

**Senate Economic References Committee**  
**Naval Shipbuilding Inquiry**  
**Reply to Questions on Notice**  
**September 2020**  
**By Dr. Jim Stanford**  
**Economist and Director, Centre for Future Work**

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*It is my pleasure to respond to the following questions on notice, arising from our submission to the Committee's inquiry into naval shipbuilding in December 2019, and our appearance before the committee on 14 August, 2020.*

1. Is it fair to say that you consider that Australia is highly dependent on the resources sector – and that this lack of diversification and absence of a strong manufacturing base is a potential risk to our future prosperity?

Yes, there is no doubt that Australia is unusually and precariously dependent on the extraction and export of largely unprocessed natural resource commodities in our international economic relationships.

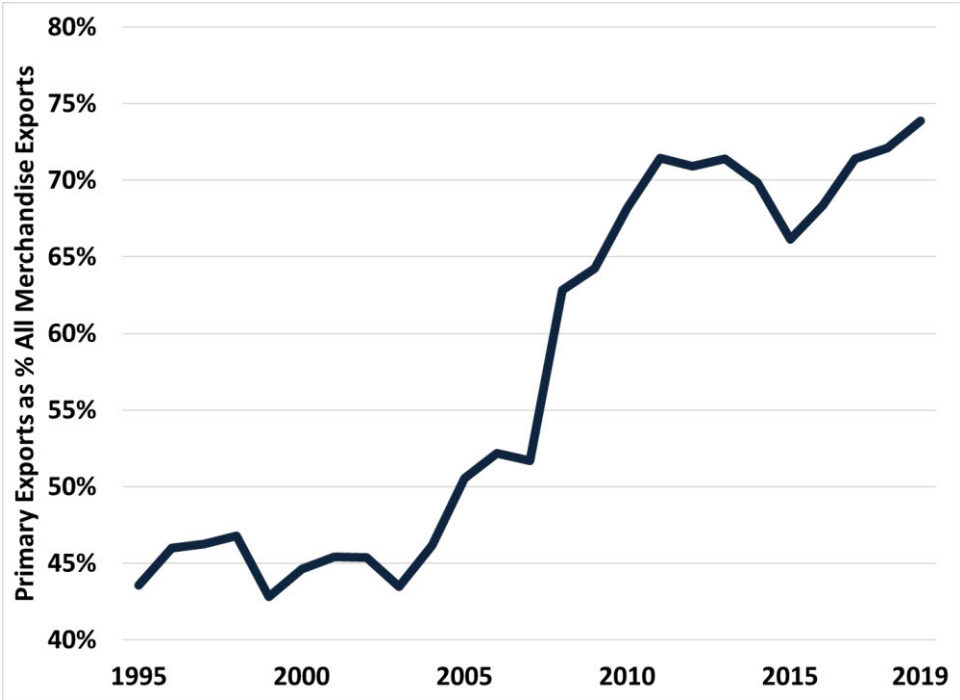
Of course, Australia's economy has always been heavily dependent on resource products: including agricultural goods, timber, minerals, and now energy products. This legacy reflects both our geographical endowment (a large, relatively sparsely populated country with abundant resources) and our colonial heritage (initially seen as a source of raw materials for more developed industries in England). For decades it was a goal of national economic policy to foster a more diversified presence in international trade, with greater participation in value-added industries, and less reliance on raw resource extraction. After the Second World War, Commonwealth policy focused on fostering domestic industrialisation, invoking numerous strategies to tie domestic investment, production, and technology to trade and fiscal opportunities. This vaulted Australia into the club of major industrial nations: once ranking in the top ten countries globally for production of automobiles and several other higher-value products.

Unfortunately, over the past generation the composition of Australia's merchandise exports has regressed notably. Government policy came to emphasise other goals, and

domestic manufacturing began to decline (in both absolute and relative terms). Australia’s export focus shifted back to the extraction and export of mostly unprocessed natural resources. Iron ore, coal, and liquified natural gas are now our largest exports. Global sales of Australian-made manufactured goods have declined. And a very large, chronic trade deficit in manufactured products undermines our international balance of payments year after year.

The growing dependence of Australian merchandise exports on unprocessed or barely processed resource products is illustrated in Figure 1. It shows the share of total merchandise exports accounted for by primary (unprocessed and barely processed goods). By the 1990s, on the strength of postwar industry-building policy, that share had declined to under half of all Australian exports. While Australia was still more dependent on resource extraction than other industrial countries, that dependence had been successfully reduced over time. Australia’s industrial and export presence was more diversified. Since the early 2000s, however, in the wake rising global commodity prices and a retreat from active industrial policy-making by Australia’s governments, Australia has gone ‘backwards’ in structural terms. The country has become far more dependent on resource exports, as domestic manufacturing declined.

**Figure 1. Primary Product Reliance in Australian Exports, 1995-2019**

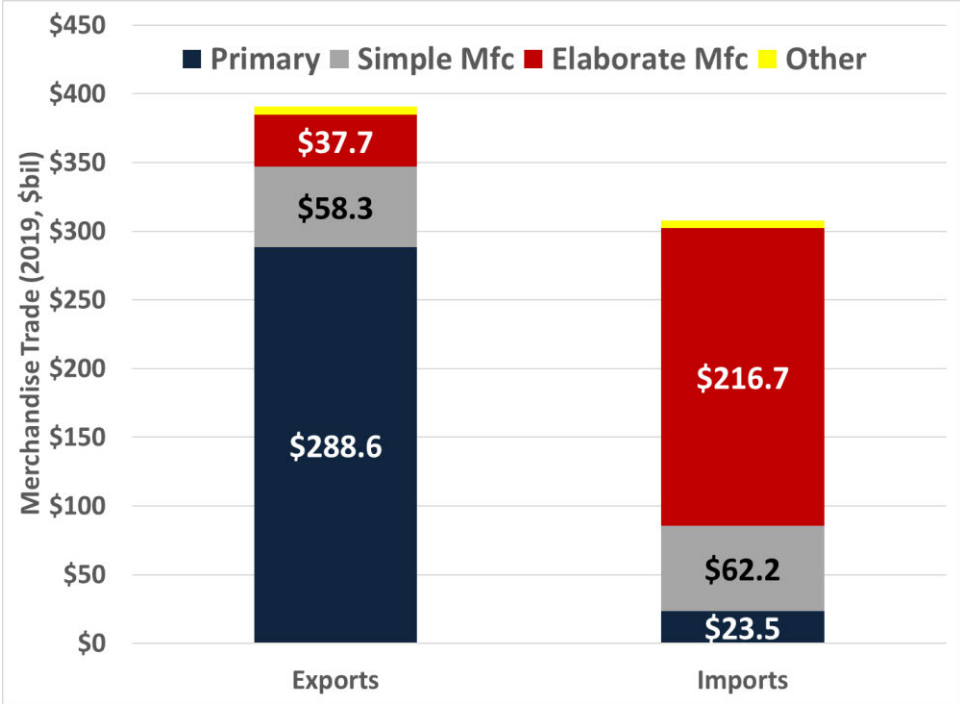


Source: Author’s calculations from DFAT TRIEC data. Includes LNG and non-monetary gold.

By 2019, primary products (including LNG and gold ore) accounted for almost 75% of total Australian merchandise exports – the highest share in decades.<sup>1</sup> With such a heavy reliance on a relatively narrow group of unprocessed export products, Australia’s economy faces significant risks:

- Exposure to dramatic swings in global prices for resource commodities, which are inherently volatile.
- Exposure to changes in global demand for basic commodities, which can shift dramatically due to changes in technology and taste.
- Competition from other suppliers of the same resource products.
- Revenue losses arising from the long-run historical trend of natural resource prices to decline relative to prices for other value-added products.
- Changes in global environmental policies, which are reducing global demand for fossil fuels.

**Figure 2. Composition of Australian Merchandise Trade, 2019**



Source: Author’s calculations from DFAT TRIEC data. ‘Other’ includes non-monetary gold.

<sup>1</sup> Figure 1 utilises the Department of Foreign Affairs and Trade’s TRIEC classification of commodity trade flows, with some adjustments. We reclassify most ‘basically processed primary products’ as defined in the TRIEC system (including food products, refined minerals, and pulp) as manufactured goods, since those products are treated as manufactures in other industrial statistics (such as GDP and employment statistics reported above). We treat LNG exports, which have been a major source of new exports for Australia, as a primary product (TRIEC considers LNG to be ‘processed’), along with non-monetary gold (which is categorised separately in the TRIEC system).

The flip side of the coin of Australia's reliance on unprocessed resource exports in our international trade is a precarious dependence on imports of value-added manufactured products (including ships and most other defence equipment) from other countries. These two personalities of Australia's trade are illustrated in Figure 2, which portrays the composition of Australia's merchandise trade.

Trade data published by Australia's Department of Foreign Affairs and Trade (DFAT) distinguishes four broad categories of merchandise: primary goods, simply transformed manufactures (including food and bulk basic manufactures like primary metals), elaborately transformed manufactured goods (such as machinery and equipment, transportation equipment, and pharmaceuticals), and 'other'.<sup>2</sup> As is clear in Figure 2, Australia's exports are dominated by primary products, but our imports are dominated by elaborately transformed manufactured products: such as sophisticated machinery, motor vehicles, electronics, medical equipment and drugs, and more.

Our trade in simply transformed manufactures (such as food products, refined minerals, and pulp) is broadly balanced, with our imports only slightly exceeding our exports. But our trade in elaborately transformed manufactured products is very unbalanced: we import almost six times as much as we export. On a combined basis (counting both simply and elaborately transformed products), our manufacturing imports are three times bigger than our exports. This results in a manufacturing trade deficit of over \$180 billion in 2019 (equal to a shocking 9% of national GDP).

2. Is it your view that the naval shipbuilding acquisitions, if properly implemented, represent an opportunity to reinvigorate the Australian manufacturing sector?
  - a. When assessing defence acquisition and sustainment decisions, how do Australian suppliers fair in this process?
  - b. How do the current procurement guidelines disadvantage Australian firms?
  - c. At the Hearing on 14 August 2020, in relation to AIC you said "*Once upon a time we would have set our sights high; we would have said, 'We'd like to see 60 per cent of the final integrated content of a project like this being made from Australian content.' That's parts, supplies, subassemblies and services input. Nowadays, we're much more cautious and we beg in our language*".

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<sup>2</sup> As noted in the previous footnote, the TRIEC data is adjusted to consider processed primary products (other than LNG, which is considered here as a primary export) as simply transformed manufactured goods, and to include non-monetary gold as a primary export.

What sort of plan or target should we set for AIC? What would be an example of a credible target for AIC? In the example you provided, how do you measure “60 percent of the final integrated content of a project”?

The naval shipbuilding procurement contracts represent an enormous expenditure on sophisticated, technology-intensive manufactured products. So certainly it is true that the procurement, if properly managed with an emphasis on enhancing domestic content, would constitute a very important boost to the Australian manufacturing sector. This comes at a time when there is a growing consensus (in the wake of the COVID-19 pandemic and resulting disruptions to international trade and supply chains) that Australia needs to become more self-sufficient in manufacturing capacity.

To provide a sense of proportion, consider that the annual total shipments of the Australian manufacturing sector amounted to around \$380 billion in 2017-18 (most recent ABS data, from Catalogue 8155.0). The estimated \$80 billion build cost for the submarine fleet alone thus represents over one-fifth of the total national output of the whole country’s manufacturing industry. (On top of that, there are important manufacturing inputs to the even larger sums that would be spent over subsequent years on the maintenance and upkeep of the vessels.) Of course, that project (like other shipbuilding procurements) would be spread over many years. But it, and other naval shipbuilding opportunities, has potential to add measurably to Australia’s total manufacturing output – both quantitatively and qualitatively (given the sophisticated technology, production methods, and skills required for the projects).

Australia has an underdeveloped shipbuilding sector. We do not meet our own current needs in this important sector (hence experiencing regular trade deficits in shipbuilding and related products). The capability of the domestic industry has been undermined by inadequate and irregular flows of business (including from public procurement). Left to its own devices, in a narrow conventional bid process, the domestic industry would not fare well in competing for this new work. That is why pro-active, targeted efforts must be undertaken to deliberately build our domestic capability in line with this flow of taxpayer-funded work.

Willingness to actively wield government procurement as a policy lever in nurturing strategic domestic industries has fallen out of favour in recent decades. Policy-makers have been influenced by simplistic market-oriented assumptions, such as:

- Government should not try to ‘pick winners’, but rather should let market forces determine what industries exist here.
- If we can purchase something cheaper from abroad, it is better to do so.
- Market forces will naturally ensure that Australians are fully employed, doing what they naturally do best (that is, in line with our inherent national ‘comparative advantage’).

These assumptions were never true. But they are glaringly false in the wake of the COVID-19 pandemic and global recession. It would make a substantial contribution to Australia's national economic performance (including job creation, incomes, innovation, and skills development) to maximise the potential spin-off benefits from this program.

The current AIC approach is generally very vague with respect to the specific domestic content targets that must be met in the course of the program. In contrast to previous incarnations of active procurement policy (which established firm quantitative domestic content targets), the current approach is imprecise and general, and provides great 'wiggle room' for contracted suppliers to underdeliver in terms of domestic content.

Ideally, government procurement strategy should:

- investigate initial domestic capability for each major component of the contracted program
- liaise with industry stakeholders (including existing domestic and international suppliers, potential new entrants, universities and TAFEs, trade unions, other scientific and research resources) to consider feasible targets for enhanced domestic content
- develop specific pathways and timelines to meet those targets
- aggregate that 'bottom-up' procurement planning into an overall domestic content target
- negotiate contractual provisions with contracted suppliers to meet those targets

As we discussed in the hearing, important contracts have already been signed with many suppliers to the naval shipbuilding programs, and hence this ideal course of planning and preparation is no longer fully possible. However, I am optimistic that an ambitious and proactive approach by government procurement planners, reinforced by an expressed commitment from the highest levels of authority within the government to maximise domestic employment benefits, could still make a difference in expanding the ultimate domestic content achieved in this large program of purchases.

3. Your submission says that: *"... since 2014 there has been an increase in prefabrication of components overseas, that are then sent to Australia for final assembly and completion. The incremental loss of national purchasing power associated with this effective "offshoring" of large portions of this historic public procurement project could result in long-lasting impacts on the Australian economy, both direct and indirect."*

- a. What effect would requiring a mandated level of Australian Industry Content (AIC) in defence contracts have on the defence industry? Would it help to prevent this offshoring?

- b. What effect would requiring a mandated level of AIC in defence contracts have on the whole economy?
- c. On 14 August you said that in order to improve AIC *“we have to have a commitment from the defence acquisition planners to work with the suppliers and to go through it, input by input – almost line by line. It's a real micromanagement task that has to happen there”*. Who should perform the micromanagement task and how much of a change in culture in the Defence procurement team is necessary before this would be effective?

The benefits of a more ambitious and detailed approach to planning, negotiating, and enforcing higher Australian domestic content in these major procurement purchases would undoubtedly be significant to regional and national economies in Australia. Increasing the ultimate domestic value-added content (inclusive of input contributions made at all stages of the supply chain) will immediately generate more work in the shipbuilding industry and its supply chain. That in turn will have positive repercussions for the amount of business undertaken by suppliers in the whole range of input industries which feed into shipbuilding. Moreover, the resulting increase in incomes and hence spending power for shipbuilding and supply workers, will generate an additional channel of stimulus into and throughout the full range of consumer goods and services industries. At a time of profound and serious underutilisation of Australia's economic capacity (such as we are experiencing now), these spill-over and multiplier effects are both more powerful (since multiplier effects are stronger under conditions of unemployment) and more important (since government must utilise every policy lever available to offset this deep downturn).

An order of magnitude of these impacts could be considered as follows. Let us use the approximate \$80 billion build component of the submarine program as a base (keeping in mind there is also a high manufacturing component in the even larger amounts that will be spent on maintenance, upgrades, and retrofits). A 10 percentage point improvement in the ultimate domestic value-added content of the program (moving it, say, from 30% domestic value-added to 40% value-added<sup>3</sup>) constitutes an \$8 billion increment in domestic value-added in shipbuilding and related suppliers. That increment alone represents almost 5 times the annual value-added of the entire Australian shipbuilding and repair industry at present in Australia.<sup>4</sup> Even though it would be spread out over several years, improvements in the ultimate domestic value-added content would thus have a very substantial impact on the total economic footprint associated with this major public purchase. In turn, that increment to value-added in shipbuilding and its supply chain would translate into billions of dollars

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<sup>3</sup> Those figures are illustrative only.

<sup>4</sup> Based on data provided in M. Youren, “Shipbuilding and repair services in Australia”, *IbisWorld*, Industry Report C2391, February 2019.

additional labour income, tax revenues, and consumer spending – at a moment in our economic history when all Australian stakeholders (including small businesses, governments, and families) need all the additional income and stability we can possibly deliver to them. This is just an illustration of the importance of even incremental improvements in domestic content for a project of this magnitude.

The detailed, practical work of assembling a ‘bottom-up’ domestic content plan for shipbuilding procurement (as described above) would need to be directed and largely undertaken by officials within the Department of Defence, the Department of Industry, and the Department of Finance – with input from other associated government departments. This task will require hands-on knowledge of defence contracting, manufacturing, and supply chains. To be sure, this capability may not be readily available within the current federal service – given the recent history of government playing a less active role in these procurement decisions (not to mention long-standing downsizing and underfunding of the federal public service). This instance thus serves as a powerful reminder of the importance of maintaining a well-rounded, capable, and adequate professional capacity within the public service, including the capability to oversee the details of procurement, negotiate with and challenge suppliers to do more to meet public policy goals, and then supervise procurement programs to ensure their successful fulfilment. This is much more complicated than simply ‘sending it to the market,’ but is necessary to maximise the benefits to Australia from procurement programs.

4. On 14 August 2020 in relation to AIC you stated that “We will want to make sure that, at the same time as we're specifying ambitious overall targets for the domestic content, we get a fair share of the stuff we really want” . You provided the example of procurement for public transportation equipment where you say there are often sub-requirements established, below the overarching commitment to, say, 50 or 60 or 70 per cent local content: 'at least this much of the powertrain and some of the other higher-tech sections'. Are you able to provide a specific example of this?

The provisions of the U.S. Buy America Act impose variable thresholds for U.S.-made content in different kinds of public procurement activity, depending on both the capability of U.S. suppliers (and what they could conceivably become capable of producing with appropriate investment and support), as well as the judged strategic importance of the product being procured. Varying domestic content thresholds are established for transit rolling stock (and different major components of that equipment), other manufactured products, and the domestic content of infrastructure and construction projects. In many cases, these targets also require final assembly to be located in the U.S. That ensures that suppliers cannot meet a threshold solely on the basis of components alone, and hence leverages domestic location of the most strategic aspects of the overall program.



Similarly, in Canada, rules regarding Canadian content for transit vehicle procurement may also specify differing thresholds for different types of transportation equipment and different stages of production.

5. The former Defence Minister, Christopher Pyne, wrote earlier this year that: *“Our national Naval Shipbuilding Enterprise is, first and foremost, a project for our national defence. Its secondary impact is as an industry project to grow our infrastructure, science, technology, engineering and mathematics capability. That’s why we did not require a mandatory minimum percentage of Australian industry content”*. He also wrote that: *“Competition ensures that everyone must perform at their best and provide the very best content in these projects – from the missiles and torpedos to the hull and engines. Anything less would be a dereliction of duty”* (Adelaide Advertiser, 17 February 2020). Do you agree with Mr Pyne’s assertion that requiring a minimum amount of AIC could undermine competition and the quality of content?

I see no contradiction between ambitious efforts to maximize Australian content, and parallel efforts to ensure maximum quality and operational reliability in this equipment. Intense competition between differing suppliers can still occur (and indeed did occur), among a number of different suppliers located in various parts of the world. The competitors will all try to put forward the most appealing bids for work within the specifications and constraints that have been announced for the program. Domestic content requirements are just one of many different requirements for a procurement program that competing suppliers need to meet in order to successfully bid for the work.

To be sure, stronger domestic content requirements will restrict the leeway of these competitive bidders, and may well raise the immediate cost of the program. That extra cost is offset, within reason, by the resulting spillover benefits from domestic procurement through incremental employment, incomes, and tax revenues.<sup>5</sup>

At any rate, merely relying on competition between huge global defence contractors to ensure high-quality, cost-competitive procurement is wishful thinking of the highest degree: even without domestic content requirements, procurement officials must still be able to exert detailed, hands-on oversight at every stage of the program. It is not credible to suggest that competition alone will ensure a successful procurement. Government needs to strengthen its internal capability to specifically and effectively oversee private suppliers in any major procurement it undertakes – all the more so in one as expensive and complex as the naval shipbuilding program.

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<sup>5</sup> In previous work, I have estimated that the boost to domestic income and employment resulting from domestic sourcing of public procurement in transportation equipment would generate a boost in government sector revenues equivalent to one-third of the total initial cost of the procurement. See Jim Stanford, *Penny Wise and Pound Foolish: The Economic and Fiscal Costs of Offshoring Public Procurement* (Canberra: Centre for Future Work, 2016).

6. How does the Centre for Future Work define sovereign capability and its value?
  - a. Does this differ from the Government's and the Department of Defence's approach to sovereign capability?

Our Centre does not have a unique definition of these concepts. We would understand 'sovereign capability' as the ability of a nation to meet its needs to produce goods and services deemed essential to its continued security, independence and prosperity. Defence products are not the only kind of output where sovereign capability is a relevant concern. There are many other types of goods and services where sovereign capability is also a concern: including health equipment and supplies, food, inputs to other essential services (such as utilities, transportation, education, and others), environmental equipment and services, and more.

A successful economy needs to maintain a well-rounded capability to produce the full range of goods and services associated with modern life. This does not mean autarky: that is, a country trying to produce *everything* by itself. Because manufactured products are specialised, and usually demonstrate strong economies of scale (such that production at small volumes is often unviable), participation in two-way international trade is essential to the viability of most manufacturing sectors. The goal of industrial strategy is not to become self-sufficient in any autarkic sense: adopting a 'do-it-yourself' attitude to every single product we use (although in some cases, like nationally strategic products, it is essential that Australia be capable of producing necessary machinery and supplies<sup>6</sup>).

A more reasonable goal would be to ensure that our domestic manufacturing sector is broadly proportionate to the size of our purchases of manufactured products, and that we possess a well-rounded and flexible capacity to produce a full range of high-quality modern products and services. To be sure, our exports would still reflect a stronger-than-proportional presence in particular sub-sectors – presumably for products in which Australian firms have particular advantages (related to cost competitiveness, availability of key inputs, proprietary technologies, energy intensity, etc.). And our imports would reflect a relative lack of domestic presence or capability in certain sub-sectors. Broadly balanced two-way trade would facilitate that useful process of mutual specialisation. But across the entire portfolio of manufactured products, Australia would retain a level of manufacturing output and employment that was broadly proportional to the scale of our national needs.

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<sup>6</sup> The potential shortages of essential medical equipment and supplies during the COVID-19 pandemic provide a timely reminder of the broader applicability of sovereign capability concerns.

In contrast, in 2017-18 Australia produced barely two-thirds as much manufactured output as we consumed. That ranked Australia dead last among OECD nations in terms of its overall proportionate manufacturing capability.<sup>7</sup> Our lack of sovereign capability in naval shipbuilding and other defence equipment is really just one manifestation of a much larger problem: the erosion over time of our general capacity to undertake domestic production of modern, essential goods and services.

7. Your submission says that training timelines are incompatible with project demands and, as a result, *“... there is a very high risk that Australia will not develop an appropriately skilled shipbuilding workforce, and contractors will not be able to source Australian labour with the requisite skills from within their own supply chains”*.
  - a. Why is there this mismatch between a skilled workforce and project timelines given we are a decade on from when Australia first committed to build 12 Future Submarines?
  - b. Would earlier engagement with Australian firms help to ameliorate these issues?

The failure to ensure the required flow of trained workers to fulfil the (already-suboptimal) domestic content requirements of this procurement program, constitutes another dimension of the Commonwealth government’s failure to capture the maximum domestic economic benefits from this enormous public expenditure. Indeed, these twin failures are self-reinforcing: since the shortage of adequately skilled workers clearly inhibits efforts to achieve higher domestic content targets in the overall program. Skills shortages also give participating suppliers a convenient excuse to shift even more of the work to offshore locations and suppliers.

There are many issues that contribute to the challenges in successfully designing and implementing a skilled workforce plan as part of the overall naval shipbuilding program, including:

- Fluctuations in demand for existing naval contractors (such as ASC Shipbuilding), which make it all the more challenging for them to retain existing skilled workers, let alone recruit new ones.
- The general crisis in Australia’s VET sector, arising first and foremost from chronic underfunding of the TAFE system and the failed marketisation of vocational training programs.<sup>8</sup>

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<sup>7</sup> See Jim Stanford, *A Fair Share for Australian Manufacturing: Manufacturing Renewal for the Post-COVID Economy* (Canberra: Centre for Future Work, 2020).

<sup>8</sup> In this regard, the Commonwealth government’s recent JobTrainer and associated announcements seem destined to repeat the earlier failures of market-subsidising vocational education, with no commitment made to allocating incremental VET funds through public institutions, and no commitment to rebuilding the TAFE system as

- Uncertainty regarding the commitment to Australian sourcing of various aspects and components of the overall program, hence undermining the willingness of both employers and potential workers to make long-term commitments to working in the sector.

The number and quality of jobs associated with this program (on assumption of at least a modestly successful domestic content strategy) represent an appealing and badly-needed opportunity for a national labour market (and particular regional labour markets) suffering from the pandemic and recession. There are many anxious workers, including young people just setting out on their careers, who would jump at the opportunity of this interesting and decently-paid work. If we end up forgoing some of those opportunities because of a failure of workforce planning and skills development, this would represent a most lamentable and fully self-inflicted injury to our economy when we can least afford it.

8. Your submission includes commentary around long-term shipbuilding capacity in Australia requiring repairs in the broader vocational sector:

- a. What are your views on the long term effects of Australia’s lack of early investment in training for the necessary skills required for our shipbuilding program, which has led to us now needing to import labour with these required skills?
- b. What is your view on the workforce numbers/levels across each period of ship build in Adelaide for the different programs?

In other words, how many people are used now and on what projects – and how many additional people will be required when Future Frigate construction commences and then when Future Submarine construction commences? How many people will be required at the peak of the Future Frigates and then at the peak of the Future Submarines?

- c. What are your thoughts on the views expressed by the Australian Strategic Policy Institute in its *The Cost of Defence* report released on 12 August 2020, which states that the local defence industry needs to ramp up to do \$10 billion a year more work and we need to develop the skills pipeline to support this? (<https://www.aspi.org.au/report/cost-defence-2020-2021-part-1-aspi-2020-strategic-update-brief>)

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the stable, high-quality core of vocational training. For more on the crisis in VET and needed policy responses to it, see Alison Pennington, *An Investment in Productivity and Inclusion: The Economic and Social Benefits of the TAFE System* (Canberra: Centre for Future Work, 2020).

Our views on the role of the broader failures of Australia's VET system in exacerbating the challenges of developing an adequate skilled workforce to meet domestic production and service goals were set out in the answer to the previous question.

We do not have information from our external perspective to answer question 8(b).

The ASPI's estimate is based on government forecasts of increased defence equipment acquisition over the next decade: growing by \$15 billion per year by 2029. The ASPI also contemplates an increase in average domestic content in those acquisitions, from around one-third at present, to between 40-50% by the end of the decade. That is an important goal. Together, rising acquisitions and an expanding domestic supply capability imply an increase in annual output of at least \$10 billion per year. In that regard, the ASPI estimate is reasonable and internally consistent. If anything, I would urge the government to aim higher in its domestic sourcing for these upcoming purchases, in which case the magnitude of expansion in domestic production would be even larger than \$10 billion per year.

9. Finally, in your view how can the Government better support a local defence industry?

Defence production can be an important component of a broader strategy to revitalize Australian manufacturing in coming years, partly in response to the COVID-19 pandemic and resulting recession. Manufacturing has the potential to fill a good portion of the economic void left by the decline in employment, investment, and growth because of the pandemic – and defence production could play an important role in that broader effort. Our research indicates that simply targeting a 'fair share' situation, in which Australian manufacturing output was commensurate with our consumption of overall manufactured products, would generate an additional \$180 billion per year in incremental manufacturing output, over 400,000 direct jobs, and at least \$40 billion per year in additional exports.<sup>9</sup> Moreover, a revitalisation of this critical pillar of our economy would also generate tens of billions of dollars of additional revenue for governments – helping to pay for a substantial portion of the costs of defence and other procurement in the first place.

Modern economic theory recognises the positive economic and social externalities arising from large and successful domestic presence of desirable strategic industries: including manufacturing. This is what justifies government efforts and investments to expand those strategic sectors: namely, those that are export-oriented, innovation-intensive, anchor strong supply chains, and have superior potential for higher productivity and rising incomes. Conventional assumptions that government should steer clear of pro-active efforts to nurture specific desirable industries (often derided as 'picking winners') have been refuted by modern

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<sup>9</sup> See Jim Stanford, *A Fair Share for Australian Manufacturing: Manufacturing Renewal for the Post-COVID Economy* (Canberra: Centre for Future Work, 2020).

theoretical and empirical research, which confirms the benefits of well-designed sector development strategies.

Once it is accepted that government has legitimate authority and rationale to actively stimulate a larger domestic manufacturing sector (including defence equipment manufacturing), the challenge becomes to identify the necessary policy tools and levers to facilitate that effort. There are several general, well-known, and accepted principles of policy intervention that can guide the overall effort to revitalise manufacturing. They can all be invoked in a multi-dimensional strategy to lead Australia's manufacturing sector back toward a proportionate and healthy economic footprint. These principles include:

*Sector Strategies:* Government needs to identify manufacturing sub-sectors with the right criteria and best chances for success, and then co-ordinate interventions with other sector stakeholders for maximum impact on investment and growth. Defence equipment certainly constitutes one such sector.

*Domestic Content in Public Procurement:* As discussed above, Australian governments are massive purchasers of manufactured goods (including defence equipment). An obvious way to support domestic manufacturing is to direct those expenditures to domestic production with stronger domestic content requirements.

*Networks, Eco-Systems, and Clusters:* Successful modern industrial policy relies centrally on connections and collaboration among different firms, agencies, and stakeholders. Spillovers and knowledge-sharing among diverse sector participants are crucial to achieving a 'critical mass' in any high-tech industry.

*Innovation:* No sector is more directly connected to the practical innovation process than manufacturing. We need better systems for linking public innovation activity with commercial applications, and more effective fiscal supports for industrial innovation efforts that reward Australian research and commercialisation.

*Targeted Fiscal Supports for Investment:* No-strings-attached company income tax cuts do not stimulate new investment, innovation, or employment. Rather, fiscal incentives are more effective when they are linked directly to investment: like accelerated depreciation measures and investment tax credits.

*Industrial Infrastructure:* Government investments in public capital assets of all kinds can foster manufacturing growth. Infrastructure investments can help to offset the sustained weakness of private investment, and to repair weak macroeconomic conditions.

*Mobilising Capital:* Medium-sized companies in Australia's manufacturing sector have suffered the biggest decline over the past decade; their constrained access to sources of long-term, 'patient' capital is a key factor in their inability to survive and grow. Public finance vehicles (like a national investment fund) can be used to support manufacturing investment; industry super funds could play a larger role, too.

*Leveraging Energy:* Manufacturing facilities have always been located to take advantage of accessible energy sources. What has changed is the source and geography of energy. Thanks to Australia's superabundance of renewable resources, and rapid declines in cost, renewable energy will be a powerful lever for attracting manufacturing investment.

*Skills and Training:* Consistent funding for skills training at all levels is essential, as are efforts to more closely link training programs with future workforce needs in strategic sectors. A plan to reconstruct Australia's crisis-ridden vocational training system must start with major investments to restore and upgrade the physical infrastructure and teaching capabilities of the TAFE system.

*Trade that Goes Both Ways:* International trade is essential to manufacturing, due to the importance of economies of scale in production and the specialised nature of both products and markets. But we need trade arrangements that make access to Australian markets conditional on comparable purchases of Australian-made output, and other measures to stimulate Australian exports of manufactured products.

This catalogue of policy tools confirms that governments have the power to strengthen Australian manufacturing, and support the growth of a domestic manufacturing base that is proportionate to our needs. They could all be applied to the specific goal of strengthening Australia's defence production capability, so that a much larger share of the coming major public purchases of this equipment can translate into improved economic opportunity for Australians.