. This requires a greater diversity of skills to address the same challenge, both at an individual level and at a team-composition level (i.e. more diverse workers within a project).</p> <p>Further, employers are more likely to make hiring decisions based on the mindset and capabilities of an engineer, rather than their disciplinary expertise, so workers are often required to showcase these abilities before they can enter the sector.</p>	<p><b>Employers should promote a diversity of learning opportunities for existing and new employees.</b> To build a diversity of experiences and develop soft skills, employers should offer professional development in existing roles and create new opportunities for their employees to experience different kinds of work around their organisations (for example, secondment opportunities, graduate programs etc.). The government can set the standard by role-modelling good practice diverse learning opportunities and/or via procurement criteria.</p> <p><u>Case studies:</u> Two examples of successful graduate programs implemented for the engineering industry include:</p> <ul style="list-style-type: none"> <li>• 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<sup>5</sup></li> <li>• The Clean Energy Council and the Australian Energy Market Operator’s Grid Connection Engineer Graduate Program, for engineering graduates looking to become grid connection engineers<sup>6</sup></li> </ul>

<sup>5</sup> Engineers Australia (2024), [Engineers Australia / API Graduate Learning Program – Power and Renewable Energy](#), accessed 10 September 2024

<sup>6</sup> Clean Energy Council (2024), [Grid Connection Engineer Graduate Program](#), accessed 10 September 2024

2.2, 2.3	<p><b>Training pathways are needed for the existing workforce.</b> Whilst many engineers move roles regularly and are likely to transition smoothly, some will require extra support. There are a range of initiatives that would support engineers to gain experience and skills to transition to the clean energy sector. Many employers and employees are investing in workforce training to provide bespoke skills in the renewable sector, but this could result in skills wastage if they are not transferable between employers.</p>	<p><b>Develop a 'skills passport' to support skills recognition and transferability in the energy sector.</b> Governments can support a process to accredit skills and incentivise employers to develop skills on an industry basis.</p> <p><b>Develop 'bridges' to cross the vocational and higher education divides.</b> New models can be created to provide targeted skill development to support engineering technicians to upskill to engineering qualifications whilst remaining in the workforce.</p>
2.5, 2.6, 2.7, 2.8, 2.9	<p><b>Stagnant uptake and continuation of engineering education.</b> The experiences in primary, secondary, vocational and higher education all impact the choices of young Australians to study engineering and to continue with the profession following graduation. Teacher shortages in mathematics, technology and science contribute significantly to whether students continue into STEM education after high school.</p>	<p><b>Incentivise training providers and employers to promote the benefits of working in the renewables sector through work experience, outreach and training pathways.</b></p> <p><b>Incentivise training providers to include sustainability in all engineering courses and degrees.</b></p> <p><b>Facilitate partnerships between industry and educational institutions.</b> This can help to provide support to school STEM programs and opportunities for early career engineers to engage with and inspire the next generation.</p> <p><b>Develop scholarship, apprenticeships and/or internship programs to help lift engineering completion rates in clean-energy relevant disciplines.</b>  <u>Case study:</u> 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.</p> <p><b>Allocate Commonwealth Supported Places (CSPs) for the two-year postgraduate engineering conversion masters.</b> This could encourage graduates from other STEM fields to become professional engineers.</p>

2.11, 2.12	<p><b>Retaining existing engineers.</b> Qualified engineers are choosing to leave the profession for a variety of reasons. We estimate that 40 per cent of qualified engineers do not currently work in the profession.<sup>7</sup></p>	<p><b>Commission Jobs and Skills Australia to analyse demographic data on the latent engineering workforce.</b> Produce advice on further strategies to address current and future skills shortages.</p> <p><b>Explore strategies for engaging overseas qualified engineers and re-engaging women in engineering and older workers to alleviate workforce shortages.</b></p>
3.1, 3.2	<p><b>Location matters to prospective workers.</b> Communities that are experiencing the transition to clean energy are facing dislocation without sufficient government intervention to support the co-location of renewable energy projects. Engineers Australia are aware that engineers who can stay working in a more proximal location are more inclined to stay in the profession. Employment models, such as contracting and fly-in, and fly-out, can pose additional challenges to workforce attraction and retention.</p>	<p><b>Governments can work to support the co-location of renewable energy projects in proximity to communities that work in thermal industries.</b> Not only can this produce synergistic cost savings for renewable projects, but it ensures that workers are not forced to relocate because of the energy transition. This approach requires a careful consideration of the local contexts of communities and their needs.</p> <p><b>Governments and industries can explore innovative labour models such as automation and remote connection.</b> This can either allow workers to continue to work in their current locations or to minimise the fly-in, fly-out aspect of renewable jobs that can make them unattractive to some prospective workers.</p>
4.1	<p><b>Reliance on skilled migrant engineers.</b> Over 62 per cent of Australia’s engineering workforce was born overseas, helping to address local expertise shortfalls.<sup>8</sup> With increasing global competition for engineering skills, particularly related to the energy transition, Australia must be mindful of its reliance on this source of engineering expertise, especially in the face of uncertain migration policy.</p> <p>Further, this cohort of engineers is the most likely to be under or unemployed, with challenges voiced by local employers and migrant employees including a lack of local knowledge or experience, perceived cultural differences, visa or sponsorship issues, certification queries, concerns that migrant engineers are less likely to stay in a role than domestic engineers, and challenges around hiring based off existing networks, particularly for senior roles.</p>	<p><b>Target clean energy-relevant skills in the regions where they are most needed through Australia’s migration program.</b> It is essential to balance the requirements of regional areas with the professional aspirations and career opportunities for migrant workers to support the transition.</p> <p><u>Case study:</u> The Hunter is a strong regional economy that is transitioning from coal mining and steel production to advanced manufacturing and renewable energy production. Out of 3,517 engineering-qualified individuals in the Hunter, only 1,623 or 46.1 per cent are working in engineering roles.<sup>9</sup> Aligning migration policies with the specific needs of regions like the Hunter, could avoid these examples of under or unemployment and ensure that the right skills for the clean energy economy are being met. In the case of the Hunter, this could look like attracting skills in advanced manufacturing and energy transition, instead of thermal industries.</p> <p><b>Support overseas qualified engineers who are under- and unemployed in Australia to transition into the clean energy workforce.</b></p>

<sup>7</sup> Engineers Australia (2023), [The Engineering Profession: A Statistical Overview Fifteenth Edition](#), accessed 6 September 2024

<sup>8</sup> Engineers Australia (2021), [Barriers to employment for migrant engineers](#), accessed 6 September 2024

<sup>9</sup> Engineers Australia (2021), [The engineering profession of Australia: a statistical snapshot](#), accessed 12 September 2024

	<p>There are also significant locational challenges for migrant engineers, many of whom have visa classes that require them to spend several years in regional areas. This does not always allow for the mobility of migrant engineering skills to where they are most needed and can lead to under or unemployment of these skilled workers.</p>	<p><u>Case study:</u> The Global Engineering Talent (GET) program is designed to support the 47 per cent of migrant engineers actively seeking an engineering job.<sup>10</sup> The 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 program to 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 actions that need to be taken and supported by governments to solve current workforce challenges.</p>
4.1, 4.2	<p><b>Underutilisation and representation of diverse engineers</b> Attracting engineers who are women and only around 0.3 per cent identify as Aboriginal and Torres Strait Islander.<sup>11</sup></p> <p>Challenges include unequal access to education and training opportunities, non-inclusive workplace cultures, imposter syndrome, poor work-life balance and inflexible work hours (for example, less than 10 per cent of engineers are working in part-time roles)<sup>12</sup>, unequal promotion opportunities and lack of role models.</p>	<p><b>Increase benefits to attract and retain a diversity of employees.</b> This includes increased gender-neutral parental leave, raising the visibility of “right-to-disconnect” legislation and other measures that increase workplace flexibility.</p> <p><b>Mandate diversity practices in major firms.</b> This could include workplace-specific bias training; expansive and inclusive language in workplace communications that raise the visibility of under-represented groups; mentoring (both traditional and “reversed” mentoring); resources for diverse groups to navigated identity-based issues in the workplace and standardising escalation processes for bullying and harassment. If first introduced to major firms, this will gradually trickle down to small and medium enterprises through company diversity policies.</p>
4.4	<p><b>There are notable salary differences and working conditions between the thermal and renewable sectors.</b> This is exacerbated by international labour market competition. The transition to renewables is an opportunity for employers to review and improve the working conditions and salary packages of their workforce to attract and retain staff.</p>	<p><b>Employers can prioritise work-life balance as a way of attracting the workforce through the creation of competitive working conditions and salary packages.</b> Governments can support this by leading by doing and through support via the work to be conducted by the Net Zero Economy Authority, which can share successes and learnings from across renewable energy workplaces.</p>
5	<p><b>The sustainability aspect of roles are not being advertised.</b> Workers in the renewable sector are often intrinsically motivated to support climate action, but the environmental</p>	<p><b>Employers can actively promote the purpose-driven opportunity to work in renewable energy through communications, position descriptions and job</b></p>

<sup>10</sup> Engineers Australia (2024), [Global Engineering Talent Program](#), accessed 12 September 2024

<sup>11</sup> Engineers Australia (2024). [The engineering professional in Australia: a statistical snapshot](#), accessed 9 September 2024

<sup>12</sup> Ibid.

	aspect of roles is not always promoted as part of the role advertisement.	<b>advertisements.</b> The government can support this via targeted information campaigns that positively frame employment opportunities in clean energy.
6	<b>The visibility of similarities between thermal and renewable work is low.</b> It can be difficult for workers to conceptualise how their skills can translate from one industry to another. This becomes even more difficult with emerging industries, such as clean energy industries.	<b>The government can work with employers to showcase the similarities in roles between the thermal and renewable energy sectors.</b> This can demystify the differences and build understanding, engagement and buy-in, including sharing stories of successful transitions.

## Workforce data and information

Recom. #	Challenge	Proposes Action(s)
7.1	<p><b>Existing data on the engineering labour component of renewable energy workforce needs is abundant but needs refining and synthesising.</b> Many academic and industry studies seek to quantify the engineering labour component of renewable energy development both in Australia and overseas.<sup>13</sup> However, a synthesis relevant to the Australian renewable energy labour force is required.</p> <p>Additionally, many well-established sources of labour and educational data and their classifications are too coarse to keep pace with the complex, multi- and transdisciplinary nature of clean energy industries. This includes sources such as the ABS quarterly labour force reports, and census data, and classifications such as the Australian and New Zealand Standard Industrial Classification (ANZSIC) and the Australian and New Zealand Standard Classification of Occupations (ANZSCO).</p>	<p><b>Continue to refine existing and develop new ANZSCO categories to reflect the evolving landscape of engineering for the clean energy transition.</b> Recognition of emerging engineering specialisations and more accurate differentiation between engineering occupations would support higher resolution data on the skills compositions required for the clean energy transition.</p>
7.2	<p><b>Existing projections of the energy workforce quickly become obsolete.</b> There have been several reports quantifying existing and projecting future skills demand for the energy sector, however,</p>	<p><b>Develop a dynamic dashboard of existing and projected clean energy workforce data.</b> Although a dashboard requires ongoing resources to ensure it remains current, this could bring together a vast array of information in a way that is instantly usable for industry workforce planning.</p>

<sup>13</sup> Powering Skills Organisation (2024), [Workforce Plan 2024: The New Power Generation: Challenges and Opportunities Within Australia's Energy Sector](#), accessed 12 September 2024, see also; Julian McCoy, Dominic Davis, Erin Mayfield, Michael J. Brear (2024), [Labour implications of the net-zero transition and clean energy exports in Australia](#), *Energy Research & Social Science*, Volume 112,103506, see also; Alsubal, Shamsan & Alaloul, Wesam & Lim, Eu Shawn & Liew, M. & Palaniappan, Pavitirakumar & Musarat, Muhammad Ali (2021), [Life Cycle Cost Assessment of Offshore Wind Farm: Kudat Malaysia Case](#), *Sustainability*, 13(14), 7943, see also; Hakan Acaroğlu, Fausto Pedro García Márquez (2022), [A life-cycle cost analysis of High Voltage Direct Current utilization for solar energy systems: The case study in Turkey](#), *Journal of Cleaner Production*, Volume 360, 132128



	these data quickly become outdated as the policy environment shifts and matures. <sup>14</sup>	
7.3	<b>Short-termism in funding cycles prevents meaningful workforce planning.</b> It can take five to seven years to transition an engineer through their training until they can practice independently. If there is funding uncertainty for even this relatively short period in an engineer’s potentially multi-decadal career in the clean energy sector, it can be difficult for the industry to conduct meaningful workforce planning. While the National Energy Workforce Strategy will provide clarity on skills gaps, clean energy industries need funding certainty for project and skills development before they will commit to investing in human capital.	<b>Align the National Energy Workforce Strategy with significant long-term funding opportunities.</b> This includes the suite of activities supporting the Future Made in Australia agenda.

## Improving coordination

Recom. #	Challenge	Proposes Action(s)
8.1	<b>Coordination of existing investment is fragmented.</b> There are a multitude of investments and initiatives across the clean energy space in Australia. Without sufficient coordination, there will be a likelihood of ongoing workforce shortages in vital industries, including renewable energy and industries supplying and processing critical minerals and green metals.	<b>Support Jobs and Skills Australia to validate emerging skill profiles and develop additional occupational profiles for emergent roles.</b> Combined with revised occupational codes, this would provide greater clarity and support transitions.
9	<b>Juxtaposition in skills policy outside of renewable investment.</b> While there is a significant investment and policy enablement to support a clean energy transition, there are other policy settings, like caps on migration and higher education, that could pose a challenge to achieving the goals of this investment.	<b>Investigate policy inhibitors and enablers in other areas of government, including in the remit of the Department of Education, Department of Home Affairs and the Department of Employment and Workplace Relations.</b> The Commonwealth has an opportunity to coordinate between portfolios to set the standard for other jurisdictions to follow.

<sup>14</sup> Jobs and Skills Australia, (2023), [Clean Energy Capacity Study](#), accessed 10 September 2024, see also; Department of Industry, Science and Resources (2023), [RACE for 2030 Developing the Future Energy Workforce](#), accessed 12 September 2024 ,see also; Australian Industry Energy Transitions Initiative (2023), [Skilling Australian Industry for the Energy Transition](#), accessed 12 September 2024, Clean Energy Council (2022), [Skilling the Energy Transition](#), accessed 10 September 2024