Jobs and Skills Australia - Australia's Clean Energy Workforce Discussion Paper

Submission by Institute for Sustainable Futures, University of Technology

2nd May 2023.

Overall, ISF considers the discussion paper an good overview of the state of play and issues that need to be resolved to develop the capacity of Australia's clean energy workforce. Owing to time constraints, our submission focusses on the sub-set of questions which we feel we have most to contribute.

If you would like to discuss any responses further please email [redacted]

- **Is the conceptual definition of the clean energy workforce ambiguous? If so, how could it be more clearly defined?**

  The definition of the clean energy workforce is ambiguous, and currently appears not to include energy efficiency. While much of the surrounding text implies efficiency is included, and many people will assume it is included under 'clean energy use', closer reading and reference to Figure 1 puts energy efficiency as an 'adjacent sector' alongside agriculture and recycling. We consider this both a conceptual and a practical error.

  Conceptually, energy efficiency not only reduces energy use and emissions directly, it reduces the cost of the entire suite of measures identified (for example electrification and new fuels) by reducing the energy intensity of services. Energy efficiency (which we take to include energy management and demand management) is a key component of clean energy use and delivers the most cost-effective element of the energy transition.

  From a practical viewpoint, the energy efficiency workforce is estimated to comprise nearly half of the entire energy workforce[1], despite the great difficulties in collecting data. Quantifying the energy efficiency workforce is probably the most significant gap in workforce estimation.

  We recommend revising the Clean Energy Workforce definition to specifically include energy efficiency. We further suggest explicitly including energy management, demand management, and fuel switching within energy efficiency.

  The split between 'clean energy supply' and 'clean energy use' does not currently work well. Whilst 'developing' clean energy supply may be intended to include the construction workforce, this is not explicit, and many people will see the word 'installation' and assume the construction workforce is covered there; this would not be the case as the subheading for that section is 'clean energy use'. We suggest modifying the clean energy supply text by adding 'constructing, and operating infrastructure for' in order to make inclusion of construction explicit.

  Our suggested revised definition is below:

  'The clean energy workforce includes the workers involved in developing, **constructing, and operating infrastructure for** generating, storing, transmitting and distributing energy generated from renewable, net-zero emissions sources ('clean energy supply'), **reducing or managing the energy required to deliver energy services (energy efficiency, energy**

[1] For example, International Energy Agency. 2022 World Energy Employment Report.

management, and demand management), and installing and maintaining the technology that uses clean energy rather than fossil fuels ('clean energy use'). This spans energy needed for electricity consumed by businesses and housing, transport and industrial processes.

- **How could clean energy supply workers be identified in existing data? What are the gaps?**

  Projections for clean energy supply workers can be undertaken by using employment indicators alongside electricity infrastructure planning, as was completed for the latest Integrated System Plan (2022) [2]. There are no current projections for WA or the NT, or for any off-grid systems. These are likely to become especially significant as hydrogen developments progress in regions such as the Pilbara, particularly hydrogen for export.

  Employment projections alongside electricity planning should be integrated with the Integrated System Plan process going forward, with the Western Australia Whole of System Plan process, and should be extended to include estimation of the off-grid development requirements in WA and the NT.

  Employment indicators are a key input to these calculations and are absent for some technologies, notably hydrogen production, renewable energy and fossil fuel decommissioning, and extraction and processing of some critical minerals associated with the energy transition, in particular battery minerals. Employment indicators are extremely volatile during early industry stages, so some indicators need revisiting, in particular distributed batteries. There are also Indicators that should be revisited periodically simply because of their importance, namely wind and solar.

  The occupational breakdowns are particularly important for planning purposes, as the total number of jobs created does not inform workforce planning. There are a number of areas where occupational breakdowns are missing or insufficient, in particular batteries, offshore wind, and manufacturing for key technologies (wind, solar, batteries). Extraction of critical minerals should be included (for example, lithium) as this is so closely tied to battery production; we note as an example that the code for lithium extraction (0990) has not been listed in Attachment B.

  We also have insufficient information on the renewable energy supply chains to estimate how many manufacturing jobs are needed. Employment indicators, occupational breakdowns, and estimates of current and future on-shore capacity, are needed for manufacturing jobs in key technologies (wind, solar, and batteries).

  Recommendations:

  a) Integrate employment projections into current energy sector planning processes, and undertake additional studies to extend coverage to the whole of Australia (for example, the current detailed electricity planning processes will only include WA and the NEM).

  b) Developing occupational employment indicators for batteries and offshore wind to support training strategies.

  c) Regularly revisit the employment indicators for major technologies, in particular wind and solar, with reference to the Australian industry to ensure accurate projections.

  d) Undertaking supply chain analysis to develop more accurate projections for onshore manufacturing. Developing better employment indicators for onshore manufacturing for

[2] Rutovitz, J., Langdon., R, Mey, F., Briggs, C. (2023) The Australian Electricity Workforce for the 2022 Integrated System Plan: Projections to 2050. Revision 1. Prepared by the Institute for Sustainable Futures for RACE for 2030.

key technologies (solar, wind, batteries), including occupational indicators to support training strategies.

e) Developing employment indicators where these are not currently available, including hydrogen production; renewable energy and fossil fuel decommissioning; extraction and processing of critical minerals associated with the energy transition where data quality needs to be improved, in particular battery minerals.

How could workers involved with energy use be identified in existing data? What are the gaps?

The energy efficiency (EE) workforce involved in advice and management, as well as installing and operating EE equipment, are vital to the energy transition proceeding smoothly. They are perhaps the most challenging to plan for, as it is so difficult to quantify or project forwards.

Very few of the companies involved will be identified from ANZSIC industry codes as most will be within the broader codes of construction or property management (2 digit codes 30, 31, 32, or 67). It is likely that over time there will be energy managers in many additional codes, including manufacturing, healthcare, education, and retail. Addressing this gap is crucially important for the energy transition, and particularly challenging as both the energy management workforce and the retrofit workforce (both residential and non-residential buildings and industrial equipment) are scattered through industry codes. The AEER has the potential to fill this gap, provided it takes the code sampling approach in its next phase[3].

We recommend developing employment indicators in tandem with suitable data sets for the energy efficiency and electrification tasks to enable the inclusion of energy efficiency, demand management and energy management, and electrification in the workforce projections.

- **How do workers obtain skills that are unique to the clean energy workforce (VET/Higher Education/on-the-job skilling/other)?**

  Based on fieldwork undertaken in the past two years, the skill acquisition process is quite opaque and there often appears to be a strong reliance on on-the-job training. In NSW, there are few courses specific to renewable energy and low uptake of these courses. There are some exceptions where the training pathways appear quite well-defined (e.g. the transmission workforce), but one priority for the strategy should be to better understand the skill requirements and employment and training pathways to enable less reliance upon on-the-job training to benefit the industry and workforce.

Are there any emerging occupations and industries in clean energy that aren't well captured by current definitions?

Very few of the clean energy roles are captured by current industry or occupational codes. Notable cases include wind technicians, electrical specialisations (e.g. sub-stations) and many energy efficiency and energy management jobs. In the longer term, it would be desirable if the codes could be modified to include the newer roles, perhaps by starting with introducing subdivisions of the electricity generation code.

- **What do you consider to be the most significant information gaps in this sector?**

[3] This was not possible during the 2023 AEER; see *Rutovitz, J., Taylor, H., Niklas, S., Guerrero, J. and Briggs, C. 2021. Measuring the Energy Workforce in Australia – Pilot Survey. Prepared for Australian Government Department of Industry, Science, Energy and Resources* for a description of the proposed methodology for the full survey.

As detailed above, the most significant information gaps are:

a) The lack of data on the volume and occupational composition of the energy efficiency, energy management and demand management workforce. We need both current quantification, and development of employment indicators that can be linked to sectoral energy planning metrics in order to make projections of workforce requirements.

b) The lack of detailed occupational breakdowns across many clean energy subsectors (batteries, offshore wind, hydrogen).

- **How can government better work with industry to measure the workforce? Are there existing data sources that could be better leveraged or improved?**

  The Australian Energy Employment Report (AEER), modelled on the USEER, is expected to sample industry codes to quantify the clean energy workforce[4], and is intended to capture the energy efficiency workforce (including energy and demand management). Ensuring that JSA capacity study and the AEER development are integrated could bring considerable mutual benefit. Firstly, the work on industry codes undertaken during the JSA study can inform the sampling strategy for the AEER. Secondly, the results from the AEER can be used to refine the JSA model on the proportion of each relevant code should be included in the clean energy workforce.

  Assuming the AEER does go ahead as planned, it also provides the opportunity for subsidiary surveys to interrogate the occupational breakdown of various elements of the clean energy workforce. It is vital that this additional work is undertaken alongside the AEER (or separately) to give the occupational breakdown alongside gross workforce projections.

  The survey work to identify occupational breakdowns per clean energy subsector could occur independently and in advance of the AEER. There are advantages in proceeding immediately, although the AEER may offer some economies of scale. However, it is recommended that:

  a) Data collection and analysis should be undertaken with a consistent approach, so that datasets across energy subsectors are comparable.

  b) Industry bodies and government should have an oversight role, perhaps as a steering group, to any projects.

  c) Methodology and de-identified data outcomes should be made public.

  d) Sub-sector definition should be consistent with the AEER and JSA categories.

  e) Sub-sector definition and the resultant indicators should be tested against their applicability for projections in advance of survey work.

  f) Industry bodies play a vital role in ensuring sufficient coverage, and it is recommended that any work undertaken is done in collaboration with such bodies.

[4] Essentially the 2024 AEER is intended to survey a representative sample of relevant industry codes in order to identify the proportion of that code which is involved in the clean energy sector. This should enable quantification of the sector within the bounds of statistical error, and providing that appropriate codes are identified.