AMWU

DESIGN, BUILD & MAINTAIN OUR SHIPS HERE

The Shipbuilders Union

# AUSTRALIAN NAVAL SHIPBUILDING



*Cover image courtesy of the AWD Alliance*

# FOREWORD

The Australian Manufacturing Workers' Union proudly calls itself Australia's Shipbuilding Union because the thousands of working men and women employed in designing, building and maintaining our naval, scientific, industrial and commercial ships and submarines choose to be our members.

Our members are passionate about their jobs, their trades, their industry and their nation's interest in building a world–class maritime engineering capacity.

That is why we have brought together workers from the major shipyards across the country to campaign for the future of our industry.

The AMWU recognises the need for a plan to be developed for the industry that helps guide the considerations of governments to ensure we not only secure the current industry against looming cyclical downturns, but that we seize the opportunity presented by defence and other governmental department's shipbuilding requirements.

There lies before us both an industry and nation building opportunity. The Australian Government has identified the need to acquire around 80 ships at a cost of $100 billion. Adding maintenance across this fleet's lifetime, the outlay is closer to $250 billion.

Designing, building and maintaining these vessels here in Australia would build and sustain an advanced manufacturing industry for over 100 years.

But we need decisions and actions from the Australian Government now or we will start to lose the people, the skills and the capacity we need to make that industry a success.

Building industries, skills and jobs while providing the best quality equipment for our service men and women, tailored for Australia's unique conditions and needs, is what our governments should be doing.

We have the capability as a nation to accept this challenge and seize this opportunity. This paper recommends the appropriate course our governments should navigate to build a world-class maritime engineering industry and build our nation.

**Paul Bastian**

National Secretary

Australian Manufacturing Workers' Union

14 November 2013

# EXECUTIVE SUMMARY

Building a naval warship is complex and challenging, just the sort of project Australians should take on.

Over the past ten years, the naval shipbuilding industry has built up a workforce of more than 4,000 people to deliver the current amphibious ship and destroyer projects. There are thousands more people in shipyards maintaining and upgrading existing warships and submarines, and elsewhere around Australia developing, integrating and manufacturing complex defence systems.

To safeguard national security, Australia needs an industry capable of designing, manufacturing and integrating a variety of warships, and subsequently able to maintain and modify those warships. Without such an industry capability there is no Navy capability.

Over the next 30 years, plans are the Navy will acquire 12 submarines, eight frigates, 14 patrol boats, six landing craft, two supply ships as well as to replace six mine hunters and two hydrographic ships. The Department of Defence will also acquire more than 20 patrol boats to be gifted to regional nations as part of a Pacific Maritime Security Program.

In the same period, the Australian Government will also acquire patrol boats and other ships for border protection, multirole vessels for Australian Antarctic operations and scientific research vessels.

All together, the Australian Government will acquire about 80 ships at a cost upwards of $100 billion. They range in complexity from submarines to lightly–armed patrol boats. They include large Navy supply ships and special purpose icebreakers and research vessels.

The AMWU believe Australians can and should build these ships. This acquisition program by the Australian Government represents an enormous volume of advanced manufacturing work. This work is strategically important to our nation. The Australian Government should use this entire scheme to drive development and growth in the advanced manufacturing sector and the national economy. This will drive investment in applied research and development, drive innovation and competition, and improve manufacturing productivity. The scheme will also create thousands of meaningful, secure jobs and long–term careers in shipbuilding for people.

To achieve these outcomes, the Australian Government needs to develop clear, coordinated and long–term plans for all these shipbuilding projects. Each project should be planned so schedules are realistic for front–end engineering activities as well as ship construction. There also should be a strong emphasis on training and skills development, including specifying minimum numbers for apprenticeships and other training places.

The whole scheme of projects needs to be planned so industry is not subject to cycles of work, like the damaging peaks and troughs of the last 20 years. Work needs to flow between projects so the different skill groups in the workforce can find continuity of work. This builds experience and know how, which delivers better and better performance on successive projects.

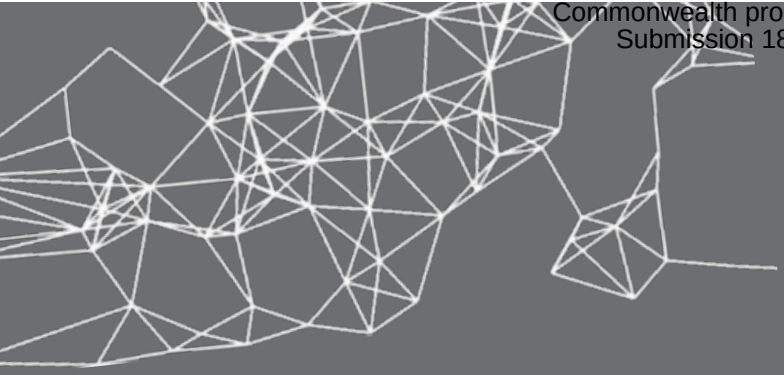
In return, industry needs to commit to investing in workforce training and skills development. Industry also needs to invest in facilities and new technologies to improve its performance and raise Australian industry's capability in advanced manufacturing.

Today the naval shipbuilding workforce is facing a "valley of death". Current project work ends in three shipyards in 2015: BAE in Melbourne, Forgacs in Newcastle and Austal in Perth. Thousands of skilled and experienced workers face redundancy in those shipyards and in the workshops, laboratories and offices around Australia that support naval shipbuilding projects. The workforce on shipbuilding projects will fall to less than 1,000 by 2016. Australia faces another serious decline in shipbuilding work and it is likely two or three shipyards will close.

Once the workforce leaves and shipyards close, it is unlikely they will return or reopen. The consequence will be that in several years when the future submarine and future frigate projects start to seriously build up activity, there will be a serious shortage of skilled and experienced workers and a serious shortage of shipyard and other industry capacity. This will cause delays, cost blowouts and many problems for these multi-billion dollar projects.

The AMWU believes the Australian Government's actions in purchasing warships and other vessels should clearly demonstrate support for local industry and Australian workers. There is a realistic set of options that avoid the coming devastation and instead continue to develop Australia's naval shipbuilding capability, preparing it for the future submarine and other shipbuilding projects. The options include bringing forward the replacement of the Navy's supply ships and patrol boats, and creating a merged, rolling build program for destroyers and frigates. The Australian Government need to make decisions now to avoid the industry sliding further into decline.

Everyone benefits from a better manufacturing sector in Australia. A national capability in advanced manufacturing is critical to the future of Australia.



## RECOMMENDATIONS

1. The Australian Government should build more Air Warfare Destroyers to immediately help preserve national shipbuilding skills and capacity leading into future submarine and other major shipbuilding programs.
2. The Australian Government should bring forward the project to replace the Armidale Class Patrol Boats to help develop Australia's capability to design and build patrol boats.
3. The Australian Government should bring forward the project to replace HMAS Success and HMAS Sirius, and build the ships in Australia.
4. The Australian Government should require all shipbuilding contracts to specify a level of block fabrication outsourcing appropriate to the type and number of ships required.
5. The Australian Government should build Australia's new multipurpose icebreaker in Australia.
6. The Australian Government should continue to support apprenticeship and other shipbuilding training programs, including requiring these schemes in all Australian Government shipbuilding projects.
7. The Australian Government should expand the role of the current Defence Expert Industry Panel to encompass Government's non-Defence shipbuilding projects and include members from associated Departments.
8. The Minister for Industry should convene an annual meeting of Ministers responsible for shipbuilding programs to review and provide direction to coordinated, long–term Government shipbuilding plans.
9. The Australian Government should direct that the future frigate project be established as a rolling build program for the Navy's future surface combatant fleet and structured so there is a seamless transition from the Air Warfare Destroyer project.

# SECTION 1 INTRODUCTION

The Australian Manufacturing Workers' Union (AMWU) believes that an Australian industry ability to build warships is essential for national security. The AMWU also believes that a naval shipbuilding capability is a vital element of Australia's advanced manufacturing sector, and that Australian warships can and should be built in Australia.

Today, the Australian naval shipbuilding industry and its workforce are facing a rapid decline in work over the next two years. Work on the amphibious ship project and the new destroyers will end in 2015 for three of the four naval shipyards in Australia. The skilled workforce of more than 4,000 people built up over the past ten years to deliver these projects will decline to less than 1,000 people by 2016, and some shipyards will close unless action is taken quickly to change project plans.

Decisions taken by the Australian Government in the short–term will determine whether Australia's continues to build a vibrant shipbuilding industry or slides into the "valley of death". The AMWU is encouraged by the new Government's stated policy that it is 'committed to supporting the local defence industry. Consistent with getting best value for the taxpayer, and effective and sustainable capability for the Australian Defence Force (ADF), the Coalition intends that the ADF use Australian–made equipment wherever possible.' [i] The AMWU also supports the Government's intent to build the new submarines in South Australia.

The AMWU is certain there are realistic options for adjusting naval shipbuilding plans that will not only avoid the problems associated with industry decline, but have the positive effect of continuing to develop workforce skills that will benefit the future multi–billion dollar mega–projects building submarines, destroyers, frigates and other warships. But action needs to be taken quickly.

The AMWU also considers that all Australian Government shipbuilding plans should be integrated into a public, coordinated long–term plan produced in consultation with unions and industry. That plan should balance industry workloads, create workflow for skill groups in the workforce, and promote skills development, productivity improvement and better performance on shipbuilding projects.

The AMWU represents approximately 100,000 members working across major sectors of the Australian economy. The AMWU has members in the Department of Defence, including the Defence Materiel Organisation and Defence Science and Technology Organisation. The union also has members engaged in naval shipbuilding in companies such as ASC, BAE Systems, Forgacs Engineering, Raytheon Australia, Lockheed Martin and Thales; as well as small to medium enterprises and the many hundreds of subcontractors.

# SECTION 2
# NAVAL SHIPBUILDING PROJECTS

## Current Defence Projects

There are two major naval shipbuilding projects underway in Australia today: the Landing Helicopter Dock project centred in Melbourne and the Air Warfare Destroyer project centred in Adelaide. Preceding these were the Collins Submarine (1983–2003), ANZAC Frigate (1987–2006) and Mine Hunter Coastal (1993–2003) projects.

## Landing Helicopter Dock Ship Project

The Landing Helicopter Dock (LHD) ship project will deliver two Canberra Class vessels and associated integrated logistic support system, which includes technical data, training and spare parts. HMAS *Canberra* (ALHD01) is scheduled for delivery in 2014 and HMAS Adelaide (ALHD02) in 2015.

Displacing 27,800 tonnes and 230 metres in length, the LHDs will be the largest ships ever built for the Royal Australian Navy. BAE Systems Australia is the prime contractor for the project, with their main subcontractors being Navantia, Saab Systems and L3 Communications. The main hulls of the ships (up to the flight deck) are being manufactured and fitted out at Navantia's shipyard in Ferrol, Spain. The work being done in the BAE Systems shipyards in Melbourne and Perth includes: manufacture of superstructure blocks (500 tonnes per ship); consolidation of the superstructure with the main hull; completion of ship outfitting; and integration and installation of the combat and communications systems.

The LHD project commenced in 2003, with the contract awarded to BAE Systems (then Tenix Defence) in 2007 at a cost of about $3 billion. The project involves about 850,000 design hours and 5.5 million production hours[ii]. Construction of the first ship commenced in 2008, the first keel blocks were laid in 2010 and the main hull launched in Spain in 2011. The main hull was delivered to Melbourne onboard a heavy lift ship in late 2012.

*LHD being finished in Melbourne*

## Air Warfare Destroyer Project

The Air Warfare Destroyer (AWD) project will deliver three Hobart Class warships and associated integrated logistic support system. HMAS *Hobart* (DDG39) is scheduled to be delivered in 2016, HMAS *Brisbane* (DDG40) in 2018 and HMAS *Sydney* (DDG41) in 2019.

Based on the Spanish F-100 frigate platform, the AWDs are 147 metres in length, displace 6,500 tonnes and incorporate an Australian version of the US Navy Aegis Combat System. An Alliance of ASC AWD Shipbuilder Pty Ltd, Raytheon Australia Pty Ltd and the Defence Materiel Organisation is delivering the project. Principal subcontractors include Navantia, Lockheed Martin, BAE Systems and Forgacs Engineering. Hull blocks for the ships are being manufactured in four shipyards: ASC in Adelaide, BAE Systems in Melbourne, Forgacs in Newcastle and Navantia's shipyard in Ferrol, Spain. The ships will be consolidated at the Government of South Australia's Common User Facility adjacent the ASC shipyard in Adelaide. The Aegis Combat System is manufactured in the US, with Australian–selected sub–systems coming from Australia, Canada, France, Israel, Norway, Spain, UK, and USA.

The AWD project commenced in 2003, with the Alliance Agreement signed in 2007. The project involves a total of about 20 million hours of work. The total budget is $8 billion. Construction of the first ship commenced in 2009 with the first keel blocks laid in 2012. Manufacturing of the hull blocks for the second and third ships has also commenced.

*AWD under construction*

## Future Defence Projects

Defence publishes information about future projects in two public documents, the *Defence Capability Plan* and the *Defence Capability Guide*. The Plan covers the next four years and the Guide covers the following six years, together providing a ten year summary. The last pair of documents was released in 2012. Those plans were

superseded by the Government's 2013 Defence White Paper, and can be expected to undergo further change when the new Federal Government releases its Defence White Paper. The following summary of future naval shipbuilding projects is based upon information drawn from all those documents.

## Future Submarine Project

The future submarine project is intended to deliver twelve submarines with greater range, longer patrol endurance and increased capability compared to today's Collins Class submarines. The new submarine will be able to conduct anti–submarine warfare; anti–surface warfare; strike; intelligence, surveillance and reconnaissance; electronic warfare; mine warfare; and support special forces' operations.

The project was considering four submarine design options: military off the shelf (MOTS), Australianised MOTS, Evolved Design including Collins, and a new design submarine. In 2013, the previous Government suspended work on the first two options to focus on the others 'that are likely to best meet Australia's future strategic and capability requirements'[iii]. The current Government has committed to centring the construction of the submarines in Adelaide [iv] but all other aspects are being reassessed.

On the parameters known for this project it will be the biggest and most challenging engineering project Australia has ever undertaken. The project will run for more than 30 years, costs tens of billions of dollars and employ thousands of people across Australia. The project will have a large, positive affect upon the Australian manufacturing industry. An example of the benefit of the Collins submarine project was its effect to improve the quality of Australian manufacturing. When that project started there were 35 Australian companies certified to defence quality levels, by 1998 there were 1,500 due in large part to the requirements of the Collins project.

*Collins submarine*

## Future Frigate Project

Details about the future frigate project are yet to be defined and published by Defence. The 2012 Defence Capability Plan said eight future frigates would be acquired and that they would be larger than the ANZAC Class warships. Details were provided on Phase 1 of the project, which will 'develop a high-power phased array radar demonstrator based on the successful Australian developed and produced CEAFAR Radar'.

The 2013 Defence White Paper reaffirmed the requirement to replace the ANZAC Class frigates. At the same time, in releasing the Future Submarine Industry Skills Plan, Government said it would 'give consideration to bringing forward the replacement of the current ANZAC Class frigates with a new Future Frigate to be assembled in Australia.' [v]

Building eight warships larger than the ANZAC Class frigates makes this a very large and challenging project for Australia, second only to the future submarine project.


*ANZAC frigate*

## Armidale Class Patrol Boat Replacement Project

Originating in the 2009 Defence White Paper, Defence had been working a project to rationalise the Navy's patrol boat, mine countermeasures, hydrographic and oceanographic forces into a single class of 20 Offshore Combatant Vessels. The 2013 Defence White Paper changed this approach, announcing Government would 'replace the current Armidale Class patrol boats with a proven vessel to ensure Defence can continue to provide a patrol capability'. The Paper said a 'modular multirole vessel remains a possible longer–term capability outcome, subject to technological maturity and an ability to provide operational flexibility with lower costs of ownership'.

Details on the operational requirements for the replacement patrol boat and the project are yet to be published by Defence. There are 14 Armidale Class Patrol Boats, which are 56 metres in length and displace 270 tonnes.

*Armidale Patrol Boat*

## Pacific Patrol Boat Replacement Project

The 2013 Defence White Paper announced the current Pacific Patrol Boats would be replaced via the Pacific Maritime Security Program. This project will replace the existing Pacific Patrol Boats over the period 2018–2028. Timor–Leste will be invited to join the program.

Details on the operational requirements for the replacement patrol boat and the project are yet to be published by Defence. The current Pacific Patrol Boats are 31 metres in length and displace 160 tonnes. Under the original project, 22 patrol boats were donated to 12 countries. Noting Timor–Leste will be invited to join the project; the number of patrol boats to be built may increase to 23 or 24.

*Pacific Patrol Boat*

## Supply Ship Project

In the 2013 Defence White Paper Government said it would replace the capability currently provided by the supply ships HMAS Success and HMAS Sirius 'at the first possible opportunity'. 'This will include examination of options for local, hybrid and overseas build or the leasing of an existing vessel.' The project was given priority because of the aging materiel condition of Success and need for a second fully capable supply ship, noting Sirius is only a tanker.

The project to replace these ships is called SEA1654 Phase 3, Maritime Operational Support Capability. The scope defined in the 2012 Defence Capability Plan is 'this project will replace both HMAS Success and HMAS Sirius with a single class of Combat Support Ship to sustain deployed maritime forces. The ships will be proven–design, double–hulled naval vessels that are compliant with the International Maritime Organisation (IMO) International Convention for the Prevention of Pollution from Ships (MARPOL).'

As with the other changes announced in the 2013 Defence White Paper, Defence are yet to publish details on the operational requirements or materiel project.

HMAS Success is 157 metres long and has a full load displacement of about 18,000 tonnes. HMAS Sirius is 191 metres long and displaces about 47,000 tonnes. Ships mentioned as possible replacements are: Spanish Cantabria Class, 170 metres, 19,500 tonnes; German Berlin Class, 173 metres, 20,240 tonnes; and the South Korean Aegir 18A derivative design, 180 metres, 26,200 tonnes.

The size of these ships limits options for a construction site. As described in the Future Submarine Industry Skills Plan, no shipyard in Australia has the immediate ability to launch ships of this size. With some investment in facilities, the common user facilities in Adelaide and Perth are modern construction site options. The graving dock at Cairncross in Brisbane is also an option, but the shipyard would require more investment in infrastructure.

*HMAS Success*

*HMAS Sirius*

## Mine Hunter and Hydrographic Ship Replacements

The 2013 Defence White Paper stated the service life of the existing mine hunter and hydrographic vessels would be extended until the longer–term solution can be delivered. For the Offshore Combatant Vessel concept overall, the outcome was the bringing forward of the patrol boat replacement, deferral of the hydrographic and mine hunter vessel replacements, and long–term deferral of the multirole vessel concept. Defence are yet to indicate when details of these new projects will be finalised.

Navy's two Leeuwin Class Hydrographic Survey Ships were commissioned in May 1997. They are 71 metres in length and displace about 2,200 tonnes. These ships are each able to carry three 11–metre Survey Motor Launches. There are six Huon Class mine hunter vessels, which were commissioned between 1999 and 2004. They are 52 metres in length and displace 730 tonnes.


*Leeuwin Class Hydrographic Ship*

## Heavy Landing Craft Replacement Project

The 2012 Defence Capability Plan said Navy will 'acquire six new heavy landing craft with improved speed and sea keeping capabilities able to transport armoured vehicles, trucks, stores and personnel and land them over the shore. It will provide a capability to conduct independent small-scale regional amphibious operations or to support the Canberra Class vessels as part of an Amphibious Task Group. This phase is expected to have an extended development schedule owing to the likely design innovation necessary to meet these parameters.'

The project was scheduled for approval in 2017–2021, with initial operational capability in 2022–2024. The 2013 Defence White Paper made no mention of this project, and plans may change as the whole scheme of naval shipbuilding projects is updated.

Australia built eight Balikpapan Class heavy landing craft in the early 1970s, and three remain in naval service. They are 44 metres in length and displace 500 tonnes.


*Balikpapan Class LCH*

# SECTION 3
# OTHER AUSTRALIAN GOVERNMENT SHIPBUILDING PROJECTS

Defence is not the only Australian Government organisation that requires ships. The Australian Customs and Border Protection Service operates patrol boats, but not fitted with the same military weapon systems as Navy's patrol boats. The CSIRO operates a marine research vessel and the Australian Antarctic Division operates a research and logistic support vessel.

## Customs

The Customs Marine Unit operates a fleet of 11 ships to maintain an armed presence around Australia's 36,000 kilometre coastline. The ships patrol out to the 200 nautical mile Exclusive Economic Zone (EEZ) and beyond. Australia's offshore maritime area is about 15 million square kilometres.

The Marine Unit currently operates eight Bay Class patrol boats built in Perth that are 38 metres in length and displace 134 tonnes. They are being replaced by the Cape Class patrol boats now under construction in Perth. The project budget is $350 million. The new patrol boats are 58 metres in length and displace about 400 tonnes. The contract with Austal was signed in August 2011 and the keel laid for the first boat in June 2012. The first boat, Cape St George, commenced operations in October 2013 and the last boat is scheduled for delivery in 2015.

Customs operate under charter three other vessels. The northern patrol vessel, ACV Triton, is a large, armed patrol and response trimaran. Built in the UK in 2000 as a multihull prototype demonstrator, the ship is 98 metres in length. The southern patrol vessel, ACV Ocean Protector is a multirole vessel capable of conducting year–round patrols of the sub–Antarctic. The ship is 105 metres in length and displaces 8,500 tonnes.

The Custom's vessel, ACV Ashmore Guardian, is stationed on a near–permanent basis in the Territory of the Ashmore and Cartier Islands. The islands are on the edge of the continental shelf, about 300 kilometres north west of the mainland. A former fishing supply vessel, Ashmore Guardian is 35 metres in length. Under a project called the Long Term Ashmore Capability (LTAC), a contract was awarded in early 2013 for a replacement. The new ship is 40 metres in length and is being built in Vietnam. The ship is due for delivery in 2014.

*Cape Class*


*Ocean Protector*


*Ashmore vessel*

## CSIRO

CSIRO's current research vessel is the RV Southern Surveyor, which is capable of oceanographic, geoscience, ecosystem and fisheries research in the seas around Australia. Built in the UK in 1972, the ship is 66 metres in length and displaces about 1,600 tonnes. The ship is in the process of being decommissioned and sold.

The CSIRO are replacing this ship under their Future Research Vessel Project, with a budget of $120 million. The contract was signed in 2011 and construction of the new ship, RV Investigator, is in its final stages in Singapore with delivery scheduled in late 2013. The ship is 94 metres long and displaces 4,575 tonnes.

*Photo of RV Investigator*

## Australian Antarctic Division

The Australian Antarctic Division currently operates under charter the RSV Aurora Australis. The ship is a multipurpose research and logistic support vessel. Aurora Australis is 94 metres in length and displaces about 8,200 tonnes. The ship was built in Newcastle, launched in 1989 and entered service in 1990.

With Aurora Australis due to decommission in 2018, the Australian Antarctic Division has commenced the project for a replacement with delivery required in late 2017. In January 2013, a request for proposal was issued for the design, build and long–term operation and maintenance of a new multipurpose icebreaker. The Request For Proposal states 'The new Icebreaker will undertake the transfer of expeditioners and the re–supply of cargo and fuel to AAD stations, together with marine science voyages in the Southern ocean, primarily in the marine areas around the Australian Antarctic Territory.'

The Request For Proposal documentation did not specify the size of ship required, but detailed its function and performance characteristics. Indications are the new ship will be substantially larger than the current ship. The proposal documentation identifies five multipurpose icebreakers operated or being developed by other countries. They are South Africa's Agulhas II, 134 metres, 13,687 tonnes; South Korea's Araon, 111 metres; India's polar research vessel, project to be approved; Japan's Shirase, 134 metres, 11,786 tonnes; and China's new polar supply and research vessel under design. The proposal documentation states 'the icebreakers described above do not appear to meet AAD's required total cargo capacity requirements for station resupply for the next 30 years'.

*Photo SA Agulhas II+*

# SECTION 4
# AUSTRALIAN NAVAL SHIPBUILDING

## Shipyards

There are presently four main naval construction shipyards in Australia: in Newcastle, Melbourne, Adelaide and Perth. These shipyards have a workforce of about 4,400 people according to the recent Future Submarine Industry Skills Plan. As detailed in that report, that workforce comprises people with skills ranging across boilermakers, welders, electricians, pipe fitters, carpenters, painters, workshop supervisors, finance, procurement, project managers, draftsman, human resource managers, engineers, managers and administrators.

In Newcastle, the Forgacs Group operates two sites manufacturing steel hull blocks for the Air Warfare Destroyers. The largest facility is at Tomago, which is where the Aurora Australis and hull sections ("rings") for the Collins Class submarines were built. The facilities are suited to the manufacture of hull blocks and integration of lower complexity ships. Forgacs employ about 750 people on the AWD project. Forgacs also operate the graving dock at Cairncross in Brisbane (267 x 35 metres). This facility has the potential to construct the larger naval supply ships.

The BAE Systems main construction shipyard is in Williamstown, Melbourne. The shipyard is manufacturing hull blocks for the AWDs and also completing the construction and integration of the Landing Helicopter Dock ships. In the past, the yard built the ANZAC Class frigates and the last two FFG-7s for the Australian Navy. Most recently the yard did final fit out, integration and delivery in 2007 of the New Zealand warship Canterbury. BAE have a smaller shipyard in Perth, which did some of the fabrication for the LHDs and is where the ANZAC frigates are now being upgraded. BAE employ about 1,300 people in their maritime division: about 1,000 at the Melbourne shipyard and 270 at the Perth shipyard.

In Adelaide, ASC conducts deep level maintenance on Collins Class submarines and are building the AWDs. For the AWDs, ASC manufacture some of the hull blocks as well as do the final consolidation of the hull and installation of equipment. Together with their Alliance partners and subcontractors, they will set to work all systems, conduct tests and trials and deliver the ships to the Navy. ASC also conduct maintenance on the Collins Class submarines at their facility in Perth. ASC have a total workforce of 2,400 people, with about half working on the AWD project.

In Perth, Austal are building the Cape Class Patrol Boats for the Customs service. At this shipyard Austal also construct high–speed ferries for commercial customers. Austal specialise in the design and construction of aluminium vessels. They are the designer and builder of the Independence Class Littoral Combat Ship for the US Navy, constructing the ships at their shipyard in Alabama, USA. Austal employ about 500 people at their shipyard in Perth.

More details on these shipyards are contained in the Future Submarine Industry Skills Plan.

There are other shipyards in Australia that could build ships for the Australian Government. For example, Incat in Tasmania designed and built the ferry HMAS Jervis Bay, which was used for troop and equipment transport from 1999 to 2001. These shipyards are suited to building smaller or commercial–design ships rather than frigates and submarines.

## Mission System Integrators

In addition to the production activities of the shipyards, naval shipbuilding projects involve the design, development, integration and manufacture of combat and other electronic data systems. This is a complex task that involves systems engineers, design engineers, software developers, hardware designers and technicians. Warship projects in Australia typically do not design and build entirely new systems, rather existing sub–systems are selected, modified and integrated to deliver the system that meets Australia's requirements.

The design and integration of the systems in the Landing Helicopter Dock ships is being led by BAE Systems supported by Navantia, Saab Systems, L3 Communications and other subcontractors. BAE and Saab are also working on the design and integration of the ANZAC Anti–Ship Missile Defence upgrade with CEA Technologies. The design and integration of the Air Warfare Destroyer is being led by Raytheon Australia with support from the US Navy, Lockheed Martin, Kongsberg, Navantia, Ultra Electronics, ITT–EDO Systems, Jenkins Engineering Defence Systems, Rafael, BAE Systems, Eurotorp, L–3 Communications, Sagem and other subcontractors.

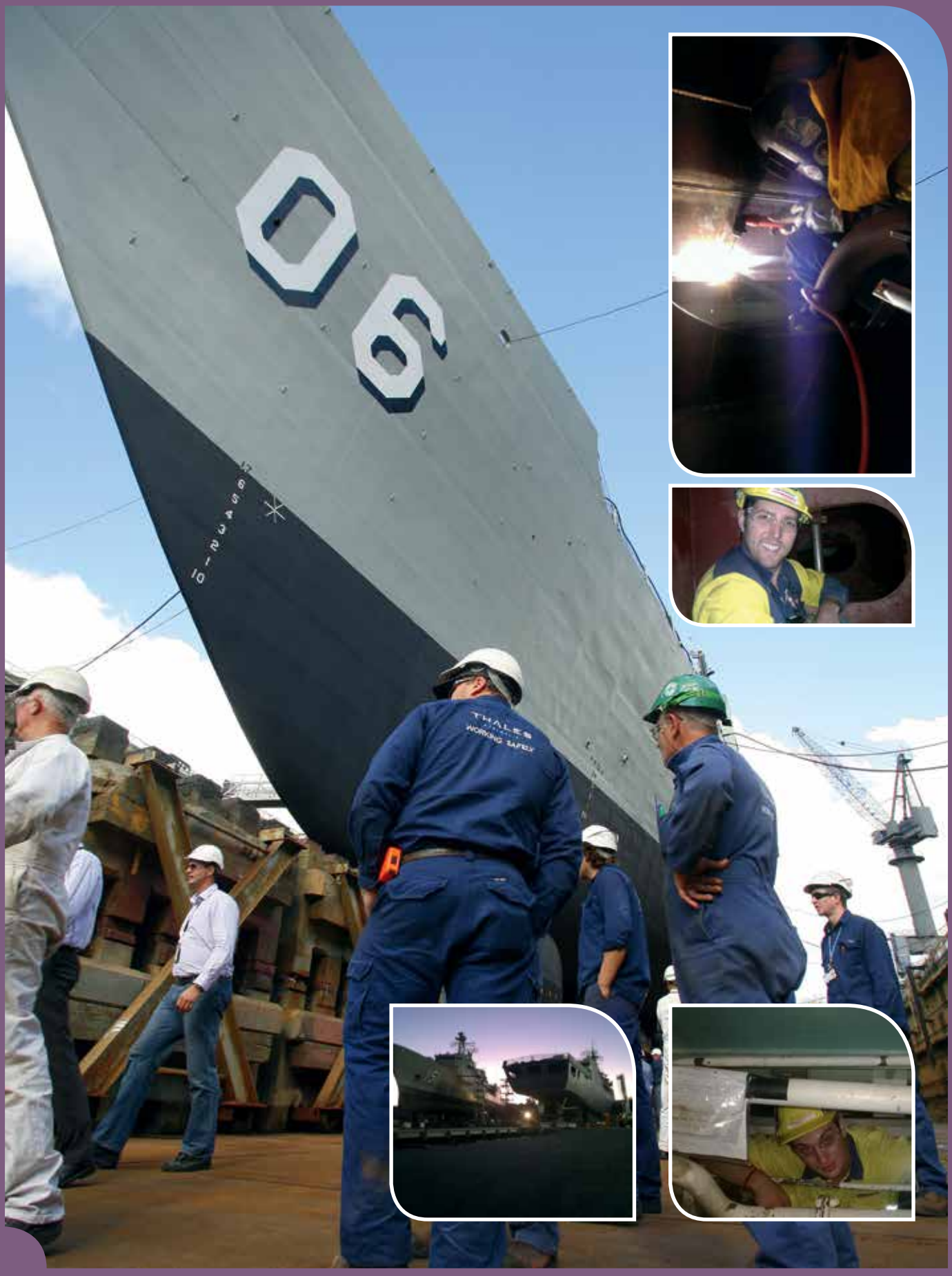
The Future Submarine Industry Skills Plan reported that according to surveys by the Defence Materiel Organisation, Defence Science and Technology Organisation and RAND Corporation, there are about 3,000–3,500 people involved in defence systems development and integration in Australia. About 600 are currently working on systems for the LHDs and AWDs. The key skill areas are systems, software, electronic and other engineering disciplines, and integrated logistic support, contract, supply chain and project management.

## Industry Workload

Since Government approval of the LHD and AWD projects in 2007, the Australian naval shipbuilding industry has grown from a workforce of several hundred to several thousand people. But activity has peaked and the workforce is experiencing what has become known as the valley of death.

Shipyard workload projections were detailed in the Future Submarine Industry Skills Plan. The most recent forecast based upon the 2012 Defence Capability Plan is shown in Figure 1 overleaf.

Skilled workers from the AWD, LHD and Cape Class projects have already been laid off, the industry is already in the "valley", it is not something that lies ahead. Typical of shipbuilding and manufacturing projects generally, the people with front–end skills like engineering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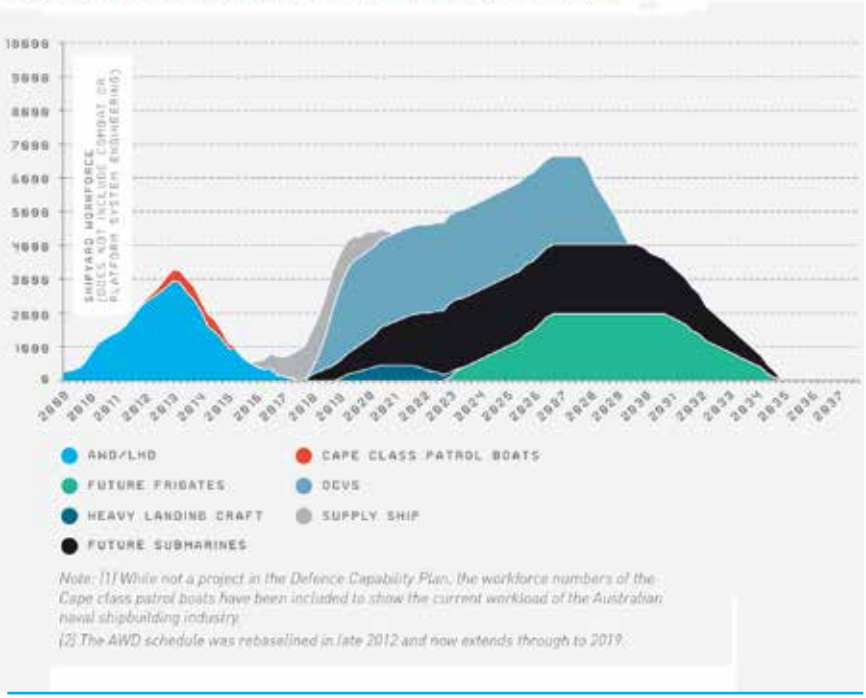
WORKING SAFELY

designers and steel fabricators have been laid off as construction progresses into hull block outfitting, hull consolidation, electrical cable pulling and equipment installation. Trades like boilermakers and pipe fitters make way for electricians and painters.

The workforce in the shipyards alone will decline by more than 2,000 people over the next two years. The 2012 projections have changed slightly with the rebaselining of the AWD project schedule, but the national shipyard workforce will still reduce dramatically in 2015. This would be yet another 'peak and trough' cycle for the Australian naval shipbuilding industry that was last at its peak in 1990s and last in a trough in the mid–2000s.

FIGURE 1

POSSIBLE SHIPYARD WORKLOADS UNDER THE DEFENCE CAPABILITY PLAN 2012




*Note: (1) While not a project in the Defence Capability Plan, the workforce numbers of the Cape class patrol boats have been included to show the current workload of the Australian naval shipbuilding industry.*

*(2) The AWD schedule was rebaselined in late 2012 and now extends through to 2019.*

A May 2013 Joint Media Release from the Prime Minister, Minister for Defence, Minister for Climate Change, Industry and Innovation and Minister for Defence Materiel about the Future Submarines Industry Skills Plan stated that at BAE Systems in Melbourne work on Air Warfare Destroyer and Landing Helicopter Dock construction programs is expected to complete around mid 2015; at Forgacs in Newcastle work on the Air Warfare Destroyer program is expected to complete in 2015; and at Austal in Perth construction of Customs Cape Class patrol boats is expected to complete around mid 2015.

While there has been talk that some naval shipbuilding projects will be brought forward, there has been no decisive action to provide work to avoid these skill and job losses. Current projections could see three of Australia's four main naval shipyards close in 2015.

## Implications of Skilled Workforce Losses and Shipyard Closures

The implications of losing the current skilled workforce and closure of naval shipyards are enormous and will impact all organisations and people associated with naval shipbuilding.

Combining plans detailed in the 2012 Defence Capability Plan and 2013 Defence White Paper, there are six naval shipbuilding projects to commence later this decade: supply ship replacement, Navy patrol boat replacement, Pacific Patrol Boat replacement, future submarines, heavy landing craft replacement and future frigates.

The ramp up in workforce capacity needed for this combination of projects is enormous. The 2012 plans would require the workforce to grow substantially faster and to higher numbers than was required for the AWDs and LHDs. Given it was not possible to grow at the rate set for those projects, it is not going to happen for the future projects. If the workforce declines to the levels projected, there will be a very serious shortage of skilled and experienced shipbuilders for the future projects.

In such circumstances, industry build–up on projects would be slow, serious delays would occur and because of the lack of a skilled and experienced workforce, more mistakes would be made and productivity would be low. All together, this means project costs would be high and ships delivered late.

This has implications for everyone associated with naval shipbuilding projects.

For the Navy this means delays in delivery of the ships required in the fleet, requiring aging ships to be retained with higher maintenance costs and expensive service life extension upgrades. For Government this means more troubles with projects, higher costs and delays in delivering Australian Defence Force capability. For industry this means higher project risks, increased workplace safety problems, quality problems, inter–project and inter–company competition for skilled workers, cost overruns, schedule delays, failure to deliver contracted warship performance and damaged reputations. For workers this means a more disturbed and uncertain workplace, and damaged reputations.

This whole situation would be much worse if the naval shipyards in Newcastle, Melbourne and Perth closed as might happen in 2015. Even if small work were outsourced, it would be impossible to build up the capacity required in one location to deliver all the ships Navy needs. This would place great pressure on decision–makers to buy ships from overseas suppliers, which would mean compromised capability for Navy, lost opportunity for Australia's manufacturing industry, and lost jobs. This would be unacceptable to the AMWU.

# SECTION 5
# CHANGING PROJECT PLANS

Many proposals have been suggested recently to fix the problem with the "Valley of death". Basically, they are plans to bring forward projects to preserve the skilled workforce and meet pressing requirements to replace aging ships in the fleet. The following is the AMWU's assessment of the merit of the different options.

## Supply Ship Project

The 2013 Defence White Paper announced the previous Government would replace HMAS Success and HMAS Sirius at the first possible opportunity, examining options for local, hybrid and overseas build or the leasing of an existing vessel.

The AMWU does not support Australia buying warships from overseas.

If the LHD project is used as a benchmark, the hybrid build option also does very little for local industry. Manufacture of the superstructure blocks for the two LHDs provided work for several hundred workers in Australia, but construction of the main hulls provided work for thousands of workers in Spain. Similarly, some systems development and integration work was done in Australia for the combat and communications systems, but the vast majority of engineering for the hull and machinery systems was done in Spain. The AMWU does not consider that hybrid build options provide real benefit to Australian industry and workers.

Defence project planning and Government approval timelines also mean it is unlikely the project can be finally approved before 2015. This would not be in time to provide work in Australia to retain any reasonable proportion of the current skilled workforce.

The AMWU supports the construction of these ships in Australia.

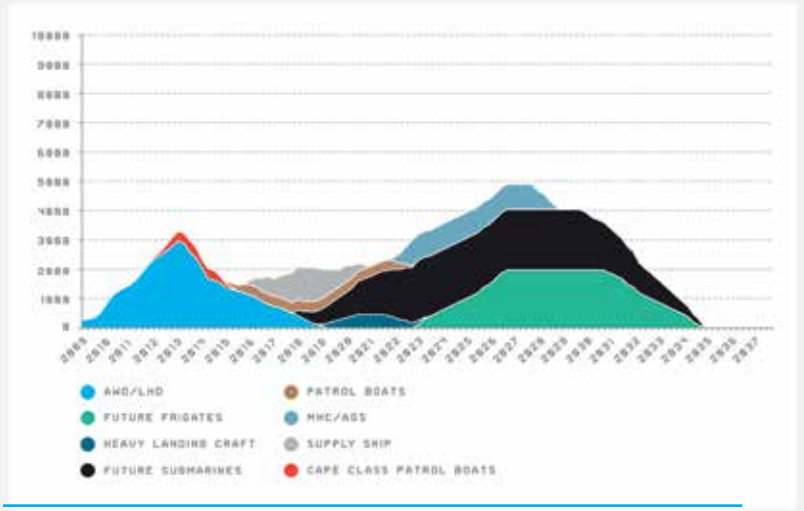
## Patrol Boat Projects

As for the supply ships, the 2013 Defence White Paper announced plans to replace the Navy's current Armidale Class Patrol Boats with a proven design in the short-term. This is an important project to advance Australian industry capability to design and build these sorts of warships, both to meet the needs of the Australian Navy and the Customs Service, but also as potential export opportunities. Patrol Boats are the warships Australia has mostly exported (sold or gifted) to foreign countries. In addition to the Pacific nations, Australia has sold locally–built patrol boats to Trinidad and Tobago, Kuwait and Yemen.

Despite the benefits of bringing forward this project, it does not cure the problem of losing the current skilled workforce. As can be seen in the scenarios presented in the Future Submarine Industry Skills Plan, the volume of work is relatively small, see Figure 2 below. As a comparative benchmark, the project to build eight Cape Class Patrol Boats employed up to 500 people over a period of three to four years. For 14 similar boats, the Armidale replacement project is likely to employ a similar number of people over a slightly longer period of four to five years.

FIGURE 2

DEFENCE CAPABILITY PLAN 2012: CHANGE TO CAPABILITY REQUIREMENTS FOR OFFSHORE COMBATANTS AND BROUGHT FORWARD THREE YEARS




Initiation of the Pacific Maritime Security Program starts the Pacific Patrol Boat replacement project. This project is expected to build 22–24 boats similar in size and functionality to the current boats i.e. 35–40 metres in length. While not the size nor complexity of the Armidale replacements, this project will provide good work for the Australian shipbuilding industry. But as for the Armidale replacement project, the volume of work is relatively small compared to the effort required for the frigate and submarine projects. As a comparative benchmark, construction of the original 22 Pacific Patrol Boats started in 1985 and after a slight pause finished in 1997, and involved a shipyard workforce of about 100–130 people.

As for the supply ship project, project planning and approval timelines will mean it is unlikely these two patrol boat projects can be fully approved before 2015 and will not retain large numbers of the current skilled workforce.

Given patrol boats do not incorporate complex combat, weapon and other systems like a warship or submarine, patrol boat projects do not engage the same spectrum of skills as a destroyer, frigate or submarine project. In addition to not retaining a large proportion of the naval shipbuilding workforce, these projects will retain few of the system development and integration skills needed on the frigate and

submarine projects.

The AMWU supports the construction of these ships in Australia.

## AWD Project

One of the more widely promoted short–term actions is to construct more AWDs. Compared to the preceding projects, the construction of more AWDs would involve a much larger volume of naval shipbuilding work in Australia than the other options. Given the scale of the future submarine and frigate projects, maintaining industry capacity is as important as maintaining capability.

Also, this option would retain a wider spectrum of systems development, engineering and production skills and maintain the current momentum of several shipyards and the defence industry more broadly. This option should also take the least time to approve given it is another order on an existing project.

The AMWU supports the option of building more AWDs. The number is not necessarily one more—the "fourth AWD". The number should be determined by an assessment of the need to replace the ANZAC Class frigates and likely delivery timeline for the future frigate. Also, the design configuration of the next batch of AWDs could be updated to meet new operational requirements such as two helicopter hangars to increase their anti–submarine warfare capacity.

## Antarctic Icebreaker

Australia's new icebreaker will be a large ship of about 12,000 tonnes. This project should be integrated into one scheme of planning and decision–making by the Australian Government for naval and other major ships. Building a ship of this size would take three to four years and involve a shipyard workforce of 500-1,000 people.

The Antarctic icebreaker project will involve expert icebreaker designers from overseas, but its construction can be done in Australia. The current icebreaker, Aurora Australis was built in Newcastle. Modern icebreakers are not as complex to build as destroyers and submarines.

The AMWU supports the option of building the new icebreaker in Australia.

# SECTION 6
# SHORT-TERM ACTIONS

## Avoiding the Loss of the Skilled Workforce

The AMWU believes multiple actions have to be taken to retain and develop the skilled workforce needed for naval shipbuilding in Australia. There is no one single action that will cure the problems with the "valley of death", nor build the capability and capacity the Defence organisation and industry will need to deliver future projects.

The AMWU recommends building more AWDs as the most immediate and effective way to retain a decent number of skilled workers, and with a wider range of skills important to future warship and submarine projects. More AWDs is the option that will have real effect to retain the skilled workforce. As soon as it is approved work can commence on finalising the detailed design of the next warship, for example design work to replace obsolete equipment. Manufacture of the hull blocks can commence before work ends at the Newcastle and Melbourne shipyards in 2015.

The AMWU also consider that building more AWDs should be directly linked to the future frigate project so together they create an ongoing construction program to sustain the number of warships needed in the fleet. Building AWDs is not simply the construction of additional warships just for industry's benefit. As mentioned earlier, the design configuration of the next batch of AWDs could be updated to meet new operational requirements.

**Recommendation 1 – The Australian Government should build more Air Warfare Destroyers to immediately help preserve national shipbuilding skills and capacity leading into future submarine and other major shipbuilding programs.**

The AMWU recommends the projects to replace Success, Sirius and the Armidale Class Patrol Boats should be brought forward. Those projects will take one to two years to complete detailed planning and achieve Government approval before contracts can be awarded. Within one year of the contract being signed, manufacture of the patrol boats should start, which would be in 2015.

Production of the supply ships will take more preparation and production may not start for two years after contract signature. How long depends upon the extent of changes made to the design, the workforce that is available to do the production engineering and the shipyard facility upgrades required. That means the first ship might not be delivered until the early 2020s. If the condition of the hull and machinery in HMAS Success is poor and the ship cannot operate until then, or it would be prohibitively expensive, then an interim solution may be required. Leasing a warship can only be a short–term solution until a new ship can be built in Australia.

**Recommendation 2 – The Australian Government should bring forward the project to replace the Armidale Class Patrol Boats to help develop Australia's capability to design and build patrol boats.**

**Recommendation 3 – The Australian Government should bring forward the project to replace HMAS Success and HMAS Sirius, and build the ships in Australia.**

The ANZAC frigate, Collins submarine and Air Warfare Destroyer projects all employed a shipyard build strategy that involved distributing block fabrication into other shipyards. The AMWU supports this approach because it reinforces national shipbuilding capability and capacity. The approach also allows work to be allocated where capacity is available at the time required.

The practical level of block outsourcing varies with ship type; it is more suited to larger ships where shipyard space can be an issue and because it allows the main yard to concentrate on the ship consolidation task. The practical level also varies with the number of ships to be built because set-up and overhead costs can be prohibitive for small ship numbers. The level of outsourcing should be negotiated on a case-by-case basis and set in the main contract.

**Recommendation 4 – The Australian Government should require all shipbuilding contracts to specify a level of block fabrication outsourcing appropriate to the type and number of ships required.**

The AMWU recommends that the new multipurpose icebreaker for Australia's Antarctic operations be built in Australia. The Antarctica Territory is important to Australia's future and the ability to construct and maintain an icebreaker is an important part of our national capability. In the future, it is conceivable that Australia will want more than one icebreaker, of the same design or different designs, to patrol territorial waters. That question will no doubt be considered in the development of the Australian Government's 20 Year Strategic Plan for the Antarctic and Southern Ocean Research.

Building an icebreaker in Australia now has broader benefits. The timing of the project means construction would happen when naval work is reducing, so it would help fill the "valley" without placing all demands upon the Defence budget. The project would also usefully develop peoples' skills in hull block fabrication, hull consolidation and the integration, test and delivery of complete ships. The high grade of steel and heavier design of the hull structure needed for

icebreaking would develop particular manufacturing skills that would be important to the future submarine project.

**Recommendation 5 – The Australian Government should build Australia's new multipurpose icebreaker in Australia.**

## Combined Benefit

Without industry capability, there is no Navy capability. Promoting shipbuilding is not simply about preserving shipyard jobs, having a national capability to build warships is vital to national security. Navy relies upon industry to design, build and deliver the warships the fleet needs, then maintain and upgrade them. The workforce should also be respected, not only is a peaks and troughs work profile poor for project performance it is unfair to people who work hard to build their skills as shipbuilders.

The actions recommended are a unified set of actions and the benefit comes from their combination. Building more AWDs creates work immediately for systems engineers, designers and procurement specialists, which are the skilled people now being laid off from the projects. When the bulk of that work is done, some of those people will move on to the future submarine, supply ship and the patrol boat projects. Hull block production will start on the fourth AWD in 2015, when current work is due to finish. Those workers will move on to manufacturing blocks for the fourth and following warships, and later on to the future submarine and other projects.

Creating this flow between projects for the different skill groups is key to building skills, experience and shipbuilding know how, which delivers better project performance. Given many skill groups work in different phases of a project, it does not create a sustainable industry by simply having complete projects run end to end. For example, the bulk of the work for boilermakers and welders occurs at the front end of production when hull blocks are being manufactured. When the blocks are completed and integrated into the hull, work starts for electricians. Design engineers work at the front end of the project and test and trials engineers work at the back end. The pattern is different for a long series of warships, where the groups can move from ship to ship.

A healthy workforce is also part of this flow of work. For each project the shipyards and other companies will take on apprentices, train them in their trade and also specialist shipbuilding skills. Qualified workers gain experience and move on to become foreman and workshop supervisors. That experienced workforce is the important group of people to move on to new projects, providing know how and leadership for new teams.

The AMWU recommends that current Defence apprentice support initiatives continue, for example the Skilling Australia's Defence Industry (SADI) program. For the companies involved in current naval shipbuilding projects, SADI funds have been used to develop courses and sponsor apprentice programs for hundreds of people. All Government shipbuilding programs should support healthy apprentice programs.

**Recommendation 6 – The Australian Government should continue to support apprenticeship and other shipbuilding training programs, including requiring these schemes in all Australian Government shipbuilding projects.**

## Inaction

If nothing is done to avoid the decline, the result will be the closure of shipyards. In 2015, work finishes at the shipyards in Newcastle, Melbourne and Perth—a little over one year away. While it might be argued that non–defence work might be found by the companies, that is a big risk to take with national security. In current circumstances, the AMWU think it is unlikely more than one of those shipyards would survive beyond 2015.

The current workforce of over 7,000 people employed in naval shipyards and elsewhere on defence systems development and integration will reduce by more than 4,000 people when current projects end. This is an enormous loss of expertise.

The AMWU's experience is the peaks and troughs cycle of naval shipbuilding deny people a life–long shipbuilding career. Once people leave the industry in their first trough cycle they tend not to return. The observation was also made in the Future Submarine Industry Skills Plan.

The consequence of this loss of workforce, skills, experience, know how and shipyards will be a national inability to take on the big projects and deliver warships and submarines as planned. This will have a direct impact on the capability of the Navy. Projects undertaken will be more expensive, more mistakes will be made and manufacturing productivity will be low. Workplace safety will also be affected, experience shows more accidents occur in new operations and inexperienced workforces.

The AMWU understand the challenges that Defence and Government face in planning and budgeting for new equipment acquisition, but decision–makers should take care to understand just how many more problems and extra costs will be caused long–term if short–term considerations prevail and industry is allowed to decline. Budget blowouts and other problems with mega–projects in 2020–2030 will dwarf the problems faced in 2013. As a comparison of scale, the AWD and LHD projects are building five ships at a cost of about $10 billion. The future frigate and submarine projects are planned to build 18 vessels at a cost in excess of $50 billion. Trying to take on these projects from a cold–start industry is inviting trouble.

Also, the rise and decline of industry capacity impacts upon its ability to maintain and upgrade ships through their service life. Sustainment typically costs more than twice the initial acquisition costs of sophisticated military equipment like warships. The 2008 Defence SA Advisory Board paper, Naval Shipbuilding, estimated that Australia will 'spend as a nation $250 billion over 30 years on naval ships and submarines'.

# SECTION 7
# LONG-TERM PLANS

## Nationwide Work

Naval shipbuilding work is spread across Australia. The main construction shipyards are in Newcastle, Melbourne, Adelaide and Perth. Defence systems development and integration work takes place in many more places. For naval systems, the main centres are Sydney, Canberra, Melbourne, and Adelaide.

In Australia, Adelaide is the centre of complex warship construction, having built the Collins Class submarines and now building the Air Warfare Destroyers. The new ASC shipyard and Government of South Australia's Common User facility are the most capable shipbuilding facilities in Australia. Facilities include a 9,300 tonne shiplift, the largest in Australia. The advantage of being new is that the facilities have been specifically designed for the modern, efficient shipbuilding practices i.e. land–level, outfitted–block build strategies.

This precinct in Adelaide should become an industry cluster for the construction of complex warships: destroyers, frigates and submarines. The particular characteristic of these ships being they incorporate highly complex, integrated combat and weapon systems. As reported by the Organisation for Economic Cooperation and Development (OECD)[vi], 'the agglomeration of firms and their suppliers can confer competitive advantage to the enterprises involved.' The report says clustering creates concentrated labour markets, fosters company specialisation, and facilitates the flow of ideas and information. Two key points the report makes are: 'it is likely that frequent contacts between users and producers of capital goods have underpinned productivity growth in firms in many industrial districts' and 'because factor costs are often similar if not identical for the cluster participants, competition may be driven by innovation'.

These benefits cannot be achieved if successive warship projects are done in different locations. The advantages of Adelaide are: it is the only location that has built submarines in Australia, it has now built up and continues to grow a capability to build destroyers/frigates, it has the best shipbuilding facilities in Australia and those facilities are a government owned common user facility. Being a common user facility allows companies to compete for a project even though the location is mandated. Centring these projects in Adelaide still allows the distribution of hull block fabrication and systems development work. Establishing this industrial cluster for complex warship engineering and construction also promotes Adelaide as a secure port for voyage repairs for US Navy warships, where many of the systems installed are common to the AWDs such as the Aegis Combat System.

The construction of the other ships required by the Australian Government can and should be distributed amongst other shipyards. Ships the size of patrol boats can be built in many locations, but the construction of large Navy supply ships will require a shipyard to install a large shiplift or barge system to launch the vessels. If the new icebreaker is a ship of about 12,000 tonnes, it could be constructed in Melbourne and with some facility upgrades in other locations.

The arrangements described above lead to a scenario, as one example, where submarines, destroyers and frigates are constructed in Adelaide; supply ships are constructed in Perth (common user facility), the icebreaker is constructed in its homeport of Hobart and patrol boats are constructed in Newcastle, Melbourne and/or Perth. These arrangements do not prevent competition for the contracts. Hull blocks for the larger ships could be manufactured in various locations (not strictly confined to shipyards), with projects competitively selecting different locations to keep workloads at a sustainable level.

## Coordinated Plans

Achieving a deliberate and balanced arrangement of shipbuilding activity across Australia requires coordinated and long–term planning by Defence and other Government Departments.

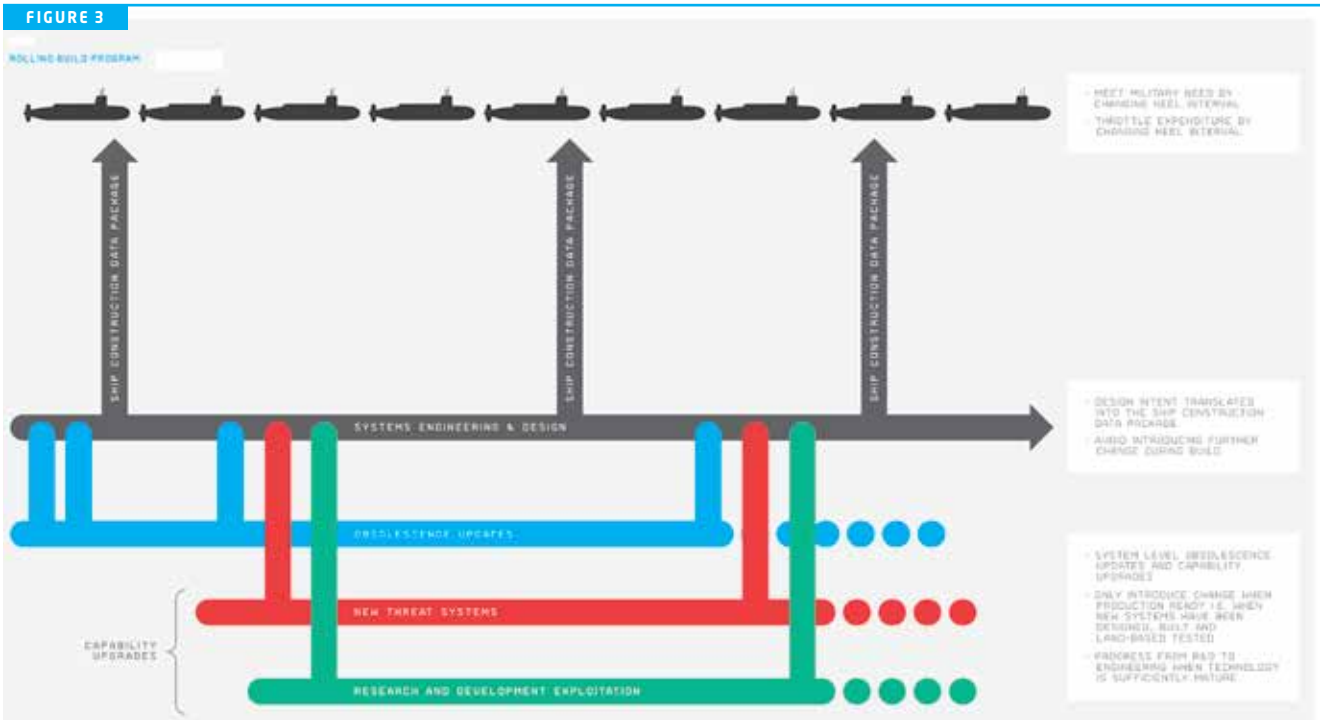
Long–term shipbuilding plans that provide a well sequenced and predictable work program would have many positive effects. Being well sequenced means the plan allows the different skills groups to progress from one project to the next and that projects are not operating in similar phases competing for the same skilled workers at the same time. Practical schedules that allow for workforce build–up, front–end engineering, land based testing and realistic construction durations are essential for each project.

For people, the benefits of good planning are skills development through long–term graduated training and practice; safer workplaces; and more secure jobs. For companies and State governments, it provides the business conditions to invest in people, facilities, tools and processes that increase their capability and productivity. For Defence, it means fewer problems with projects and an increasingly capable and productive industry that can deliver more demanding projects. For Navy, the benefit is more reliable delivery of quality warships. These are all benefits to the Australian Government.

The AMWU was engaged in the development of the Future Submarine Industry Skills Plan, and strongly support the first recommendation that 'planning of the whole scheme of naval shipbuilding programs should be optimised to provide industry more predictable, better sequenced and long term work'. The Expert Industry Panel that supported the development of that plan, and continues to support its implementation, should be expanded to include within its remit the other Australian Government shipbuilding projects and include representatives from the associated Departments.

**Recommendation 7 – The Australian Government should expand the role of the current Defence Expert Industry Panel to encompass Government's non-Defence shipbuilding projects and include members from associated Departments.**

FIGURE 3




This expanded panel can produce coherent advice for the consideration of the Departments and their Ministers. On an annual basis, the Federal Minister for Industry should convene a meeting of the Ministers whose portfolio includes shipbuilding programs: principally Minister for Defence, Minister for Immigration and Border Protection, and Minister for the Environment. The meeting should be briefed on long–term plans by the Departments, hear the views of the Expert Industry Panel, and provide direction on priorities and plans.

**Recommendation 8 – The Minister for Industry should convene an annual meeting of Ministers responsible for shipbuilding programs to review and provide direction to coordinated, long–term Government shipbuilding plans.**

## Rolling Build Programs

For warships like submarines, destroyers and frigates, a continuous construction program makes good sense. This is because they are relatively large warships with very complex combat and weapon systems and are required in the fleet in sizeable numbers.

A rolling build program is a project that continuously builds ships and delivers them at a steady interval. The design configuration of each ship is progressively updated to replace obsolete equipment and introduce system upgrades. For a fleet of 12 submarines, a rolling build program could deliver boats at two yearly intervals so when the 12th submarine was delivered, it would be time to replace the first submarine after a 24 year service life. The diagram in Figure 3 above was used in the Future Submarine Industry Skills Plan to illustrate the model.

A rolling build program sustains Navy capability, delivering on–time replacements for ships at the end of their service life and providing regular capability upgrades as the configuration of systems is steadily updated. A rolling build program provides the steady and certain work that allows companies to invest to improve skills, processes and productivity. They provide stability for the workforce, secure jobs for workers and real opportunity for people to gain skills and experience. This all improves industry performance.

While the specific details of the future submarine project are yet to be defined, Government has endorsed the concept of a rolling build program for this project. This was one of the Government–endorsed recommendations of the Future Submarine Industry Skills Plan.

The AMWU recommends that the future frigate project also be designated and planned as a rolling build program. The pattern of work for the various skill groups like systems engineers and hull block fabricators must be lined up with work on the current destroyer project so a continuous work flow is created and the skilled workforce is not lost.

**Recommendation 9 – The Australian Government should direct that the future frigate project be established as a rolling build program for the Navy's future surface combatant fleet and structured so there is a seamless transition from the Air Warfare Destroyer project.**

## The Foundation of Australia's Shipbuilding Capability

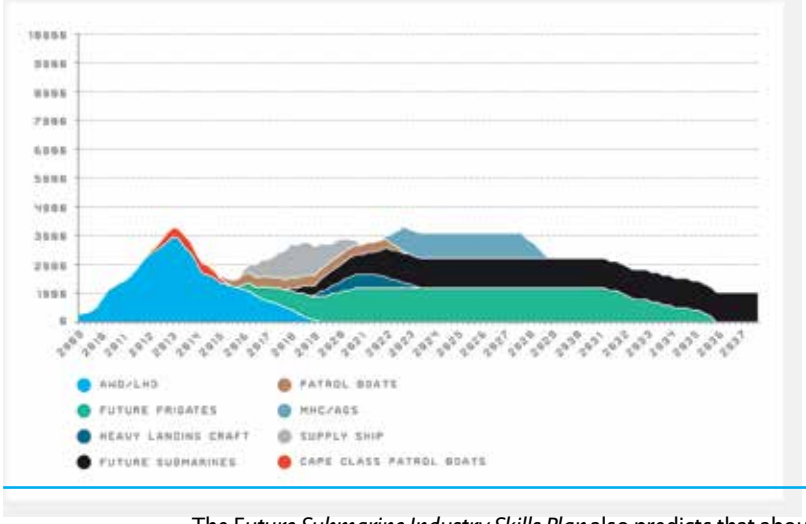
Establishing rolling build programs for the future submarine and future frigate projects will provide a strong foundation of shipbuilding capability that will be important to the nation for 50 years and beyond. The continuous operation of these projects will provide work all around Australia for the complete spectrum of people involved in designing, building and maintaining complex warships.

The national systems development and integration workforce will include systems engineers, software engineers, electrical and electronic engineers, naval architects and mechanical engineers and people with expertise in integrated logistic support, supply chain management, data and configuration management, contract management, budget and financial management and project management. The national shipyard workforce will include boilermakers, welders, electricians, mechanical and pipe fitters, sheet metal workers, carpenters, painters, draftsman, quality inspectors, engineers, production supervisors, human resource managers, purchasing officers, contract managers, warehouse storeman, finance managers and project managers.

Just how these two programs forms a strong base layer in Australia for all other projects was illustrated in the Future Submarine Industry Skills Plan, as shown in the scenario from that plan reproduced in Figure 4. The diagram represents the number of people working in shipyards on the program, in production, engineering and all other parts of the shipyard's operation. The diagram shows that about 1,000 shipyard workers would be engaged on each of the submarine and frigate projects.

FIGURE 4

DEFENCE CAPABILITY PLAN 2012: CAPABILITY REQUIREMENTS FOR OFFSHORE COMBATANTS CHANGED AND BROUGHT FORWARD IN THE SCHEDULE, CONNECTED BUILD PROGRAM FOR FUTURE FRIGATES WITH TWO YEAR KEEL INTERVAL, ROLLING BUILD FOR FUTURE SUBMARINES

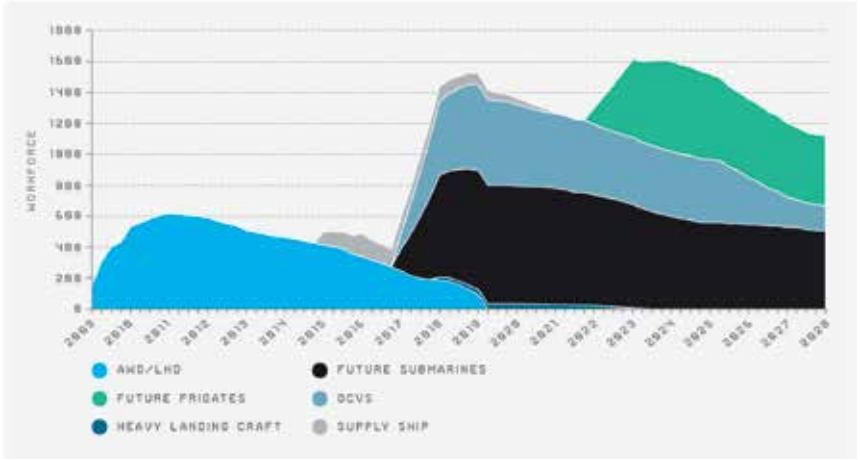



The F*uture Submarine Industry Skills Plan* also predicts that about another 1,000 people would be working on systems development and integration for the submarines and frigates, see Figure 5.

Together, this provides a national workforce of about 3,000 people designing, manufacturing, testing and commissioning complex submarines and frigates.

FIGURE 5

POSSIBLE WORKFORCE TO SUPPORT SYSTEMS DEVELOPMENT UNDER THE DEFENCE CAPABILITY PLAN 2012




Not only important to national security, this highly–skilled workforce is an incredibly important element of Australia's advanced manufacturing industry. The size and strength of this workforce will really help Australia deliver all other shipbuilding projects, and other similarly complex civil projects in, for example, the oil and gas sector.

# SECTION 8
# THE ECOCOMICS OF SHIPBUILDING

## The Broad Debate

The economic debate about naval shipbuilding in Australia has been dominated by a debate about the efficiency of building any large military platforms domestically. Numerous academic and quasi–academic economists have sought to make the case that Australia should not produce any large military equipment domestically because in their view this equipment can be produced more efficiently overseas. This view is supported by a very rudimentary economic argument that neither allows for real world deviations from the perfect neo–classical world of perfectly competitive markets nor does it acknowledge real world strategic, social and political constraints.

In the broadest sense, these arguments reduce to the view that Australia does not posses a comparative advantage in manufacturing generally and should therefore not engage in manufacturing. According to this view, the Australian economy should entirely be composed of an agricultural and mineral export sector where wealth and foreign reserves are generated and a domestic service sector where employment is generated[vii]. Not only does the AMWU utterly reject such a vision for the national economy, through countless surveys and other measures of public opinion including the public stance of the major political parties, the Australian public also rejects such a vision. The public as well as unions recognise that such an economy would not generate prosperity for the working and middle classes, would not ensure the future prosperity of the nation as a whole and would be corrosive to the institutions that serve to protect the Australian way of life.

The reality is that manufacturing has always and continues to play a crucial role in the national economy, not only as a source of employment but also as a driver of the investment and innovation that underpins much of our national prosperity. What often remains unmentioned by critics of manufacturing in Australia is that comparative advantage is not simply determined by factor endowments such as land and mineral wealth. Comparative advantages are also the product of investment, innovation, technology, strategic industry planning, clustering, network effects and global economic circumstances. Over time, a nation's comparative advantage is shaped by a raft of policies as well as private sector decisions and to conclude that our national economic destiny is determined purely by our natural endowments flies in the face of considered economic analysis, history and common sense.

## The Case of Naval Shipbuilding

Critics of domestic naval shipbuilding will often point to the past record of procurement projects, most fashionably the Collins Class submarines, as evidence that Australian industry cannot and will not be capable of delivering complex warships within budget and on schedule. There is no doubt the Collins submarine project was incredibly large and complicated, and it should come as no surprise that it brought challenges, problems, lessons learned and expansion of workforce skills and industry expertise.

This is especially the case as the project started from a small industrial base. However, to conclude that this experience should serve as a warning not to engage in shipbuilding projects in future is the exact wrong lesson to take away from the experience. The correct lesson to be drawn has already been outlined above; in order to ensure an efficient, skilled and capable shipbuilding industry, the industry needs the opportunity to practice and build on experience from one project to the next. Industry needs a certainty of workflow that allows workers to remain in the industry and advance, not lose skills. Australia needs strategic planning from government to optimise the timing and industrial organisation of projects. In essence, the industry needs to be afforded the opportunity to move up what is often referred to as the "learning curve", a progression that continuously improves industry's ability to support navy capability.

The recommendations presented above are aimed at providing the Australian shipbuilding industry with such an opportunity. Avoiding the "valley of death" by commissioning additional AWDs, new patrol boats, supply ships and an icebreaker all serve to maintain and build Australia's industrial capability. Mandating apprentice and other training programs in government shipbuilding projects ensures workers' skills are developed and people find good, life–long careers in shipbuilding. Moving to a continuous build process ensures that these capabilities, as well as the fixed capital investments required for such projects, are maintained and able to provide the highest payoffs in terms of industry performance and value for taxpayer dollars.

Critics will also frame the choice faced by government as a simple binary decision; to commission a shipbuilding project in Australia or purchase the ships from overseas. This is of course a gross simplification of the actual decision being confronted. No sophisticated military platform will be entirely built domestically and neither will it be entirely imported. The reality is the decision varies from project to project as to what components are manufactured where and what is assembled where and by whom. Whether it is strictly economically efficient or not, every sovereign nation rightly seeks to maintain an industry capability to sustain their military assets, so we can never consider ourselves in a situation where we simply outsource our military industrial needs.

This implies that the relevant question is not whether naval shipbuilding projects should be conducted in Australia or not, but how is the ability of Australian industry optimised to meet all the expectations of the government and people of Australia? Put another way, the cost minimisation calculation considered by government should consider the total cost of ownership of a ship rather than just the upfront acquisition cost. The question for government is what can be done to ensure the cost of ownership is best managed? The answer to this question is relatively self-evident. Decisions need to be made to ensure Australian industry is capable of producing and sustaining ships at minimal cost and on time. This can only be done through the retention and improvement of workforce skills and know how, shipyards and systems development facilities, and other industry capabilities. Again, the recommendations outlined above are all framed in the context of this reality and are aimed at ensuring the best outcome for the security of Australia, long–term value for the taxpayer as well as performance of the Australian shipbuilding industry.

# SECTION 9
# AUSTRALIA'S MANUFACTURING INDUSTRY

Australia's manufacturing industry employs almost one million people: 8% of Australian jobs[viii]. Each job in manufacturing generates between two and five jobs in the rest of the economy[ix]. Manufacturing accounts for over one third of Australian merchandise exports and last financial year accounted for over 7% of GDP.

Manufacturing plays a central role in the development of new technologies and innovation that benefits the broader economy. In 2011–2012, manufacturing accounted for nearly one quarter of all business expenditure on research and development (R&D), representing an investment of around $4.5 billion.

Australia has over 90,000 manufacturing businesses. In 2010, manufacturing businesses:

- Registered sales of more than $420 billion.
- Bought $260 billion of goods, materials and services.
- Paid nearly $54 billion in wages and salaries.
- Paid nearly $5 billion in superannuation.
- Invested around $700 million in training workers.
- Invested nearly $20 billion in facilities and equipment.
- Employed more than 32,000 apprentices.

Manufacturing expert Göran Roos has pointed out the industry is strategically important to a nation and its economy because it is:

- The biggest spender on applied research and innovation with spill over effects into the rest of the economy.
- The key driver of productivity improvement across the economy.
- The biggest share of world trade and hence is critical for export earnings.
- The largest driver of high value services.

The AMWU believes the Australian Government's actions in purchasing warships and other vessels should clearly demonstrate support for local industry through maximisation of local content in terms of percentage of budget spend, number of jobs created and focus on priority industry capabilities. This support should extend to small to medium size enterprises. There also should be a strong emphasis on training and skills development, including specifying minimum numbers for apprenticeships and other training places.

## CONCLUSION

Building a naval warship is complex and challenging, just the sort of project Australians should take on. To safeguard national security, Australia needs an industry capable of designing, manufacturing and integrating a variety of warships, and be subsequently able to maintain and modify those warships. Without such an industry capability there is no Navy capability.

Australian Government spending on warships and other large vessels is a vital tool in Australia's industrial and economic development. Australia will spend about $100 billion on warships, icebreakers, research vessels and border protection ships over the next 30 years. These ships should be built in Australia. This spending needs to be carefully planned so it delivers the national security and other outcomes required; drives improvement in industry capability and productivity; promotes workforce skills advancement and creates meaningful jobs.

Government support for shipbuilding is not a question of returning to old–style protectionism. Rather, it is about working with unions and industry to develop smart, targeted industry policy. This is not about organising projects so there is a level workload on industry. As is often said, mega–projects like future submarine and future frigate are nation–building. They should be seen as a powerful driver of Australia's national capability, economy, ambition and reputation.

Today Australia's naval shipbuilding industry and its workforce are facing a rapid decline in work over the next two years. This would see the loss of several thousand people from the industry and the closure of shipyards. The AMWU believe there are a set of actions that can be taken by the Australian Government that would avoid this downturn and also better prepare Australia for the challenges of future shipbuilding and other manufacturing projects.

i Coalition's Policy for Stronger Defence, September 2013.

ii BAE Systems (2013), Landing Helicopter Dock Case Study.

iii 2013 Defence White Paper, P83.

iv Coalition's Policy for Stronger Defence, September 2013

v Prime Minister, Minister for Defence, Minister for Climate Change, Industry and Innovation and Minister for Defence Materiel – Joint Media Release – 2013 Defence White Paper: Naval Shipbuilding: Release of the Future Submarine Industry Skills Plan, 3 May 2013

vi Warwick, K. (2013), "Beyond Industrial Policy: Emerging Issues and New Trends", OECD Science, Technology and Industry Policy Papers, No. 2, OECD Publishing.

vii For example, see Davies, A. Ergas, H, and Thompson, M. Should Australia Build Warships? Australian Strategic Policy Institute, Discussion Paper, 2012.

viii ABS (September 2013), Labour Force, Australia, Detailed, Quarterly, Original (Cat No. 6291.0.55.003).

ix Roos, G. (2012), "Manufacturing into the future", Government of South Australia.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