

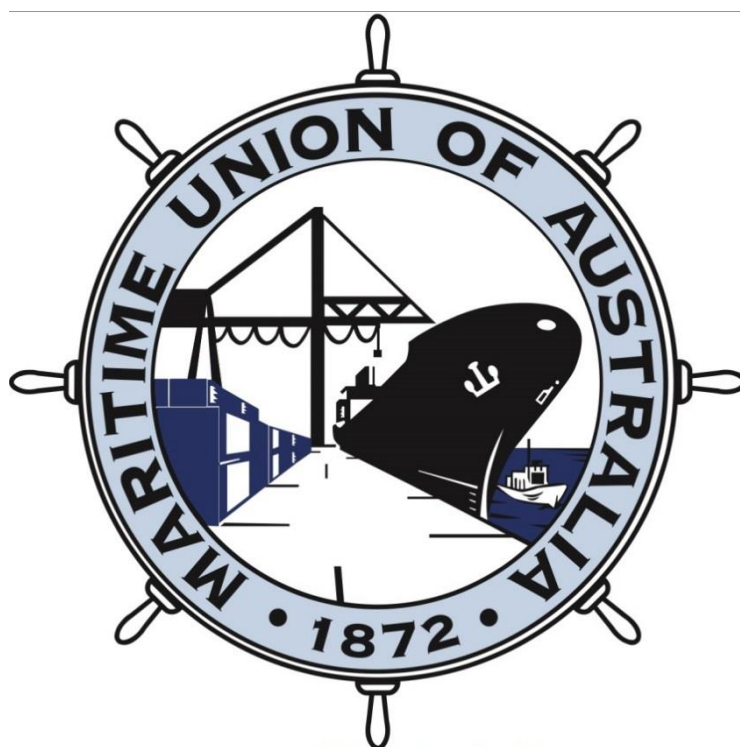
**Submission
No 43**

INQUIRY INTO DEVELOPMENT OF A HYDROGEN INDUSTRY IN NEW SOUTH WALES

Organisation: Maritime Union of Australia (MUA)

Date Received: 16 March 2021

**MUA Submission:
Inquiry into the development of a hydrogen
industry in New South Wales**



16 March 2021

Standing Committee on State Development

Submitted by email: State.Development@parliament.nsw.gov.au

Paddy Crumlin

National Secretary,

Maritime Union of Australia

A Division of the Construction, Forestry, Maritime, Mining and Energy Union

365 Sussex St, Level 2,

Sydney, NSW, 2000

For inquiries contact:

Website: www.mua.org.au

We are happy for the submission to be made public.

Introduction

This submission has been prepared by Maritime Union of Australia (MUA). The MUA is a Division of the 120,000-member Construction, Forestry, Maritime, Mining and Energy Union and an affiliate of the 20-million-member International Transport Workers' Federation (ITF).

The MUA represents approximately 13,000 workers in the shipping, offshore oil and gas, stevedoring, port services and commercial diving sectors of the Australian maritime industry. MUA members work in coal export ports and we are part of the Offshore Alliance representing workers working on offshore oil and gas facilities. MUA members work in port terminals throughout Australia handling the import and export of chemicals, oil and gas.

MUA members currently handle wind turbines and solar panels in ports across Australia, and would work in future hydrogen port terminals, on board vessels transporting and/or powered by hydrogen and ammonia, and be part of building and maintaining future offshore renewable energy projects.

In 2020, MUA members worked on the vessels that rescued people from bushfires in Mallacoota, sheltered a large numbers of people fleeing bushfires on commercial tugs in Eden, and a number of MUA members lost their homes to bushfires.

Table of contents

Summary	5
Response to terms of reference	5
Significance of the hydrogen industry for NSW.....	5
Employment in the hydrogen industry	6
Employment in hydrogen shipping	8
The contribution of hydrogen to energy security.....	9
NSW ammonia terminals and tankers: Stop the use of Flag of Convenience shipping ..	12
Manufacture of hydrogen infrastructure	14
Use of offshore wind to produce hydrogen.....	15
Zero carbon fuels for shipping	18
Use of hydrogen in industrial processes.....	20
Hydrogen industry workforce	21
Safety in the Hydrogen industry	21
Jobs in hydrogen	22
Appendix 1: <i>Wincanton</i> safety inspection record	23
Appendix 2: Temporary Licence voyages by the <i>Wincanton</i> since the start of the Coastal Trading Act 2012.	24

Summary

We welcome the initiative taken by all levels of government into establishing a hydrogen industry in Australia. Hydrogen made from renewable energy has significant potential to reduce greenhouse gas emissions and establish a new industry and significant jobs in Australia.

However, proper industrial policy must be developed to ensure this new industry is safe, properly planned, and delivers good quality jobs. NSW should develop its own Hydrogen Strategy to guide development of the hydrogen industry, as Queensland has already done.

The MUA supports the submission made to this inquiry by the South Coast Labour Council.

The MUA is working hard to prepare our membership and industries for the necessary transition to a zero-net emissions economy and society. We recognise the need to urgently reduce emissions globally and in Australia to prevent global heating from exceeding 1.5°C, but this will have a very significant impact on the jobs held by many of our members. Our ability to provide climate leadership in these industries depends on the ability of governments and of our union to deliver a just transition to our members working in fossil fuel industries, and their communities. If we cannot provide such a transition, we risk significant reductions to workers' living standards, deepening inequality, and a very significant political backlash which could stall the transition we need.

Response to terms of reference

Significance of the hydrogen industry for NSW

TOR 1. The size of the economic and employment opportunity created by the development of a hydrogen industry in NSW, in particular those opportunities for regional NSW.

NSW should develop its own Hydrogen Strategy to guide development of the hydrogen industry and ensure it is safe, properly planned, provides quality jobs, and contributes to the state's energy security. Building on the work of the National Hydrogen Strategy and the Technology Investment Roadmap, the Australian Energy Market Operator (AEMO) is modelling a future 'Export Superpower' scenario for the future of Australia's electricity system which includes both Port Kembla and Newcastle as hydrogen export ports. We strongly support this development. For the 2022 Integrated System Plan, AEMO are modelling hydrogen production beginning in 2023, and then ramping up significantly.¹

¹ Australian Energy Market Operator, [Draft 2021 Inputs, Assumptions and Scenarios Report](#), December 2020, p.172-181.

To gain full economic value from the development of the hydrogen industry, we must develop expertise in the use of hydrogen or ammonia as a fuel, and the development of hydrogen or ammonia transport, storage and bunkering – rather than just exporting it.

Development of a domestic hydrogen industry could also contribute significantly to the energy security of NSW – since the closure of the Clyde and Kurnell refineries, all of NSW’s liquids fuels are imported and rely on supply chains that have become increasingly precarious since the pandemic.²

Employment in the hydrogen industry

Careful consideration must be given to the role of the hydrogen industry in ensuring a just transition to a low-emissions economy. This is imperative to ensure that the transition to a low-emissions economy happens with community support and is not subject to political backlash. Unfortunately, the history in Australia is that industrial transitions have increased inequality, with only one half to one third of displaced workers finding equivalent employment.³

The need for a just transition is part of the Paris Agreement, which describes "the imperatives of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities."⁴ The creation of the LaTrobe Valley Authority following the closure of the Hazelwood coal-fired power plant and the Worker Transfer Scheme is one significant effort to establish a just transition in Australia. The Queensland Government has also established a Just Transition Group, which will be developing a transition plan for the state.⁵

Existing jobs in fossil fuels industries tend to be good secure union jobs. Ensuring that new low-emissions industries feature jobs of a similar quality is essential to combating inequality and ensuring that there is justice in the transition to a new low-emissions economy.⁶

² John Francis, [Australia’s Fuel Security: Running on Empty](#), November 2018.

³ ACTU, 2016, [Sharing the challenges and opportunities of a clean energy economy: A Just Transition for coal-fired electricity sector workers and communities](#).

⁴ UNFCCC, [Report of the Conference of the Parties on its twenty-first session](#), held in Paris from 30 November to 13 December 2015, p.21,

⁵ Queensland Department of Employment, Small Business and Training, [Just Transition](#).

⁶ Other sources on implementing a just transition include: MUA and others, [Putting the Justice in Just Transition: Tackling inequality in the new renewable economy](#), November 2019. Australian Council of Trade Unions, [Sharing the benefits with workers: A decent jobs agenda for the renewable energy industry](#), November 2020. ACTU, [Securing a Just Transition Guidance to assist investors and asset managers support a just transition](#), December 2020. Peter Sheldon, Raja Junankar, Anthony De Rosa Ponello. [The Ruhr or Appalachia? Deciding the future of Australia’s coal power workers and communities](#), October 2018. IRRRC Report for CFMMEU Mining and Energy Division. Hunter Jobs Alliance, [No regrets: Planning for Economic Change in the Hunter](#), March 2021. IndustriALL, [Just Transition – An idea whose time has come](#), 16 May 2019. Commission on Growth, Structural Change and Employment (Germany), [Final Report](#), January 2019. Dr. John Falzon, [Goodbye Neoliberalism: Restoring democracy, supporting trade unions, protecting workers’ rights](#), December 2018.

The risks and opportunities are outlined below:

Overall, the energy transition will generate more jobs in renewable energy and energy efficiency than will be lost in the fossil fuel sector. However, the geographic distribution of jobs gained and lost may not be in alignment. Similarly, new job creation may not occur within the same time scale as jobs losses, and training misalignments can also be expected, requiring additional adjustment measures. Moreover, other economic sectors than the energy sector can experience transition-related employment impacts, calling for a holistic labour policy that applies just transition considerations across all the economy.

It is against this backdrop—diverging transition outcomes as well as spatial and temporal adjustments needs—that policies for economic restructuring are needed to spread the benefits of the transition widely and to minimize the burdens and costs. Such policies are essential not only as a matter of fundamental fairness but also to limit the likelihood that those negatively impacted will continue to oppose policies required to render the world's economies climate-safe.⁷

At a minimum, the following measures should be taken in the hydrogen industry to ensure a just transition:

1. **Maximising local jobs.** Detailed procurement plans must be developed for the sourcing of materials and equipment that maximise Australian production capacity and potential production capacity. Government should require strict local content requirements in all projects, including their maritime supply chains.
2. **Ensuring good union jobs.** The government should ensure that procurement rules with good employment conditions, union agreements and responsible contracting policies are in place across the industry.
3. **A job guarantee and no forced redundancies** for workers from fossil fuel industries, allowing for direct transition into employment on hydrogen projects. In conjunction with the relevant unions, examine how the German job guarantee model could be implemented in Australia.⁸
4. **Carry out a detailed skills and training assessment** and ensure local training providers are in place and appropriate training is funded to ensure the workforce is prepared. Training should be provided through local TAFEs rather than privately.
5. **Reducing inequality.** Ensure the hydrogen industry has apprenticeship programs in place with minimum ratios, and include recruitment of workers from disadvantaged backgrounds, including women and Aboriginal workers.
6. **Ensuring community engagement and development,** to ensure that local communities benefit in the broadest possible sense.

⁷ Xavier Garcia-Casals, Rabia Ferroukhi, Bishal Parajuli. [Measuring the socio-economic footprint of the energy transition](#). *Energy Transitions* (2019) 3: 115-116.

⁸ Commission on Growth, Structural Change and Employment, *Final Report*, January 2019, see p.97-98 for details of the job guarantee scheme.

7. **Safety and Training.** Work with Safe Work NSW and relevant training agencies to develop safety codes of practice and qualifications for the hydrogen industry at a national level. Establish hydrogen industry training centres in TAFEs to ensure they are publicly accessible and accountable.

Employment in hydrogen shipping

Hydrogen is a dangerous, experimental and high-value cargo. Transported as ammonia, it is also highly toxic to people and the environment – it is classified as ‘Hazardous’ by Safe Work Australia, as toxic by inhalation, and causing burns. At high concentrations, it can cause death by inhalation.⁹ A liquid ammonia explosion in April 2013 decimated 4 blocks around a Texas facility, and shook the ground over 100km away.¹⁰

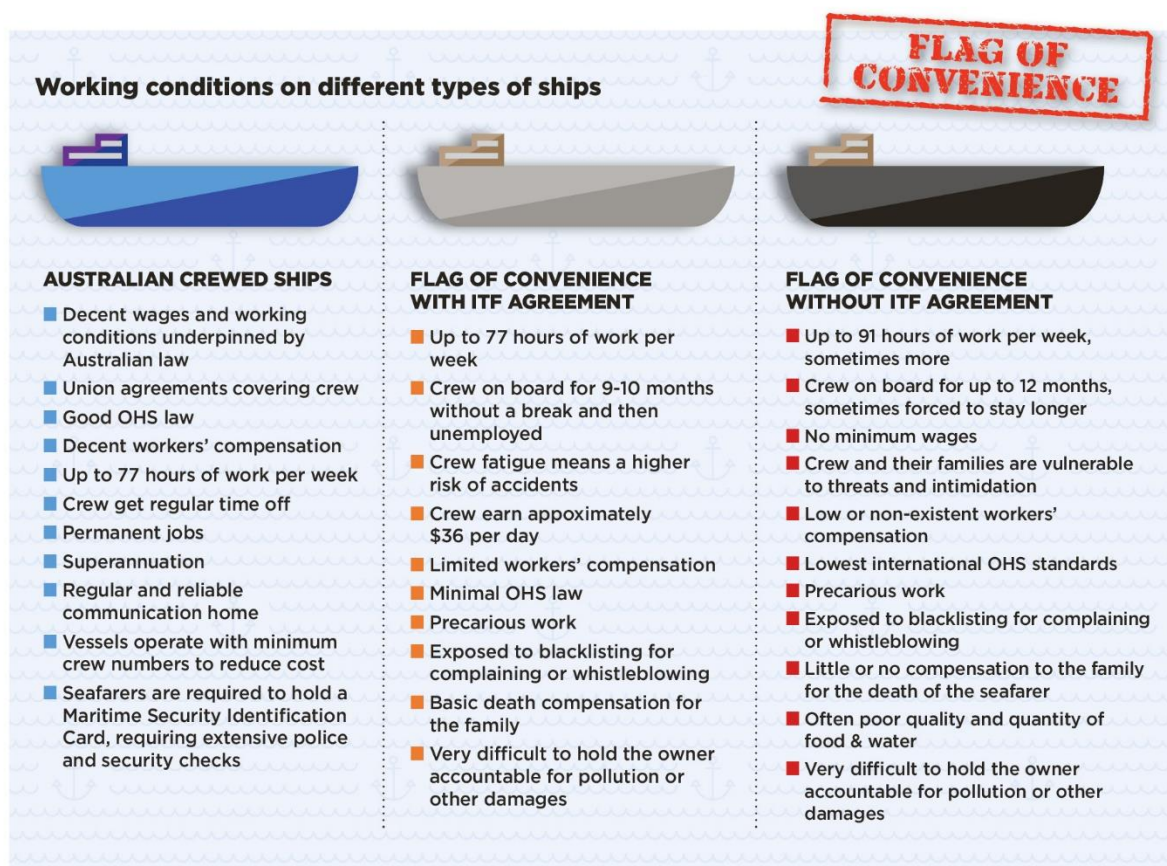
We urge the committee to require that hydrogen and ammonia shipping in Australia and from Australia take place on Australian flagged and crewed ships, governed by Australian WHS and fatigue standards. Ships must be regulated under the *Navigation Act 2012*, crew must have Navigation Act qualifications and vessels must have clear Minimum Safe Manning documents (MSMD) that reflect the danger and complexity of the cargo and the location of facilities near population areas. Tripartite consultations should take place on the MSMD. Dangerous goods training under the National Law is not at all sufficient. The costs of this are minimal in comparison to the value of the cargo, and the importance of safely establishing the industry.

There is too much at stake to leave the safe regulation and rapid development of the industry to other flag state authorities, or to flag of convenience shipping and crews. Figure 1 gives a comparison of working conditions on various types of ships.

⁹ IMAP – Accelerated assessment of industrial chemicals in Australia, [Ammonia and Ammonium hydroxide: Human health tier II assessment](#), 04 July 2014

¹⁰ Ker Than, [Explosion Highlights Dangers of Anhydrous Ammonia](#), *National Geographic News*, April 21 2013. The 2020 Beirut explosion was of the different but related substance, ammonium nitrate.

Figure 1: A comparison of working conditions on Australian and international ships.



Source: Maritime Union of Australia and International Transport Workers Federation

Ensuring that hydrogen export vessels are Australian flagged and crewed will also ensure that the economic value of the transport directly contributes back to the Australian economy. This happens both through the vessel's management in Australia, but also the income taxes crew pay in Australia back to the Australian government, and the wages they spend in their (often regional) communities.

In the LNG export industry, four Australian-flagged and crewed vessels have been operating for 30 years to transport LNG from the North West Shelf (NWS) LNG Joint Venture project, with no industrial issues during that time.

The contribution of hydrogen to energy security

With no remaining refineries manufacturing liquid fuel in NSW, there is a need to invest in ensuring we have adequate domestic sources of energy. The Australian Government has

correctly identified that ‘the Covid-19 pandemic has highlighted limited flexibility in the fuel storage market in Australia when fuel supply and demand balance changes suddenly.’¹¹ As Engineers Australia say in their submission on the Australian Government’s Liquid Fuel Security Interim Report:

It is time to develop a positive forward-thinking strategy that builds jobs in new industries, linking this strategy to evolving transport modes and fuel options, and position Australia as a global leader. This vision will cost money, but the alternative is the real prospect of our nation grinding to a halt and being rendered defenceless in a matter of weeks. (p.4)

The report *Australia’s Fuel Security: Running on Empty* previously raised concerns about Australia’s total reliance on international ships and crews for crude imports, refined petroleum imports, and domestic fuel distribution. These risks have only become greater in the pandemic.

Ships flagged in other countries are considered to be a part of those countries. During the Covid-19 pandemic we have seen many unprecedented examples of countries exercising their national power to secure essential supplies. It is extraordinary that Australia relies on the equivalent of 60 full-time tankers to import its fuel supplies annually, and does not flag or crew a single one of these ships, and since 2016 does not operate a single tanker larger than a bunker barge.

As the pandemic unfolds, Australia may need ships to secure essential supplies. There is no guarantee that they will be available to us. In addition to the risks already identified, the shipping industry finds itself in a completely unforeseen crisis in which the international crews that it relies on are often unable to leave the ships they work on, and it is extremely difficult for them to be replaced by new crews.

The MUA has advocated for the creation of a Strategic Fleet.¹² Ships in this fleet could be incentivised to accelerate the development of new zero-carbon shipping fuels and technologies (described in more detail later in this submission), along with associated storage, port terminal and bunkering infrastructure, in line with objective 3.8 and 3.16 of

¹¹ Department of Industry, Science, Energy and Resources, [Opportunities to increase Australia’s domestic fuel storage capacity - Request for Information](#), 15 June 2020.

¹² Maritime Union of Australia, *MUA submission: Opportunities to increase Australia’s domestic fuel storage capacity - Request for Information*, 15 July 2020. Maritime Union of Australia, *Inquiry into the Policy, regulatory, taxation, administrative and funding priorities for Australian shipping - Supplementary Submission*, 7 September 2020, Senate Standing Committees on Rural and Regional Affairs and Transport. Maritime Union of Australia, *Response to Questions on Notice from Committee hearing on 15 September 2020, Inquiry into the implications of the COVID-19 pandemic for Australia’s foreign affairs, defence and trade*. Joint Standing Committee on Foreign Affairs, Defence and Trade, 9 October 2020.

the National Hydrogen Strategy.¹³ The Senate Standing Committees on Rural and Regional Affairs and Transport has recommended that ‘the Australian government develops a fuel security strategy, which will include proposals to transition to locally-sourced fuels as well as address supply issues.’¹⁴ The Committee quotes evidence from Professor Ross Garnaut:

The path to self-sufficiency in fuel, to reduced reliance on long transport chains to insecure parts of the world, is through acceleration of the transition to zero emissions fuel, which will be Australian renewable electricity, Australian hydrogen, Australian ammonia—not only Australian; it will be highly decentralised around Australia. So that is a path to genuine fuel security. I don't think that there's any security comparable in holding reserves of petroleum in the United States or anywhere in any single place in Australia. So that's my point about security. It will be cheaper, it will be more reliable, it will be Australian and it will be secure.¹⁵

The committee commented that it ‘agrees with statements made by inquiry participants that Australia's long-term security will benefit from a transition to domestically produced environmentally friendly fuels, such as renewable electricity, hydrogen, and biofuels. Further, this will also reduce Australia's carbon footprint and help mitigate the impacts of climate change.’¹⁶

Recommendation 1: NSW should develop its own Hydrogen Strategy to guide development of the hydrogen industry and ensure it is safe, properly planned, provides quality jobs, and contributes to the state’s energy security.

Recommendation 2: The NSW government should support a review of the operation of the *Australian Jobs Act 2013* to ensure that the Australian participation provisions are applied to the sea transportation elements of hydrogen and ammonia projects. It should also make this a requirement for any hydrogen or ammonia projects operating in NSW and for any projects receiving NSW government support.

Recommendation 3: Ships carrying hydrogen or ammonia must be regulated under the *Navigation Act 2012*, crew must have Navigation Act qualifications and vessels must have clear Minimum Safe Manning documents (MSMD) that reflect the danger and complexity of the cargo and the location of facilities near populated areas. Tripartite consultations should take place on the MSMD.

¹³ Objective 3.8: “the following areas should be priorities for research, pilot projects, trials, and demonstration projects ...Using hydrogen for transport, with a focus on heavy and long-range road transport, rail and shipping.” Objective 3.16: “Agree to a shared vision of hydrogen being a clean, cost competitive fuel option for Australian land and marine transport, in particular for heavy duty and long range transport applications,” COAG Energy Council, [Australia's National Hydrogen Strategy](#), November 2019, p.79.

¹⁴ Senate Rural and Regional Affairs and Transport References Committee, [Policy, regulatory, taxation, administrative and funding priorities for Australian shipping](#), Recommendation 18.

¹⁵ Professor Ross Garnaut, evidence to the Senate Rural and Regional Affairs and Transport References Committee, [Policy, regulatory, taxation, administrative and funding priorities for Australian shipping](#), December 2020, p.83

¹⁶ Senate Rural and Regional Affairs and Transport References Committee, [Policy, regulatory, taxation, administrative and funding priorities for Australian shipping](#), December 2020,p.92

Recommendation 4: Ships used in towage in NSW should be operated under collective agreements negotiated with maritime unions, and the use of partnerships, used in some WA ports exporting iron ore, should not be acceptable in NSW.

NSW ammonia terminals and tankers: Stop the use of Flag of Convenience shipping

TOR 2. The State's existing hydrogen capabilities, including:

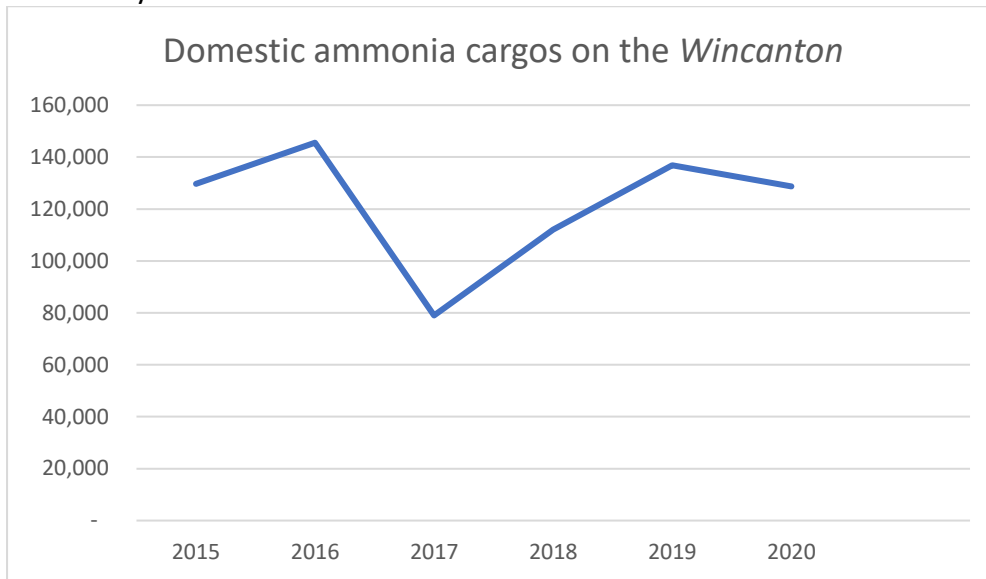
(b) The State's energy and industrial infrastructure which could support the production, storage, distribution, use and export of hydrogen.

One possibility for the export of hydrogen is as ammonia. Newcastle has a working ammonia port terminal operated by Orica. Since January 2010, Orica has also had an ammonia tanker on long-term charter to carry ammonia from Orica facilities in Newcastle to Orica facilities in Gladstone. The Newcastle ammonia terminal and the tanker *Wincanton* could provide an excellent opportunity for research and development and of hydrogen and ammonia ships, bunkering and port facilities, and training of tanker crew. For example, new research is being undertaken in the Netherlands on the use of ammonia as a fuel for ammonia tankers.¹⁷

In 2020 *Wincanton* carried out 23 voyages from Newcastle to Gladstone, carrying a total of 123,054 tonnes of ammonia – an amount that has stayed roughly consistent over the past 5 years (Figure 2).

¹⁷ C-job Naval Architects, [The next step in C-Job's ammonia research](#), 4 July 2019.

Figure 2: Ammonia cargos carried on the *Wincanton* between Newcastle and Gladstone in the last 5 years.



However, Orica has instead chosen to use a Flag of Convenience ship for these cargos, operating on Temporary Licences held by Orica under the *Coastal Trading Act 2012*. We are not aware of any Australian ever being employed on this ship, despite it only operating in Australia. The *Wincanton* is currently flagged and registered in Panama, operated by Peruvian company Transgas, and has an all-Peruvian crew. During the time it has operated in Australia, it was previously flagged in the Marshall Islands, and Singapore before that. It has also been operated by the Singaporean office of German company Bernard Schulte, by the Norwegian company Pareto Business Management, and by the American company Petredec through its Bermudan office. At various times the ship has also had crew from the Philippines and from Myanmar.

The outsourced and inconsistent ship management not only prevents the development of a proper program to use the ship and its terminals to assist in the development of the hydrogen and ammonia industry in Australia, it has also lead to multiple safety breaches. The *Wincanton* was detained by Australian authorities in November 2019 and February 2020, with further defects identified in September and December 2020. Full details of the detentions and defects are available in Appendix 1. Reputable ship owners seek to avoid any detention of their ships.

A ship is detained when the Australian Maritime Safety Authority (AMSA) judges that the problem is severe enough to hold the ship in port until it is fixed, despite the considerable cost and inconvenience to the ship owner (a detention). It is only applied to more dangerous problems than a 'deficiency' or 'defect'.

AMSA explains that detentions are made:

To ensure that the ship will not sail until it can proceed to sea without presenting a danger to the ship or persons on board, or without presenting an unreasonable threat of harm to the marine environment, whether or not such action will affect the scheduled departure of the ship.¹⁸

Governments at all levels should mandate Australian content in the marine elements of supply chains servicing and supporting the hydrogen and ammonia industry, as a contribution to improving supply chain security, resilience and safety. That should include a commitment to Australian employment in all facets of the industry's supply chains along with a commitment to use Free on Board (FOB) Destination shipping contracts (where the seller is responsible for the ship and freight until it arrives at the buyers nominated discharge port) to ensure the safety of both cargo and crew during transportation under Australian safety standards.

Recommendation 5: Orica should be required to register and crew their ammonia tankers in Australia so that they can be used for research and development of an Australian ammonia and hydrogen industry and training of crew for Australian hydrogen and ammonia export tankers.

Recommendation 6: Governments at all levels should mandate Australian content in the marine elements of supply chains servicing and supporting the hydrogen and ammonia industry. That should include a commitment to Australian employment in all facets of the industry's supply chains along with a commitment to use Free on Board (FOB) Destination shipping contracts (where the seller is responsible for the ship and freight until it arrives at the buyers nominated discharge port) to ensure the safety of both cargo and crew during transportation under Australian safety standards.

Recommendation 7: Consistent with the NSW Government commitment to use its renewable energy plan to drive local content requirements and local jobs, Australian content should be required for the transportation of BlueScope's iron ore feedstock from WA to Port Kembla, and other shipping needs, as well as the use of low-emissions fuels.

Manufacture of hydrogen infrastructure

TOR 3. The capacity of and barriers to NSW becoming a major production, storage and export hub for hydrogen, including NSW's capacity to:
(c) manufacture and export hydrogen storage and transport infrastructure, including in heavy transport and shipping vessels;

¹⁸ AMSA, Port State Control 2014 Report, p. 19.

We strongly support the manufacture of hydrogen storage and transport infrastructure in NSW.

Use of offshore wind to produce hydrogen

TOR 3(d) generate green hydrogen through renewable energy sources;

Renewable hydrogen could be produced directly by offshore wind projects, potentially avoiding the need for transmission and the cost of purchasing electricity from the grid.¹⁹ This could help bring down the cost of producing hydrogen.

More consistent wind offshore has a higher capacity factor, to the extent that offshore wind has been described by the International Energy Agency (IEA) as having a ‘value proposition potentially comparable to that of baseload technologies such as nuclear power and coal-fired generators.’ The reliability and consistency of offshore wind ‘reduces the need for investment in other dispatchable capacity, including investment in combined-cycle gas turbines (CCGTs).’²⁰

Building renewable energy offshore virtually eliminates the climate risks of high temperature and bushfires.²¹ Many of the REZs are proposed to be built in areas with a high bushfire and temperature risk, so infrastructure offshore reduces the climate hazards the energy system is exposed to.

The development of offshore wind in Australia is progressing rapidly. The Australian Government carried out a consultation on the regulatory framework for offshore renewable energy in early 2020, and says that ‘legislative settings and framework aim to be in place and operational by mid-2021’. \$4.8 million in funding was provided to finish developing the new framework and deal with initial licence applications in the 2020 Commonwealth budget.²²

NSW has outstanding offshore wind resources with average annual wind strengths of 10 meters/second available not far off the coast – a Class 1 resource (Figure 3). This is windier than most parts of the European North Sea, matched only by wind off the far north of Scotland. A full report on the potential for offshore wind in Australia, including NSW case studies, will be released in May through the Blue Economy Cooperative Research Centre

¹⁹ International Energy Agency, [Offshore Wind Outlook 2019](#), p.55-6. Robert Service, [Ammonia—a renewable fuel made from sun, air, and water—could power the globe without carbon](#), *Science*, 12 July 2018.

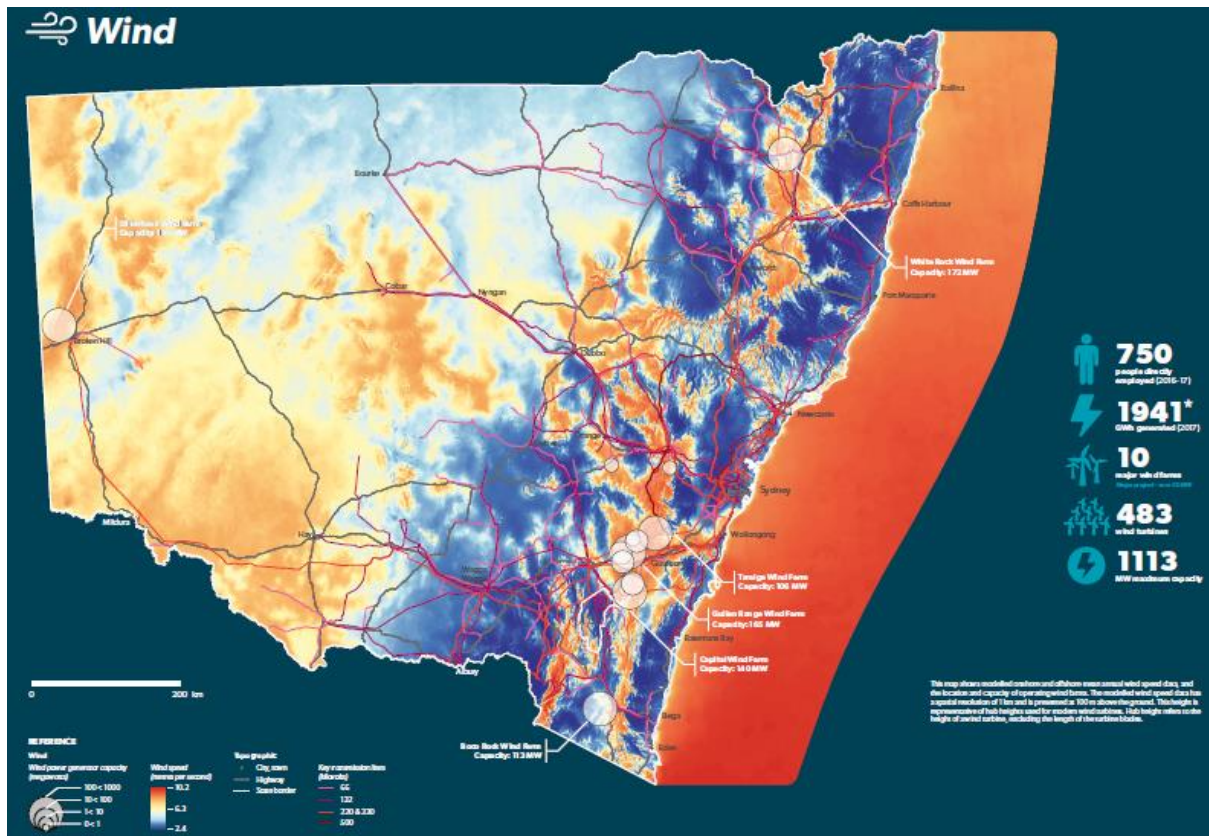
²⁰ International Energy Agency, [Offshore Wind Outlook 2019](#), p.12, 21, 44.

²¹ The Star of the South offshore wind project is proposing to bury the transmission cable landing site and the short length of onshore transmission needed underground.

²² The bill will be the Offshore Renewable Energy Infrastructure Bill (changed from the ‘Offshore Clean Energy Infrastructure Bill’). Department of Industry, Science, Energy and Resources (DISER), [Offshore clean energy infrastructure - proposed framework](#), 4 December 2020. DISER, [Offshore renewable energy](#), 21 January 2021.

with collaboration from the CSIRO and the UTS Institute for Sustainable Futures, and we would be pleased to share this with the Committee when it is released.

Figure 3: NSW wind speed. Red indicates highest average annual wind speed of 10 meters/second, and blue is lowest.



Source: Carter P.J & Gammidge L.C. (compilers) 2019. [Renewable energy map of new South Wales](#) (3rd Edition). Geological Survey of New South Wales, Maitland. ©State of New South Wales through NSW Department of Planning and Environment 2018.

There are already two significant offshore wind projects in development in NSW and possibly a third one in the pipeline. There are outstanding port facilities available for offshore wind manufacturing and construction hubs in Newcastle and Port Kembla. Projects in development in NSW include:

1. **NSW offshore wind.** Starting with a multi-gigawatt project off Newcastle, then potentially expanding with further locations off Wollongong, Ulladulla and Eden up to 6 GW in total. The developer is Oceanex, which is led by two of the co-founders of the Star of the South offshore wind farm, Andy Evans and Peter Sgardelis, with international investment partners. The project will use floating offshore wind technology.
2. **Newcastle Offshore Wind.** A separate multi-gigawatt Newcastle project using floating offshore wind, which applied for a licence from DISER in January 2020.

The first offshore wind project in Australia will be Star of the South off Gippsland, Victoria. The project is 2.2 GW in size, backed by global offshore wind leaders Copenhagen Infrastructure Partners. Its exploration licence was approved in March 2019 which has allowed the project to undertake detailed observations and planning.²³ In addition, The Cliff Head Wind and Solar Project is in development south of Geraldton in WA, by Pilot Energy in a joint venture with Triangle Energy. It is up to 1.1 GW in size.²⁴ Bass Offshore Wind Energy off Burnie, Tasmania, is being developed by Brookvale Energy. It is initially planned to be 360 MW, with an expansion of up to 2GW linked to the development of Marinus Link.²⁵

Despite these offshore wind developments in NSW. It appears that the new *NSW Electricity Infrastructure Act 2020* was not drafted with offshore renewables in mind. In addition, the national 2020 Integrated System Plan for the electricity system,²⁶ which NSW based its initial Renewable Energy Zones on, does not properly incorporate offshore wind.²⁷ We also need the Commonwealth government to pass the Offshore Renewable Energy Infrastructure Bill for any offshore renewable project to proceed.

As is discussed in the South Coast Labour Council submission, the production of green steel at the Port Kembla Steelworks will require very large quantities of hydrogen, at a scale which would need large offshore wind projects to generate the required electricity.

Recommendation 8: For the NSW government to undertake a study of the potential for offshore wind in NSW to both benefit the electricity system and produce hydrogen, for inclusion in the NSW Renewable Energy Plan.

Recommendation 9: For the NSW Government to advocate with Minister Angus Taylor for the Offshore Renewable Energy Infrastructure Bill to be put to Parliament as soon as possible.

Recommendation 10: To ensure that Bluescope and NSW fabricators are capable of manufacturing components for larger offshore wind towers using 80-85mm plate, and have a pipeline of projects to supply.

²³ [Star of the South](#)

²⁴ Pilot Energy, [Pilot to sell majority interest in offshore Perth Basin Permit and form Wind and Solar Joint Venture with Triangle](#), ASX Announcement 9 November 2020; Pilot Energy, [Pilot to pursue development of offshore wind project](#), ASX announcement 4 September 2020.

²⁵ [Brookvale Energy](#)

²⁶ Australian Energy Market Operator, [2020 Integrated System Plan](#), July 2020.

²⁷ For details see [MUA submission: 2020-21 Planning and Forecasting Consultation on Inputs, Assumptions and Scenarios](#), 1 February 2021.

Zero carbon fuels for shipping

TOR 3(e) use hydrogen for transport;

Domestic manufacture of renewable hydrogen and use as a transport fuel has the potential to improve energy security and to reduce emissions.

We urge the inquiry to further examine the possibilities for hydrogen to be used as a shipping fuel for domestic freight in Australia, and the processes required to facilitate this. Significant emissions reduction can be achieved, but this will require government investment to develop the technology at the speed and scale that is required.

In the Foreword to Australia's new National Hydrogen Strategy, Ministers Taylor and Canavan say that 'the development of our hydrogen resources could enhance Australia's energy security, create Australian jobs and build an export industry valued in the billions.' The Strategy 'agrees to a shared vision of hydrogen being a clean, cost competitive fuel option for Australian land and marine transport, in particular for heavy duty and long range transport applications' (objective 3.16). It also calls for 'research, pilot projects, trials, and demonstration projects' that use 'hydrogen for transport, with a focus on heavy and long-range road transport, rail and shipping' (objective 3.8).²⁸

The Strategic Fleet proposed by the MUA (see earlier in this submission) could be used to help deliver the National Hydrogen Strategy by serving as a pilot project for the use of hydrogen or ammonia as a fuel for cargo ships. To gain full value from the development of the hydrogen industry, we must develop expertise in the use of hydrogen or ammonia as a fuel, the development of hydrogen or ammonia storage and bunkering – rather than just exporting it.

Emissions from transport make up 19% of Australian emissions.²⁹ Australian transport emissions have increased from 80 MtCo₂e in 2007³⁰ to 100 MtCo₂e in 2019, and are projected to increase to 112 MtCo₂e by 2030. There has been a 63% increase in transport emissions since 1990 – more than any other sector of the economy.³¹

There is a need for all levels of government to develop a comprehensive plan to systematically reduce greenhouse gas emissions from transport of freight. This can be achieved by shifting freight on to ships, and by shifting to zero-emissions shipping.

²⁸ COAG Energy Council, [Australia's National Hydrogen Strategy](#), November 2019, p.79-80.

²⁹ Department of Environment and Energy, *Quarterly Update of Australia's National Greenhouse Gas Inventory: December 2019*, p.12

³⁰ Parliament of Australia, Australian transportation emissions, November 2010.

³¹ Climate Council, *Waiting for the Green Light: Transport solutions to climate change*, September 2018, p.6

Ports Australia says that shipping produces 1/5th the carbon emissions of road per tonne-km.³²

Lloyd's Register and University Maritime Advisory Services (UMAS) have undertaken a series of studies on zero-carbon shipping looking at potential fuels such as hydrogen, ammonia, batteries, and biofuels (plant matter). The most recent one concludes that 'under the scenarios in this paper, ammonia looks to be the most promising' ship fuel, for an 82,000 DWT bulk carrier (which the paper says would have very similar characteristics to a tanker an appropriate size for an Australian Strategic Fleet).³³ Hydrogen and Ammonia can go straight into specialised internal combustion engines, or into fuel cells. They can be made from renewable energy.³⁴ Unfortunately, biofuels will need an area the size of Australia to grow fuel if the shipping industry converts, which would undermine food supplies. Batteries are very expensive (except for smaller vessels on shorter routes).

Australia's National Hydrogen Strategy envisages that 'giant ships could be powered by clean ammonia made from hydrogen, or powered directly by compressed or liquefied hydrogen.'³⁵ MISC, Samsung Heavy Industries, Lloyd's Register and MAN Energy Solutions are currently working on the development of an ammonia-fuelled tanker.³⁶ A hydrogen-powered ferry is expected to go into use in Queensland in 2021.

Ammonia can be used to store energy from hydrogen, and is already handled at a number of port terminals, including in Newcastle, Gladstone and in the Pilbara. It is, however, toxic and dangerous to handle. Using either hydrogen and ammonia as fuel, or exporting them for use in other countries, will require detailed safety regulation and crew training to be put in place.

As a member of the International Maritime Organisation, Australia has agreed to reduce shipping emissions by 50% by 2050. This will require zero-carbon international cargo ships to be operational by 2030, which means that the technology and infrastructure for engines and fuel will need to start being put in place in the 2020s.³⁷ Over 110 different maritime companies and other maritime organisations have formed the 'Getting to Zero Coalition' with the objective of making this a reality – although there is currently minimal Australian participation.³⁸

³² Ports Australia, [Using Australia's Blue Highway](#).

³³ Lloyd's Register and UMAS, [Techno-economic assessment of zero-carbon fuels](#), March 2020, p.12, 19,34

³⁴ Lloyd's Register and UMAS, 2019, [Zero-Emission Vessels: Transition Pathways](#).

³⁵ COAG Energy Council, [Australia's National Hydrogen Strategy](#), November 2019, p.76 and p.40

³⁶ Lloyd's Register, [Industry leaders join forces on ammonia-fuelled tanker project](#), 15 January 2020.

³⁷ Lloyd's Register and UMAS, 2019, [Zero-Emission Vessels: Transition Pathways](#).

³⁸ [Getting to Zero Coalition](#)

Lloyds Register and UMAS highlight that implementing any of these measures in shipping will require significant government investment and regulation. The Australian government could begin developing and testing these fuels and technologies on ships in an Australian Strategic Fleet.³⁹

Recommendation 11: The NSW government should develop a comprehensive plan to systematically reduce greenhouse gas emissions from transport, through:

- Supporting the establishment of an Australian Strategic Fleet that includes the development and testing of zero-emissions cargo ships, including the use of hydrogen or ammonia as a fuel.
- Commission a study to examine the role of ships and ferries in meeting NSW's emissions reduction targets, through modal shift and the use of zero-carbon fuels.
- Ensure shipping needs are future proofed and aligned with Australia's National Hydrogen Strategy, and emissions reduction targets, including through:
 - Support for modal shift to meet emissions reduction targets
 - Support for coastal ships to test and use zero-carbon fuels
 - Ensuring Australian content for hydrogen or ammonia tankers, domestically and internationally
 - Ensuring the safest possible development of port terminals for export of hydrogen and ammonia

Use of hydrogen in industrial processes

TOR 3(f) use hydrogen in its own industrial processes, such as in steel, aluminium and chemical production;

We support this initiative, and in particular the proposals from the South Coast Labour Council made to this inquiry. Similar initiatives must be developed for industrial production in the Newcastle area.

TOR 3(h) manage the safety and safeguarding of hydrogen utilisation.

The safe development of the hydrogen industry critical, see a fuller response in TOR 6.

³⁹ Maritime Union of Australia, [A plan to save the shipping and maritime industries](#), 5 March 2019. Submission to the Senate inquiry into the policy, regulatory, taxation, administrative and funding priorities for Australian shipping.

Hydrogen industry workforce

TOR 5. The infrastructure, technology, skills, workforce capabilities and other things needed to realise the economic opportunities of hydrogen as and when it becomes commercial in different sectors of the economy.

NSW has a workforce with many of the skills for hydrogen production and transport, particularly those working in port terminals and on tankers, and in the chemicals industry. Support and training will likely be needed for a full transition and this should be funded and delivered through TAFEs.

Safety in the Hydrogen industry

TOR 6. The actions needed of the public and private sectors, to support the development of a hydrogen industry in NSW and to realise the associated economic opportunities, including actions to manage any safety risks in the hydrogen industry.

A major consideration of the National Hydrogen Taskforce was how to achieve community acceptance of the hydrogen industry, with significant concerns in the community about the safety of the industry. Community acceptance will be significantly facilitated if:

1. The industry features good secure permanent jobs with decent wages.
2. Training and direct transition measures are in place to ensure workers from high-emissions industries can transition to work in the hydrogen industry.

Working with hydrogen will be hazardous, and somewhat experimental as new processes and technologies develop. Measures to ensure good secure jobs in the hydrogen industry will also significantly increase the safety of the industry. Australia's process-based safety laws rely on the participation of Health and Safety Representatives and full consultation with the workforce. Workers can only participate in these processes properly and with confidence if they are in secure work, are not fatigued, and have the support and protection of a union.

Casualisation of work significantly undermines safety, and this should not be allowed to develop in the hydrogen industry or it will significantly undermine the community confidence needed for the speedy development of the industry.

A new hydrogen industry must aim for best practice employment and WHS processes.

A hydrogen safety working group should be established through Safe Work NSW, and include Unions NSW and unions from relevant industries including maritime unions, and the Australian Maritime Safety Authority. The Australian Maritime Safety Authority will need to be involved in the development of maritime regulation, and can play a role in the development of regulation at the International Maritime Organisation. This will be needed to support the development of international hydrogen shipping.

Recommendation 12: A hydrogen safety working group should be established through Safe Work NSW, and include Unions NSW and unions from relevant industries including maritime unions, and the Australian Maritime Safety Authority.

Jobs in hydrogen

TOR 7. The potential for jobs in New South Wales, both directly in the hydrogen industry and in other industries powered by hydrogen.

We believe there is good potential for jobs in the hydrogen industry, and that the development of a renewable hydrogen industry is essential to allowing other industries to continue production with a decarbonised production process.

TOR 8. Any other pertinent matters the Committee wishes to draw to the Government's attention in this regard.

The Committee should have regard to the NSW target of net zero greenhouse gas emissions by 2050. It should also have regard to the need to keep global heating to 1.5°C degrees, which may require reaching net zero emissions before 2050.