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Low Carbon Liquid Fuels Consultation Team(s)
Dept of Infrastructure, Transport, Regional Development, Communications & the Arts; &
Department of Climate Change, Energy, the Environment, and Water

Via webform: https://www.infrastructure.gov.au/have-your-say/consultation-future-made-australia-unlocking-australias-low-carbon-liquid-fuel-opportunity

Via email: lclfconsultation@infrastructure.gov.au

Dear members of the Low Carbon Liquid Fuels Consultation Team(s),

Shipping Australia's submission re *"Consultation on Future Made in Australia: Unlocking Australia's low carbon liquid fuel opportunity".*

A. About Shipping Australia

1. Shipping Australia is the principal Australian peak body that represents the locally owned and the locally active ocean freight-focused shipping industry. We provide policy advice, insight, and information to just over 70 members, who, between them, employ more than 3,000 Australians. We provide policy input to Australian State, Territory and Commonwealth Government bodies. We are recognised across Australia by politicians, public service officials, national media and trade media as being the national association for Australian shipping.
2. Our membership includes Australian ports, the local arms of global shipping agents and domestic shipping agents, towage companies, the locally active arms of ocean shipping lines, and a wide variety of Australian-owned and locally operated maritime service providers. Services provided by our members include ocean freight shipping, local seaport cargo handling, domestic harbour towage, Australian marine surveying, and domestic pilotage, among other services. Our members handle nearly all Australian containerised seaborne cargo. They also handle a considerable volume of our car, and our bulk commodity trades.

B. Executive Summary

3. International shipping is vitally important to the Australian economy – to our imports, our exports, the jobs that are available to Australians and to our standard of living. While, of course, there are no areas of Australian life that are immune from review or reform, ocean shipping services are vital to Australia. It therefore follows that minimal disruption to, or cost impositions on, ocean shipping is in the Australian national interest as any factors that adversely affect shipping thereby adversely affect the Australian economy and the quality of life of everyday Australian families.
4. As global shipping is inherently cross-border in nature, it is essential that the industry is governed at the highest levels of global governance; international trade simply could not take place on a large enough scale to support all the economies of the world if this principle is not fundamentally observed. The United Nation's specialised agency, the International Maritime Organization, is the body that regulates international commercial shipping at the highest international level and it should remain so.
5. Any measures to promote low carbon liquid fuels must align with IMO work and policies.

6. Biofuels / biodiesel in Australia is not competitive and is hindering uptake. Shipping Australia and its members would be pleased to take part in further consultations.

7. The marine fuel market is large, but its future size is uncertain owing to a number of factors. The international shipping industry will be dominated for the next few decades by a mix of conventional fuel, liquefied natural gas, methanol, possibly ammonia, and some electrification. There appears to be niche opportunities for biodiesel.

C. Importance of shipping to Australia

8. Exports and imports of goods and services (including intangible services) accounted for 25.8% and 19.9% of our gross domestic product in 2022, according to World Bank Data (accessed 06 July 2023).

9. The combined volume and value of Australia's import and export cargo (2020-2021), according to the Bureau of Infrastructure and Transport Research Economics (BITRE) publication, Australian Sea Freight 2020-21 was about 1.61 billion tons valued at about $601.4 billion. Approximately 99.93% by volume of all cargo that enters or leaves this country is carried by ocean-going ships.

10. There were 6,315 uniquely identified cargo ships which together made a total of 30,613 port calls at Australian ports in 2020–21. This included 6,219 unique cargo ships that made 17 303 voyages to Australian ports directly from overseas ports, according to the Bureau of Infrastructure and Transport Research Economics (BITRE) publication, Australian Sea Freight 2020-21.

11. It was estimated in "Australian Trade Liberalisation: analysis of the economic impacts," 2017 Centre for International Economics Report on Australian Trade Liberalisation for the Department of Foreign Affairs and Trade, that 1-in-5 Australian jobs were related to global trade. If that ratio still holds true today, then, based on August 2023 Australian Bureau of Statistics data which shows that over 14.1 million Australians were employed, global trade supports over 2.8 million Australian jobs.

12. It should now be obvious that ocean shipping services are vital to Australia. It therefore follows that minimal disruption to, or cost impositions on, ocean shipping is in the State and the Australian national interest as any factors that adversely affect shipping thereby adversely affect the State & Australian economies.

D. Governance of international shipping

13. We are always keen to emphasise that all activities, rules, policies, regulations, legislation, etc should be wholly consistent and aligned with International Maritime Organization (IMO) treaties, rules, regulations and guidance.

14. The primacy of the IMO over international and national jurisdictions in the regulation of global commercial maritime traffic is an internationally accepted principle and it is consequently wholly inappropriate for national- and sub-national governments to write laws in this area which conflict with international maritime law.

15. This principle of IMO primacy is – or ought to be – especially true in Australia given that our nation is a founding member of the IMO, has held a seat on the IMO Council (the organisation's executive organ), has repeatedly sought re-election to that body and has signed up to the IMO Convention, the first article of which states that the purposes of the Organization are "(a) to provide machinery for co-operation among Governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade… [and]… (b) to encourage the removal of discriminatory action and unnecessary restrictions by Governments affecting shipping engaged in international trade".

16. Ocean shipping is only going to become more environmentally friendly over time. Ocean going shipping is already subject to a range of IMO international regulations promoting cleaner shipping, such as MARPOL Annex VI, the EEXI, the EEDI, CII, to name a few.

17. At the International Maritime Organization's Maritime Environment Protection Committee #80 (July 2023), the IMO ruled that international shipping must become carbon neutral by 2050 or thereabouts.

18. The following MEPC 81 (March 2024) discussed a new global goal-based marine fuel standard regulating the phased reduction of the greenhouse gas potential of marine fuel and also some kind of economic mechanism or mechanisms (e.g. a levy, a trading system, others) to incentivize the transition to net zero. There are currently about eight or so different proposals being considered; work continues on these matters.

E. Shipping and the environment

19. Shipping is the most environmentally friendly form of domestic or international freight transport. In Australia, for instance, trucks produce more carbon emissions than rail, aviation and shipping combined, according to the Australian Climate Change Authority's document "Opportunities to reduce light vehicle emissions in Australia," of 29 June 2023.

20. A very large container ship (18,000 plus TEU) will (with conventional fuel) emit 3 grams of CO2 per tonne-km of freight carried, an oil tanker (up to 119,999 dwt) 5.9 grams, and a dry bulker carrier up to 34,999 dead weights will emit 7.9 grams. However, a truck greater than 40 tonnes will emit 80 grams per tonne-kilometre of freight and an aeroplane (747, capacity 113 tonnes), 435 grams per tonne-kilometre of freight, according to "Environmental Performance: Comparison of CO2 Emissions by Different Modes of Transport," by the International Chamber of Shipping, published circa 2020.

21. According to the latest figures (IMO, 2018) the total amount of carbon dioxide (CO2) emissions from the whole international commercial fleet, using the voyage-based allocation to international shipping, stood at 740 million tonnes in 2018, a small decline from the 746 million tonnes seen in 2017, which equates to about 2.02% of the global CO2 total (Source: "Table 1 – total shipping and voyage-based and vessel-based international shipping CO2 emission 2012-2018 (million tonnes)" quoted in the Fourth IMO Greenhouse Gas Study 2020".

22. There are an enormous range of greener processes (e.g. taking advantage of currents), devices (such as Mewis ducts), power systems (e.g. wind-assisted propulsion), and fuels (ethanol, battery-electric, biodiesel, methanol) that can be, and are being, adopted by industry.

23. International shipping is probably one of the world's biggest consumers of heavy fuel oil ("bunkers" in industry jargon). In or about March 2021, after a massive data-collection effort, the size of the world commercial marine fuel market was finally revealed by the IMO to be about 229 million tonnes of heavy fuel oil a year (See "Welcome to the 229 million metric ton global bunker market!" A Tolson, Blue Insight, for Ship & Bunker, 25 March 2021; refers to fuel oil consumption, vessels under 5,000 gross tons were excluded so the 229-million-ton figure and did not include vessels solely engaged in domestic trading, so this 229-million-ton figure is an underestimate. Tolson estimated the upper figure at 250-260 million when taking into account smaller vessels, domestic vessels etc).

24. It should be noted that the current trends indicate that the international merchant ship bunker market will collectively likely see the consumption of heavy fuel oil (which decrease both in volume and percentage terms over time), liquefied natural gas (which will also likely decrease both in volume and percentage terms over time), ammonia (NH3), and methanol (CH3OH). There may be small volumes of vessels powered by other means e.g. electricity for smaller, near-shore, vessels (ferries, harbour tugs etc), biodiesel.

25. The choice of fuel used will have implications for the size of the future international liquid bunker market. Electrified vessels won't consume any liquids whereas methanol and ammonia are (relative to heavy fuel oil) energy poor and so a multiplier of 2.2x to 2.3x will need to be applied to give e.g. the same range for a vessel as compared to heavy fuel oil, or, alternatively, the vessel will need to bunker more often. Then there are the wide range of procedures, protocols and devices that can change fuel consumption. Hard sails can knock of 5% to 8% of total fuel consumption; sailing with the current can reduce fuel consumption a few more percent, as can hull and propellor polishing, and so on.

26. So, the size of the future international liquid bunker market is uncertain. However, 229 to 260 million tons seems a reasonable starting point as an estimate.

F. Shipping Australia's submission - biodiesel

27. Biodiesel is one form of fuel that be regarded as a low carbon liquid fuel, and which could potentially be consumed by commercial freight-carrying ships (whether they are domestic or international) or vessels engaged in marine services.

28. There have been numerous trials of biodiesel around the world by various kinds of ships. Cruise ship line Holland America trialled biofuel on its flagship "Rotterdam" in May 2024 in Rotterdam; United European Car Carriers tried it at Vlissingen in the Netherlands; and Japanese K-Line has tried it with bulkers (See Goodfuels.com/news). Reports to-date have generally described the trials of the various kinds of biofuels as being successful. Note: there are numerous different kinds of biodiesels.

29. Shipping Australia has consulted members on the topic of biodiesels. One member is – or would be – keen on biodiesel but advises that the policy settings in Australia are not keeping pace with the rest of the world. Europe and the US are reported to be "far more advanced" in both the policy/legislative settings and/or investment incentives to attract decarbonisation initiatives. Biofuel is a necessary immediate and medium-term decarbonisation solution that is proven today. There is not an identified feasible alternative to biofuels for existing assets in operation in Australia ports such as tugboats.

30. With ambitious Australian decarbonization targets of a 50% reduction in intensity by 2030, net carbon zero by 2040 (n.b. these are greater than the IMO goals) it is impossible to build enough new technology vessels in this timeframe to meet such goals. Low carbon biofuel will be required to have any chance of meeting a 2030 target.

31. The member in question uses multiple tactics to achieve its decarbonization goals, such as behaviour alteration e.g. how masters and pilots manage operations reduce fuel consumption. Significant progress has made in last five years at this company; there has been a reduction of 5% over baseline. Further progress will depend on co-operation of various stakeholders.

32. Outside of baseline, there has been a near 10% reduction in fuel usage through behaviour change, operational efficiencies and (new and upgraded) asset improvements. There has been / will be a total achievable reduction by 2030 up to an estimated 10-15% (behavioural initiatives over baseline).

33. The company is currently reviewing feasibility of methanol-powered assets; depending on the carbon content of methanol, this fuel could save up to 35-50% of CO2 equivalent emissions. Battery power, hydrogen and ammonia powered vessels may be considered in longer-term but biofuel is the critical immediate and medium-term bridging fuel to reduce the decarbonisation gap.

34. The effect of overseas decarbonization incentives means biofuel is 60% to 300% more expensive in Australia than diesel. Hydrotreated Vegetable Oil (HVO) is a drop-in fuel that is up to three times the price of diesel. HVO is successfully used overseas in many assets without significant issues. Fatty Acid Methyl Ester (FAME) biofuel is cheaper but has technical issues: 100% FAME is currently 60% to 80% more expensive than diesel; engine makers have only certified some engine types for use with FAME.

35. We understand from our concerned member that, prior to overseas incentives being introduced, HVO was price competitive with diesel in Australia. However, we are told, most available feedstock is now being exported to Singapore and the US; the remaining three biofuel refineries are operating at 10% of total capacity of 100m litres per year.

36. It is said that there is a significant local Australian manufacturing and biofuel industry opportunity being missed – largely because of hesitance of market to commit to supply and producers with more certain markets overseas. Biofuel opportunity needs to be transport-sector agnostic and think beyond just as a sustainable aviation fuel solution.

37. Companies are keen to use low carbon biofuels, but it is commercially unviable. There are currently no incentives from governments, ports or customers to decarbonize. If a company adopts higher priced biofuels, competitors will undercut prices and take market share. The net result will be higher CO2 equivalent output, so this would counter-productive to the company. Biofuel needs to be considered as an opportunity for both immediate and medium-term decarbonisation solution and given a corresponding, high level, of policy and legislative attention.

38. A focus on longer-term, 'future-fuel' solutions such as hydrogen, methanol, ammonia and electrification is important but ignores the existing transport asset base in operation (and being manufactured) today and which will still be operating in 10-40 years from now. It is uneconomical and costly to think that asset owners can retrofit these assets in the future or dispose of them (i.e. 'Capex cliff'). Hence, biofuel as a decarbonisation solution is critical.

39. Shipping Australia members are open to discussion and interest in participation in any trials or longer-term pilot programs today. It has proven experience in implementing biofuel operations. Ideally, however, policy changes that would enable more cost-effective biofuel availability would allow for longer-term change to be implemented (and therefore avoid 'band-aid' short-term solutions).

40. Members are open to ideas on policy solutions to make biofuel accessible and not impact on competitiveness. Industry wide carbon reduction incentives are required to create a level playing field. A number of successful examples are already used overseas and these include the UK Renewable Transport Fuel Obligation and the California's Low Carbon Fuel Standard.

41. Members have suggested that ideal solution is for the federal government to introduce a scheme covering ALL liquid fuels, ideally industry and technology agnostic, ramping up over time (although there may need to be specific marine provisions to avoid competition with sustainable aviation fuel).

42. In absence of federal legislation, states and local authorities will introduce their own standards; Queensland already appears to be moving in this direction. Port authorities have the power to impose standards but are reluctant to impose costs.

G. Shipping Australia's submission – other fuels

43. **Methanol** – is IMO-approved methanol as a safe fuel in MSC.1/Circ.1621, the Interim Guidelines for the Safety of Ships Using Methyl/Ethyl Alcohol as Fuel (2020).

44. Methanol - CH3OH (a chain of atoms of one carbon, three hydrogen, one oxygen, one hydrogen) is a type of alcohol with an energy density (gravimetric) of 19.9 MJ/kg (LHV basis), compared to 42.7 MJ/kg for marine gas oil ("Ammonia as a Marine Fuel: Safety," N de Vries, 13 November 2019, C-Job Naval Architects). So a ship powered with methanol will need to carry about 2.15 times more methanol compared to Marine Gas Oil.

45. Despite the fact that methanol contains carbon, it can be regarded as a green fuel because it can be produced from a range of feedstocks, some of which are renewable waste products such as forestry residues, agricultural wastes and the like. The ingredients for methanol are carbon (which can be derived from biogenic sources as described above), along with hydrogen and oxygen. The latter two elements are commercially available industrial gases and can, in any case, be industrially manufactured by splitting water with electricity. Provided that the electrolysis is carried out with green power (wind, solar, geothermal, tide, etc) then the resulting fuel will be environmentally friendly.

46. Combustion of methanol creates carbon dioxide, however, provided that the carbon is biogenic in origin, then the carbon that is released to the atmosphere is merely being returned from whence it came and therefore does not add to the atmospheric carbon burden (unlike fossil fuels which add carbon to the atmosphere when combusted).

47. It is possible that the most likely way that the shipping industry will decarbonise will involve the use of methanol as many major international shipping companies are now committing to methanol-powered vessels. These include Maersk, Berge, Höegh Autoliners, Stena Bulk, CMA CGM, Waterfront Shipping and many more. In May 2024, according to Det Norske Veritas there were 281 methanol-powered vessels in service or on order – this is a considerable achievement given that, a few years ago, there were none. There are now more methanol vessels in operation or on order than Liquefied Petroleum Gas powered vessels (232; DNV), a category that has been in existence for a long time. Since then, it is likely that more methanol-powered vessels have been ordered. There is much more than can be written about methanol but, for the purposes of brevity, we will conclude "methanol" here.

48. **Ammonia** – this is a compound gas at standard temperature and pressure; when transported or used as a fuel it is typically stored either cold or at pressure (or both) which transforms it into a liquid. As of May 2024, there are about 20 ammonia-powered vessels on order (DNV AFI). Liquid ammonia has an energy density (gravimetric) of about 18.6 MJ/kg, a little until 2.3 times less than conventional marine gas oil (42.7 MJ/kg) (LHV basis) ("Ammonia as a Marine Fuel: Safety," N de Vries, 13 November 2019, C-Job Naval Architects).

49. Ammonia is mass produced and is a widely used industrial gas and is used as a refrigerant, for water purification, in the manufacture of plastics, explosives, textiles, pesticides, dyes and other chemicals. It is most typically used in agriculture as a fertilizer. The U.S. Congressional Research Service estimates that about 183 million tonnes of ammonia is produced around the world each year (https://crsreports.congress.gov/product/pdf/IF/IF12273).

50. Ammonia is comprised of one part nitrogen to three parts hydrogen (NH3) and it can be made using renewable energy to separate air into its component parts (which is mostly nitrogen) and water into hydrogen and oxygen. As Ammonia is carbon-free it does not produce carbon dioxide on combustion. However, its green status is debateable. Combustion produces nitrous oxides which are up to 273 times more potent greenhouse status causing than C02 and it can also lead to the formation of acid rain which damages animal, plant, and eco-system health alongside human health issues. There are also very considerable safety-related issues in respect of ammonia.

51. Ammonia is a possible future fuel that could be used by the international shipping industry; however, as the volume of vessels is quite low, for the purposes of brevity, we will conclude "ammonia" here.

H. Overlapping state and local requirements will create an inefficient, bureaucratic mess

52. Shipping Australia notes that we have seen such developments in Australia several times over. For instance, the now-famous examples of different rail gauges in different parts of the country. And, more recently, the IMO mandate for a Single Maritime Window… the deadline of which has been missed by the Federal Government and now we are seeing multiple Single Maritime Window systems being created around the country.

53. Members advise that effective certification and regulation of low carbon fuels would be a small but useful first step. Certification, regulation, and auditing are required to establish confidence in sector, reduce greenwashing, and prevent criminal infiltration. Consider, for example, the recent scandal in Sydney in which the supply chain for, of all things, mulch, was infiltrated by criminal elements which led to the spreading of asbestos in parks, gardens, and flowerbeds in Sydney. Shipping Australia members also emphasise that alignment with overseas standards would simplify international compliance obligations.

I. RECOMMENDATION(S)

54. Our recommendations therefore are as follows:

i. **RECOMMENDATION:** all work done in this space, any tariffs, subsidies, fees, levies, or any other industry rules, regulations, policies, legislation, industry assistance of all kinds etc must align with and be compatible with the work programme and rules of the International Maritime Organization;

ii. **RECOMMENDATION**: no action of any kind should be taken, and no policy introduced, that in any way imposes any kind of financial or administrative burden on the international shipping industry as such action / policy etc would be adverse to the interests of the Australian people and the Australian economy as a whole; the international shipping industry should not be subsidising any other parties in any shape or form whatsoever;

iii. **RECOMMENDATION**: if action is to be taken, then policy makers ought to carefully consider ways to incentivise the take up of all low carbon liquid fuels and this assistance, if any, ought to be (ideally) industry- and technology-agnostic and which ramps up over time;

iv. **RECOMMENDATION**: policy makers ought to be aware, and strongly bear in mind during all deliberations. that the international maritime industry (which is likely to be one of the biggest consumers of low carbon liquid fuels) is very strongly looking at liquefied natural gas, methanol, and ammonia; policy makers ought to bear in mind that the various biodiesels etc are (at this point) likely to be niche use cases (although this could change);

v. **RECOMMENDATION**: Federal policy makers ought to use all endeavours to ensure that there are not multiple overlapping rules, regimes, incentives, systems etc created / developed / imposed by different levels of government and / or by different government agencies.

vi. **RECOMMENDATION**: policy makers are strongly advised to consult with Shipping Australia on this topic as our members are likely to be the biggest consumers of low carbon liquid fuels and have globally-unmatched expertise and experience in this area.

Submission authorised by:

Capt Melwyn Noronha
CEO, Shipping Australia