The Australian Manufacturing Workers' Union.

Submission to the House of Representatives Standing Committee on Industry, Science and Resources Inquiry into Developing Advanced Manufacturing in Australia.

The Australian Manufacturing Workers' Union (AMWU) is Australia's only specialist manufacturing union. We are made up of around 65,000 workers in every region and city of the country. We design, build and maintain ships, munitions, aircraft, and vehicles for Australia's military; we build and repair trains; mining machinery; electric buses and trucks; wind towers and turbines; and we process the food our farmers grow. In short, we are at the cutting edge of Australia's most cutting-edge manufacturing work. We welcome the opportunity to make a submission to this inquiry, and would appreciate the discuss our submission on these matters in any subsequent hearings.

The opportunities of advanced manufacturing for Australia – including in relation to job creation, productivity and capability.

A growing body of work has been dedicated to the notion of 'advanced manufacturing', but the term has multiple, sometimes contradictory definitions. In some instances, it appears to be used to describe the integration of internet enabled devices, real-time data sharing and other digital technologies into manufacturing processes. In other examples, it appears to relate to the product market or the commodity being produced.

The AMWU believes that advanced manufacturing is correctly understood as the movement towards high-value-adding manufacturing processes. Pursuing high-value-adding manufacturing means those activities that generate a large margin between the final price of a good and the cost of the inputs used to produce it, thus creating higher revenue for businesses and higher wages for workers. Today, such processes can only be achieved on a large scale through co-ordinated industry policy, strategic investments in research and development, the adoption of digital technologies, the maintenance and development of heavy engineering capabilities, and the upskilling and empowerment of Australia's manufacturing workforce. An increasingly advanced manufacturing industry is essential for Australia's economic development. It is the only way to ensure our industry is producing for export markets, and not competing with low- and middle-income economies for lower value-adding work.

One measure of the level of value-adding in an economy is economic complexity, which measures an economy's ability to integrate diverse sources of knowledge and apply it to processes of product, technology and service innovation, then export these products to high-value markets in the global economy. . Australia currently ranks very poorly in terms of economic complexity;[1] in 2020, Australia ranked 91st in economic complexity, down from 81st in 2010 and 60th in 2000. We currently sit just behind Laos and Pakistan, and just ahead of Namibia and Bangladesh. These low levels of

[1] Growth Lab at Harvard University. 2023. The Atlas of Economic Complexity. Cambridge: MIT Press, http://www.atlas.cid.harvard.edu

economic complexity are, in significant part, the outcome of a lack of private investment in advanced manufacturing innovation, R&D and skills and training. Australia also has low and declining investment in machinery and industrial equipment as a percentage of gross domestic product.[2] Here, Australia is an outlier, as other developed countries have increasingly invested in machinery and industrial equipment. Heavy engineering generally has a much higher level of innovation and research and development. Therefore, low and declining investment is cause for alarm for those who wish to see Australia develop a more advanced manufacturing sector.[3]

The AMWU has consistently advocated for Australia to make as much as it consumes—for Australia to build its 'Fair Share' of manufactured goods. This means that Australia should produce as much as it uses in terms of manufactured goods. This would represent huge economic and social benefits for Australia. Professor Jim Stanford estimates that:

> *Total manufacturing output would need to grow by close to $180 billion to attain that 'fair share' benchmark. That would translate into $50 billion in new value-added – representing a 2.5% increase in national GDP. Over 400,000 direct jobs would be created in manufacturing, supporting some $30 billion per year in additional wages and salaries. Another 265,000 jobs would be created in the various supply industries which would experience new sales opportunities as a result of the increase in domestic manufacturing. Those new supply chain purchases would be worth an estimated $115 billion per year. Cautiously assuming the same export intensity of current manufacturing production, exports of manufactured product would grow by around $40 billion.*[4]

International trends in advanced manufacturing.

Several observers have pointed out that the global financial crisis spurred renewed governmental interest in growing the 'real' economy and firms capable of creating products of tangible and functional value. This trend has been compounded by the COVID-19 pandemic as lockdowns, disruptions to global supply chains, and resulting shortages of essential goods have demonstrated the strategic importance of domestic manufacturing capacity. A recent OECD report argues that the pandemic will likely hasten the adoption of digital technologies and that automation is expected to

[2] Stanford, J. 2020. A Fair Share for Australian Manufacturing: Manufacturing Renewal for the Post-COVID Economy. Australia Institute. https://futurework.org.au/wp-content/uploads/sites/2/2022/11/A-Fair-Share-for-Australian-Manufacturing-WEB.pdf
[3] Stanford, J. 2020. A Fair Share for Australian Manufacturing: Manufacturing Renewal for the Post-COVID Economy. Australia Institute. https://futurework.org.au/wp-content/uploads/sites/2/2022/11/A-Fair-Share-for-Australian-Manufacturing-WEB.pdf
[4] Stanford, J. 2020. A Fair Share for Australian Manufacturing: Manufacturing Renewal for the Post-COVID Economy. Australia Institute. https://futurework.org.au/wp-content/uploads/sites/2/2022/11/A-Fair-Share-for-Australian-Manufacturing-WEB.pdf

change tasks within jobs more than replacing jobs themselves, with the impact being felt across the skill spectrum.[5] Many jurisdictions also see the transition away from fossil fuels as an opportunity to correct for the excesses of deindustrialisation and develop 'green' manufacturing capabilities. Finally, renewed geopolitical tensions in Europe and the Asia-Pacific have spurred several governments to reinvest in defence manufacturing capacities.

A growing body of research makes it clear that governments, industry, and trade unions in major economies around the world see the transition towards more advanced manufacturing industries as a strategic priority. Germany's Industry 4.0, China's 'Made in China 2025', the USA's Inflation Reduction Act, Canada's NGen Superclusters initiative and others all indicate that advanced and developing economies alike recognise the economic and strategic importance of developing advanced manufacturing industries. What these initiatives have in common is a renewed commitment to co-ordinated industry policy and government planning. If Australia wants to keep pace with other rapidly advancing economies, it will need to adopt comparable industry policies.

In short, there is an increasing global awareness of the strategic and economic importance of sovereign capability in high-value-adding manufacturing. As will be discussed further in the sections below, this has been accompanied by a growing recognition of the need for higher skilled workers capable of working with significant levels of autonomy. This necessarily requires the application of strong standards regarding training and qualifications, labour standards, job quality, and union representation, to ensure that high-value-adding work processes can be achieved. In a recent study of the application of advanced manufacturing techniques in Germany, the authors observed that the successful deployment of new technologies and work reorganisation was closely correlated with a co-operative relationship between management and workers and their unions. Further, the authors concluded that upskilling workers will be central to achieving high-value-adding manufacturing outcomes:

> *Further intensification of a Taylorist mode of work organisation based on short-cycle, highly standardised, monotonous work tasks is regarded as a cul-de-sac, contradicting the new technologies' potential for increasing efficiency. Instead, the greater complexity of future work will require highly qualified workers able to operate independently.*[6]

[5] OECD. 2021. What happened to jobs at high risk of automation? Report: The Organisation for Economic Co-operation and Development, Paris.
[6] Bosch, G. and Schmitz-Kießler, J. 2020. Shaping Industry 4.0 – An Experimental Approach Developed by German Trade Unions. *Transfer: European Review of Labour and Research*, 26(2), 189–206.

Competitive strengths and advantages of Australia in advanced manufacturing, including Australia's comparative international position in advanced manufacturing.

Despite decades of policy negligence, Australia maintains several competitive advantages that place it well to grow a highly advanced manufacturing industry:

- *A highly skilled workforce*. Despite systematic policy neglect and the hollowing out of Australia's vocational education and training system, we maintain a highly skilled manufacturing workforce. New models of advanced manufacturing naturally require large numbers of highly trained workers in all occupations: production workers, skilled trades people, technicians, and engineers. Despite having skills shortages in many of these areas, we nonetheless maintain a base of highly-skilled manufacturing workers which forms a base upon which an advanced manufacturing sector can be built.[7]
- *A superabundance of renewable energy resources*. For too long, environmental sustainability and creating more jobs in the manufacturing industry have been framed as incompatible with one another. The AMWU rejects this framing. In fact, our union believes that the international transition to renewable energy represents an unprecedented opportunity to revive our nation's battered but resilient manufacturing industry. Australia's unique opportunity stems from our abundance of renewable energy resources. Research shows Australia has perhaps the greatest natural resources in terms of sun (solar), wind, and waves among other resources, of any developed nation.[8] Harnessing our immense renewable energy resources would generate an abundance of cheap power which can be used to revitalise existing industries and build new ones. This includes building the renewable energy infrastructure like wind towers and solar panels.
- *Unrivalled access to critical minerals*. Australia currently exports commodities including lithium, cobalt, bauxite and rare earth elements (i.e. vanadium) and then imports value-added downstream products like lithium ion batteries and electric vehicles. Among these commodities, lithium represents Australia's greatest opportunity – Australia is the world's biggest exporter of spodumene (the primary ore comprising lithium carbonate, the precursor necessary for lithium-ion batteries) and holds the largest reserves of all lithium mining and export nations. Cobalt is a by-product of copper and nickel ore processing and has also been identified as a critical mineral given its application for batteries – for which a

[7] Stanford, J. 2020. A Fair Share for Australian Manufacturing: Manufacturing Renewal for the Post-COVID Economy. Australia Institute. https://futurework.org.au/wp-content/uploads/sites/2/2022/11/A-Fair-Share-for-Australian-Manufacturing-WEB.pdf

[8] Garnaut, R. 2019. Superpower: Australia's low-carbon opportunity. Carlton: La Trobe University Press.

"substitution is unlikely to emerge over the medium term".[9] If Australia were to commit to adding value to our minerals prior to exporting them, it has the potential to generate thousands of good manufacturing jobs and help insulate our economy from volatile global markets.

Barriers to the growth of advanced manufacturing in Australia – including barriers to existing manufacturers, particularly small and medium enterprises, adopting advanced manufacturing technologies and processes such as AI and robotics.

Despite many fundamental advantages, Australia has nonetheless gone backwards in terms of advanced manufacturing in recent decades. This is evidenced by Australia's declining economic complexity and diminishing investment in industrial machinery and equipment discussed above. In these respects, we are an international outlier, as other developed countries and emerging economies have generally been investing in advanced manufacturing capabilities. What explains Australia's comparative decline? Several observers—from unions, industry and academia—have argued that Australia has failed to develop a co-ordinated industry policy.[10]

To support the development of advanced manufacturing capacities in SMEs, the federal government must play a co-ordinating role, investing in shared infrastructure and skills and training. Large scale publicly owned common user facilities (CUF), discussed at length in the following sections, offer proven model for facilitating technological adoption among SMEs. The revitalising of Australia's vocational education and training system—along with the need for employers to invest in apprenticeships—is also discussed in a subsequent section.

In terms of government co-ordination, research commissioned by the AMWU[11] has previously advocated for the establishment of a network tripartite of 'Advanced Manufacturing Sector Councils', supported by a broad infrastructure and secretariat at the Department of Industry, Science, Energy and Resources. These Sector Councils would be made up of representatives from industry, government and trade unions, and would engage sector stakeholders to identify the most

[9] DIISER. 2021. Resources and Energy Quarterly – September 2021. Department of Industry, Science, Energy and Resources, Commonwealth of Australia (Canberra, Australia).
[10] Wood, T. 2022. Why Australia Needs a 21st Century Industry Policy. Grattan Institute. https://grattan.edu.au/news/why-australia-needs-a-21st-century-industry-policy/ ; AMWU. 2021. Submission to the Senate Economics References Committee inquiry into the Australian manufacturing industry 2021. https://www.amwu.org.au/submission_manufacturing2021
[11] Stanford, J. 2020. A Fair Share for Australian Manufacturing: Manufacturing Renewal for the Post-COVID Economy. Australia Institute. https://futurework.org.au/wp-content/uploads/sites/2/2022/11/A-Fair-Share-for-Australian-Manufacturing-WEB.pdf

promising sub-sectors for investment and development. Sector Councils would develop investment and innovation plans for the identified sub-sectors and oversee the implementation of these plans with the support of other government bodies.

Financial and non-financial investment opportunities or possible reforms to support the growth of advanced manufacturing in Australia in: renewables and low emission technology; medical science; transport; value adding in agriculture, forestry and fisheries; value adding in resources; defence; and enabling capabilities.

Building Australia's advanced manufacturing capacity requires strategic government investment in technology and infrastructure to help facilitate the growth of small and medium enterprises. CUFs in the vein of the Australian Marine Complex[12] Western Australia have a demonstrated capacity to facilitate the growth of small and medium enterprises, diversify industry, encourage technological adoption, and support the development of advanced manufacturing. The AMC CUF in Henderson is a large, 40ha integrated facility and has supported the development of a world class shipbuilding and maintenance industry in Western Australia. Since its establishment the AMC has delivered hundreds of infrastructure projects and tens of thousands of jobs.[13] The AMC CUF also supports fabrication and manufacturing for the WA mining, oil and gas industries.

The Western Australian government maintains ownership of the AMC CUF which provides open access to multiple users. Rather than handing out money to private enterprises the government invests in a publicly owned space and allows firms to bid for access. This model provides firms with access to cutting edge common use infrastructure including industry 4.0, additive manufacturing and machine learning technologies. CUFs support SMEs to achieve scale through alliances and joint ventures to bid for major projects. They can provide firms with access to research and development opportunities to help them innovate. Finally, these CUFs should contain skills centres, run in conjunction with TAFEs and universities, which provide access to state-of-the-art education and training facilities for the training of apprentices and the upskilling of workers. All these benefits are provided while maintaining public ownership over infrastructure; all proceeds generating from leasing the infrastructure is reinvested in the facilities.

The Business Council of Australia has advocated that the National Reconstruction Fund be geared towards to building a handful of "internationally significant precincts" in strategic locations around

[12] Development WA. *Australian Marine Complex*. https://developmentwa.com.au/projects/industrial-and-commercial/australian-marine-complex/about-the-amc
[13] Government of Western Australia Department of Commerce. 2016. *Australian Marine Complex Brochure.* https://www.commerce.wa.gov.au/sites/default/files/atoms/files/amc_brochure_may_2016.pdf

the country.[14] The AMWU supports this idea but argues that public ownership should be maintained of these facilities in order to ensure long term benefits of the investments are controlled in the interests of the Australian people. The CUF model—on a similar template to the AMC facility—should be expanded to facilitate the growth of advanced manufacturing in other locations in Australia.

The AMWU is currently campaigning for the establishment of major CUF facilities in Western Australia and Victoria. The Western Australian government, along with several private investors, has already committed to an advanced manufacturing CUF in the southwest of WA[15] that would be significantly bolstered by Commonwealth investment. This facility would help develop an advanced manufacturing industry, skills and provide good jobs to a region experiencing transition away from coal mining and energy generation industries. The AMWU is involved in the development of this project and believes that significant federal funding is required to maximise returns from the project.

BAE Systems has recently made stakeholders aware that it plans to sell the Williamstown dockyard, a major industrial precinct in Melbourne's western suburbs. The dockyards previously employed more than 1,500 workers in highly skilled manufacturing jobs,[16] but since the federal government decision to concentrate the naval shipbuilding in Western Australia and South Australia the yard has been virtually unused. The decline of shipbuilding capability and employment reflects a broader decline in heavy engineering capacity in Victoria over the last several decades, but this decline can be reversed. The AMWU is advocating for the establishment of a heavy engineering CUF at the Williamstown docklands to be owned jointly by the state and federal governments. This would create hundreds of advanced manufacturing jobs for Melbourne's western suburbs, facilitate the growth of SMEs, and train hundreds of workers.

The opportunities to increase the number of workers employed in advanced manufacturing, including consideration of ways to increase the participation and retention of women and other historically underrepresented groups.

This section will focus specifically on how the manufacturing sector can support the participation and employment of historically underrepresented groups, while the following section relating to skills will address how to address skills shortages more broadly in the industry.

[14] Brookes, J. 2023. Use $15bn NRF to build future industry precincts: BCA. Innovation Aus. https://www.innovationaus.com/use-15bn-nrf-to-build-future-industry-precincts-bca/
[15] AMWU West Australian Branch. 2021. *Submission to the Australian Manufacturing Inquiry*.
[16] Star Weekly, 2015. *200 more jobs cut at Williamstown naval dockyard*. Available at: https://maribyrnonghobsonsbay.starweekly.com.au/news/200-more-jobs-cut-at-williamstown-naval-dockyard/

Despite many employers complaining of skills shortages, few are engaged in concerted efforts to attract historically underrepresented groups to the union. Women are notably underrepresented in manufacturing trades in Australia. Only 3.5% of automotive mechanics and electricians are women, 1% mechanical engineers, and 3.4% of panel beaters and vehicle body builders. The AMWU wants to see more women on the tools to help address skills shortages in the industry; because having more women in the workplace has been shown to boost productivity levels, increase job satisfaction, increase employee retention, and increase team building; and because it is simply the right thing to do.

There are tangible industrial and policy initiatives that can be implemented rapidly to facilitate an increased participation of women in metal and mechanical trades. First, any government attracting government support in the form of finance, grants, or equity should have a mandated ratio of apprentices to tradespeople, and a requirement that at least 50% of new apprentices should be women. Secondly, employers must be required to provide appropriate support and facilities to women workers, including bathrooms and changerooms. Finally, the federal government should consider a national 'Women in Manufacturing Trades' program to encourage young women to consider an apprenticeship in manufacturing trades in the vein of the program funded by the Victorian state government and delivered by the Victorian branch of the AMWU.

Skills needs in advanced manufacturing.

Around the world today, the governments of most major countries are making significant investments in developing highly skilled manufacturing workforces to bolster their sovereign capabilities. These governments recognise the economic opportunities represented by rapid changes in production technologies and are positioning themselves to take full advantage. Without a significant rethink of skill development and recognition, Australia risks being left behind. The nexus between productivity growth and wages was broken around the time of the Global Financial Crisis, but this trend accelerated under the Abbott/Turnbull/ Morrison governments. To re-establish the link between wages and productivity growth requires both renewed investment in skills and training and greater recognition for the skills workers already have.

Therefore, a root-and-branch industry profiling exercise is required to fully account for the future workforce needs of an advanced manufacturing in Australia. The AMWU has for several years been proposing the establishment of 'Occupational Profiles.' Based on several components, these would include an occupational standard and a collaboratively developed national industry framework curriculum or training standard. Occupational Profiles would ideally contain two types of industry

level categorisation of jobs and occupations. The first categorisation would cover occupations where there is a high level of consistency and mobility in the skills and capabilities required and where there is industry consensus that a full nationally recognised Occupational Profile is warranted. The second categorisation is of occupations that may require consistent underpinning foundation and core skills, but the inherent diversity of work associated with the occupation would make an Occupational Profile inappropriate.

Union involvement in the identification, design and development of Occupational Profiles is critical where, even as increased digitalisation and automation shapes manufacturing, the role of workers remains pivotal to highly skilled and complex manufacturing processes. Advanced manufacturing industry policy must be developed in a way that recognises workers possess not only qualifications, but skills informed by experience. Studies of some of the world's most sophisticated manufacturing supply chains have determined that even in highly automated workplaces, the experiential knowledge and skills of workers is an essential ingredient in highly advanced, digitalised, and automated industrial systems. Human skills become critical inputs in firms that acknowledge workers' first-hand knowledge of production processes is more than just 'routine', and therefore is not easily replaced by labour-saving technologies. The ramifications of this recognition of the value of workers' all-around knowledge for transforming VET-based skills provision are enormous. Industry policy that places skills at its centre will manage the transition to an advanced manufacturing industry by ensuring competent workers are active in shaping advanced manufacturing workplaces.