Submission to the

Climate Change Commission on their draft advice to Government

25 March 2021

The New Zealand Shipping Federation represent coastal ship operators on the New Zealand coast. The current fleet is:

- 5 Cook Strait ferries linking the North island with the South Island (amounting to State Highway 1 between Picton and Wellington)
- 2 fuel tankers, distributing fuels to the ports of New Zealand (including fuels refined at Marsden refinery)
- 2 cement tankers. One of these vessels, *MV Buffalo*, uses diesel as fuel and plugs into the electrical network when at its home port in Timaru.
- 1 container cargo vessel, carrying 1,700 teu (twenty foot equivalent containers)
- 1 small bulk cargo vessel
- 1 research vessel, uses diesel

The movement of coastal cargo, excluding empty containers, is recorded at:https://www.transport.govt.nz/statistics-and-insights/freight-and-logistics/sheet/figs-coastal-bulk-cargo

Other than the Cook Strait ferries, where there is no land-based option, each of these vessels substitutes for a significantly less carbon efficient alternative transport mode. This was established in "The Externality Value of Coastal Shipping" a report to the Ministry of Transport by EY New Zealand (Ernst Young) in July 2020. This is available as a pdf on the Ministry's website at: https://www.transport.govt.nz//assets/Uploads/Report/TheExternalityValueOfCoastalShipping.pdf .

As outlined in a briefing by Minister Twyford in a beehive briefing on the release of the report:

> The overall findings from the report found that net external benefits from coastal shipping is valued at $306.4 million annually for New Zealand and up to $367.7 million under a 20 percent growth scenario. Much of this value is in the form of reduced travel times and congestion benefits for all road users. Congestion benefits account for 74% of externality benefits in the base scenario.

Decisions about new ships have long lead times with limited opportunities to change the propulsion system during the course of the build. Ships are expected to have at least a 25-30 year life but will change hands during the course of their working life. In New Zealand, we have a mix of new-build ships and used ships. In the case of used ships entering the coastal fleet, the ships are likely to be about 15 years old at the time of arrival. In the case of new ships, there is a significant advance in the efficiency of the ship and reductions in emissions due to design developments, e.g., in the hull shape and engine improvements.

The aim of our submission is to increase the knowledge of decision makers about:

- the current situation,
- what is possible with current technology
- what is driving decision-making.

General introduction

Due to distance, New Zealand is reliant on ships for the bulk of its imports and exports. The economy is maritime dependant.

For the movement of goods internally, the options are maritime from port to port (with the "last mile" likely to be road), road or rail. Road and rail are dependent on the five Cook Strait ferries to get cargo between the islands. Light goods or urgent goods can be transported by air but this would be a minority of internal cargo movements.

Coastal shipping operates with a number of disadvantages as compared to international ships operating on the New Zealand coast and as compared to road and rail.

As compared to international ships operating on the New Zealand coast, coastal ships:

- are required to purchase carbon credits on bunker fuel, costing approximately NZ$1million per ship (calculated using a carbon value of $25),
- operate on New Zealand terms and conditions in respect of crew which will usually be more expensive;
- are subject to New Zealand taxes, such as PAYE, GST and income tax;
- do not get any subsidies from the government.

As compared to road and rail, it is generally accepted that coastal shipping:

- is slower;
- is cheaper; and
- has the lowest emissions footprint.

Current legislative setting

Current legislative settings have a significant negative impact on the operation of coastal shipping.

- Section 198 of the Maritime Transport Act restricts the circumstances in which a foreign ship can move coastal cargo between ports in New Zealand. It is interpreted by the Ministry of Transport so as to place almost no restrictions on how such cargo is moved so long as the coastal movements are less than the cargo that is transport either on the entry journey or the exit journey or both. This significantly reduces the opportunities for the movement of coastal cargo by dedicated coastal ships and is a

major disincentive to coastal operations. This in turn leads to a reliance on international ships.

- The Emissions Trading Scheme does not apply to international ships. This may reflect the history of the scheme and how it aligns with similar schemes elsewhere. The effect is to give such ships a competitive and pricing advantage. We note that worldwide there is a growing tendency to include international ships in such schemes.
- There is a lack of transparency about the pricing and subsidy settings for road and rail transport. It is clear that no such pricing and subsidy issues arise in respect of the movement of goods by sea which is a fully user pays environment.

Dry Dock

We endorse the Commissions comments about the need for a dry dock in New Zealand.

The absence of a dry dock in New Zealand is the single thing that could make the most difference to the emissions from the coastal maritime sector. Legal and safety requirements necessitate the dry docking of ships on regular schedules and in emergencies. The current options for most ships in New Zealand waters are to dry dock in Sydney if a book is available (increasingly unlikely) or in Singapore. Both the Singapore and Sydney options are difficult in emergencies.

To reach either of these foreign dry docks takes time and fuel. The cost of time is counted both in the time taken for the return journey and therefor the opportunity cost of being out of service plus the cost of staff time. Issues around staff time are exacerbated due to quarantine restrictions at both ends of each leg of the journeys to and from the dock. An additional cost in respect of the fuel ships is the cost of bringing an alternative vessel to New Zealand to fill the gap in the schedule.

It takes about 4 days to get to Sydney and about 12 days to get to Singapore. The fuel used on these journeys varies for each vessel but a useful approximation is that the fuel cost of a one–way trip to Singapore consumes about NZ$500,000 of fuel. For Sydney, the figure is about NZ$180,000. For China, the figure is about NZ$750,000, one way. This is a waste of carbon emissions as well as money.

Alternative fuels and fuel networks

Maritime fuel usage is dependent on a reliable supply of fuel at the bunkering points for the ships. In the case of the five Cook Strait ferries, bunkering is done in Wellington. Other vessels are most likely to pick up bunkers at Auckland, Tauranga or NorthPort, depending on their schedules.

The existence of a known supply of a known fuel is at the heart of any proposal to change the fuel used by any vessel. In recent years there have been concerns about the availability of fuel that is compliant with MARPOL Annex VI, other than the expensive option of diesel. This is still a live issue both for vessels that have scrubbers and will want to get heavy fuel oil and for vessels which will rely on a lighter fuel to meet their emissions target.

Any switch to an alternative fuel presupposes that the fuel is available. This is something that needs to be certain well in advance of any decision to alter the fuel that is being used. Hence, any decision about switching to an alternative fuel, such as hydrogen, gets caught in a chicken-and-egg dilemma as to which comes first.

Biofuels may also be a viable option with potential development in the commercial shipping sector but at this point projections are with greater cost, potential supply chain quality issues, higher energy demand for production, and conflicting demand from other transport sectors.

Maritime hydrogen systems are being tested, generally in smaller vessels, and recent announcements suggest modular fuel cells may be available for larger vessels by 2035.

Hydrogen, once produced, can be used in several ways to power ships. It can be burnt in an internal combustion engine (ICE) One downside to this is that burning anything in air, which consists largely of nitrogen, inevitably produces some level of nitrogen oxides – which are major air pollutants. These emissions can however be tackled by fitting an after-treatment device. But hydrogen can also be used in a fuel cell – a device which chemically converts the fuel into electricity without the need to burn it, and the only emission is water. On board storage issues due to cryogenic or compressed storage requirements, storage tank locations, size and weight, together with its low energy density, are constraints for research ship design. The option of Ammonia as a Hydrogen carrier provides further options with increased energy density, but still significantly less energy dense than traditional fuel oils.

Battery power

Battery powered vessels are mentioned in the draft report. We do not share the optimism about the availability of technological advancements to allow such ships to be ocean-ready. To date, this technology has been installed in vessels on short routes with frequent opportunity for recharging. We think it is highly unlike to be available in new ships and certainly not likely to be available in second-hand ships.

As with other types of fuel, battery power is dependent on fuel supplies, in this case, the availability of re-charging facilities at the wharf in ports and/or battery replacement facilities. Currently, there are extreme shortage of wharf space in New Zealand and it is not clear where such facilities would be located.

There is one ship in the coastal fleet that uses plug-in facilities when in port. This is the *MV Buffalo* in Timaru. The charging facility was installed by the user, not the port. It is used to power the vessel when it is tied at the wharf. Another coastal shipping operator is currently progressing the use of shore power when discharging their vessel at Ports of Auckland.

We are aware of the difficulties faced by at least one smaller vessel which is trying to commence battery powered operations of a cross-harbour ferry in Wellington. There are lessons to be had from their experience and also some warnings.

The future

It is difficult to predict the ways in which technology and usage will develop. In the case of coastal shipping it is not just the propulsion system that is in play. In addition, the whole infrastructure needs to be aligned, including storage, bunkering, charging capability in the ports and in electricity supply. To achieve critical mass, it may be necessary for different operators to reach aligned conclusions about what is the best option for their vessels.

There are ways to reduce transport emissions in New Zealand but they are not quick fixes. In respect of maritime it often takes time for developments to cascade to this country because of the numbers of second-hand vessels in the coastal fleet.

- Fuels –decisions about what fuels are to be available need to be apparent to ship operators with years of notice
- Mode shifts to coastal shipping and away from modes of transport with higher emissions profiles will happen over time, driven by:
    - Neutral setting as to subsidies an costs, as between coastal ships, road and rail
    - Demand from users, including end consumers, who are looking to reduce their emissions footprints
- Newer technology in new ships on the coast. This has already been seen in the *MT Kokako* and the *MT Matuku*
- The use of MARPOL Annex VI compliant fuels or scrubbers
- Changes to shipping patterns, such as greater uses of hubbing import and export cargoes to major New Zealand ports resulting in large volumes of containers centralised to a main hub port from regional ports.

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