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

AUSTRALIAN STEEL INSTITUTE

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The Australian Steel Institute (**ASI)** is pleased to make a submission on Developing Advanced Manufacturing in Australia.

Introduction

The ASI is the nations peak body representing the entire steel supply chain, from the primary producers through to end users in building and construction, resources, heavy engineering and manufacturing.

Its membership base includes approximately 6,000 individuals that are associated with more than 500 corporate memberships and over 350 individual memberships.

A not-for-profit member based organisation, the ASIs activities extend to, and promote, advocacy and support, steel excellence, standards and compliance, training, events and publications. The ASI provides marketing and technical leadership to promote Australian-made steel as the preferred material to the resources, construction, and manufacturing industries, as well as policy advocacy to government.

The Australian Steel Industry

The Australian steel industry consists of four primary steel producers, supported by over 300 steel distribution and processing sites throughout the country and hundreds of manufacturing, fabrication and engineering companies.

Australia's primary steel producers and steel product manufacturers together form a strategically important value chain that has the capability to supply in excess of 90 per cent of the steel grades and qualities required in this country. If special categories such as very large diameter pipe, stainless steel, electrical steel, and tinplate are excluded, then the capability is significantly closer to 100 per cent.

Australia produces around 6 million tonnes of steel per annum across five major manufacturing locations, with approximately 74 percent produced via the more emissions-intensive method in the blast furnace - basic oxygen furnace (BF/BOF) and the remainder produced via the electric arc furnace (EAF) method.

It is important to note the economic and social contribution of the Australian steel industry. It employs over 100,000 people and generates $29 billion in annual revenue, and it associated with a disproportionally large share of skilled jobs in regional and rural areas.

Australia has world leading manufacturing capability in many areas of steel product application. Some examples include wear resistant and ballistic plate steels for mining and defence applications, grinding media for mineral processing, strata

control products for underground mining, wire rope for open cut mining, wheels, rail, and sleepers for both mainline and heavy haul railway applications, strapping for load restraint, engineered bar and resultant products such as automotive springs and specialty fasteners, high pressure gas storage tanks, racking and shelving for automated warehouse solutions, highly durable coated steel water pipe for infrastructure, and a myriad of specialised components for building, construction and defence industry applications.

Similarly, the steel fabrication sector is well served by a wide range of domestic businesses, located in all regions of the country, each with an area of unique capability or specialisation. Steel fabrication is essential for manufacturing of bespoke construction products such as foundations, piling, columns, beams, girders, gantries, platforms, and towers. Areas of specialisation include wind turbine towers, transmission towers, storage tanks, chemical processing plant, boilers and pressure vessels, mining infrastructure refurbishment, mobile equipment for underground and surface mining, mobile cranes, bridges, armoured vehicles for Defence, naval and domestic ship building, rolling stock, truck bodies and trailer chassis. In those applications where demand is relatively consistent from year to year, local fabricators have invested heavily in state-of-the-art manufacturing technology and fully integrated design software that incorporates visualisation and 3D simulation capability.

The opportunities of advanced manufacturing for Australia

In response to the significant pipeline of building and construction work that exists in most states and territories, there has been substantial investment in state-of-the-art manufacturing equipment by steel producers and fabricators over the last five years. These investments include CNC machines, fully automated beam processing lines, automated presses, robotic profiling cells, and robotic welding cells. This equipment is being used to enhance labour productivity, increase capacity, and improve the capability to take on larger projects. In the main, these investments have been targeted at supporting the demand for fabricated structural steel such as is required for large infrastructure projects e.g. metro stations, road bridges, sports stadia.

The steel industry is also a key enabler for the nation's renewable energy transition and associated legislated climate targets. Between now and 2030 it is estimated that at least 400,000 tonnes of fabricated steelwork will be required per annum to service over 23 GW of existing renewable energy generation projects across wind, solar, water and transmission infrastructure, as illustrated in this table:

Wind:

- It is estimated that each 1 MW generated by an onshore wind tower requires 124 tonnes of steel.
- Offshore wind increases generation scale and steel consumption further. Each 1 MW generated by an offshore wind tower requires 190 tonnes of steel.

Solar:

- The steel components include a foundation pile (normally a hot rolled channel or column), torque tube (octagonal, square or tubular hollow section), frames or Rails for PV panels and Brackets.
- Typically, about 45 tonnes of steel are required for each 1 MW of solar energy generated.

Water:

- Hydro projects require large diameter steel liner pipes, penstock, related fabrications, tunnel reinforcement, and foundations.
- It is estimated that each 1 MW of hydro power will require 161 tonnes of steel.

Transmission:

- Each 1000 kms of transmission line typically requires 2500 towers at 30 tonnes per tower.

The fabricated steelwork required for this transition includes a mixture of components that are readily available in Australia and those that haven't been sourced locally for many years. The sheer scale of the demand and the extended timeframe over which it is required mean that this energy transition provides a unique opportunity to develop advanced manufacturing capability in several areas of strategic importance for future energy security. These opportunities include but are not limited to:

- Onshore wind tower fabrication;
- Offshore wind tower fabrication;
- Production of large diameter tube suitable for manufacturing of torque tubes for solar cell tracking and support frame structures;
- High voltage transmission tower fabrication.

The local steel producers, steel product manufacturers and fabricators have the crude steel supply and underpinning production capabilities to make these products, but largely lack the specialised large scale automated capacity that is typically required to produce cost efficiently. This capacity can readily be created in a relatively short time via targeted investment in dedicated plant and equipment. The key to driving the required capital investment is the existence of firm local participation targets for supply of renewable energy infrastructure, which are set at a level sufficiently high enough to ensure manufacturing economies of scale are achieved.

Recommendation: Firm local participation targets for supply of renewable energy infrastructure be established by all states and territories, such that it drives capital investment in optimally scaled state-of-the-art manufacturing capability.

Competitive strengths and advantages of Australia in advanced manufacturing

Australia needs a large and diverse traditional manufacturing base in order to nurture and support new and emerging industries. High tech future industries such as aerospace rely heavily on the existing industrial ecosystem for the supply of experienced staff, access to specialised skills and capabilities, and all the infrastructure needed for prototyping and initial trial manufacturing. Our future industries will not be developed in complete isolation from existing, mature industries, rather they coexist and have a mutually beneficial relationship. Therefore, a strong and 'healthy' manufacturing base helps to provide the essential ingredients for development of future industries that we look to for growth in new markets.

In both relative and absolute terms, the Australian steel industry employs highly sophisticated process technology that requires a highly skilled and well-educated workforce to operate it. The ongoing training and replacement of the next generation

of this workforce helps to underpin the engineering and science components of the excellent tertiary education system in this country, including both the vocational training and university sectors. An example of this mutually beneficial intersection of industry, academia, and research is the very successful Steel Research Hub, which is co-funded by the Australian Research Council (ARC) and steel industry partners.

Recommendation: The Steel Research Hub model of collaborative co-funded academic research and development continue to be supported by the Commonwealth, and ideally expanded to a broader range of steel industry subsectors.

Barriers to the growth of advanced manufacturing in Australia

Australia is naturally blessed with access to large volumes of high quality, low-cost raw materials that span virtually all the requirements for a completely vertically integrated steelmaking value chain. For example, Australia has huge scale iron ore and metallurgical coal mines that export to world markets, it collects and recycles into new products more than ninety percent of all scrap steel generated each year, it produces the ferroalloys required for steelmaking, and also mines much of the fluxing materials required in iron and steelmaking. From a raw material standpoint, Australia is well placed to support a long term viable domestic steel industry.

With regard to energy cost, for both electricity and natural gas, the situation is much less competitive. Major steel producers such as BlueScope with manufacturing operations in both Australia and a range of countries in the region, report that 'Prices paid by our Australian operations for electricity and gas are approximately double those paid by our US steelmaking operation'[1]. Similarly, natural gas, which is critical for reheating in all steel rolling operations, and for most steel heat treatment processes, is not available at a price that is competitive with our major competitors.

Recommendation: Commonwealth government energy policy needs to act to continue to drive a reduction in the cost of energy in order to encourage all forms of manufacturing, which includes advanced manufacturing.

The key to competitive labour productivity is ongoing investment in automation and industrial robotics. Many businesses have already made significant investments in these technologies and continue to do so. In many cases, these have resulted in redeployment of labour from dangerous and repetitive manual tasks to higher skilled roles, so automation need not lead to a net reduction in employment opportunities. For the Australian steel industry overall, there are several significant barriers to wholesale adoption of automation.

[1] BlueScope FY2021 Results Presentation slide 48

- Firstly, many manufacturing sites have been in operation for a considerable time, with associated legacy constraints. This means that often the only way to automate is via a bespoke solution that isn't commercially available, but instead requires significantly higher cost to design and implement.
- The second significant barrier is that many Australian manufacturing industries are relatively subscale in world terms, because they have been sized to serve just the domestic market. This means that it can be more difficult to achieve a satisfactory return on investment for an automation project.

In the light of these barriers to existing steel product manufacturers, particularly SME businesses, adopting state-of-the-art manufacturing technology, it is essential that they have ongoing access to both impartial expert advice, and funding schemes that encourage the investigation and uptake of new technology. University based industrial automation groups such as the University of Wollongong Facility for Intelligent Fabrication (FIF) play a vital role in assisting industry to make this transition. Similarly, the various matching funding schemes provided by AusIndustry and comparable state government organisations have proven to be important as catalysts for this type of innovation. A good example is Advantage SME.

Recommendation: Raise the profile of university-based industrial research translation groups such as FIF.

Recommendation: Maintain support for collaboration funding schemes that encourage universities and SMEs to partner on commercial implementation of innovative manufacturing technologies.

Mark Cain

Chief Executive
Australian Steel Institute

Mobile: 0417236807
email: markc@steel.org.au
website: www.steel.org.au

G1, Ground Floor
25 Ryde Road, Pymble
NSW 2073
PO Box 197, Macquarie Park BC, NSW 1670