A Submission to the UNIVERSITIES ACCORD REVIEW PANEL

"This is not the first time we've had to make choices about the kind of country that we want to be – future makers or future takers – but it might be the most important time."[1]

From

Deakin Energy Networks

August 2023

1 Hon Jim Chalmers MP, Treasurer. National Press Club. 24 August 2023.

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Executive Summary

The various submissions to the Accord Review and a range of papers prepared by credible industry and environment advocates highlights the following:

- Australia is seen as lagging other nations when it comes to education system readiness for a clean energy economy and transition.
- University education has in the past been a significant export for Australia, training our region's workforce in climate skills will create jobs domestically and help accelerate climate action globally.
- Not meeting workforce demands will jeopardise attainment of Australia's widely supported emissions reduction and energy transition targets and clean manufacturing and export ambitions.
- Australia does not have the technical and professional skills needed to meet its climate ambitions, but the precise deficit is hard to quantify due to inconsistent definitions and data collection.
- Universities have insufficient funding and focus to expand clean energy offerings to meet the demand from international and domestic markets.
- The Universities Accord Final Report should commit all parties to climate ready skills in all relevant university courses.
- Resolution of these issues requires a co-ordinated and intensive consideration of ***a Climate Education Strategy*** to guide decision making.
- It is important that the development of this Strategy is an inclusive and open process that includes tertiary institutions – universities, TAFE and VET providers-- employers, trade unions, and climate advocacy organisations. This is critical to the buy-in required to deliver a sustainable solution.
- To that end, to kick off the process and as an early demonstration of bona fides, the Government should immediately commit dedicated funding for a Secretariat to manage the development and implementation of the Strategy
- The urgency of this work cannot be overstated. The Interim Report's focus on improving access and equity, as well as diversity, in Australian universities can be supported by a Climate Education Strategy. A Strategy also aligns with other major public debates about Australia's future, including the:
    - Inter Generation Report 2023
    - productivity debate and the future directions of our economy
    - forthcoming Employment White Paper and
    - a recommendation to establish a Tertiary Education Commission

Recommendations

Deakin Energy Networks urges the University Accord Review to strongly recommend and support the urgent development and implementation of a *Climate Education Strategy,* and, in doing so:

- acknowledges the urgency and priority of addressing Australia's climate education and skills deficit, recognising that without those skills Australia risks failing its 2030 interim target and the 2050 net zero target; and
- recommends that the vital role of Australia's universities in delivering climate careers skills for our national mission be acknowledged through:
    - An immediate review of barriers to and required incentives for students entering and completing engineering and other STEM degrees critical to Australia's renewables transformation and carbon reduction efforts.
    - the urgent development of a *Climate Education Strategy* by the proposed Tertiary Education Commission, to embed climate skills in all relevant university courses, and to lead work on identifying and funding universities to fill mid-term and future gaps in relevant fields of study and skills development.
    - Government and sector recognition that core and elective modules on climate and climate related knowledge should be included in all relevant degrees, as most fields of study also have a role in preparing Australia's economy and community for a clean energy future and operating in that new environment.
    - Agreement to the 'need' to lift our country's investment in research and development (R&D) generally and, particularly, in clean economy studies, which touch every faculty in every university.
    - Development of the *Climate Education Strategy* to reflect the current work underway to update, standardise, and publish relevant 'green economy' employment and skills data and forecasts
    - Acknowledgement that increased focus and new funding for universities to design and deliver green economy related skills and knowledge will also benefit Australia's international education goals by attracting new students to Australia who will contribute to our future as well as their own home countries' green economy ambitions.

Opening remarks

Deakin Energy Networks appreciates the opportunity to respond to the Interim Report of the Australian Universities Accord.

The Interim Report (July 2023) is an important event in the future of the higher education sector and the whole Australian economy and community.

In a separate submission Deakin University will respond more broadly to the issues raised in the Interim Report and present its university-wide priorities for the final report to the Commonwealth Government in December 2023.

This submission from the Deakin Energy Networks is focused on how the Australian universities sector can and must be a positive contributor to climate action and Australia's clean energy future by urgently addressing our skills gaps and preparing future students to navigate the transformation to net zero.

Those gaps exist in two forms: skills for new jobs generated by the move to renewable energy and a clean economy; and new skills and training for workers in existing industries impacted by the transformation to net zero proceeds.

Current and future university students face a future that MUST be transformed economically, socially, and environmentally. To successfully prepare future generations of university students we must provide skills to deal with this changing reality.

The Interim Report

In presenting our proposal, we acknowledge the many sound recommendations in the Interim Report, but that consideration of Australia's challenges from climate change and our transformation to a clean economy were 'underdone' . The lack of major focus on this issue and the universities' pivotal role would seem to ignore (or, at least, downplay) both the sentiment of the review and one of the 'key areas of review'-"Meeting Australia's knowledge and skills needs, now and in the future".

The announcement of the Review on 17 November 2022 said:

> *The panel will make recommendations for Government, the sector and other relevant stakeholders* ***to deliver a higher education system that meets the current and future needs of the nation, and targets to achieve this****.*

The forecast seismic geo-political competition for resources will present opportunities for students that understand and can take action in their future workplaces to enable change. As Climate Change Minister Chris Bowen has said "the world's climate emergency is Australia's job opportunity".

The Final Report is the opportunity to address this situation and highlight how the university sector can and must contribute to the transformation of our economy and community which is already underway in Australia.

Our proposal for a Climate Education Strategy aligns with the equity and access priorities of the Interim Report. Our Strategy is to increase the opportunities for university students to learn skills and develop knowledge so they can participate in and contribute to a changing economy and community. By increasing and diversifying the numbers of students in climate related engineering and broader STEM studies, Australia will be investing in its future and graduates will be able to take advantage of evolving opportunities. By offering climate change related content across all fields of study (beyond STEM) universities will be offering all students the chance to participate in and benefit from a clean economy.

A Climate Education Strategy relates to all forms and levels of education and training and adds to the Australian University value proposition for domestic and international students.

We have attached relevant documentation outlining work needed to gather data and map the current offerings across the university sector. We have also summarised some of the international approaches that we can learn from.

There is significant recognition across the sector that the ability to manage climate change, advance sustainability and support the energy transition will require a wide array and a significant number of new skills. We must develop and resource a climate change education strategy which can link all universities, Jobs and Skills Australia, the Tertiary Education Commission, and other stakeholders.

We would be delighted to further discuss this proposal.

Appendix 1. Australia's 'green' skills gap: A challenge for the University Accord

While all Australian universities offer some courses and course content focused on the skills and knowledge Australia needs for its transformation to a clean economy,[2] there are gaps in availability and access across the country. There is also broad acknowledgement that there are not enough graduates from current arrangements to meet current and future skills demands.

This view is evident among submissions to the Accord.

> *"Australia faces major challenges with climate change and environmental sustainability, health and wellbeing, social cohesion and cultural resilience, democracy and security, digital transitions and AI, and reconciliation. These are all challenges which Australia's higher education system will need to address, in teaching, research and governance and across HASS and STEM disciplines."* [3]
>
> *"Health, social and environmental challenges, security and biosecurity threats, economic and industry transformation, and building flexible and resilient capabilities are among the major challenges facing our nation in the next decade and beyond. The higher education 'ecosystem' needs to play a central role in training and adapting the workforce to meet these changing needs. Specifically, Australian universities, in collaboration with those in the ecosystem, need to take immediate action and prepare new generations of students to not only respond to these increasing challenges, but to pre-emptively position our nation to lead the way."*[4]
>
> *"The education system needs to be agile enough to support the new technologies and skills which are going to be needed to solve the challenges of tomorrow."5*
>
> *"Over the course of the coming decades, it is imperative Australia's higher education system delivers graduates possessing both the hard and soft skills necessary to meet the demands of the ever-changing workplace."6*
>
> *"The higher education sector, as well as the broader tertiary eco-system need to be equipped with the right offerings, infrastructure and workforce to cultivate the talent pipeline for clean-energy related roles; both new and emerging roles, as well as those that support the full supply chain of clean energy production."7*

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[2] work in progress by Matt Carew, Susie Ho, Lucy Richardson, Alan Reid – Monash University, has identified 124 units with climate change in the title, 60 with renewable, 27 green, 1 decarbonisation, 0 clean economy, 0 clean energy.

[3] ARC Centre of Excellence for Automated Decision Making and Society. Submission to University Accord Review

4 Association of Australian Medical Research Institutes. Submission to University Accord Review

5 Engineers Australia. Submission to University Accord Review

6 ACCI. The Australian Chamber of Commerce and Industry. Submission to University Accord Review

7 Minerals Council of Australia. Submission to University Accord Review

> *"Education systems in Australia are inefficient, misaligned with macro-economic drivers, and inequitable. Despite having comparable overall outcomes among OECD countries, our education system fails to provide the high-skilled workforce needed for the domestic workforce of 2030 to 2040 and beyond."8*
>
> *It is critical that Australia continues to develop sovereign capabilities and new intellectual capital in core disciplines, in order to ensure resilience and responsiveness to future challenges. Such challenges include but are not limited to: climate change and its impacts on biodiversity and habitats, food security and sustainability, preparedness for future pandemics, bolstering our physical and cyber defences, new materials to support technology development, and addressing the energy crisis through renewable options.**9***

In addition, while it is focused on a 'clean energy workforce', which it defines more narrowly than this submission does a 'clean economy workforce', Jobs and Skills Australia's (JSA) *"Australia's Clean Energy Workforce"* Discussion Paper (April 2023) recognizes the urgency of skills development[10], observing

> *"Australia is reshaping the way we generate, use and export our energy. … However, this transition will not be possible without a workforce that is equipped with the right skills. Just like any other element of the energy transition, our investment in skills development will take time and proper planning."*

Again, JSA captures the skills challenge and the urgency driving our submission:

> *Australia is inarguably well-placed to benefit from the transition to net zero … However, this potential will not be fully realised without sufficient investment in understanding, supporting, educating and training the future clean energy workforce.*
>
> *The effective delivery of clean energy specific education and training will be vital to the Australia's transition. This will necessarily include both the introduction of new, exclusively clean energy focused qualifications, the incorporation of clean energy skills and knowledge into existing qualifications … and ensuring a sufficient supply of graduates from more generalised courses that will experience increased demand as a result of the transition to clean energy, such as many fields of engineering and science.*
>
> *These efforts are underway but are not yet delivered at the scale and pace required and will take time to fully establish***. ...** *Access to education and training is also inconsistent across regions, particularly in rural and remote areas where cost of delivery is high, markets are thin and attracting educators is difficult."*[11]

8 Australian Council of Engineering Deans. Submission to University Accord Review

9 Australian Council of Deans of Science. Submission to University Accord Review

10 P6. JSA comments *"Our review of existing studies in Australia and internationally indicates there is no single definition of the clean energy workforce".*

11 P20. JSA April 2023

As early as 2010, GHD[12] concluded:

> *"Both the higher education and VET sectors are interested in developing training that will address the sectors' skills development needs, but supply is likely to lag behind demand until external funding sources are identified and/or there is a stronger business case made to support the investment of time and resources in program development."*

Measuring the skills gap

Reflecting definition challenges and differences, including scope, as well as a rapidly changing economy changing its workforce demands, estimates of current and future demand for clean economy skills vary but all indicate current and future shortages.

Supporting this observation about Australian data, the International Labor Organisation (ILO) and the International Renewable Energy Agency (IRENA), in their "*Renewable Energy and Jobs Annual Review 2022"*[13]*,* comment:

> *"Overall, however, there is lack of systematic reporting on renewable energy employment data* [in Australia]*."*

Australia has recognised its own data weaknesses and moved to collect and publish 'more accurate' data. The Australian Energy Employment Report (AEER)[14] is Australia's first national energy workforce survey. The AEER:

- *"will improve government and industry understanding of jobs in the energy sector and support the people in those jobs and their skills."*[15]

The current work reflects other recent findings that Australia needs good quality data to support workforce and skills initiatives.

> *To date, there has not been a systematic national framework for measurement or monitoring [data]. By developing the ability to adequately track and forecast clean energy jobs, Australia will put itself in a strong position to assess how the energy sector contributes to overall employment and the economy over time, and to identify the needs of the future energy workforce. This is critical for demonstrating the role and impact of clean energy across a wide range of sectors, both now and into the future, for managing the transformation of the workforce, and for maximising the jobs and opportunities offered by the global shift to low carbon. …*

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[12] GHD. (2010). Report for long term training strategy on energy efficiency assessment skills reports

13 P49. IRENA and ILO (2022)

[14] At the time of writing, there is no information on when results will be published.

[15] https://www.energy.gov.au/government-priorities/energy-workforce/australian-energy-employment-report

Significant effort will be required to understand the new skills and occupations involved, as well as the underpinning training and professional development pathways required, to deliver this transition.

There has not been systematic measurement of the clean energy sector in Australia since the NSW Sustainable Energy Development Agency (SEDA) survey in 2001/2003. Recent studies estimate the renewable energy workforce to be at least 30,000 and the energy efficiency workforce to be between 59,000 and 236,000. However, there is no reliable baseline information, and no consistent method of projection apart from some types of renewable energy. By 2030 the clean energy sector could increase by somewhere between 130,000 and 200,000 jobs.[16]

Estimates of current workforce numbers and future demand include:

1. In a 2020 publication[17] the Clean Energy Council[18] estimated that the 'renewable energy sector' could employ as many as 44,000 people by 2025.

2. In February 2023 the Australian Industry Energy Transitions Initiative (Australian Industry ETI)[19] published a range of forecasts, with this summary: *"The transition to renewable energy will create jobs for ~194,000 workers by 2050 and will require an additional 59,300 workers before 2030".* The ETI also make the following observations:
    - *Currently, there are 26,000 workers employed in renewable energy across solar, wind and storage across Australia.*
    - *"this report suggests that across wind, solar, storage, hydrogen generation and transmission infrastructure up to 193,900 workers will be required to support the renewable energy industries by 2050. Based on current employment [26,000] … this leaves a gap of at least 167,900 workers."*[20]
    - *Under the "coordinated action scenario", up to 1.35 million jobs can be supported across the Australian energy system by 2050, through investment in key renewable energy infrastructure.*
        i. *This comprises 1.22 million construction jobs*[21]*, plus 130,000 in ongoing operations and maintenance of the new infrastructure.*
        ii. *85,000 workers will be required by 2030 (current 26,000 plus an additional 59,000 workers [in] construction and ongoing O&M).*
    - *Some 43,000 of the 85,000 workers required by 2030 are in national shortage occupations. "Critically, 39% of these jobs in key occupations are higher skilled occupations, which require formal education and training at TAFE or university".*[22]

[16] P 5-6, E3 Opportunity Assessment: Developing the future energy workforce Final Report 2021
17 using data from 2018-19
18 Clean Energy Council "Clean Energy at Work". 2020
19 Australian Industry Energy Transitions Initiative (ETI) "Skilling Australian Industry for the Energy Transition", 2023.
[20] P24. ETI
[21] That means 1.22m jobs over the period, NOT 1.22m different workers employed.
[22] P24. ETI

3. As this submission has observed, the definitions of 'green economy', 'energy transition', 'clean economy' and 'net zero economy' all vary, so do estimates of skills needs and skills gaps. Some estimates are presented above. The Jobs and Skills Australia (JSA) discussion paper presents further examples of those variations[23]
    - The ABS's *Employment in Renewable Energy Activities 2020* says there were 26,850 FTE employed in the 'direct renewable energy workforce'
    - The Clean Energy Council's '*Clean Energy at Work'* says there were 25,000 in the 'renewable energy workforce' in 2020. There would be a peak of 44,000 in 2025, with long-term levels of about 37,000.
    - The Institute for Sustainable Future '*projects that employment will grow from 19,000 in 2023 to a peak of 81,000 in 2049'.*
    - Net Zero Australia (2022) modelled five scenarios, with estimates of domestic sector workforce growth by 2060 ranging from 270,000 to 450,000.

The range of skills required.

Our submission argues for urgent work to develop and implement a Climate Education Strategy, as well as an immediate investment in lifting the number of university students studying relevant engineering courses to support Australia's transformation to a clean economy. In doing so, we recognise that virtually every aspect of our economy and community life will be affected by the changes taking place. Hence, every graduate needs to be skilled for the changing world.

There is widespread agreement that 'all' or 'most' education and training must include skills to cope with and work and live in a clean economy and the transformation to this situation.

> *"When it comes to work in the sustainability space, we are often presented with images of a solar panel technician or a wind turbine engineer. In reality, green skills span virtually every industry and come in many forms.*
>
> *The fastest-growing green skills are in ecosystem management, environmental policy and pollution prevention. But … skills in clean energy, sustainable finance, construction, technology and urban planning will also be required … [as well as] jobs such as fleet managers, data scientists and health workers, non-traditional green jobs that will increasingly require green skills.*

[23] P22-23 JSA 2023.

The message is clear: In a green economy, green skills won't just be reserved for those working in renewable energy – they will be ubiquitous. The infrastructure to upskill workers must be put in place right now

...."[24]

Figure 4.4 **Skills needed for future green jobs.** Source: Government of the United Kingdom 2011; Fedrigo-Fazio and ten Brink 2012; Consoli 2015; Vona et al. 2015; Maclean, Jagannathan and Panth 2018; Burger et al. 2019; Occupational Information Network (O*NET Online) 2019.

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[24] ISO ((International Organization for Standardization) 13 December 2022.

[25] World Economic Forum. These are the skills young people will need for the green jobs of the future 23 August 2021

Appendix 2. What are other countries thinking and planning?

Most countries are facing the same challenges as Australia in identifying and seeking to fill their climate related skills gaps.

United Kingdom

On 24 May 2023, the UK's independent Expert Advisory Group's report *"Skills and Net Zero"*[26] to the UK Government's Climate Change Committee's[27] A Net Zero Workforce observed:

> *"Universities have a major role to play in providing the high-level education and training the workforce of the UK and other nations will need to accelerate the transition to Net Zero. Although most universities have committed to reducing emissions from their estates and activities, few have fully embedded Net Zero into their learning provision."*

The European Union[28]

> *THE COUNCIL OF THE EUROPEAN UNION,UNDERLINES [its] conclusions of 9 February 2023 calling for bolder, more ambitious action to be taken to further develop the skills that are required for the green … transitions through education, training, upskilling and reskilling to meet the challenges of labour shortages and the transformation of jobs, including … New 'green jobs' will be created, while some jobs will be replaced and others redefined, requiring changed skill sets.*
>
> *A fundamental element in facilitating the green transition and sustainable development is the acquisition of key competences in a lifelong learning perspective*
>
> *The green transition can only succeed if the EU has the skilled workforce for it... Green skills and the upskilling and reskilling of the workforce will be urgently needed to achieve the shift to a modern, resource-efficient, and competitive economy.*
>
> *Initial and continuing VET, higher education and adult learning have a key role to play in responding to the need to counter and adapt to climate change, halt and reverse biodiversity loss, and make the green transition a reality by equipping young people and adults with the skills and competences they need to thrive in an evolving labour market and society, and by contributing to the development of green solutions through technological and social innovation.*[29]

[26] Professor Prof Dave Reay – University of Edinburgh and Chair of the independent Expert Advisory Group.

[27] The UK Climate Change Committee (CCC) is an independent, statutory body under the Climate Change Act 2008.

[28] It is European Year of Skills for the period 9 May 2023 until 8 May 2024

[29] Council of the EU. 14 March 2023.

Appendix 3. What are other countries doing?[30]

United Kingdom

- A Lifetime Skills Guarantee to align education with skills gaps in construction, digital, clean energy, and manufacturing.
- Launched 400 fully funded qualifications for adults currently without a high-level qualification.

France

- Automotive-industry support plan to retrain automotive workers in electric vehicle production, jointly funded by government and industry.
- The French metallurgy observatory is conducting a skills gap analysis between declining and new jobs to identify training needs.

United States

The Biden Administration's Inflation Reduction Act (IRA) of 2022 has attracted major global attention to its proposed US$500 billion in new spending and tax breaks to boost clean energy, reduce healthcare costs, and increase tax revenues.

More relevant to the arguments of this submission is The Creating Helpful Incentives to Produce Semiconductors and Science Act of 2022 (CHIPS Act), which seeks to "boost US competitiveness, innovation, and national security" by, inter alia:

- jump-starting R&D and commercialization of leading-edge technologies, such as quantum computing, AI, clean energy, and nanotechnology
- creating new regional high-tech hubs and a bigger, more inclusive science, technology, engineering, and math (STEM) workforce.

There are other initiatives funded by the US Government aimed at increasing relevant clean energy skills, including the *Hydrogen Education for a Decarbonised Economy Initiative* which will deliver regional training in advanced hydrogen technologies and uses, and provide a platform for cooperation between government, industry and universities to develop curriculum, qualifications and standards for training and education.

[30] Country level information is based on ILO (2023) and IEA (2019) data published in ETI's *"Skilling Australian Industry for the Energy Transition."*

India

- The Skills Council for Green Jobs identifies skill and training needs.
- Green jobs VET is being introduced in schools, universities and engineering institutions.
- 44 national qualifications and training over 500,000 candidates

Philippines

The 2016 Green Jobs Act took a whole-of government approach to identifying skill needs, and training and certifying workers in green jobs. The incentive is a 50% tax deduction on skills training.