SUBMISSION

2 May 2023

Clean Energy Capacity Study Team
Jobs and Skills Australia
Department of Employment and Workplace Relations
GPO Box 9828
Canberra ACT 2601

Email: CleanEnergyWorkforce@jobsandskills.gov.au

Dear Sir/Madam

Re: ***Australia's Clean Energy Workforce Discussion Paper (April 2023)***

The Waste and Recycling Industry of Queensland (WRIQ) is the unified voice of waste management and resource recovery in the State. Representing more than 90 Queensland-based organisations ranging from multi-nationals through to small family owned and operated businesses, WRIQ engages in a broad range of state-specific issues of strategic importance to the sustainability and development of the waste management and resource recovery sector.

WRIQ represents all aspects of the sector including major landfills, transfer stations, resource recovery facilities, firming power and clean energy facilities and collection services. WRIQ's mission is to elevate the waste management and recycling industries through services, education and advocacy for members to achieve successful economic, social, environmental outcomes.

We welcome the opportunity to provide a submission on Australia's Clean Energy Workforce (Discussion Paper, April 2023). WRIQ provides this submission without prejudice to any additional submission from our members or other individual waste management and resource recovery operators.

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Consultation

WRIQ understands that Jobs and Skills Australia (JSA) has been commissioned to undertake a capacity study on the workforce needs for Australia's transition to a clean energy economy. The capacity study will build on existing research and deepen our understanding of the clean energy sector.

The purpose of the discussion paper is to provide stakeholders, interested parties and the broader community with a sense of the study's scope and approach, and an early opportunity to provide submissions.

Definition of Clean Energy

It is unclear how the proposed definition of clean energy and a clean energy workforce is linked directly to 'green jobs'. The clean energy workforce is a small, but important sub-set of the green job sector.

The inclusion of green job definitions is irrelevant to the definition of clean energy, and therefore in defining the clean energy workforce.

Clean Energy may be defined simply as renewable energy plus sustainable energy. As such, thermal and other technologies utilised by the waste management and resource recovery sector may be defined as either renewable energy (see Section 17) or sustainable energy. In many cases, the difference between renewable and sustainable, is not the energy technology utilised but rather the source of the feedstock (source segregated and/or single stream material feedstocks, versus mixed feedstock).

Queensland's waste management, recycling and resources recovery sector, currently utilise a range of clean energy technologies and feedstocks including but not limited to:

- Landfill Gas Energy Generation
- Waste Mine Gas Energy Generation
- Bioenergy Generation, using technologies such as anaerobic digestion and pyrolysis
- Co-generation using various thermal and combustion technologies (including black liquor boilers, gasification, pyrolysis) which recover energy from various waste streams, including agricultural by-products, waste water, recycled paper pulp, non-recyclable plastics
- Production of liquid and solid fuels and energy from non-recoverable waste plastics and oils
- Production of hydrogen from selected waste streams including non-recyclable plastics and resins
- Energy and oil recovery (including liquid fuels) from the pyrolysis of end-of-life tyres

For the purpose of defining clean energy, technology and feedstocks must be considered. The clean energy definition must also be extended to include energy systems and infrastructure such as microgrids, distributed energy systems, through to supporting clean energy technologies (metering to blockchain supply and trading systems).

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The direct, indirect and supporting workforce, (and relevant skills, qualifications and competencies) can then be identified in a structured workforce planning process.

Consideration of Heat Values and Liquid Fuels (and their workforce)

In many existing commercial (paper recyclers), agricultural and agri-processing facilities, the value of heat and steam is already well known and recognised. Any clean energy definition must recognise the contribution of heat and fuels (liquid and solid). The value of any electricity and heat generated can make a substantial difference to the ongoing economics of a clean energy generation facility, but the practical uses of the two energy forms are very different. Electricity is easy to transmit from the point of production to the point of use, as long as an appropriate local grid connection is feasible. In contrast, heat energy needs a user close to the point of generation, otherwise the transmission losses (and infrastructure costs) quickly become prohibitive.

Workforces within these facilities would be typically identified by the core business (as opposed to clean energy or energy worker ANZSIC).

Defining Green Jobs

As the discussion paper rightly identifies, definitions of 'green jobs' vary significantly between organisations and countries, and there is no universally accepted definition—some definitions characterise green jobs as only applying to the vocational and trade professions (Thomas et al., 2010). Further studies question the ethics of some potential 'green jobs'. For example, Annandale et al. (2004, as cited by Thomas et al., 2010) question if a recycling plant that emits air pollution can be considered as a producer of green jobs and this would extend to energy from waste facilities (which are forms of clean and/or sustainable energy – subject to the adopted definition).

Definitions of green jobs are generally devised to suit a particular study or support a particular outcome (Davis, 2013), ranging from 'everyone has a green collar job' and 'anyone who has the word environment, sustainable, green or something similar in their title on their business card is a green collar worker' (Viridus, as cited in EIANZ & DECC, 2009). It can be argued that a green job must go further than simply a job title and must contribute significantly to preserving or enhancing environmental quality. The number of green jobs in Australia varies between 50,000 to more than 300,000 depending on the definition used and data source, including the level of extrapolation or the use of multipliers (EIANZ & DECC, 2009). Many of the studies on green jobs creation and mapping future green job growth are not clear about their scope, units or timeframes associated with their results, making it difficult to compare studies or clarify assumptions (Energy Skills Queensland, 2011; Energy Skills Queensland, 2011b).

To further categorise clean energy jobs or even jobs within the waste management and related sectors (as represented by WRIQ) into green jobs, and presumably 'non-green jobs', may only confuse

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quantification of jobs and recognition of the sector as a whole or abject confusion when identifying the clean energy workforce.

ANZSIC

The paper does elude to the issues surrounding the ANZSIC codes – in so much that they are generally a blunt definition and they struggle to maintain currency and pace with new and emerging sectors such as clean energy. For example, there is a lack of understanding of what constitutes waste management and resource (including energy) recovery work and omissions to the employment statistics for the sector make it difficult to accurately identify the current number of jobs or range of occupations within this sector from 'officially sourced' data (Davis 2013) – this includes those within the sector working on clean energy jobs.

Omission of the Agricultural Sector

WRIQ is perplexed by the rationale to exclude agriculture, forestry and fishing and presumably agri-processing from the clean energy workforce measurement (as stated in Figure 3).

Bioenergy is one of the most utilised forms of renewable and sustainable energy (and therefore clean energy) in Queensland. Bioenergy is energy generated from solid, liquid and gaseous products that have been predominantly derived from biomass. Biomass is any organic matter (biological material) that is available on a renewable basis, including material derived from animals or plants, municipal or industrial waste. End-uses include heat, electricity and transport fuel.

The Australian Bioenergy Roadmap[1] reveals that by the start of the next decade, Australia's bioenergy sector could contribute around $10 billion in extra GDP per annum, create 26,200 new jobs, reduce emissions by 9 percent, divert 6 percent of waste from landfill and enhance domestic fuel security.

A number of factors could be considered to help bioenergy meet its potential. These include[2]:

- A secure demand for bioenergy products, which will underpin investment for feed supply and bioenergy processing.
- A regime that places costs on carbon emissions across each of the areas in which bioenergy can contribute (e.g. heat, power, transport fuels, chemicals).
- Further understanding of the environmental and social costs and benefits of using different types of bioenergy in Australia.
- Local feedstocks with technical characteristics and costs that are well understood.
- Mapping of potential feedstock volumes and thus actual supply (fuel and electricity) that Australia can expect from biomass.
- Mapping of current industry and technologies being utilised, to provide a baseline against which growth may be measured.

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- ‘Buy in’ from market drivers such as oil majors and car manufacturers.
- Greater understanding that some new tree crops can be integrated into current agricultural production systems to maintain or increase agricultural production, produce biomass and provide benefits such as soil protection.
- Integration of bioenergy production with production of co-products such as foodstuffs, chemicals and biochar.

Given the availability of cost effective and environmentally beneficial feedstock sources, the bioenergy sector has significant potential to assist with both Queensland’s and Australia’s energy transition and to help Australia further reduce emissions. This is complimentary to many Queensland initiatives the Queensland Climate Transition Strategy supporting zero emission targets; Queensland Waste Management and Resource Recovery Strategy which supports circular economy principles; the Biofutures Roadmap; and the Powering Queensland Plan which includes targets for renewable energies.

Queensland’s agricultural sector is the largest provider of firming-load renewable (clean) energy from resource streams, including energy from waste as defined under the *Renewable Energy (Electricity) Act 2000 (Cth)*, contributing over 1,200GWH of renewable energy annually (both behind the meter and for export to the grid).

The agricultural sector (agri-processors in particular) are significant stakeholders in the energy from waste, bioenergy and renewable energy sector (collectively defined as clean energy). As an example, bioenergy includes the energy derived from the biomass components of an energy source mentioned in any of paragraphs (i) to (s) of the definition of eligible renewable energy source (as defined within subsection 17 (1) of the *Renewable Energy (Electricity) Act 2000 (Cth)).*

Australia’s agricultural sector is the largest single adopter of Clean Energy Finance Corporation (CEFC) loans (at 26.5 percent), with the average project amount financed in the agribusiness sector being $248,998. Thus, indicating the maturity and innovation of the sector in both energy efficiency and renewable energy projects and infrastructure.

Examples of Existing Clean Energy Projects in Queensland

Sugar mills have been generating renewable energy from waste sugarcane fibre for approximately 100 years in Australia, meeting their own electricity needs and exporting excess electricity to local networks.

Many of the existing REC registered thermal units are sugar mills. There are 24 sugar mills in Australia, 23 of which are in Queensland. Australian sugar milling is a diversified agricultural and regional manufacturing industry. Sugar mills utilise their waste streams with bagasse used to generate electricity and steam. Most of the boilers in the industry are grate fired. All mills ensure that they have capacity to move between biomass and other solid fuels (including coal or biomass-derived fuels) in some instances.

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The 23 Queensland sugar mills export additional electrical capacity to the grid. Invicta, Pioneer and Victoria Mills have upgraded cogeneration facilities to increase their export capacity. Pioneer's cogeneration plant is the largest biomass generator in Australia. Surplus bagasse produced in the Burdekin mills during the crushing season is stockpiled on large, specially designed pads at Pioneer to enable the cogeneration facility to continue to operate outside of the crushing season.

Invicta, Isis and Rocky Point Mills all provide over 30MW generating capacity. Subject to the boiler design and mill operations, approximately 15 per cent of the original energy in the bagasse is being converted into electricity and exported to the grid. When the mill is not crushing, approximately 20 per cent of the original energy in the bagasse is converted into electricity and exported to the grid.

Sugar mills play an integral role in a low carbon economy into the future, and currently represent an under-utilised clean energy resource for bioenergy. The sugarcane plant is one of the world's most efficient converters of solar energy into chemical feedstock, making it suitable to derive a range of products such as electricity and ethanol; and into the future, other biofuels and biochemicals.

Sugar milling companies have the capacity to significantly expand their production of renewable electricity and biofuel, with no expansion to the existing industry footprint. These expansions can have payback periods in excess of 10 years and as such, require the right policy settings to provide the necessary investor confidence. They are also significant regional employers and require a skilled and competent workforce.

Much of this clean energy workforce associated with sugar milling (currently 350 direct FTEs in Queensland) would be identified in existing ANZSIC codes (for example, 1181).

It is essential that the waste management sector is specifically acknowledged in the clean energy definition (beyond the simplistic utility categorisation used on page 14) and that agriculture is included (in scope).

Please do not hesitate to contact [redacted] if you have any questions.

Yours faithfully

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