

Hydrogen Capability Mapping Executive Summary

Results from the Hydrogen Demonstration Plant questionnaire
of 171 businesses

Prepared by Hayley Warren
March 2023



Executive Summary

The hydrogen industry has been around for centuries but has only recently become a hot topic nationwide as another contender for clean green energy production. As Australia's focus shifts to renewable energy sources, an area of concern amongst industry is skills development. With the Federal Governments ambitious targets for net zero emissions by 2050 and the Queensland State Governments reduction target of 30% by 2030, many businesses are looking to hydrogen as a way to reduce their emissions footprint and to enhance business efficiency throughout the changing energy environment. To become more dependent on renewable energy to power our communities consistently, the cost of hydrogen needs to be reduced, the uptake of hydrogen across industries needs to increase with more investment in green hydrogen projects. This can't occur in isolation and most importantly there needs to be capable workforces to facilitate supply and demand as scale increases. Without these key areas being addressed, Australia will not reach the desired targets which will therefore isolate our skilled workforces and put international agreements at risk.

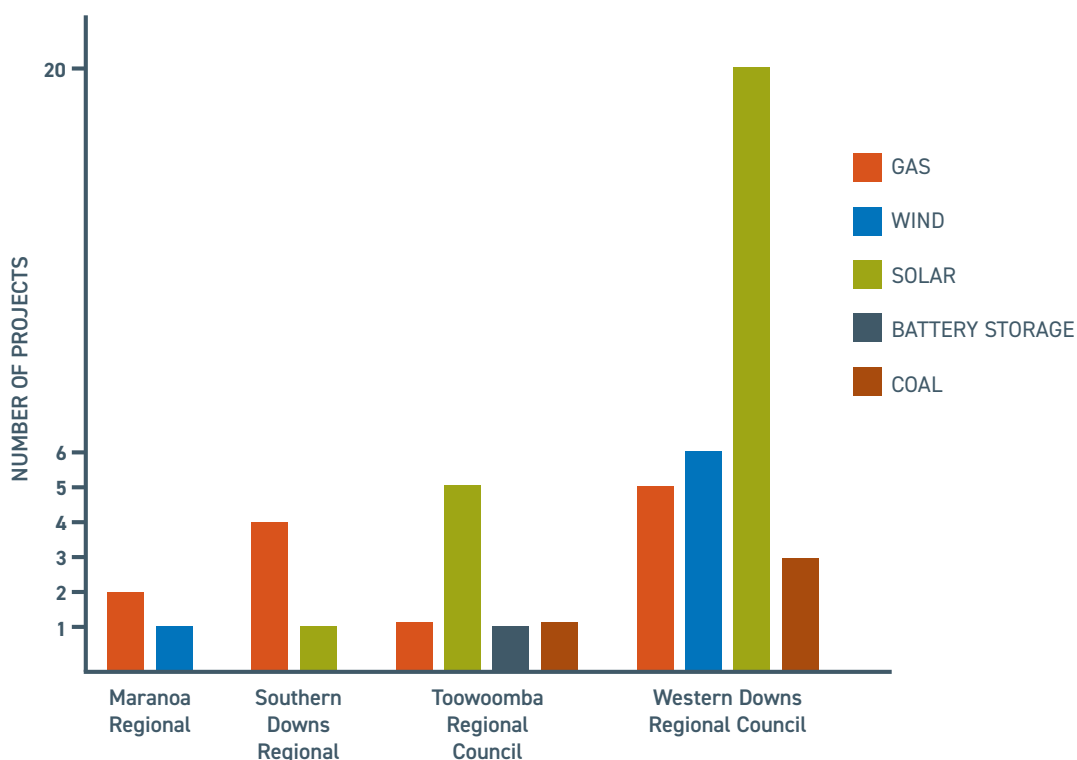
Hydrogen can be produced from different energy sources and the Surat Basin has a rich history of resource development. The most valuable to our economy both domestically and internationally is green hydrogen produced from abundant renewable energy sources. Additionally, the option of blue and grey hydrogen from our gas sector, black and brown from our coal sector exist. For the Toowoomba and Surat Basin region, the importance of being connected by rail, road, air and sea will enable the region to tap into the domestic mobility opportunities the hydrogen market has to offer.

List of existing, under construction and proposed projects (Nov 2022)



Source: <https://electricity-generation-map.epw.qld.gov.au/>

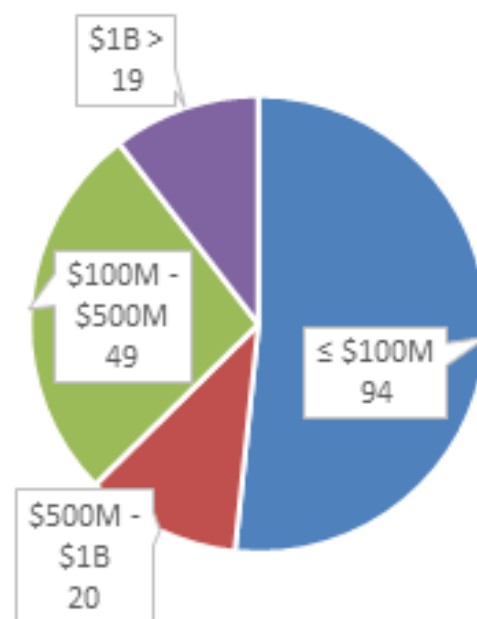
Existing, under construction and proposed projects November 2022



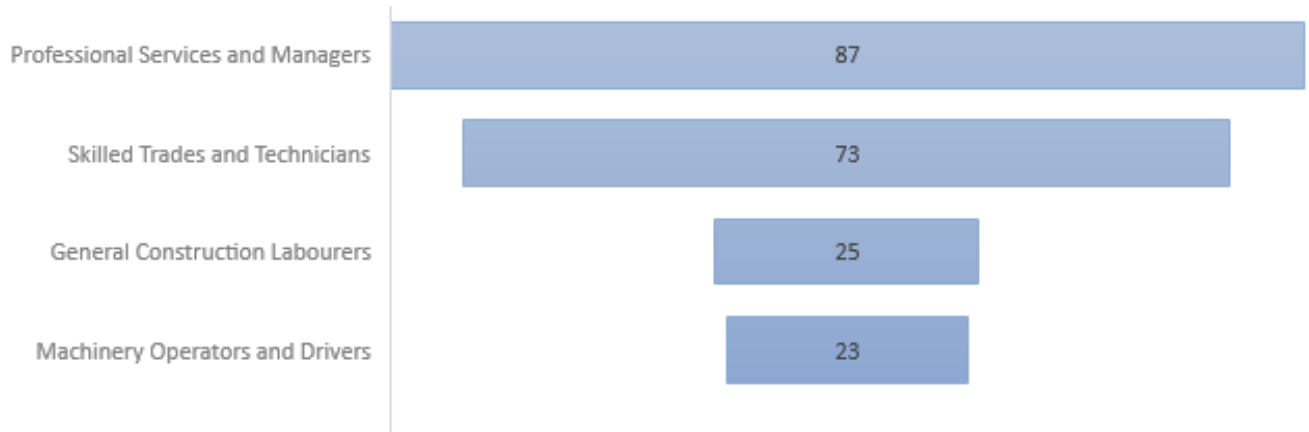
To ensure the region has sufficient capability to support the hydrogen market and to tap into these opportunities, Toowoomba and Surat Basin Enterprise (TSBE) undertook a capability mapping exercise to identify the strengths, challenges, weakness and opportunities within the regional business community and supply chain companies in relation to hydrogen. The findings revealed areas where investment in training and accreditation is needed to increase the capability, expand offerings and to support hydrogen skills development.

The findings show there has already been investment by the supply chain in micro credentialing, and upskilling in new oil & gas processes, high risk health and safety and in specific role accreditation. There is existing knowledge and experience working on industrial construction sites within major projects worth \$100m or less with only a small percentage of businesses having worked on projects worth \$500m or more, which will increase with further investment in hydrogen production in the Toowoomba and Surat Basin region. While there are 73 businesses who have specialised technicians and skilled trades apart of their current workforce and 87 businesses with skilled professional service staff and experienced managers, businesses have indicated they are more likely to employ those undertaking a professional services degree rather than a specific trade course. If we consider the different pathways within the professional services sector, it appears to be the easiest way to enter or move into a career in energy industries because of the readily identified upskilling opportunities.

Construction Project Size



Workforce Specialisation - Number of Businesses



In addition to workforce, there is a current decrease in the uptake of apprentices and trainees amongst businesses, however, there is interest in engaging with more cadets, apprentices, and trainees to assist businesses to embed themselves into the major project sector, which could mean stronger connections may be needed between industry, regional stakeholders and schools to help increase the future workforce for the hydrogen industry. Due to the impacts of COVID-19 and inflation within the economy, there may be financial pressure on businesses which could be contributing to the decision to appoint less trainees and apprentices at this time which will require assistance of Government funds to release this pressure so businesses can return to supporting growth within their workforce.

It is apparent in the findings that there is a shortage of specialised skills for niche and specialty areas which will be needed in the short term to support the construction, installation, and operation phases of a hydrogen project. These areas will include firstly the design of electrical systems to enable distribution of electricity through to a network to balance the size of the electrical load from the project. At the moment, it seems this scope of work is overlooked across the supply chain as most Engineering Procurement and Construction (EPC) companies are undertaking this internally given their size and more experienced workforce. By encouraging investment from electrical businesses to upskill in this area, it could mean the unbundling of these scopes to share with the broader electrical workforce.

Secondly, there has also been a steady increase in solar and windfarm installation experience across the region, however more focus on targeted upskilling around site installation by contractors is needed by renewable projects generally. On a hydrogen project this includes aspects such as mechanical & hydraulic engineering capability procured to support during construction and installation, and trades such as plumbing, gas fitting and hot works. The modification of imported equipment to Australian Standards and our operating conditions will mean further investment into mechanical capability as well.

Thirdly, diving deeper into electrical and systems, further investigation into the SCADA technology requirements will be needed to remotely capture data and how existing SCADA technology within traditional resources can be transitioned over to support the hydrogen market. This could also identify any new innovative technology and systems that could be developed to not only support data capture but to enhance efficiency throughout the renewable industry and adjoining sectors. Turning focus to major electrical work, it is evident there is a shortage of linesman positions within major utility providers which is a highly specialised and important role for projects to not only be connected to the network but to stay connected. To assist in filling this gap foreign electrical workers under a visa may alleviate this area of concern but would require substantial investment from these providers or Government and additional skilling to meet Australian standards.

Another sector requiring upskilling and investment is local manufacturing; manufacturing of tube trailers, cell stacks, refueling infrastructure and overall structural steel products. Sourcing manufacturing of these products could be adopted locally to support supply and demand, and more skilled specialists to store, load, transport and decanter hydrogen to refueling stations will be required as demand increases. The production of hydrogen storage is specialised with little capability available, so diversification within traditional manufacturing will be beneficial to support the store, load and transport of hydrogen on major project sites.

To maintain the operations and maintenance of manufactured hydrogen refueling infrastructure, more training is needed for workers to safely refuel onsite and for suppliers utilising external refueling infrastructure, this will ensure the health and safety of workforces, suppliers and will reduce any major impacts to the site.

As green hydrogen production is a relatively new industry, the regulations for the appropriate health and safety measures is not well established like on a traditional industrial site. This is the crux of issues many hydrogen projects will face when going through the pre-feasibility process, approvals, construction, production and operations and maintenance phases. As risk increases with projects of significant scale, without proper regulation, hydrogen projects will dwindle in the first instance, not making it past approvals. Those that are successful in establishment, may be faced with significant reputational and profile risks that will be detrimental to the local communities and workforces.

Key areas for development:

- Investment in electrical capability and mechanical capability required
- Diversification within traditional manufacturing needed
- Clearer Government regulation regarding hydrogen required
- Increase importance of health and safety

As we move forward, it is key that niche and specialty areas are targeted first, particularly in the electrical, mechanical and manufacturing sectors in order to attract more hydrogen production to the Toowoomba and Surat Basin region. Further investment from the Government to support the net zero emissions will also need to benefit the supply chains so they can continue investing in the appropriate upskilling and accreditation for their workforce to transition into hydrogen work. Governments need to focus on developing a clear planning and regulatory framework that support safe hydrogen production so all regions including the Toowoomba and Surat Basin region can benefit, whilst supporting businesses to adapt a cleaner energy solution into their business to increase demand. For businesses, investment in upskilling of technical staff is needed to maintain status quo and retain Toowoomba and Surat Basin operational expertise as we continue to transition from traditional resources.

