INPEX

MARITIME WORKFORCE POSITION PAPER

Report commissioned by
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Australian Resources and Energy Employer Association (AREEA)

Maritime Industry Association Limited (MIAL)

Australian Institute of Marine and Power Engineers (AIMPE)

Australian Maritime Officers Union (AMOU)

Maritime Union of Australia (MUA)

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AUSTRALIA IS THE 5TH LARGEST USER OF SHIPPING SERVICES IN THE WORLD

EXECUTIVE SUMMARY

Australia is a maritime trading nation, and almost every aspect of our society is dependent on the ability to import and export through our ports. The COVID-19 pandemic and the deteriorating security environment in our region and across the globe has precipitated deeper contemplation of the concept of 'national resilience'. Analysis of what Australia requires to withstand future crises has revealed significant deficiencies that must be addressed.[1] Particular attention has been given to energy security, sovereign industrial capability, and national defence. Underpinning these three important facets of national resilience is a robust maritime workforce and yet little attention has been given to the recent erosion of this essential capability. Domestic shipping, offshore infrastructure effectiveness, port services and the maritime services sector all depend on this vital labour force.

The maritime industry has grown strongly over the last two decades[2]. In 2020-21, the maritime industry's contribution to GDP was $105.3 billion in value added and it supported 462,000 full time jobs. Australia is the 5th largest user of shipping services in the world; 10% of world sea trade passes through Australian ports. The offshore natural gas production sub-sector recorded significant increases in value of production despite the impact of COVID-19, rising from $31.9 billion in 2017-18 to $43.7 billion in 2020-21 (in real terms).

The Australian economy grew at an average rate of 2.8% annually between 2001 and 2021. The value of offshore oil and gas exploration and extraction activity made a significant contribution to this, growing at 7.5% per year on average over the same period[3]. The maritime support workforce has played a vital role in the growth of the oil and gas sector and the rest of the economy. Australia is the global leader in LNG exports which is entirely dependent on effective offshore infrastructure management. In 2020–21, Australia recorded a $15.9 billion surplus in the trade of oil and gas—down from the record surplus of $27.9 billion in 2019–20. To sustain current production, support new construction programs, and contribute to sector-based projects, maritime crewing demand is expected to need a 140% increase over the next 5 years.[4]

Despite the increasing demand for maritime workers across numerous sectors (oil and gas, mining, tourism, defence industry, aquaculture, renewable energy, etc) there has been a 12% reduction in deck hands[5] in the past five years. Looking more broadly at all marine transport professionals, while there has been some growth over the last five years, this group shrank by 23% in the last year. Other parts of the maritime workforce have stagnated resulting in an ever-widening gap between demand and supply of these essential workers. Globally, the latest Seafarer Workforce Report from the Baltic and International Maritime Council (BIMCO) and the International Chamber of Shipping (ICS) predicts a dangerous shortage in maritime officers by 2026.[6] Globally, the industry might require up to an additional 89,510 officers by 2026, a challenge magnified by the pandemic.

Multiple industry forums, Maritime Skills Reports, reports commissioned by Australian unions, industry associations focus groups, Australian Parliament inquiries, and the Australian Government Strategic Fleet Taskforce terms of reference all indicate the maritime sector has skill shortages, and the problem is becoming more severe. This issue has a direct impact on the capacity of the maritime workforce to rapidly scale to meet the expansion and maintenance of Australia's offshore oil and gas sector. As Australia's energy strategy shifts to renewables, there will also be a severe shortage of maritime professionals to support offshore windfarms and to carry out important decommissioning work.

This problem is of national significance and market forces alone are incapable of solving it. The urgent need to coordinate across the industry, deploy government resources and create robust structures to remedy deficiencies in the development of the maritime workforce was first addressed more than ten years ago in the 2013 Australian Maritime Workforce Development Strategy[7]. Given the responsible Minister at the time is now the current Prime Minister[8], it is hoped that sufficient attention can finally be given to the recommendations.

There is an opportunity for federal and state governments to work with industry, leveraging existing initiatives to grow the workforce of the future and remedy the current deficiencies. The research contained in this paper has identified four immediate actions to resolve current issues with the maritime workforce and two recommendations for implementation over the next 3-5 years to ensure issues in the maritime workforce do not undermine national resilience. They are as follows:

1. **IMMEDIATE ACTION:** Secure funding for retention, training, and education in maritime workforce roles. Reduce or subsidise RTO fees, provide workforce support program.
2. **IMMEDIATE ACTION:** Targeted recruitment campaign to inspire and attract people with transferable skills into areas of maritime workforce demand.
3. **IMMEDIATE ACTION:** Expand the talent pool by making existing STEM and technical vocation incentive programs available to people studying maritime qualifications.
4. **IMMEDIATE ACTION:** Make seagoing berths available on all vessels controlled under Government and Government-related contracts.
5. **3-5 YEAR ACTION:** Standardising education, training, and career pathways through establishing a national maritime training coalition with appropriate geographic distribution that facilitates effective maritime workforce development outcomes.
6. **3-5 YEAR ACTION:** Invest in technology and instructors to support optimisation of skills acquisition, development, and deployment for the maritime sector.

1 https://globalaccesspartners.org/GAP_IIERA_NationalResilienceFramework_Report_July21.pdf
2 Australia's blue economy grew through COVID, new report shows | AIMS
3 This largely reflects greater production as significant price rises did not occur until 2021-22.
4 According to major project resourcing estimates in December 2022 it is expected that there are nearly 15 committed projects totalling $46 billion in oil and gas construction to be commenced from 2023 onwards.
5 "Deck Hand" refers to General Purpose Hand, Integrated Rating, Chief Integrated Rating and Marine Cook.
6 "What Awaits The Shipping Industry in 2022 and 2023?"
7 Australian Maritime Workforce Strategy: Maritime Workforce Development Forum; May 2013
8 In 2013 the Hon Anthony Albanese MP was the Minister for Infrastructure and Transport. He established the Maritime Workforce Development Forum and commissioned the Strategy.

THE MARITIME WORKFORCE HAS PLAYED A VITAL ROLE IN THE GROWTH OF THE OIL AND GAS SECTOR AND THE REST OF THE ECONOMY.

THE VISION

To help explain the magnitude of the opportunity that is available to government and industry, scenarios have been developed to portray alternative futures focused on the year 2035.

These should be viewed as predictive analyses based on best available information. They demonstrate how decisive action can potentially have substantial and far-reaching impacts well beyond the individuals and entities closely associated with the maritime sector.

This paper sets out two scenarios currently before Australia's maritime sector:

AUSTRALIA'S MARITIME FUTURE: REGIONAL LEADER OR HIGH AND DRY?

SCENARIO 1

Regional Leader

Australian Maritime Workforce in 2035

Having taken advantage of an international trade agenda to realise the opportunities in digitisation, automation, and shipbuilding for the blue ocean sector, by 2035 Australia's offshore energy industry has boomed, fuelling the regional transition to net zero. Through recognition of the importance of the maritime workforce to this endeavour, Australia embraces the opportunity to create strength and resilience in the national interest. Government, industry, and unions are delivering on a ten-year program to become a regional centre of excellence for maritime skills development. Building on Australian education sector capabilities as a globally recognised exporter of skills outcomes, the maritime workforce development ecosystem achieves sufficient scale to deliver world class training to both domestic and international students and trainees.

Utilising the recommendations of the 2013 Maritime Workforce Development Strategy and benefiting from insights through the UK government 'Maritime 2050' plan, the ten-year program commenced with securing funding from the federal government. This funding supports an expert body that is consolidating career pathways and professional education requirements to simplify career progression and achieve efficiencies in the development of the skilled maritime workforce. Incentive programs are deployed to attract new entrants to the sector and reduce the time and cost of gaining qualifications while maintaining the highest standards. Skills mapping and facilitated pathways are completed to make it easier for lateral transfers from other sectors such as infrastructure, mining, and armed forces.

Funding programs are being used to provide training berths on various classes of vessels to reduce the burden on vessel operators. Leveraging these institutional efforts, cadetships are reintroduced for all parts of the workforce, starting with maritime deck officers, engineering officers, and ratings.

The major domestic maritime education institutions are provided with funding to purchase state of the art equipment to support training to include simulation and virtual, augmented, and mixed reality systems. Viability of domestic maritime education institutions is enhanced through diversifying course enrolments with international students. The number of trainees/students from regional countries to include the Philippines, Indonesia, and Vietnam attending Australian institutions is increasing, ensuring the viability of courses. The workforce supply and demand gap has been reduced; key projects in the major industries are proceeding according to plan.

The "Strategic Fleet" is established and always crewed by Australian workers. Decommissioning of oil and gas facilities occurs at the same time as renewable energy projects are commenced, together with the next wave of more than $90b (as of 2023) in expected gas infrastructure expansion as an interim energy source. Supply chain robustness is a significant factor encouraging overseas investment in a myriad of sectors to include agriculture, advanced manufacturing, and value-added products. The maritime sector is an important contributor to national resilience and underpins Australia's position as a bulwark in regional security upholding the rules-based order.

SCENARIO 2

High and Dry

The Australian Maritime Workforce in 2035

Impacted by changing global trade policies, the demands of fuelling the race to net zero, the constant threat of labour and skill shortages and pressure to digitise and automate, the offshore energy sector in Australia has not reached its potential. By 2035, in the absence of any coordinated effort across industry and government to remedy long recognised deficiencies in maritime workforce development and its deployment to critical sectors, the gap between demand and supply has reached the point at which it cannot be recovered with domestic policy mechanisms. The complexity and cost of education, competency based training and ongoing skills development combined resulted in colleges removing entire maritime orientated courses. This was further exacerbated by an absence of suitable educators, facilities, and certifiers. The requirement to pursue training and qualifications at overseas establishments, at significantly higher cost and time away from home, resulted in the best and brightest leaving the sector in mid-career. The absence of appealing long-term career prospects in turn reduced the attractiveness of a maritime career to school leavers and those transitioning from complementary sectors. Whole cohorts of experienced mariners have disappeared creating gaps in the domestic workforce. The trend of vessel operators shifting their operations overseas accelerates to the point where Australia is reliant on near neighbours for vessel management and deployment. Critical business skills and know how about the industry has been eroded.

'Crewing companies' soak up the remaining workforce and provide basic services only to vessels entering Australian ports. Despite a commitment to a "Strategic Fleet" in 2023 it has not been possible to crew these vessels. The heavy reliance on foreign crews and vessels reduced national resilience and transferred a significant risk to the industries that continue to underpin the wealth of the nation. The pipeline of seafarers to our critical safety organisations, regulators, ports, and training establishments reduced to below minimal viable standards. Critical sub-industries that rely on a functioning Australian maritime industry are consequently suffering as part of the "ripple effect".

In the arena of public opinion, Australians find it increasingly hard to reconcile an island nation stranded ashore, unable to staff its own offshore infrastructure and run its own ports. There are significant delays in the decommissioning of oil and gas platforms, with much of this work being completed by overseas companies. The transition to green energy is also delayed as the cost of establishing offshore windfarms increases with fewer resources available to do this work, and regional countries overtake Australia as a preferred investment destination. Our position as global leader in LNG is lost.

A heavy reliance on overseas ships and crews has increased the risk of supply chain disruption in the event of a new pandemic, natural disaster, or regional conflict. This in turn is impacting foreign investment in Australia for both export and import related enterprises. Australia's fuel security has become a critical vulnerability that can be exploited by regional powers at any time to force the government to act against the interests of the nation, allies, and regional partners. The end-state of this 'butterfly effect' is a shift in the regional balance of power to the detriment of the nation.

DETAILED ANALYSIS

The next section of this paper will examine in detail the factors that are assessed to be the root cause of the nation's inability to develop the maritime workforce required to maximise the opportunities and minimise the risk of the country being left "high and dry" in 2035.

It will examine four phases of capability development, beginning with entry to the workforce; then education, training, and skilling; then career progression and finally future workforce challenges. Part five will examine the target state – linked closely to the "2035 Regional Leader" scenario above. The recommendations from the Executive Summary will be restated throughout this analysis to emphasise their relevance to overcoming the known issues and deficiencies.

Part 1: Barriers to Entry

Any strategy to overcome the deficiencies in developing the required maritime workforce must examine and overcome the issues related to entry into this segment of the workforce. The UK government's report 'Maritime 2050' addressed this in the chapter on 'People'. The findings and recommendations can be useful to Australia (see link below)[9]. Similar analysis has been conducted in the recent past by the Western Australian state government related to shipbuilding trades. The WA Defence Industry Workforce Office (WADIWO) was established to increase the available workforce to meet the needs of industry to build new ships for the RAN.[10] The analysis conducted by this office identified issues that are identical to those being faced by the maritime workforce. The following section will examine these issues.

POOR AWARENESS OF MARITIME CAREERS IS STIFLING THE PIPELINE OF AUSTRALIAN SEAFARERS.

9 https://www.gov.uk/government/publications/maritime-2050-navigating-the-future
10 https://www.dtwd.wa.gov.au/wadiwo
11 The three major providers of education and training for the maritime workforce in Australia are the Australian Maritime College at the University of Tasmania, Hunter TAFE New South Wales and South Metro TAFE in WA.
12 Chapter 4 – Parliament of Australia (aph.gov.au).

1.1 Poor awareness of maritime careers

In the analysis conducted by the UK on its maritime workforce and the WA government on the shipbuilding workforce the first issue that required attention was general awareness of career opportunities. Research conducted by the Australian Resources and Energy Employer Association (AREEA) for this paper identified the same issue.

The three major education providers[11] responsible for maritime skills training associated with internationally recognised certificates in Australia reported there is a lack of awareness about maritime careers, illustrated in part by falling or plateauing of enrolments for courses over the past 10 years. The Australian Maritime College (AMC) noted very few school leavers enter the bachelor's course to become marine engineers. Using data from the Commonwealth Department of Education, Figure 1 shows the decline in enrolments for Marine Engineering at Australian universities, which confirms the sustained downward trends identified by the Australian Parliament Inquiry into policy, regulatory, taxation, administrative and funding priorities for Australian shipping.[12]

Figure 2 illustrates that after a slow decline in total numbers to 2020, enrolments have slightly recovered post COVID-19. This decline to 2020 will have implications for the availability of skilled personnel in the next two years as numbers would not have recovered sufficiently. It is likely that the sharp increase relates to the return of tourists in 2021, government VET fee subsidies, combined with the need to obtain Coxswain's tickets (such as for the Certificate II in Maritime Operations (Coxswain Grade 1 Near Coastal). These are not the candidates that will typically move into the production marine support roles required by the energy sector.

THE AUSTRALIAN MARITIME COLLEGE (AMC) NOTED VERY FEW SCHOOL LEAVERS ENTER THE BACHELOR'S COURSE TO BECOME MARINE ENGINEERS.

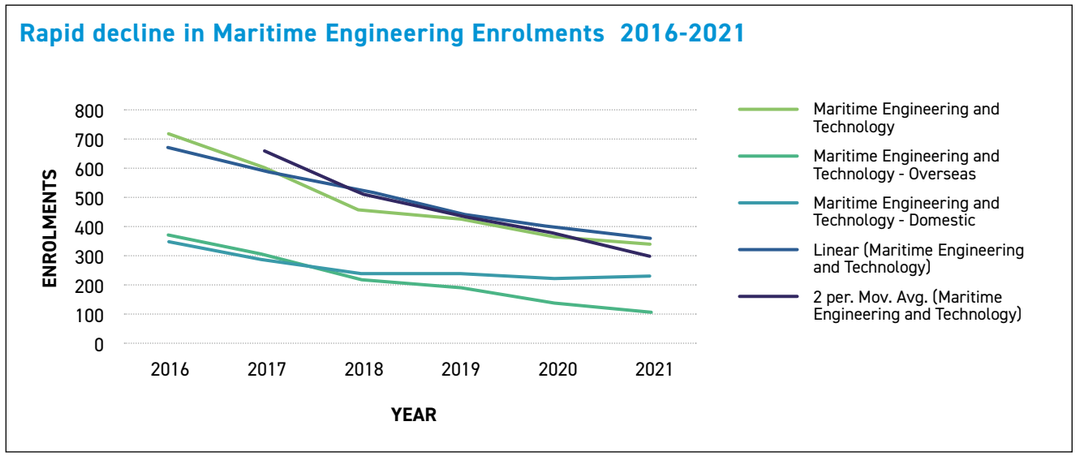


Figure 1. Maritime Engineering Enrolments 2016-2021 – Commonwealth Department of Education uCube

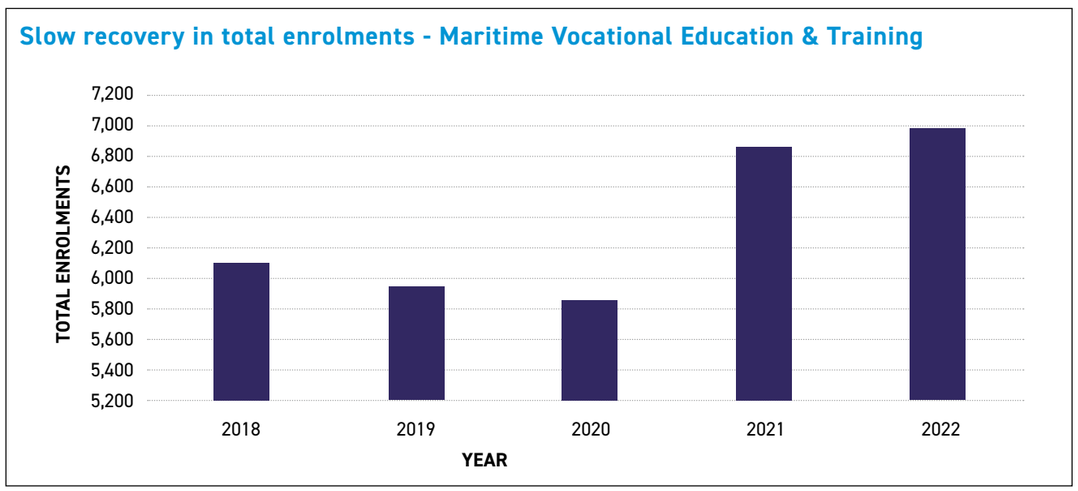


Figure 2 Total enrolments – Maritime VET (Source: NCVER 2023, Total VET students and courses 2022: program enrolments).
**Note: includes both STCW and non-STCW courses, acknowledging that the focus of the report is on the STCW qualified workforce*

As Figure 3 illustrates for more senior roles that sectors like offshore oil and gas infrastructure require for maritime operations, there has been a noticeable plateau and then a decline in 2022 in the Certificate III roles such as Certificate III in Maritime Operations and Certificate IV in Maritime Operations.

Critically, enrolments are one side of the story. On the other side is the low rates of completions in the VET sector; while data wasn't immediately available for maritime operations, across the VET sector it has been predicted for 2020 that 1 in 2 students will complete their qualification.[13] This constrains the effective flow of the skills to replenish the maritime sector, further compounded by highly regulated requirements, the need for sea time training, high costs and long qualification periods (to be examined below).

In a highly competitive job market, with young people increasingly seeking careers that are exciting and rewarding there is a need for a coordinated effort to promote maritime careers and improve retention within the sector.

By way of case study, the WA state government funded and launched 'The Other Force' campaign to attract school leavers and mid-career workers to the shipbuilding sector in recognising the importance of a diversified economy. In the UK, the Maritime 2050 plan called for a single industry body to promote maritime careers. It also recommended government and industry work together on improving diversity in the sector. An identical approach for the maritime skills sector in Australia would seem compelling. Unsurprisingly, the education providers in Australia stated that when they engaged in marketing activities, student enrolments increased. As a highly specialised niche sector, repeated studies since the Australian Government's own Maritime Skills Development Strategy 2013 have all identified that national funding and coordination is an essential condition to create a sustainable skills base for this sector. National issues require national solutions. Effective sector-based reforms (for example role-based attraction strategies such as marketing campaigns) provided by national institutions that can manage competing interests ensure maximum sector wide benefits, mitigating the risk of low investment and insufficient scale.

1 **IMMEDIATE ACTION:** Secure funding for retention, training, and education in maritime workforce roles. Reduce or subsidise RTO fees, provide workforce support program.

2 **IMMEDIATE ACTION:** Targeted recruitment campaign to inspire and attract people with transferable skills into areas of maritime workforce demand.

13 *VET qualification completion rates 2022 (ncver.edu.au)*

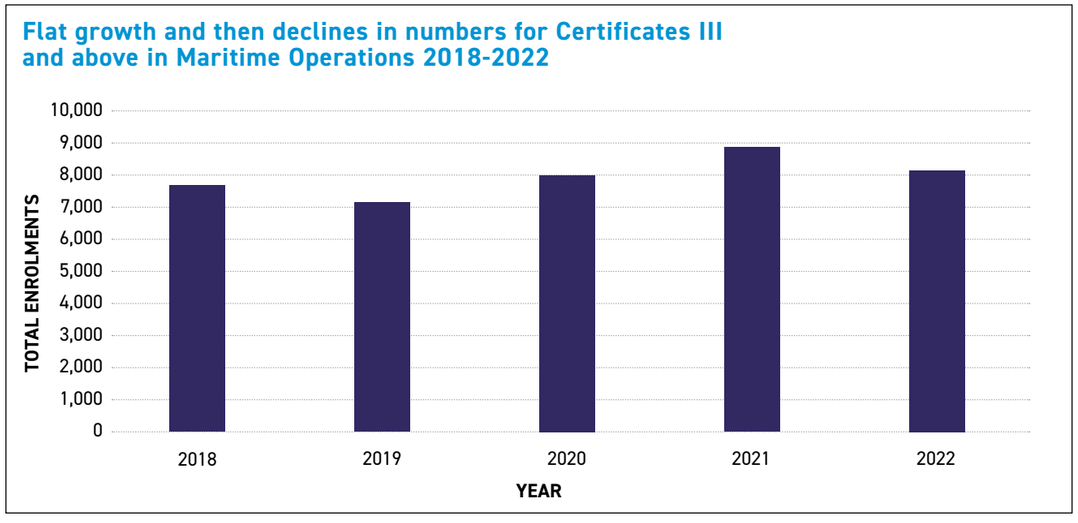


Figure 3 Total enrolments data – Maritime VET (Source: NCVER 2023, Total VET students and courses 2022: program enrolments). Note: STCW level officer qualifications require Diploma and Advanced Diploma training.

1.2 Perception of Lifestyle as Demanding and Hard

The next major barrier to developing the required maritime workforce is the perception roles in this sector are associated with poor work/life balance. The interviews conducted with employers by AREEA found growing reputation issues that impede recruitment, especially in the oil and gas industry. Employers stated the maritime industry is often described as not family friendly or attractive to younger generations, with long periods away from home for study, sea time and rosters. While there is a move in the industry from five-week even time rosters to four-week even time rosters, the length of time spent working away from home is considerable compared to other industries and occupations.

Any campaign designed to attract people to the maritime sector will need to address this concern in a way that does not mislead but shifts the focus to the historical significance of maritime workers and the value of this work to the nation today and over the next decade. The Australian Defence Force (ADF) provides an example of an organisation that has comparatively greater success in attracting people to service despite the privations of service life. A collaborative approach across industry, with the support of government, must consider a recruitment and retention campaign that recasts the image of a career in the maritime workforce. The WA government ship building workforce campaign "The Other Force" borrowed heavily from the messaging and symbology of Defence and emphasised how people who accept the challenge of this work are worthy of great respect and admiration. A similar tactic must be considered for the national maritime workforce and should illustrate changes taking place in the use of technology that make long term careers attractive.

2 **IMMEDIATE ACTION:** Targeted recruitment campaign to inspire and attract people with transferable skills into areas of maritime workforce demand.

REPUTATION ISSUES ARE IMPEDING RECRUITMENT, ESPECIALLY IN THE OIL AND GAS INDUSTRY.

1.3 Few Dedicated Training Establishments

The final barrier to entry that must be acknowledged and addressed is the limited number of dedicated training establishments with an appropriate geographic spread that can offer the high degree of customisation and long-term connection to the maritime sector. The two main providers of education and training for the maritime workforce in Australia are the Australian Maritime College (AMC), at the University of Tasmania and South Metro TAFE (SM TAFE) in Perth. TAFE NSW and TAFE QLD offer some courses that will enable students to gain internationally recognised qualifications but not the full range. It is not feasible for the AMC and SM TAFE to shoulder the responsibility of attracting students from across the country and finding mechanisms for them to relocate to Launceston or Perth, especially with historically low availability of accessible accommodation. This is beyond the resources of either organisation.

The demand for education and training at present does not justify expanding the number of institutions that offer the full spectrum of maritime courses. As we will explore in the next section, there is a strong case for having centres of excellence and standardising course content and aligning this to career progression. However, any campaign intended to promote a career in the maritime sector must also promote AMC and the TAFEs that offer the specialised courses. The Australian Government's White Paper on Employment, published in September 2023, promotes, and articulates the benefits of vocational education and training Centres of Excellence; we would see this as a very good fit for supporting the needs of the maritime sector.

The industry wide approach to promoting maritime careers will need to examine mechanisms to support people who are relocating to pursue these careers. Like those joining the Defence Force, consideration may need to be given to cadetships. The Australian Maritime Officers Union (AMOU) and Australian Institute of Marine and Power Engineers (AIMPE) wrote to the Federal Treasurer and Chair of the Strategic Fleet Task Force in September and October of 2022 to lobby for the government to fund an annual intake of 60 Deck Officer Cadets and 60 Engineering Officer Cadets. The cost of this program was estimated to be $30~36M over the course of the three years of education. This is a modest investment to arrest the current deterioration in the highly skilled maritime workforce and training pipeline and aligns to the STEM education strategies of the federal and state governments. Having recognised a similar problem in 2018, the United Kingdom launched a major reform program through Maritime UK for how it plans, attracts, selects, and trains its maritime workforce. Funding for maritime cadets in the UK was boosted to £43 million pounds ($82 million AUD) over 2022-2024 to help build the maritime sector, followed by the commitment to implement an entire new maritime training system in 2024.[14]

1 **IMMEDIATE ACTION:** Secure funding for retention, training, and education in maritime workforce roles. Reduce or subsidise RTO fees, provide workforce support program.

2 **IMMEDIATE ACTION:** Targeted recruitment campaign to inspire and attract people with transferable skills into areas of maritime workforce demand.

5 **3-5 YEAR ACTION:** Standardising education, training, and career pathways through establishing a national maritime training coalition with appropriate geographic distribution that facilitates effective maritime workforce development outcomes.

14 *Funding for cadets boosted to £43 million pounds over next two years to help build the maritime sector - GOV.UK (www.gov.uk)*

LIKE MANY OTHER TECHNICAL TRADES AND QUALIFICATIONS, THERE IS A REQUIREMENT FOR TRAINEES TO ACCUMULATE SEA TIME DURING THEIR STUDIES.

Part 2: Limitations in Education, Skilling, and Training

Research conducted by AREEA for this paper identified the current state of education and skilling for the maritime sector is the greatest factor impacting the development of the required workforce. At face value the career options appear simple, with four pathways available; deck officer (ship's navigator and master), engineering officer (ensures the mechanical and engineering equipment is operational), integrated rating (responsible for other work keeping the vessel operational) and electrical/electro-technical officer (in charge of the electrical systems and electronic equipment). These careers are consistent across the global maritime sector. However, the requirement to achieve qualifications on different kinds of vessels and differences between domestic and international systems introduces significant complexity. Skills and training were the major focus of the UK Maritime 2050 plan with over half the recommendations focused on addressing complexity and deficiencies. This is a global problem. The 2013 Maritime Workforce Development Strategy could have put Australia ahead of the UK by five years had the recommendations been actioned. As it stands, we are now five years behind in an environment where our global maritime trade integration is more pivotal than ever.

2.1 Small Number of Dedicated Courses

An extension of our finding related to the small number of dedicated training establishments (Section 1.3 above) is the related finding that courses offered in each location are different. This has an impact on the end-qualification of the trainee and their subsequent employability. The subtle, but important differences in the courses offered is a result of demand which is influenced by the types of vessels operated by industry in that location. Like many other technical trades and qualifications, there is a requirement for trainees to accumulate sea time during their studies. This invariably means the relocation of trainees not living in Launceston or Perth seeking to complete courses to crew large vessels used by industry like offshore oil and gas or offshore renewable energy. There are time and cost implications of doing this that will be examined below. Data from training institutions indicates there has been a reduction in student numbers across numerous courses that make them uneconomical to deliver. The result of this vicious cycle is fewer courses and a reduction in instructors/educators further restricting the options available to prospective students. Anecdotal evidence from AREEA indicates instructors are also being drawn back to sea as demand for experienced mariners increases.

5 **3-5 YEAR ACTION:** Standardising education, training, and career pathways through establishing a national maritime training coalition with appropriate geographic distribution that facilitates effective maritime workforce development outcomes.

2.2 High Course Costs

Currently there is substantial variation in fees and subsidies (and therefore total prices) for VET qualifications across Australia, even for the same qualification. Analysis conducted by the National Skills Commission in 2020 through its first national collection of information on VET pricing (17,000 observations and more than 2,000 qualifications) confirmed the weighted average prices for a Certificate III in Engineering and related technologies was $12,100 for a non-apprentice/ trainee. On average about 87% of the total price was subsidised, leaving 13% for the fee itself to the student. By comparison, research conducted by AREEA concluded the average cost of gaining and maintaining qualifications for those in the maritime workforce is extremely high. This is because in addition to course fees there are costs associated with medical certificates, certificates of competency from regulatory authorities, mandatory safety training and first aid. A consideration for people choosing a career in the maritime sector is the need for separate qualifications that match the workplace conditions of different kinds of vessels. For example, maritime workers employed on offshore oil and gas support vessels, oil tankers, chemical tankers or LNG tankers must complete an add-on skill set. The cost of upskilling to operate a wider variety of vessels in near-shore and international waters adds to the cost of education for maritime professionals and can be a barrier to career mobility.

Federal and state governments across the country have recognised that subsiding course fees and/or forgiving student debt is an excellent mechanism to attract people to high priority sectors. The WA state government has done this with the Defence Industry Workforce Initiatives (DIWI) that have successfully funded 400 new VET positions at SM TAFE. Through similar mechanisms it would be possible for government to attract people to the maritime workforce and to guide them towards qualifications that are (or will be) in high demand. These incentive programs can also assist with people transitioning within the sector by offering incentives to undertake higher education and/or gaining qualifications on vessels required for the industries that are important to the national economy. Government subsidies for re-certification and safety training would encourage people to remain in the sector and provide a net benefit to the community by skilling people that can also assist with emergencies and natural disasters as seen in Victoria in 2020, when the Navy and support vessels were used to evacuate residents in the East Gippsland region who were caught in bushfires.

In addition to the need for students and trainees to be provided with assistance to remedy the current trend in workforce development, consideration should be given to supporting the training institutions to cover the costs of delivering the training. It has been stated by the leading institutions in Australia that simulation technology has become a crucial tool for advancing the skills of maritime workers. These systems are expensive and require frequent upgrades to ensure software is appropriate to deliver realistic training based on real world contingencies. The WA state government provided $2M in funding to SM TAFE for a state-of-the-art maritime simulator in 2023. Funding of more of these systems in the context of optimisation of the maritime skills development pipeline, plus additional funding for the maintenance and upgrades to the technology should be considered for the major maritime training intuitions. The economics for an investment of this magnitude is improved when the number of students using the systems increases. This is something we will examine below in section 4 in considering the potential for Australia to be a regional centre of excellence for maritime skills training.

1 **IMMEDIATE ACTION:** Secure funding for retention, training, and education in maritime workforce roles. Reduce or subsidise RTO fees, provide workforce support program.

3 **IMMEDIATE ACTION:** Expand the talent pool by making existing STEM and technical vocation incentive programs available to people studying maritime qualifications.

2.3 Impact of Sea Time

The research conducted by AREEA focused on the impact of sea time on developing the required maritime workforce. Like any industry that awards licences based on demonstrated competence operating a mode of transport, qualifications in the maritime sector require set periods of sea time to confirm the trainee can apply the learning under real world conditions. For example, the base level of sea time for engineering and navigation cadets and trainees is 18 months. For integrated ratings, a minimum of 9 months sea time is required. Beyond this a maritime professional is required to accumulate years of experience to gain additional qualifications. To progress from Watchkeeper Deck to Chief Mate, and from Engine Room Watch to Second Class Engineer requires 24 months' sea time on an appropriate vessel, in terms of size, engine power and journey duration to be accrued.

The accumulation of sea time is fundamental to the development of maritime professionals, shaping expertise, skills, and readiness for the challenges of the maritime industry. The length of time required at sea is a critical factor in this process, as it directly influences the depth of experience and competence attained. However, it is also a barrier to progression due to the time commitment required and the difficulty in finding suitable positions to support the learning phase.

It is vital that sea time requirements are optimised and contemporary. This includes the coordination of sea time across vessel types, sectors, and regions and how study time can be combined and undertaken during sea time. In addition, where simulation and augmented reality can be used to optimise the training pipeline of relevant maritime skills, this should be considered. Investment in these systems (as mentioned above) will require government assistance. A return on these investments, as well as improving viability of institutions offering maritime courses, will be realised faster if the number of trainees is increased through attracting foreign students.

5 **3-5 YEAR ACTION:** Standardising education, training, and career pathways through establishing a national maritime training coalition with appropriate geographic distribution that facilitates effective maritime workforce development outcomes.

6 **3-5 YEAR ACTION:** Invest in technology and instructors to support optimisation of skills acquisition, development, and deployment for the maritime sector.

THIS INCLUDES THE COORDINATION OF SEA TIME ACROSS VESSEL TYPES, SECTORS, AND REGIONS AND HOW STUDY TIME CAN BE COMBINED AND UNDERTAKEN DURING SEA TIME.

2.4 Limited Training Berths

Related to the issues of sea time is the current shortage of berths on vessels for cadets and trainees which according to the research conducted by AREEA has become a significant impediment to growing and nurturing the maritime workforce. This scarcity has multifaceted impacts that reverberate throughout the industry and hinder its sustainable development.

The main reason cited for the shortage of trainee berths was cost. Vessel companies that usually took on cadets and trainees commented the short-term nature of contracts limit their ability to fund and support these berths for the required time. Other sectors facing similar issues have opted for managed training and services coordination through third parties; in Australia this is commonly undertaken via group training schemes and would be a viable option for the maritime sector if supported nationally through policy and investment.

Exacerbating the challenge of insufficient training berths is the long-term reduction in the number of Australian based vessel operators in all sectors other than tourism, as the sector has trended toward global consolidation and offshoring of capability. Putting aside crewing agents which should maintain some capacity, larger fleets that support the energy sector are now mainly operated by foreign entities. In recognition of the risk associated with this trend the federal government commissioned a study into establishing a strategic fleet. The full report has not been made public, but concerns have already been raised by industry bodies that crewing these vessels will be increasingly difficult in the future if significant investment is not made in training.

Without sufficient berths, cadets and trainees cannot meet sea time requirements necessary for obtaining essential certifications which hinders the development of qualified maritime professionals. With an ageing workforce the maritime industry's looming skills gap is undeniable (see figures 4, 5, 6 & 7 which show a significant number of maritime workers >61 years old who may depart the industry in the coming years). Addressing this issue requires collaborative efforts from industry stakeholders, educational institutions, and government agencies to ensure the appropriate incentives are deployed to make training berths available. A whole of sector approach is necessary as 'training berths' may be available on vessels that do not have trainees. Again, the WA state government Defence Industry Workforce Initiatives provide a useful example. Financial incentives were deployed that exceeded the cost of hiring an apprentice, providing a financial benefit to employers willing to share the burden of growing the required workforce. Similar incentives could be used to encourage vessel operators to 'sponsor' trainees even when they don't have a need for the workforce. Consideration must be given to making seagoing berths available on all vessels controlled under Government and Government-related contracts including Defence Support, Border Force, CSIRO and AMSA.

1 **IMMEDIATE ACTION:** Secure funding for retention, training, and education in maritime workforce roles. Reduce or subsidise RTO fees, provide workforce support program.

4 **IMMEDIATE ACTION:** Make seagoing berths available on all vessels controlled under Government and Government-related contracts.

6 **3-5 YEAR ACTION:** Invest in technology and instructors to support optimisation of skills acquisition, development, and deployment for the maritime sector.

Part 3: Complex and Costly Career Progression

As noted already the regulatory intricacies of the sector, the substantial financial investment required at each stage of development, limited options for formal education and the need for extensive sea time, make it a challenging and expensive journey for aspiring professionals. AREEA analysis on training institutions revealed that courses for higher level qualifications have low attrition rates because experienced maritime professionals are normally employer sponsored through their training. There is also an increasing number of officers who are self-funding their training to progress their careers. Even so, numbers in these courses appear to be declining. They are also more likely to have a clear view of their career path because of experience. However, for those beginning their careers in the maritime sector there are a range of issues that must be overcome. These will be examined in the following section.

3.1 Complicated Career Paths

The AREEA research identified that complexity in career paths for those seeking long term, rewarding and varied work as a maritime professional in Australia can lead to mid-career departures of very capable people. This research attempted to map career progression for the engineering and navigation paths, both diagrams are contained in the Annexures. Though documents like this can be helpful they do not adequately capture all the permutations of how these qualifications can be achieved depending on industry segment and vessel type. Interviews conducted across the workforce identified better career structure existed when the major oil and gas companies had cadetship programs. At this time companies like BHP operated their own fleets and invested in cohorts of maritime professionals. When these companies outsourced their fleets, with few exceptions, the remaining vessel operators do not appear to have continued investing in and guiding the careers of junior people. As noted above, vessel operators commented that the nature of the contracts they hold does not encourage taking on trainees.

The 2013 Maritime Workforce Strategy and the UK Maritime 2050 plan recognised that career progression is an important part of the attractiveness of a maritime career. A key recommendation of the UK plan was establishing a Maritime Skills Commission (MSC). To put in place clear and universally supported career promotion plans that enable career transition to take place the MSC must ensure professional development plans are built into training programmes across all roles, so trainees know from the outset the routes available to them and the qualifications needed. The commitment in the UK to a single body that will lead the simplification of career paths and ensure alignment between the needs of the sector, recruitment and training incentive programs is a great example for Australia. Notably, the Maritime Workforce Development Forum would have served a similar purpose had it not been scrapped by the government in 2013. A similar entity if re-established in Australia with a national maritime remit could explore financial assistance options, coordinate sector wide workforce planning, streamline certification processes, support course viability through diversification of the student intake such as international entrants and promote industry-wide awareness of opportunities to make career advancement more accessible and achievable in the maritime sector.

5 **3-5 YEAR ACTION:** Standardising education, training, and career pathways through establishing a national maritime training coalition with appropriate geographic distribution that facilitates effective maritime workforce development outcomes.

MAJOR AUSTRALIAN RESOURCE SECTOR OPERATORS NO LONGER OPERATE THEIR OWN VESSEL FLEETS, WHICH HAS REDUCED INVESTMENT IN COHORTS OF MARITIME PROFESSIONALS.

ONLY 13% OF RESPONDENTS WERE FROM THE TOURISM SECTOR AND ABOUT THE SAME FROM OIL AND GAS.

Part 4: Future Workforce Challenges

Anticipating the future needs of the maritime sector across all industries is extremely difficult. There is no recent comprehensive survey that can be relied upon to inform predictions about the future maritime work force. The 2018 MIAL Seafaring Skills Census, which focused on the achievement of internationally recognised maritime skills, achieved responses from 103 organisations and the majority were ports and harbour services. Only 13% of respondents were from the tourism sector and about the same from oil and gas. This is not proportional to the size and value of these two sectors. Importantly, there has been no survey conducted since 2018.

Analysis conducted by the oil and gas sector individually is far more reliable and comprehensive. The data points in this analysis reveal some concerning trends. Based on ratio analysis of required vessel crewing to oil and gas construction, it is expected that the maritime workforce supporting the offshore oil and gas sector will need to increase by approximately 50% to service new projects from 2024-25. These projects will require an increase in masters, engineers, and ratings over the next 12 months, and will place pressures on likely graduations beyond what is likely through the VET system (based on anticipated course completion data).

Industry and employee groups have identified there is a growing profile of offshore oil and gas decommissioning projects that will require additional maritime workers (just for the offshore oil and gas sector and related sub-sectors). This excludes demand requirements for strategic fleet ships, ports, tourism, and similar sub-sectors. "Decommissioning involves the timely, safe, and environmentally responsible removal of, or otherwise satisfactorily dealing with, infrastructure from the offshore area that was previously used to support oil and gas operations." ("Decommissioning | NOPSEMA") According to NOPSEMA there are approximately 57 platforms, 8100km of pipelines and 1008 wells to be decommissioned across WA and Victoria (2020). Industry ratio analysis of vessel crewing requirements for 10 major decommissioning programs of work to commence in 2023 and 2024 is an additional 1020 maritime support workers across all employment categories.

Offshore wind-farm electricity generation programs are also being planned in detail because of the first offshore wind development zone being announced in December 2022, covering an area in the Bass Strait. Preliminary analysis indicates there are three major offshore wind projects to be approved and commence work in the next five years for collectively 10.5 GW of new energy. This will require a significant uplift in new

BASED ON RATIO ANALYSIS OF REQUIRED VESSEL CREWING TO OIL AND GAS CONSTRUCTION, IT IS EXPECTED THAT THE PRODUCTION MARINER SUPPORT WORKFORCE WILL NEED TO INCREASE BY APPROXIMATELY 50% TO SERVICE NEW PROJECTS FROM 2023 AND INTO 2024-25.

capacity for the maritime sector, as that installed capacity effectively doubles the size of the wind power sector. Notably, the Clean Energy Generation Workforce Study by the Australian Government highlights the vital role offshore wind will have in Australia's energy mix but failed to identify the role seafarers will play in the construction and sustainment of this sector. As an example of how it could be done, Maritime UK launched the Offshore Wind Plan in March of this year to articulate how best to enable the UK's goal of 50 GW of offshore wind by 2030.[15]

Finally, the Australian Federal Government is expected to support the formation of a strategic fleet of 12 additional coastal trading ships. If this fleet was to be established as new and staffed with a new workforce, on the basis that a typical crew on a coastal trading ship is 17 (and collective agreements require two crews for each ship) a total of approximately 400 additional seafarers (masters, engineers, and ratings) will be required to crew strategic fleet ships.

Collectively between sustaining production, decommissioning, and the new construction programs this represents a 150% increase over the next 5 years in maritime workforce demand.

Over the next five years there are an additional 29 major oil and gas projects that have been publicly announced and currently being assessed for feasibility valued at $73b. As these projects are still under evaluation the additional marine support workforce has not been estimated but is certain to exceed the capacity of the existing workforce.

Looking at this analysis it is fair to say the number of additional maritime workers required is small compared to other high priority work force related supply and demand gaps across the nation. Secondary school teachers, nurses, and building trades are the subject of much attention at the state and federal level because of the current impact of deficiencies across society. However, an absence of action at this time to address deficiencies in the maritime sector is likely to have irreversible consequences for our economic resilience because of several factors that will now be examined.

15 *News: Maritime UK launches landmark Offshore Wind Plan | Maritime UK*

4.1 An ageing and non-diverse workforce

The first indication that the maritime workforce had a sustainability issue due to the ageing profile was provided in the 2018 MIAL Seafaring Skills Census. This report compared responses with the 2013 census and though it was not possible to use identical data samples (there were different respondents) the results were believed to be an accurate portrayal of the composition of the sector. Most notable was the age profile of the work force. Further analysis conducted for this report has revealed significant gaps opening in the workforce related to specific qualifications.

From 2013 to 2018 the number of seafarers under the age of 30 had dropped from 18% to 8%. The number of seafarers over the age of 46 had increased from 47% to 52%. Half of all seafarers surveyed were 46 or older. In the 2018 census women accounted for 5% of all seafarers, an increase from 2% in 2013. This is consistent with the global average (2%).

As an update, utilising data on international STCW Certificates of Competency holders, by 2022 over 55% are now 46 or older. This data is similar for all Near Coastal (NC) Certificate of Competency holders, who have 52% 46 years older and over. Deck Certificate of Competency holders have an older profile – over 53% of competency holders are 46 and over.[16] Accepting the data is imperfect, it is reasonable to conclude that the workforce is ageing at a rate that causes concern for the medium-term sustainability of this sector.

The data shows there are more maritime workers entering the 'pre-retirement phase' of their lives (over 55) than those in the 'career development phase' (30s – early 40s). The AREEA study identified that late career mariners are less likely to pursue new qualifications and are less flexible when it comes to work conditions. As such the portion of the maritime workforce that is willing and able to adapt to the needs of industry is small and getting smaller. As this older workforce moves into retirement there will be less experience to call on both in the formal education setting at the colleges and TAFEs and practical education on vessels. Effort will be required to ensure vital experience is retained in the sector over the coming 5~10 years and is deployed to help build the workforce required.

The absence of diversity in the Australian maritime sector is consistent with global norms but is worthy of attention. The UK Maritime 2050 paper noted the early success of the Women in Maritime Taskforce. At the time of publishing the taskforce has been in existence for 18 months and had attracted 110 companies to embrace initiatives to inspire women to pursue a maritime career. This is another opportunity for government and industry to collaborate and is consistent with other initiatives to encourage women in STEM related roles. The desired outcome here could be achieved by ensuring taskforces encouraging women to pursue careers in male-dominated sectors include maritime trades and professions.

16 *AMSA Seafarer Certification Demographics; all classes, September 2022*

2 **IMMEDIATE ACTION:** Targeted recruitment campaign to inspire and attract people with transferable skills into areas of maritime workforce demand.

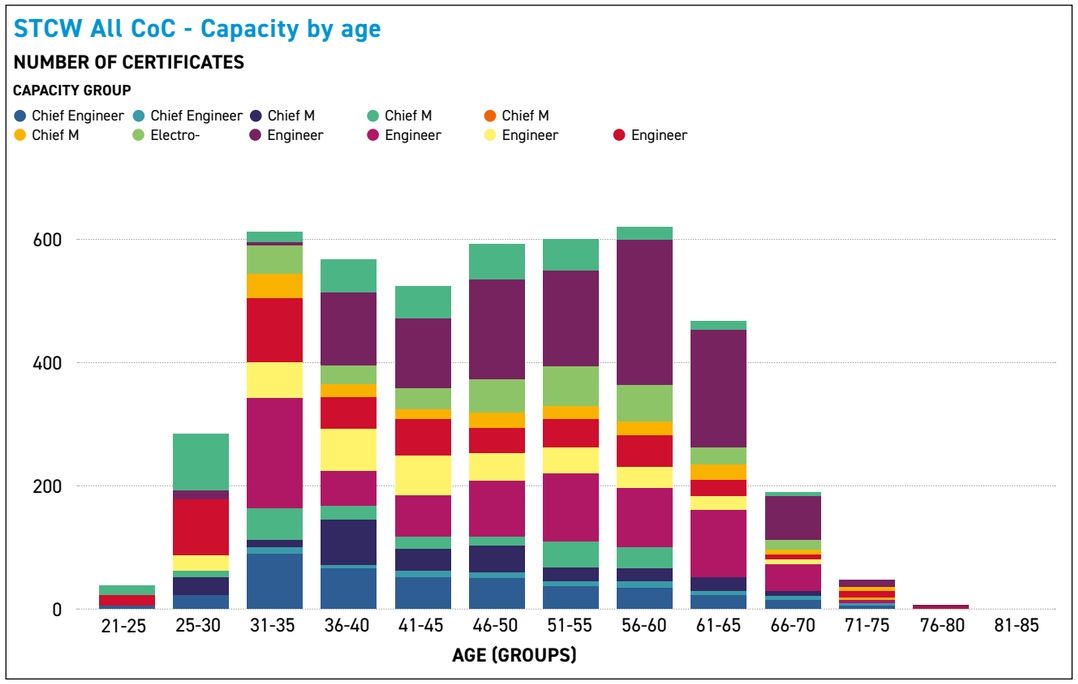


Figure 4 STCW Certificate of Competency Demographic Information (Source: AMSA Shipping Consultative Forum 23 March 2023)

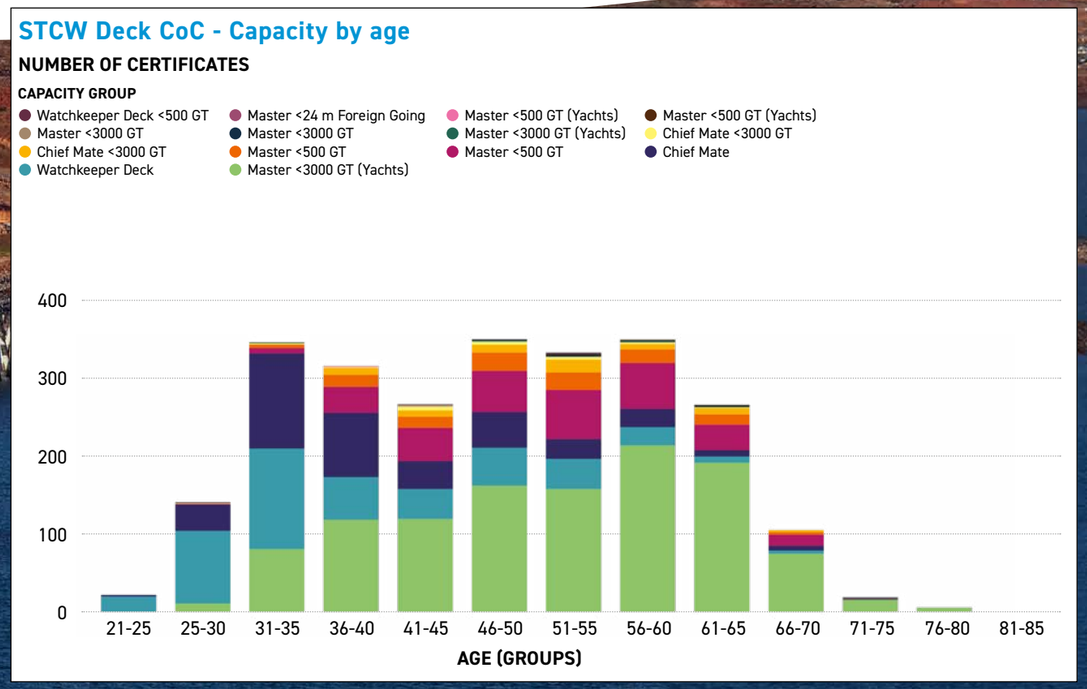


Figure 5 STCW Certificate of Competency Demographic Information (Source: AMSA Shipping Consultative Forum 23 March 2023)

DETAILED ANALYSIS

ESSENTIAL WORKERS MUST CONDUCT RIGOROUS INSPECTIONS, REPAIRS, AND MAINTENANCE, OFTEN IN CHALLENGING CONDITIONS AND ADVERSE WEATHER.

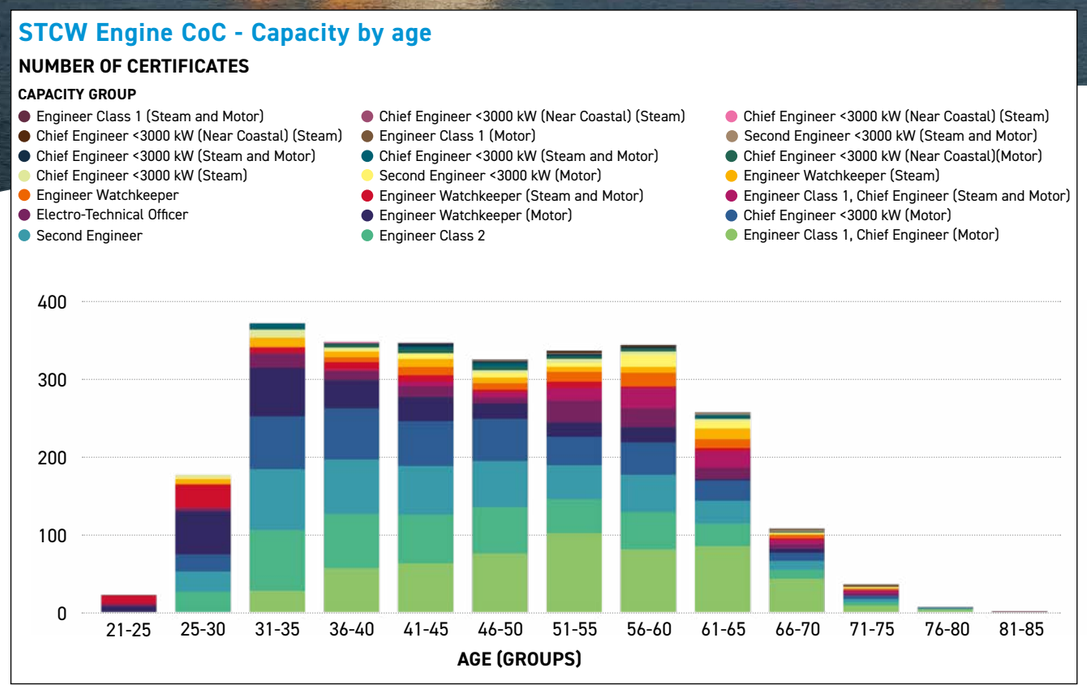


Figure 6 STCW Certificate of Competency Demographic Information (Source: AMSA Shipping Consultative Forum 23 March 2023)

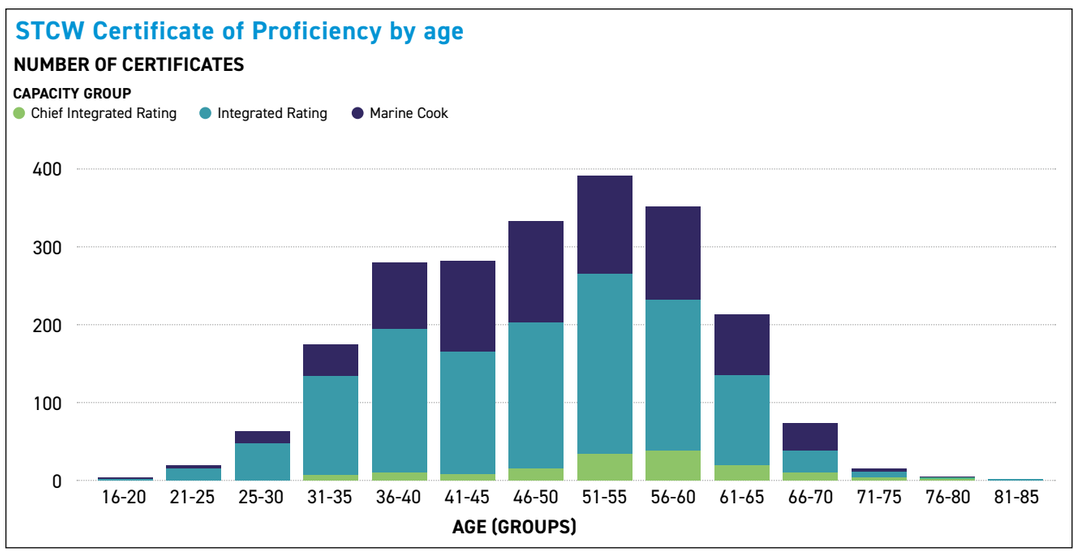


Figure 7 STCW Certificate of Competency Demographic Information (Source: AMSA Shipping Consultative Forum 23 March 2023)

4.2 Pressure on Maritime Workers Performing Essential Work

Australia's maritime workforce plays a crucial role in Australia's supply chains, ensuring the timely delivery of goods and raw materials. Because of Australia's heavy reliance on exports of commodities essential workers must meet tight schedules and handle a high volume of cargo. As a maritime trading nation, the maritime workforce operates continuously. Workers often face irregular work hours and extended shifts to accommodate vessel schedules and the continuous flow of goods. In the Pilbara region ports of Port Hedland and Dampier alone there are over 17,000 vessel movements annually representing over 700 million tonnes of throughput with a value of $165 billion. Ensuring the safety and maintenance of vessels, ports, and related infrastructure is a top priority. Essential workers must conduct rigorous inspections, repairs, and maintenance, often in challenging conditions and adverse weather. Some of Australia's busiest ports are subject to tidal changes of over 6 metres and experience severe weather events numerous times every year.

As was mentioned in the section above on sea time, workers in the maritime sector must be prepared for a high-pressure workplace, long periods away from home, and isolation at sea. These factors can take a toll on the mental health of essential workers. Employers are increasingly recognising the importance of mental health support programs. Essential workers must adhere to strict environmental regulations and contribute to sustainability efforts, which can add complexity to their roles. Finally, the COVID-19 pandemic brought additional pressures to the maritime sector, including health and safety concerns, quarantine measures, and disruptions to crew changes and supply chains.

Though the pressures above are being faced by maritime workers in the present day, the stresses increase when there are gaps in the workforce, a lack of experience and/or reliance on crews that are not trained to the same high level. Employers and industry stakeholders must prioritise the well-being of these workers by providing adequate training, support, and resources to manage the challenges they face. Failure to do so will likely result in an exodus from the sector of the best and brightest and exacerbate the skills and knowledge gap.

5 **3-5 YEAR ACTION:** Standardising education, training, and career pathways through establishing a national maritime training coalition with appropriate geographic distribution that facilitates effective maritime workforce development outcomes.

4.3 Labour Market Intelligence and Modelling

To respond to the challenges of an ageing, non-diverse workforce that is experiencing significant stress because of the widening gap between the supply and demand of the necessary skills and qualifications it will be necessary to improve labour market intelligence and reporting. The MIAL and AREEA co-hosted Maritime Skills Crisis Workshop held on 21 June 2023 relied on eight different data sources to gain insight into maritime skills availability and forecasted needs. Participants commented there were dozens of other sources that should also be examined. The attendees agreed there are significant gaps in data and concerns relating to robustness of information. The lack of reliable data frustrates attempts to complete accurate supply and demand modelling, which diminishes the value of related labour market intelligence.

This is not a unique conundrum. The UK Maritime 2050 report acknowledged a similar problem hence the decision to establish a Maritime Skills Commission (MSC). Labour market intelligence helps identify skills gaps within the maritime workforce. This information is invaluable for designing targeted training and development programs to upskill or reskill workers to meet industry requirements. It also aids educational institutions in aligning their programs with industry needs. To develop this intelligence a suitably experienced, well-funded, dedicated maritime industry body will be required. The mandate for this entity should be developed through industry and government collaboration to ensure the focus of reporting serves the national interest. Though the federally established Jobs and Skills Council[17] for maritime should provide a central source of skilling and workforce data it has been stated that workforce modelling for maritime will not be undertaken in detail until 2025.

3 **IMMEDIATE ACTIONS:** Expand the talent pool by making existing STEM and technical vocation incentive programs available to people studying maritime qualifications.

5 **3-5 YEAR ACTION:** Standardising education, training, and career pathways through establishing a national maritime training coalition with appropriate geographic distribution that facilitates effective maritime workforce development outcomes.

17 *Industry Skills Australia (ISA) has been appointed as the Council for the maritime workforce. Have attended industry meetings in the recent past to include those chaired by the MUA. They stated modelling is not likely to commence until 2025 for use in 2026.*

Part 5: Target State for Maritime Workforce in Australia

The beginning of this paper provided an overview of the target state for the maritime workforce in Australia in the vignette on what could be achieved by 2035 if appropriate action is taken now. It is important to realise there is very little middle ground between the two future facing scenarios. A failure to take all necessary actions to arrest the current trajectory of skills development and prepare for the opportunities identified in the five-year time horizon will set in motion events that lead to an unrecoverable deterioration of the maritime workforce. Conversely, a modest investment in the maritime workforce, aligned to the recommendations from the 2013 Maritime Development Workforce Strategy and borrowing where appropriate from other contemporary studies like the UK Maritime 2050 plan and the Singapore Maritime Foundation Workforce Transformation Guidebook, will resurrect this vital sector, and ensure the prosperity of the nation. Following is a summary of the major lines of effort required to achieve the target state.

5.1 Whole of Nation Strategy - National Resilience

The modern Australian nation has been forged by a maritime workforce. The line from our national anthem "Our land is girt by sea" emphasises the geographical isolation of Australia as a continent surrounded by water. Considerable resources are being invested by governments, both state and federal, on ensuring national resilience by recognising the importance of our maritime capabilities. Just within the Australian Naval investment, this is expected to total $168b and $183b, and an uplift of 132% in tonnage by 2041[18] that will need to be sustained through our ports. This includes the acquisition of nuclear-powered submarines for the RAN, a commitment to a "Strategic Fleet" of 12 merchant vessels, and investment in our major ports as critical infrastructure. Both the Northern Territory and Queensland have released Maritime industry development papers since 2020, recognising the importance of skills to their success as regionally linked economies.

The 'Achilles Heel' in this concept of national resilience is the maritime work force. Paradoxically, compared to the billions being spent on the major maritime capabilities mentioned above a significant 'resilience dividend' can be secured for a relatively small investment. As such the nation requires a robust maritime workforce that can meet the needs of industry and the community in the face of regional instability, pandemic, financial crisis or other yet undefined threats.

5 **3-5 YEAR ACTION:** Standardising education, training, and career pathways through establishing a national maritime training coalition with appropriate geographic distribution that facilitates effective maritime workforce development outcomes.

5.2 Regional Centre of Excellence for Education and Training

Education is normally Australia's fourth largest export with a total value of $40B in 2019 prior to the COVID-19 pandemic. Maritime skills education and training is currently not a significant export and in fact international student enrolments have dropped. Compared to 7075 total enrolments in 2022 in maritime operations, only 30 were international fee paying. The AMC, SM TAFE, and Hunter TAFE (NSW) are recognised as excellent institutions providing training to maritime professionals. Australia's extensive coastline and proximity to major shipping routes make it an ideal location for maritime training. The country's diverse maritime environments, from busy ports to remote coastal areas, provide a wide range of training opportunities. Australia has a well-developed regulatory framework for maritime education and training, ensuring that programs meet international and national standards. The Australian Maritime Safety Authority (AMSA) plays a pivotal role in overseeing the quality of maritime education and training.

To become a centre of excellence for maritime education, the nation must promote international collaboration with neighbouring seafaring nations and expand course offerings to cover emerging areas such as renewable energy and sustainable shipping practices. Additionally, actively marketing maritime education programs to international students will enhance Australia's global reputation in this field. Australia has the potential to become a hub for maritime skills education and training in the Asia-Pacific region and beyond. The demand for this kind of training is apparent based on the fact the Norwegian Training Centre (NTC) in Manila currently accepts only 3% of all applications. The NTC provides a good case study for Australia.

By attracting a larger student body, to include international students from regional countries, it will be possible for Australia's maritime colleges to achieve the necessary scale to invest in cutting edge technologies, sustain their commercial viability for niche programs and attract the very best educators. Elevating our institutions to 'recognised world leading' status will greatly enhance the development of our domestic maritime workforce. Consideration should also be given to providing scholarships to high potential international students and linking their education to service with an Australian vessel operator.

6 **3-5 YEAR ACTION:** Invest in technology and instructors to support optimisation of skills acquisition, development, and deployment for the maritime sector.

18 *National Naval Shipbuilding Enterprise | Business & Industry | Defence*

A FAILURE TO TAKE ALL NECESSARY ACTIONS TO ARREST THE CURRENT TRAJECTORY OF SKILLS DEVELOPMENT AND PREPARE FOR THE OPPORTUNITIES IDENTIFIED IN THE FIVE-YEAR TIME HORIZON WILL SET IN MOTION EVENTS THAT LEAD TO AN UNRECOVERABLE DETERIORATION OF THE MARITIME WORKFORCE.

5.3 Financial Support Mechanisms

Government sponsored financial support mechanisms have been discussed above in relation to the WA government Defence Industry Workforce Initiatives and the success this had with growing an additional 400 apprentices for shipbuilding. A mandatory training obligation of 2 per cent of payroll for the maritime industry using maritime labour and covering relevant maritime qualified jobs was advocated for in 2013 and similar schemes have been successful in other countries. In 2022 after the UK released the Maritime 2050 strategy the government increased the education cost subsidy from 30% to 50% for all new and existing courses. The Support for Maritime Training (SMarT) funding had initially provided a 30% subsidy. The new scheme committed an additional £43M over two years to growing the maritime workforce.

With the shift away from the major resource companies operating their own vessels, and several major vessel operators shifting operations out of Australia a federally funded incentive program to reduce the cost of training and/or to compensate vessel operators for providing berths for trainees/cadets is required.

1 **IMMEDIATE ACTION:** Secure funding for retention, training, and education in maritime workforce roles. Reduce or subsidise RTO fees, provide workforce support program.

3 **IMMEDIATE ACTION:** Expand the talent pool by making existing STEM and technical vocation incentive programs available to people studying maritime qualifications.

5.4 Technology to Maximise Training Value of Sea Time

Though sea time is an important part of achieving qualifications for maritime work force professionals it is burdensome on vessel operators and increasingly difficult to secure. Technology can play a significant role in maximising the training value for maritime trainees by providing more efficient and effective training methods. Advanced maritime simulators can replicate realistic onboard experiences, allowing trainees to practise navigation, ship handling, and emergency response in a controlled and safe environment. This optimises the trainee experience and skills acquisition, without being dependent on constraints such as berth availability to accumulate sea time for basic skills acquisition. VR and AR technologies enable trainees to immerse themselves in maritime scenarios without leaving the classroom. Creating digital twins of vessels allows trainees to explore and understand the ship's systems and operations virtually. This can significantly reduce the time needed for familiarisation once onboard. Modern vessels are equipped with advanced monitoring and control systems. Trainees can access and familiarise themselves with these systems remotely, gaining valuable experience before they even set foot on a ship, where it makes sense to do so.

While technology can reduce the reliance on sea time for maritime trainees, it's important to strike a balance between virtual training and real-world experience. Sea time remains crucial for building practical skills, situational awareness, and teamwork, which is challenging to replicate entirely in a simulated environment. Therefore, a blended approach that combines technology-driven training with traditional sea time experiences is the most effective way to prepare future maritime professionals. A framework and process for determining what skills/areas/experiences can be viably shifted from real world to virtual will be needed, with a commitment to build understanding and commitment from not just the social partners but the industry regulators and the training deliverers to achieve an outcome acceptable to all stakeholders.

The future state of Australian maritime workforce training must embrace the full potential of emerging technologies. Providing students with access to the very best training aids and helping them to master their trade as quickly as possible will ensure a career in the sector is viewed positively from the very start. This kind of learning environment will also attract students from overseas. Investment in these systems will require government support. The WA state government assistance to SM TAFE is an excellent example of what is required. More of the same from the federal government will be necessary to achieve the desired target state for the maritime education sector.

3 **IMMEDIATE ACTION:** Expand the talent pool by making existing STEM and technical vocation incentive programs available to people studying maritime qualifications.

6 **3-5 YEAR ACTION:** Invest in technology and instructors to support optimisation of skills acquisition, development, and deployment for the maritime sector.

ANNEX A: CONSULTATIONS

A wide range of employers were consulted during the research phase of this project, covering:

- Major offshore hydrocarbons producers, which drive substantial ongoing demand for maritime skills in Australian waters.
- Vessel operators and manning agents servicing the offshore oil and gas sector.
- Specialist offshore construction services and labour providers, whom are integral to the building, maintenance and decommissioning of offshore hydrocarbons platforms.
- Specialist offshore exploration services and labour providers, whom are integral to exploring, discovering and developing new oil and gas fields.
- Port authorities, operators and related service providers, which are central to Australia's role as a prominent maritime trading nation.

Evidence, experiences and views of research participants were critical to the development of this report.

EDUCATION

- Australian Maritime College – Launceston, Tasmania
- South Metropolitan TAFE – Perth, Western Australia
- Newcastle TAFE - Newcastle, NSW
- Great Barrier Reef International Marine College TAFE – Portsmith, Queensland
- Fremantle Maritime Simulation College – Fremantle, WA
- ERGT Australia (WA Office) – Jandakot, Western Australia
- Whitsunday Maritime Training Centre – Airlie Beach, Queensland
- ECA Maritime College - Murarrie, Queensland
- METL – Sydney, New South Wales
- Maritime Career Training Sunshine Coast – Kulangoor, Queensland

SOCIAL STAKEHOLDERS

- Australian Institute of Marine and Power Engineers (AIMPE)
- Australian Maritime Officers Union (AMOU)
- Logistics and Defence Skills Council
- Maritime Industry Association Limited (MIAL)
- Maritime Industry Reference Committee
- Maritime Strategic Fleet Taskforce
- Maritime Union of Australia (MUA)

MARITIME WORKERS

Eleven mariners provided perspectives and insights to support this research:

- Five marine pilots with Master Unlimited (international - pinnacle of career)
- ETO/Chief Engineer with electrical trade, Deck Watch and Class 1 engineer qualifications (international - pinnacle of employment)
- Chief Engineer with Class 1 engineer (international - pinnacle of career)
- 2 Masters, up to 45m, domestic (early to mid-career)
- 1 Watch Keeper Deck (mid-career)
- 1 Cadet completing Watchkeeper Deck international qualifications (early career)
- 2 Trainers at VETs (holding domestic and international qualifications) (late career)

OTHERS

- Australian Maritime Safety Authority (AMSA)

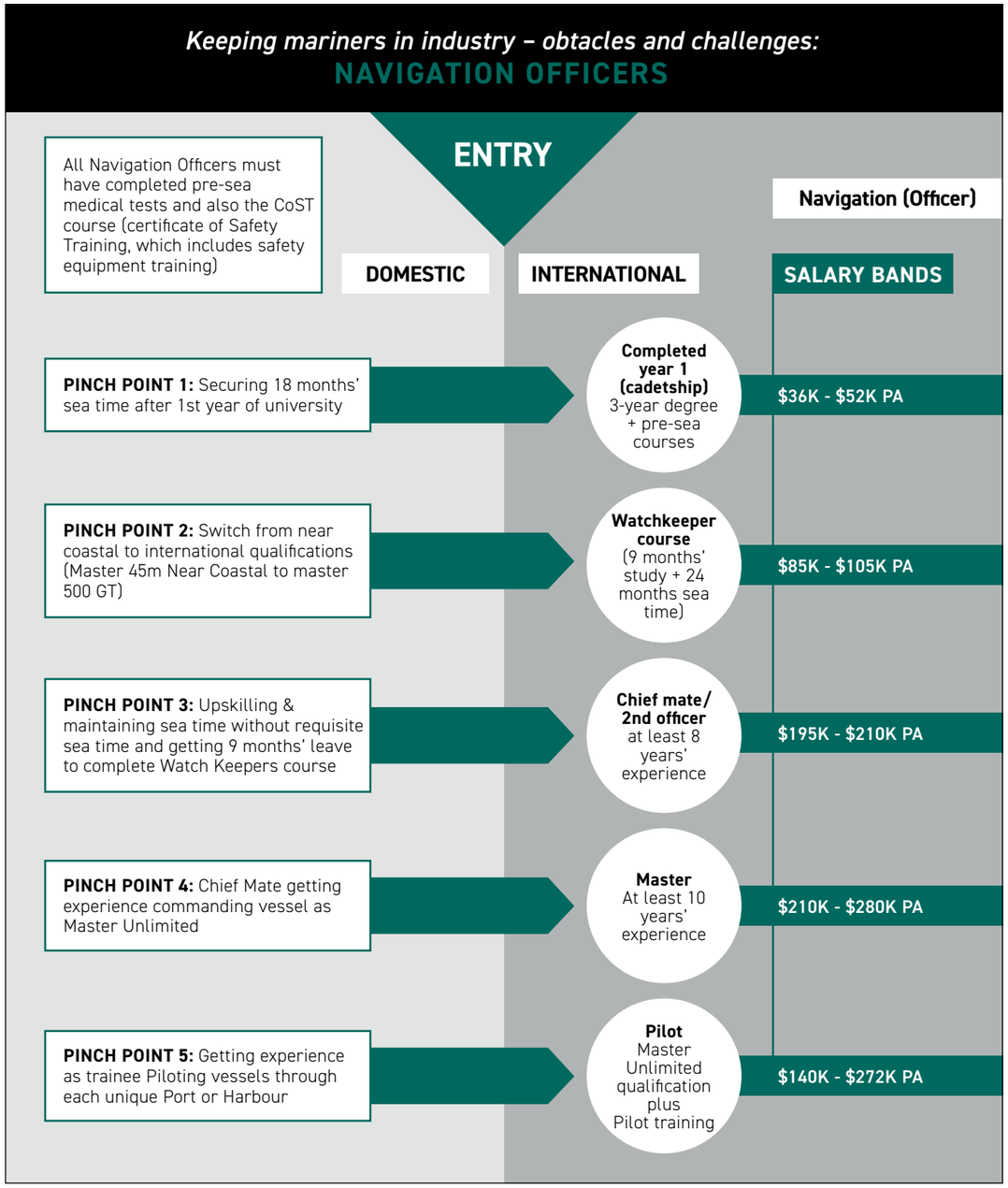
AUSTRALIA HAS THE POTENTIAL TO BECOME A HUB FOR MARITIME SKILLS EDUCATION AND TRAINING IN THE ASIA-PACIFIC REGION AND BEYOND.

ANNEX B: WORKFORCE DEVELOPMENT ANALYSIS

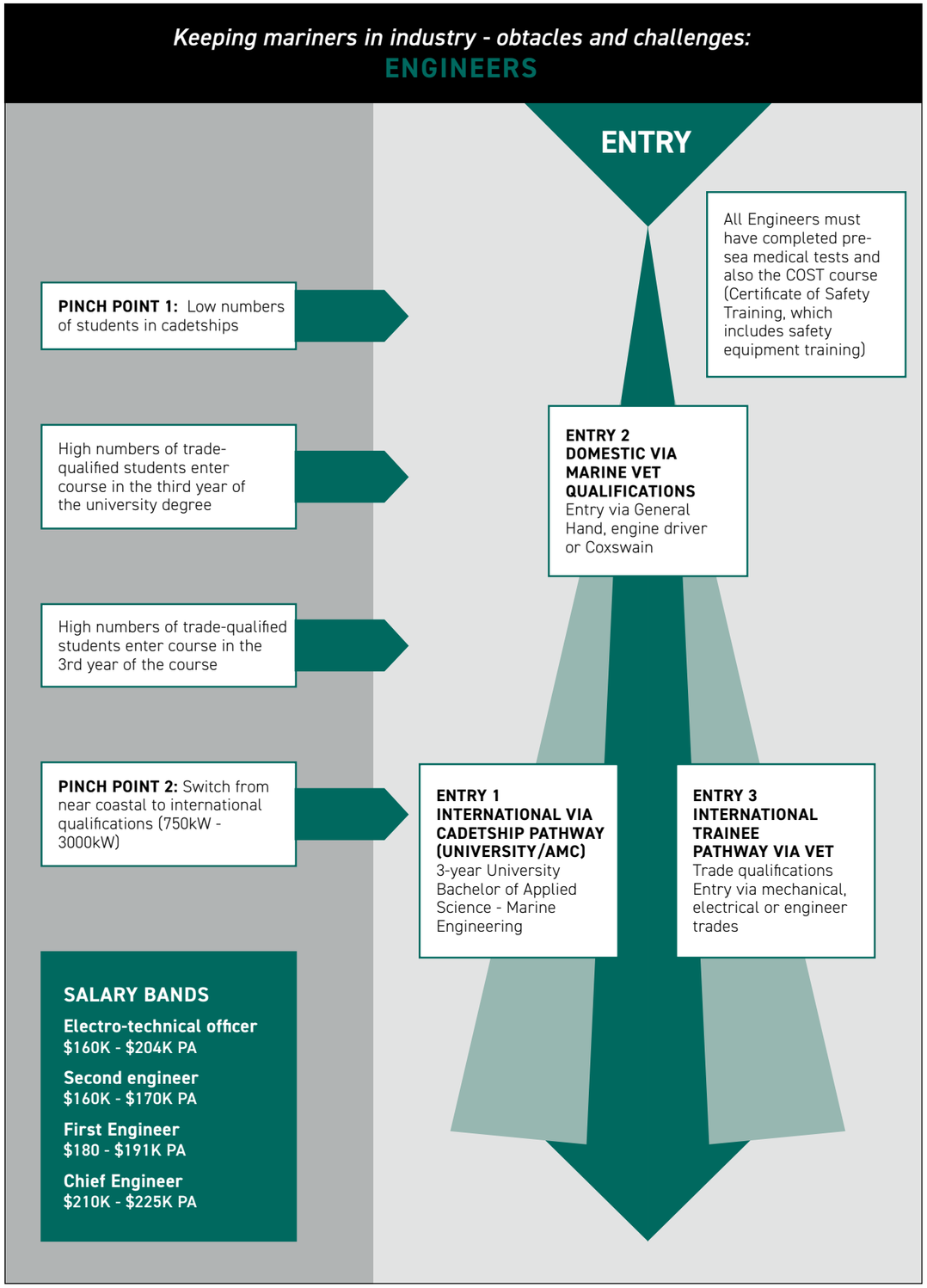
Skilling Constraints by Role

In interviews, mariners highlighted discouraging blockages and delays in the skilling process. These "pinch points" are depicted in the maps below.

Navigation Officers



Engineers



FROM 2013 TO 2018 THE NUMBER OF SEAFARERS UNDER THE AGE OF 30 HAD DROPPED FROM 18% TO 8%.

ANNEX B: WORKFORCE DEVELOPMENT ANALYSIS

Integrated Ratings

Keeping mariners in industry - obstacles and challenges:

INTEGRATED RATINGS

International qualification

ENTRY

Deck Officer/IR

All Ratings must have completed pre-sea medical tests and also the COST course (Certificate of Safety Training, which includes safety equipment training)

SALARY BANDS

Either 9 months' as Ratings, or 6 months' holding Able Sea Farer certificate

PINCH POINT 1: Paying for upfront cost of qualification = $5,000 - $8,000

Integrated Ratings

Integrated Ratings: $95K - $125K PA

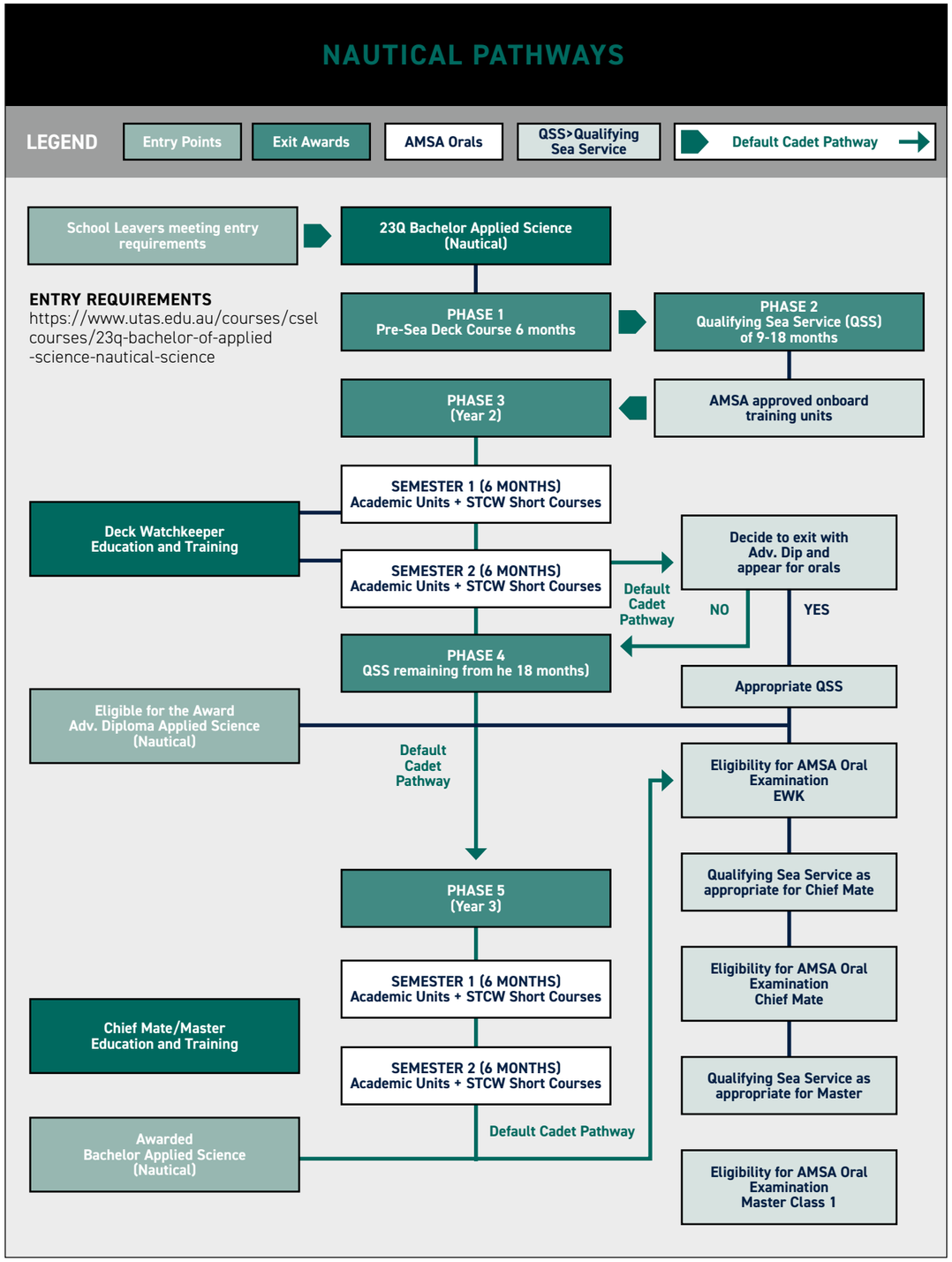
PINCH POINT 2: Getting 9 months' sea time

Integrated Ratings Chief

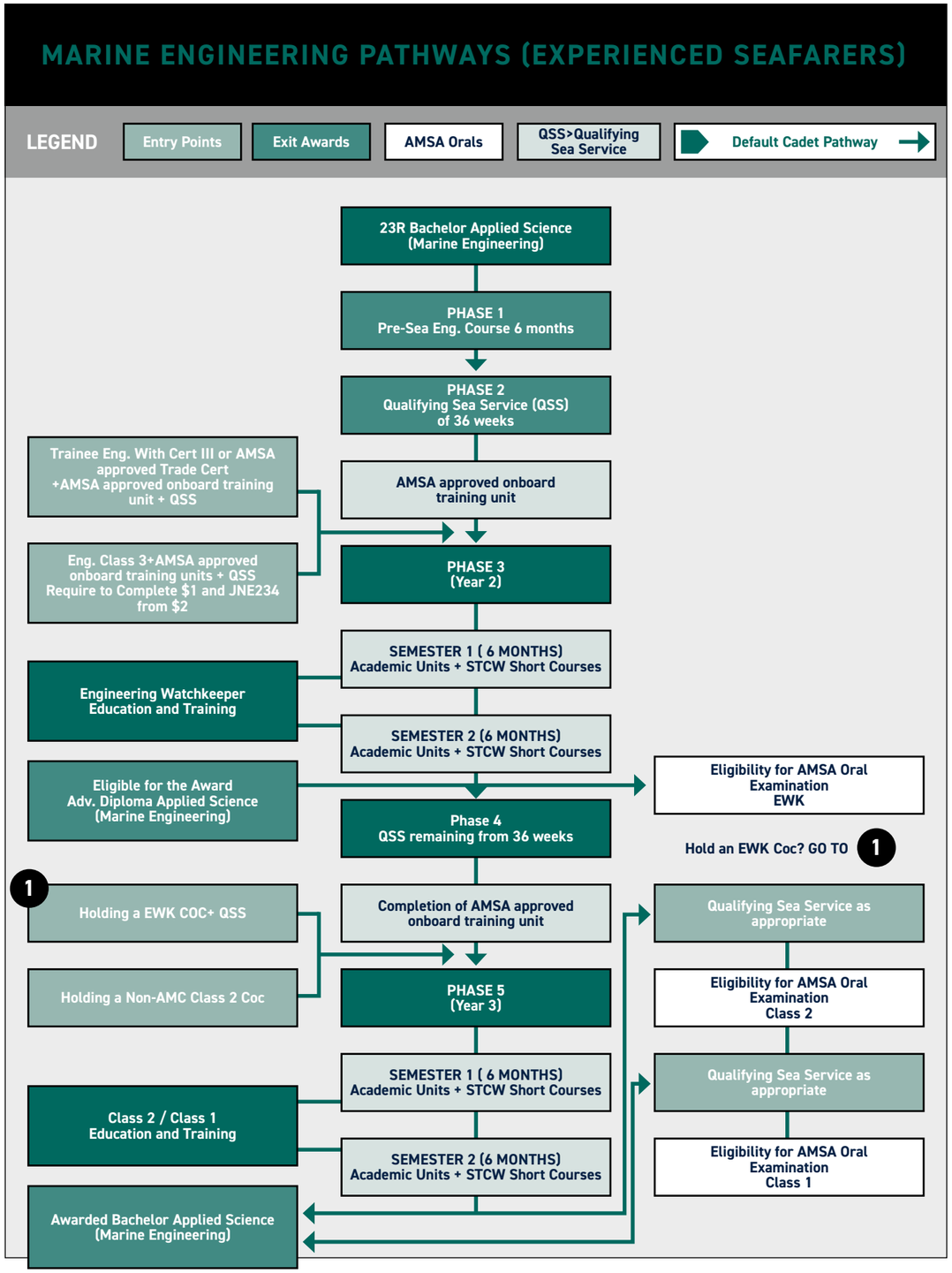
Chief Integrated Ratings: $113K - 140K PA

ANNEX C: CAREER PATHWAYS

Nautical pathways sourced from Australian Maritime College



Marine engineering cadet pathway for experienced seafarers



ANNEX D: REFERENCES

Selected references utilised for the Paper, in addition to datasets identified in the footnotes in the Paper.

- Maritime Workforce Development Forum 'Australian Maritime Workforce Development Strategy' May 2013
- Australian Government Infrastructure and Transport 'The Australian Maritime Industry Census Report' 2013
- Cato Institute: "The Jones Act: How an archaic, burdensome law has been able to withstand scrutiny and persist for almost a century." Colin Grabow, Inu Manak, and Daniel J. Ikenson June 2018 ("The Jones Act: A Burden America Can No Longer Bear")
- Maritime Industry Australia Limited 'Seafaring Skills Census Report' 2019
- Maritime IRC 'Industry Skills Forecast 2020 & 2021' 2020-22
- Queensland Government - Transport and Main Roads 'Maritime Jobs Taskforce' September 2020.
- Australian Parliament 'Policy, regulatory, taxation, administrative and funding priorities for Australian shipping' December 2020
- Maritime Industry Australia Limited 'Submission: Skills in a post-COVID Australia, Joint Standing Committee on Migration' March 2021
- Australian Government - National Skills Commission 'VET average price benchmarks 'Findings from the national VET average price benchmark database' March 2021
- Northern Territory Government 'Maritime Industry Development Discussion Paper' August 2021
- Go offshore Pty Ltd Maritime Offshore Oil and Gas Employee Enterprise Agreement 2021
- Australian Government – Home Affairs 'Civil Maritime Security Strategy' 2021
- Hamburg School of Business Administration, Commissioned by International Chamber of Shipping 'The Perfect Storm, The Impact of COVID-19 on Shipping, Seafarers and Maritime Labour Markets, Lessons learned and practical solutions for the future' April 2022
- Maritime Industry Australia Limited 'Skilling Our Maritime Nation: An Industry Snapshot' April 2022
- Australian Institute of Marine & Power Engineers 'A Career as a Marine Engineer' September 2022
- Maritime Industry Australia Limited 'Submission to Strategic Maritime Fleet Discussion Paper' November 2022
- Australian Government Productivity Commission 'Lifting productivity at Australia's container ports: between water, wharf and warehouse - Inquiry report' December 2022
- Australian Institute of Marine and Power Engineers & Australian Maritime Officers Union 'Submission to Strategic Maritime Fleet Discussion Paper' December 2022
- Maritime Union of Australia 'Submission to Strategic Maritime Fleet Discussion Paper' December 2022
- Pilbara Ports Authority 'Submission to Strategic Maritime Fleet Discussion Paper' December 2022
- Australian Government – Australian Institute of Marine Science 'The AIMS Index of Marine Industry 2023' 2023
- Australian Government – Australian Maritime Safety Authority 'Marine orders, forums, regulations and guidance' 2023
- Western Australian Government 'WA Shipping and Supply chain Task Force – Discussion Paper' January 2023
- Singapore Maritime Foundation (commissioned by Maritime and Port Authority of Singapore) 'Maritime Workforce Transformation Guidebook' April 2023
- Australian Government – Treasury 'Working Future - The Australian Government's White Paper on Jobs and Opportunities' September 2023
- AMSA Shipping Consultative Forum 23 March 2023 Agenda Paper

ANNEX E: IDENTIFIED MARITIME SKILLS REVIEWS SINCE 2013

NO	PUBLICATION	YEAR	DESCRIPTION	FUNDING	STATUS
1	Maritime Workforce Development Forum	2013	The Maritime Workforce Development Forum was established by the then Minister for Infrastructure and Transport (The Hon Anthony Albanese MP) in 2012 to address areas that are fundamental to building a sustainable domestic maritime skills base. Ageing workforce, increasing requirements, low training numbers relative to requirement and importance of regular workforce planning highlighted. 'Australia is "running on empty" when it comes to its ability to maintain a national pool of maritime labour trained and working in Australian waters. An ageing workforce demographic, fewer and fewer Australian flagged vessels and increasing global economic pressure on labour and shipping costs mean that failure to act now will condemn our domestic commercial maritime workforce to a recycling of labour within the existing labour market and a continuing decline in terms of numbers and skills'	Cost of training, availability of berths, availability of staff; all highlighted	Action proposed with funding, training targets, training levy and national coordination of workforce development via new institutional arrangements. No government action taken on funding.
2	Maritime Industry Australia Limited	2018	Builds on SEA18, Skilling our Maritime Nation the 'Seafaring Skills Census Report' was endorsed by Commonwealth Government. Executive summary highlighting workforce challenges, future demand for workforce to increase, identified cost of training, ageing workforce and skill shortages.	Cost identified as No.1 barrier to training; not enough people in the training pipeline	No action on funding.
3	Policy, regulatory, taxation, administrative and funding priorities for Australian shipping (Australian Government)	2020	Highlighted the critical importance that having the right maritime skills plays for Australia. Generic funding identified as flowing into the system, difficulties navigating complex training system, identified training gaps and pathways, declining opportunities, ageing workforce, and skill shortages (75% of employers had experienced skills shortages). Identified 2012 study and initiatives.	Broad range of recommendations including funding	No government action taken on funding.
4	Maritime Industry Development Plan – Discussion Paper	2021	Highlights that a skilled, stable and available workforce is a critical component for economic development. Worker shortages, high wage costs and large peaks and troughs in demand for skilled workers are a by-product of the Territory's resources-driven economy. This is compounded by changing industry conditions such as the widespread adoption of technology and automation.	Discussion points raised in respect to future skills requirements, training, consideration of regional relationships to develop overseas training demand	Unknown
5	Strategic Fleet Taskforce	2022	The Australian Government appointed a new taskforce to guide the establishment of Australia's Maritime Strategic Fleet, which will strengthen economic sovereignty and improve national security. Highlighted the importance of having secure employment and pathways for maritime skills	Final report and government response released publicly in November 2023. Response primarily concerned with establishing strategic fleet and vessel registration matters.	No government action taken on funding.
6	Maritime Skills Crisis Workshop [Maritime Industry Australia Limited]	2023	Forum identified well known challenges; series of new demand for maritime skills emerging. Funding and costs of training highlighted; noted industry wide skill shortages and lack of whole of nation approach.	Broad range of recommendations including funding	No action on funding