Monday, 8 May 2023

Submission – Clean Energy Capacity Study

The Clean Energy Council (CEC) and the Australian Hydrogen Council (AHC) welcome the opportunity to make a submission in response to the Clean Energy Capacity Study Discussion Paper (the Paper).

The CEC is the peak body for the clean energy industry in Australia. We represent and work with more than 1,000 businesses operating in Australia across renewable energy, energy storage, and renewable hydrogen.

AHC is the peak body for the Australian hydrogen industry. AHC connects the hydrogen industry and its stakeholders in building a secure, clean and resilient energy future that sustainably produces and uses hydrogen within the energy mix. AHC's members are from a range of sectors, including energy, transport, consulting, banking and technology.

This is an important study at a watershed moment in Australia's energy transition. The clean energy workforce is already experiencing workforce and skills shortages across key occupations, which are projected to intensify as demand for workers increases. Medium- to long-term workforce planning in the clean energy industry is inhibited by an incumbent industry and occupation typology ill-suited to the needs of emerging industries. In this context the present study provides clear benefit to industry by establishing a consistent definition and understanding of the current supply and future demand for a clean energy workforce. However, it is important that it does not limit its application to the questions and answers required of the current policy landscape but looks forward and anticipates the future challenges Australia will experience through the transition to net-zero. Workforce is an enabler of change, and effective workforce planning requires a vision of the future objectives and policy drivers that will determine what is achieved and when. While the future is uncertain, and the very nature of the transition is disruptive, it should be established with an ongoing role that can respond to changes in the industry. The transition to net-zero will require a transformation of our energy system at an unprecedented pace; we do not have the luxury of time to limit our focus to short-term, piecemeal solutions.

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Definitions and data gaps

Conceptual definition

The proposed conceptual definition of the clean energy workforce is ambiguous with regards to some upstream/downstream sectors. Manufacturing jobs are excluded from the conceptual definition but are included in Figure 1 as 'enabling' jobs. Onshoring domestic manufacturing capability is a key policy objective for the Australian Government to ensure supply chain sovereignty, and increasingly to meet local content requirements. An expanded clean energy manufacturing sector could impact the broader clean energy workforce due to overlap of required skills.

The Paper defines the clean energy workforce as workers involved in activities related to '*energy generated from renewable, net-zero emissions sources'*. The comma between 'renewable' and 'net-zero' is ambiguous and could be interpreted as either 'or' or 'and', which has implications for the breadth of technologies included. The former interpretation opens the possibility of including fossil-fuel based technologies such as blue hydrogen or even gas-powered electricity generation, provided they utilise high rates of Carbon Capture and Storage (CCS), offsets and Direct Air Capture (DAC). Presumably, these technologies are not the intended focus of this study. This ambiguity could be clarified by changing the scope to '*energy generated from renewable, zero emissions sources'*.

The definition also makes no provision for drawdown and negative emissions technologies like DAC and Bioenergy with Carbon Capture and Storage (BECCS), which have been identified by the International Energy Agency (IEA)[1] and the International Panel on Climate Change (IPCC)[2] as necessary to address emissions overshoot and meet the objectives of the Paris Agreement by limiting warming to no more than 1.5°C.

Finally, while a narrow definition of the clean energy workforce is appropriate when modelling future workforce demand, a broader definition is necessary to analyse future workforce supply. The incumbent energy workforce has many skills transferrable to the clean energy workforce, whether they be plant operators in coal-fired power stations undergoing closure, or electricians in upstream industries such as construction or mining.

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[1] IEA. (2022). *Bioenergy with Carbon Capture and Storage*. IEA, Paris. URL: https://www.iea.org/reports/bioenergy-with-carbon-capture-and-storage

[2] Smith, P., J. Nkem, K. Calvin, D. Campbell, F. Cherubini, G. Grassi, V. Korotkov, A.L. Hoang, S. Lwasa, P. McElwee, E. Nkonya, N. Saigusa, J.-F. Soussana, M.A. Taboada. (2019). *Interlinkages Between Desertification, Land Degradation, Food Security and Greenhouse Gas Fluxes: Synergies, Trade-offs and Integrated Response Options*. URL: https://doi.org/10.1017/9781009157988.008

Data gaps

The Paper provides a detailed overview of the data gaps impacting the clean energy sector due to aggregation of data categories by the Australian and New Zealand Standard Industrial Classification (ANZSIC) and the Australian and New Zealand Standard Classification of Occupations (ANZSCO). Industry feedback has identified many occupations requiring specific skills and training across the design and build phases of clean energy projects as having inadequate coverage in the existing ANZSCO schema. A partial list of these occupations includes:

Asset manager; Battery design specialist – residential/utility-scale; Blade engineer; Community liaison manager; Energy trader; Engineering, procurement, construction (EPC) manager; Grid connection engineer/manager; HSQE manager; Hydropower design engineer; Quality manager/engineer; Solar data analyst.

Workers in these occupations and other clean energy roles acquire the skills necessary to perform their jobs through formal tertiary or vocational settings as well as on-the-job. In the absence of established onshore training capacity, expertise is also imported via skilled migration. For example, the nascent offshore wind industry in Australia has a high dependency on recruiting skilled workers from established overseas industries, especially from Europe and the United Kingdom.

Additionally, emerging industries that will enable decarbonisation but are not included in the current ANZSIC schema include:

- The emerging hydrogen industry across the supply chain, including Hydrogen, Equipment, Technology and Services (HETS). Within the existing ANZSIC schema, HETS jobs are present across multiple divisions, including but not limited to Division C: Manufacturing; Division D: Electricity, Gas, Water and Waste Services; Division E: Construction; Division I: Transport, Postal and Warehousing.
- Drawdown and negative emissions technologies including DAC and BECCS. These jobs are likely to occur across Division C: Manufacturing; Division D: Electricity, Gas, Water and Waste Services; Division E: Construction; Division I: Transport, Postal and Warehousing.

Recommendation

To address the ongoing data gaps, we recommend the Government fund the Australian Energy Employment Report (AEER) in full and bring the study under the banner of JSA to enable ongoing reporting on a regular basis. Establishing participation in the AEER as a criterion of funding/project approvals would ensure industry engagement. Regular reporting of actual employment against forward estimates would validate the results.

Barriers to entry and retention

The 2022 Clean Energy Council report *Skilling the Energy Transition* provides an overview of the

existing and worsening skills shortages experienced by the clean energy sector. This is due to a range of factors:

- **Visibility** – jobs in clean energy jobs and pathways to work in the industry are poorly understood, with most workers side-stepping from other industries. Consequently, the industry has low participation of workers under 30.
- **Location** – the regional location of most jobs is a major impediment to attracting qualified graduates, who are typically attracted to metropolitan areas.
- **Training** – the clean energy industry is already experiencing a critical lack of training capacity, notably in electrical trainers. A slow and unwieldy VET system has been a brake on the development of relevant and meaningful qualifications for electrical and mechanical tradespeople in renewable energy. Australia's enduring STEM (science, technology, engineering, mathematics) crisis threatens clean energy project developments, which rely heavily on STEM-based skills.
- **Mobility** – workers currently face barriers to mobility between projects. There are opportunities to increase worker mobility, such as harmonising the required qualifications and training, and enabling the portability of long service leave and parental leave entitlements.
- **Entitlements** – long-standing policy uncertainty and tight operating margins have meant that the clean energy sector has struggled to compete with more established (and subsidised) sectors on salaries and entitlements such as oil and gas.[3]

Additionally, considerations affecting future workforce supply and demand for large-scale renewable projects include:

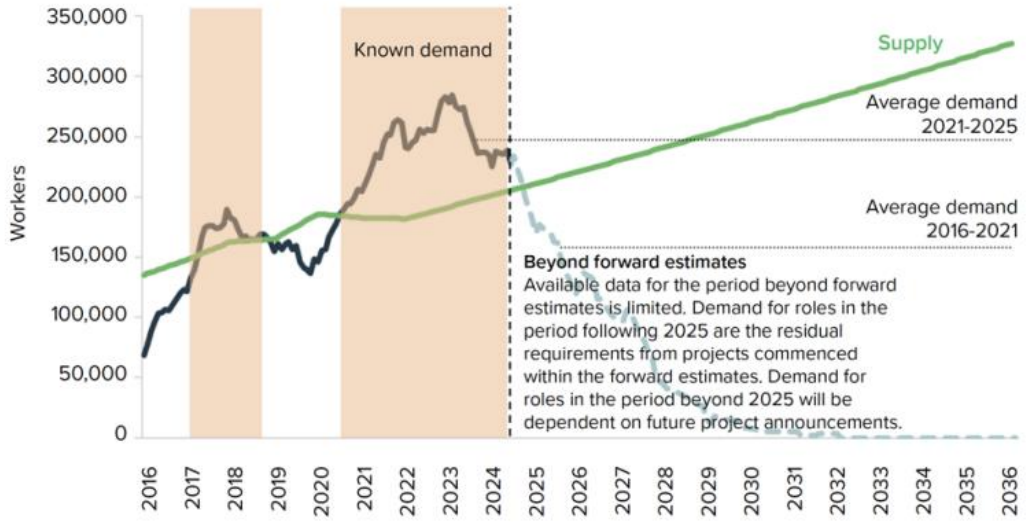
- **Historic low unemployment, and a record pipeline of infrastructure investment.** This will induce domestic competition for construction workers due to large-scale public infrastructure projects (*Figure 1*).
- **Projections for rapid growth in renewable energy projects across solar, wind, storage and green hydrogen.** The Integrated System Plan (ISP) Step Change and Hydrogen Superpower scenarios project NEM capacity will increase by factors of four and ten respectively to 2050. The ISP scenarios can be compared with the recent findings from the Net Zero Australia project, which modelled decarbonisation pathways for Australia's domestic and export sector emissions. This study found that national generating capacity needs to increase 40-fold to 2050, largely to accommodate the decarbonisation of fossil

[3] Clean Energy Council. (2022). *Skilling the Energy Transition*. URL: https://assets.cleanenergycouncil.org.au/documents/CEC_Skilling-the-Energy-Transition-2022.pdf

fuel exports with green hydrogen. This requires the energy workforce increase by 6- to 8-fold by 2060.

- **Lack of national coordination and strategic sequencing of projects.** This can lead to boom-bust construction cycles and exacerbate workforce competition between states and regions.
- **Global competition for investment and skilled workers.** This is due to large-scale subsidies offered through the United States Inflation Reduction Act (IRA) and competing policies such as the European Commission's Green Deal Industrial Plan.

Figure 1 | National supply and demand for public infrastructure workers. Infrastructure Australia, 2021, p.108.



Diversity and inclusion

On average, clean energy employers are more inclusive and compare favourably against other industries, such as the oil and gas or coal industries. However, women are underrepresented in senior leadership across the industry. Organisational culture starts at the top, which is where more women are needed. Women are also underrepresented in both STEM and trades occupations, comprising just 2% of electricians. More data is needed to identify and mitigate barriers to

education, recruitment, and retention, but specific workplace failures affecting women identified by the Electrical Trades Union[4] include:

- Lack of adequate amenities including workplace toilets and sanitary bins.
- Personal protective equipment not designed for female physiques.
- Inadequate processes or channels to raise and address gender-based workplace discrimination.

Aboriginal and Torres Strait Islander employment is low across the clean energy industry. Survey findings suggest that 0.8 per cent of the clean energy workforce identify as Aboriginal and/or Torres Strait Islander compared to 3.3 per cent of the Australian population. There is a persistent disconnect between industry and established dedicated Indigenous service providers in recruitment, labour hire and community consultation. The clean energy industry is also competing with other industries to attract a finite number of Indigenous STEM graduates.

Tertiary and vocational training sector

On the university side, the issues are both quantitative – concerning the number of graduates from relevant disciplines – and qualitative – relating to the misalignment of course content with the needs of industry. Australia is experiencing an enduring STEM crisis. Australia's proportion of engineering graduates is just 8.2%, which is the lowest in the OECD, compared with Germany at 24.2%[5]. As a result, there is a dependency on skilled migration to meet demand, with over half of all engineers working in Australia being born overseas[6]. The enduring effects of the COVID-19 pandemic on skilled migration can be seen in the 2022 Skills Priority List, which identified national shortages of all engineering occupations, with moderate to strong anticipated future demand[7]. Finally, the recent Job-Ready Graduates Program in 2020 reduced funding for units in STEM, which disincentivises universities from offering robust STEM programs.

A slow and unwieldy Vocational Education and Training (VET) system has been a brake on the development of relevant and meaningful qualifications for electrical and mechanical tradespeople in renewable energy. The VET industry is already experiencing a critical lack of training capacity, notably in electrical trainers. These issues are amplified in regional communities, where Registered Training Organisations may not offer the electives required for clean energy specialisations such as solar installation. States and territories also have different registration requirements that impact

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[4] Electrical Trades Union. (2022). *Nowhere to Go: Barriers to participation resulting from inadequate workplace amenities for women in male dominated occupational industries*. URL: https://www.etunational.asn.au/wp-content/uploads/2022/03/2108_ETU-Women_Nowhere-to-Go_Report_Draft02_WEB.pdf

[5] Clean Energy Council. (2022). *Skilling the Energy Transition*. URL: https://assets.cleanenergycouncil.org.au/documents/CEC_Skilling-the-Energy-Transition-2022.pdf

[6] Engineers Australia. (2020). *Migrant engineers – research and resources*. URL: https://www.engineersaustralia.org.au/news-and-media/2022/07/migrant-engineers-research-and-resources

[7] Skills Priority List. (2022). URL: https://www.nationalskillscommission.gov.au/topics/skills-priority-list

training and professional development offerings, as well as movement opportunities for the clean energy workforce.

Implications for regional communities

JSA should engage with the First Nations Clean Energy Network as an Indigenous organisation working to ensure First Nations people can harness the opportunities of the clean energy transition. Regional communities primed for consultation include those hosting Renewable Energy Zones, and coal regions such as the Hunter Valley and the Latrobe Valley. In these regions, organisations such as Energy Australia, Origin and the Latrobe Valley Authority have worked with local community and workers in emissions-intensive industries on programs of reskilling and redeployment to minimise the impact on workers. The Latrobe Valley Authority have also worked with the University of Melbourne to develop the Gippsland Smart Specialisation Strategy, which applies the 'Smart Specialisation Strategy' pioneered in the European Union to a region undergoing transition.

Communities require long-term transition planning that includes short-term population fluctuations from temporary construction booms and long-term population growth from ongoing workforces. Most clean energy jobs will be in regional parts of the country. This will require investment in civil infrastructure. Access roads will be needed to facilitate the transport of materials and workforce. Population growth will require social infrastructure, including health and education services. It will also require appropriate accommodation. Insufficient housing supply risks increasing house prices, which can impact the social license of a project if residents are priced out of their communities.

A key success criterion for regional projects is social license. Long-term transition planning affords local businesses the opportunity to increase capacity and bid for disaggregated components of procurement contracts. Achieving community buy-in by utilising the local workforce where possible is an important step in ensuring a project delivers local benefits and will minimise project delays due to community pushback. Long-term planning for emissions-intensive communities also provides clarity regarding timelines and pathways to alternative employment and can assist with access to any reskilling and training necessary to transition workers to new employment.

We thank JSA for the opportunity to provide feedback on the Paper, and hope this work provides a sound evidentiary basis that anticipates and informs the long-term opportunities and challenges facing Australia's clean energy transition.

Yours Sincerely,

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