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Submission to the Department of Industry, Science, Energy and Resources

Modern Manufacturing Strategy roadmaps

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MODERN MANUFACTURING STRATEGY ROADMAPS

The Australian Academy of Technology and Engineering (ATSE)[1] is pleased to contribute a submission to the consultation on the Australian Government's Modern Manufacturing Strategy Roadmaps.

ATSE supports the Modern Manufacturing Strategy (MMS) as an industry-led and co-designed initiative, and particularly the partnership between government, industry and the science and research community. ATSE shares the Strategy's vision for Australia to be recognised as a high-quality, sustainable manufacturing nation, helping to deliver a strong, modern and resilient economy for all Australians. Australia's abundant natural resources and highly skilled workforce mean that targeted and strategic investment in advanced manufacturing, digital technology, and a STEM-skilled workforce would catalyse this transformation.

Government investment in modern manufacturing should be market-led and targeted at high-value, technology-based projects with commercial potential, complemented by strategic investment in essential manufacturing to protect Australia against disruptions in normal supply chains. The Strategy should look beyond incremental change; funding should be made at sufficient scale and over the long-term to establish infrastructure and build advanced manufacturing skills in the workforce to achieve the broad and enduring progress required to build thriving, agile and resilient manufacturing in Australia.

To fully exploit the opportunity to build a sovereign capability in manufacturing, the Modern Manufacturing Strategy should support capacity development in both established and new manufacturing. We need to innovate and create new industries to recover from the COVID-19 pandemic, but it is equally important to support and grow existing manufacturing, leveraging our existing skilled workforce and capabilities. The Strategy should be clear about its objectives in this respect and supported by policy settings and frameworks to facilitate collaboration and incentivise innovation, as well as by dedicated leadership to oversee the proposed investment.

In our pre-budget submission, ATSE identified advanced manufacturing, health technology, resource recovery and productivity, clean energy and the research and development workforce as key priorities to build Australian industry and jobs for the future.[2] We are pleased that four of these priorities – advanced manufacturing, medical products, recycling and clean energy – are included as priority areas of the MMS. However, ATSE believes that recycling and clean energy are functionally separate challenges and should be given their own dedicated streams in the Strategy.

While defence and space are areas in which Australia can develop a competitive advantage, long development and procurement timelines mean that it will be some time before any significant manufacturing capability can be developed. In this submission, ATSE has therefore focused on areas where Australia's established global credibility, competence, skills capability, and natural advantage can be swiftly leveraged to create jobs and economic growth. In order of priority, these are:

1. Medical products
2. Recycling and clean energy
3. Resources technology and critical minerals processing
4. Food and beverage

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[1] The Australian Academy of Technology and Engineering is a Learned Academy of independent, non-political experts helping Australians understand and use technology to solve complex problems. Bringing together Australia's leading thinkers in applied science, technology and engineering, ATSE provides impartial, practical and evidence-based advice on how to achieve sustainable solutions and advance prosperity.

[2] https://www.atse.org.au/wp-content/uploads/2020/08/SUB-Budget-200824.pdf

Across all the priority areas, ATSE urges cooperation, collaboration and consultation between government departments and agencies, different levels of government, industry and research sectors. ATSE is well placed and experienced in connecting science and industry. Our Fellows, drawn from industry, academia, research institutes and government, represent the brightest and the best in technology and engineering in Australia. We welcome the opportunity to contribute to a strong modern Australian manufacturing sector through providing future input, guidance, and advice.

1. Medical products

ATSE's report on technology readiness in the Australian healthcare sector recommended digitisation of health records as the most critical priority, as integrated, patient-centred care relies on accurate and timely information. Targeted support and investment is needed to improve pathways to commercialisation for Australian-developed medical technology, including in digital health records.[3] Specific recommendations from ATSE's report included strategic investment in technology with high commercial potential, coaching to upskill researchers in product development and commercialisation, recognising successful commercialisation in the peer-reviewed competitive grants process, and leveraging Government procurement to support innovation.

Australia also has existing competencies in medical devices and technology,[4] including successful large companies such as CSL, Resmed and Cochlear. Australia has the skills, capabilities and potential for a sustainable medical device industry, but the conditions have not been created to attract significant private investment in manufacturing facilities, and inconsistent incentives have resulted in much of Australia's medical manufacturing move offshore.[5] This has resulted in shortages in essential medicines and medical devices, and recently in medical equipment including personal protective equipment (PPE).

ATSE's advice to the Government on investment to support a post-COVID tech boom advised that technologically advanced infrastructure would enable better management of critical stockpiles and coordination of government procurement, including wider application of Industry 4.0 principles for supply-chain stabilisation and resilience and customer engagement.[6]

2. Recycling and clean energy

Redesigning the end-to-end process of recycling so that it aligns with manufacturing would create significant opportunity for sector growth and jobs creation. ATSE is releasing a major project on the readiness of the Australian waste management and resource recovery sector to adapt, adopt, or develop technologies to transition towards a waste-free future, on 18 November 2020.[7] This work identified that appropriate new technologies are available but are yet to be widely adopted in the recycling and manufacturing sectors. The widespread uptake of these innovations across our industries, especially the important small-to-medium-sized businesses, the economic engine room of

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[3] https://www.atse.org.au/research-and-policy/publications/publication/a-new-prescription-preparing-for-a-healthcare-transformation/

[4] https://www.mtpconnect.org.au/images/2020%20MTPConnect%20Sector%20Competitiveness%20Plan.pdf

[5] https://www.afr.com/companies/healthcare-and-fitness/csl-executive-gordon-naylor-on-how-to-create-advanced-manufacturing-success-20150807-gitkkg

[6] https://www.atse.org.au/wp-content/uploads/2020/08/Investing-in-a-post-COVID-19-tech-boom-1.pdf

[7] https://www.atse.org.au/research-and-policy/big-issues/helping-australia-get-technology-ready/waste-and-resource-recovery-report/; https://www.atse.org.au/wp-content/uploads/2020/02/SUB-2020-01-31-ATSE-submission-to-inquiry-into-Australias-waste-management-and-recycling-industries-Final.pdf

the nation, requires a stable policy environment, targeted and strategic government investment, and a systems-based approach.

Australia's priorities for clean energy technology should focus on long-term and resilient solutions, including low and zero emissions electricity, accelerated transformation of the electricity market, and development of a world-leading clean energy industry.[8] Australia is a world-leader in solar photovoltaic (PV) and wind energy deployment,[9] but challenges remain in stability systems for reliable and low-cost supply. Other opportunities include a potential hydrogen market, energy storage and grid stabilisation technologies, and the export of renewable energy.

3. Resources technology and critical minerals processing

Abundant mineral resources are a natural advantage for Australia, however large quantities of raw or minimally processed minerals are exported at a relatively low unit value. Innovative technology for mineral extraction and processing has the potential to increase the sector's energy, water and environmental efficiency, and increase the value of our exports. Regional hubs integrated with clean energy sources can reduce the associated transport and processing costs. Value-adding to extracted minerals has huge potential as an industry in Australia, as these minerals are required in the manufacture of electronics, IT and aerospace, among others.

The success of Australian mining will also provide a strong foundation for the development and commercialisation of new, integrated mine-site technology and equipment.[10] Significant new investment and collaborative models are needed to develop breakthrough technologies and world-leading hubs in Australia for minerals, given the reduction of major new mineral discoveries in Australia.[11]

4. Food and beverage

New, innovative approaches will be needed to remain productive and competitive in a changing natural, social and economic environment. For example, agricultural biotechnology can increase the efficiency of land, water and energy use while delivering higher quality crops.[12]

The Australian Council of Learned Academies (ACOLA)'s Horizon Scanning report on *The Future of Agricultural Technologies* identified the potential of advanced biotechnology solutions and digital technologies and devices to increase productivity. The report called for cross-sectoral and cross-disciplinary collaboration in research, development and innovation, and prioritised construction of critical enabling infrastructure, and ATSE commends it to this consultation.[13] Meaningful innovation and commercialisation of technology developments will be achieved through private investment and collaboration with public sector research.[14]

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[8] https://www.atse.org.au/wp-content/uploads/2020/08/SUB-2020-06-19-ATSE-submission-on-Technology-Investment-Roadmap-1.pdf

[9] https://www.irena.org/Statistics

[10] https://www.atse.org.au/wp-content/uploads/2019/01/AS-improving-productivity-in-themineral-resources-sector.pdf

[11] https://www.atse.org.au/wp-content/uploads/2019/01/AS-2019-01-30-APPLIED_Minerials-Increasing-mineral-discovery-success-01-D2-web.pdf

[12] https://www.abca.com.au/wp-content/uploads/2020/09/ABCA-Guide_4th-edition_final.pdf

[13] https://acola.org/wp-content/uploads/2020/09/hs6_agricultural-technologies_acola_report.pdf

[14] https://www.atse.org.au/wp-content/uploads/2019/10/Inquiry-into-growing-Australian-agriculture-to-100-billion.pdf