

Regulatory barriers to moving towards zero-emission shipping in New Zealand

Prepared for the Ministry of Transport Te Manatū Waka

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THE MINISTRY OF TRANSPORT TE MANATU WAKA

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1 Executive Summary

Internationally, decarbonisation actions in the maritime transport sector are already underway, and New Zealand will soon be visited by ships using lower-carbon fuels. Accordingly, there is a growing imperative for New Zealand to adapt its regulations so that it can accommodate these lower-carbon vessels. This report considers what regulatory barriers there are to New Zealand achieving zero-emission shipping and proposes some high-level remedies to address the key barriers.

1.1 The regulatory system needs to allow for multiple shipping decarbonisation options

A variety of lower-carbon fuels and energy sources are being considered for different types of ships and shipping. There are significant differences in the pros and cons of each low-carbon fuel or energy source across different key characteristics (such as the extent of greenhouse gas (GHG) reduction, energy density, and the port-based facilities and personnel required for fuel storage and handling). This will mean that different low-carbon fuels and energy sources are likely to be appropriate for different maritime transport types (eg, while it may be commercially viable for short-distance ferries to be battery-electric powered, this won't be the case for long-distance container ships). Therefore, regulation will need to be robust to whichever low-carbon fuels and energy sources emerge as the key shipping decarbonisation options.

1.2 Regulatory design and delivery could hinder New Zealand's ability to achieve zero-emission shipping

We consider regulatory barriers to zero-emission shipping to be any elements of regulatory design or delivery that could affect New Zealand's

ability to transition to and/or achieve zero-emission shipping. Regulatory barriers could impact New Zealand's ability to transition to and/or achieve zero-emission shipping in up to four ways:

- limiting the pathways/options for achieving zero-emission shipping
- reducing the speed at which New Zealand achieves zero-emission shipping
- increasing the cost of achieving zero-emission shipping
- increasing the risk associated with adopting lower-emission shipping technologies or fuels.

There are potential regulatory barriers to zero-emission shipping in both maritime regulation (such as the Maritime Transport Act 1994), as well as in other regulatory systems (eg, the Health and Safety at Work Act 2015 and the secondary legislation that sits under it).

1.3 We consider that there are nine key regulatory barriers that should be addressed further

Our assessment of regulatory barriers to zero-emission shipping has identified nine key regulatory barriers that should be assessed further. These key regulatory barriers are listed in the first column of Table 1, overleaf. Table 1 also proposes some actions that could be taken to help address these key regulatory barriers and the government agencies that could be involved in those actions. Note that some potential actions relate to more than one potential regulatory barrier.

Table 1: Key potential regulatory barriers and actions to address them

Potential regulatory barrier	Legislation that the barrier relates to	Potential actions to address	Government agencies that might be involved
1. The time taken to develop and amend Maritime Rules and Marine Protection Rules	<ul style="list-style-type: none"> Maritime Rules Marine Protection Rules 	<ul style="list-style-type: none"> Review of Maritime New Zealand resourcing 	<ul style="list-style-type: none"> Ministry of Transport Maritime New Zealand
2. The Maritime and Marine Protection Rules and parts of the Maritime Transport Act 1994 are too prescriptive and not objective based	<ul style="list-style-type: none"> Maritime Rules Marine Protection Rules Maritime Transport Act 1994 	<ul style="list-style-type: none"> Wholesale review of Maritime Transport Act 1994 Wholesale review of Maritime Rules and Marine Protection Rules 	<ul style="list-style-type: none"> Ministry of Transport Maritime New Zealand Ministry of Foreign Affairs and Trade
3. A lack of legislation around prevention and response for marine spills of low-carbon fuels	<ul style="list-style-type: none"> Marine Protection Rules Maritime Transport Act 1994 	<ul style="list-style-type: none"> Wholesale review of Maritime Transport Act 1994 Wholesale review of Maritime Rules and Marine Protection Rules 	<ul style="list-style-type: none"> Ministry of Transport Maritime New Zealand Ministry of Foreign Affairs and Trade
4. The first importer or manufacturer of a low-carbon fuel that does not have a hazardous substance approval bears the cost of obtaining an approval	<ul style="list-style-type: none"> Hazardous Substances and New Organisms Act 1996 	<ul style="list-style-type: none"> Consider alternative process for hazardous substance approvals of low-carbon fuels 	<ul style="list-style-type: none"> Environmental Protection Agency Ministry of Transport Maritime New Zealand
5. The time taken to get hazardous substance approval (if needed)	<ul style="list-style-type: none"> Hazardous Substances and New Organisms Act 1996 	<ul style="list-style-type: none"> Consider alternative process for hazardous substance approvals of low-carbon fuels 	<ul style="list-style-type: none"> Environmental Protection Agency Ministry of Transport Maritime New Zealand
6. Separation distance requirements for flammable gases and liquids	<ul style="list-style-type: none"> Health and Safety at Work (Hazardous Substances) Regulations 2017 	<ul style="list-style-type: none"> Consider changes to separation distances for low-carbon fuels 	<ul style="list-style-type: none"> Ministry of Business, Innovation and Employment WorkSafe Maritime New Zealand Ministry of Transport

Potential regulatory barrier	Legislation that the barrier relates to	Potential actions to address	Government agencies that might be involved
7. Requirement that gases be odourised, which is not appropriate when using hydrogen as a fuel.	<ul style="list-style-type: none"> Gas (Safety and Measurement) Regulations 2010 	<ul style="list-style-type: none"> Consider alternative hydrogen detection mechanism(s) 	<ul style="list-style-type: none"> Ministry of Business, Innovation and Employment
8. Lack of regulatory incentive or requirement for visiting ships to use shore power.	-	<ul style="list-style-type: none"> Consider shore power requirements 	<ul style="list-style-type: none"> Ministry of Transport Maritime New Zealand Electricity Authority
9. Uncertainties created by conflicting policies in New Zealand Coastal Policy Statement 2010.¹	<ul style="list-style-type: none"> New Zealand Coastal Policy Statement 2010 	<ul style="list-style-type: none"> Address conflicting policies in the New Zealand Coastal Policy Statement 2010 	<ul style="list-style-type: none"> Ministry for the Environment Ministry of Transport

Addressing these regulatory barriers will require co-ordination between the Ministry of Transport and Maritime New Zealand, as well as engagement with the other government agencies listed in the last column of Table 1. In addition to the actions set out in Table 1, the Ministry of Transport and Maritime New Zealand should continue to monitor global developments in the maritime transport industry to reduce GHG emissions and potentially develop a national policy strategy for achieving zero-emission shipping that could help focus efforts on eliminating (or reducing) the key regulatory barriers to zero-emission shipping.

The International Maritime Organization (IMO) has a resolution to encourage IMO member states to develop and submit voluntary national action plans to address GHG emissions from ships. New Zealand has not yet developed such a national action plan. If the Ministry of Transport and/or Maritime New Zealand were to develop a national policy strategy for achieving zero-emission shipping, this could form part of a national action plan submitted to the IMO.

¹ The New Zealand Coastal Policy Statement 2010 is secondary legislation under the Resource Management Act 1991.

2 Introduction

As a signatory to the Clydebank declaration, New Zealand has declared an intention to put in place conditions to enable zero-emission maritime services between two or more ports. The Ministry of Transport (MoT) is working with counterparts in partner countries, and with stakeholders across the private sector, to facilitate and encourage the shift to zero-emission shipping.

To help facilitate the shift to zero-emission shipping, this report considers what barriers there are in New Zealand's regulatory regime to transitioning to, and achieving, zero-emission shipping. This report is intended to inform the MoT, as well as other relevant government agencies, on where changes to the regulatory regime may be needed to support an orderly transition to zero-emission shipping.

Internationally, decarbonisation actions in the maritime transport sector are already underway, and New Zealand will soon be visited by ships using lower-carbon fuels. Accordingly, there is a growing imperative for New Zealand to adapt its regulations so that it can accommodate these lower-carbon vessels, and to avoid becoming a "dumping ground" for older ships with relatively high emissions as the global fleet transforms. In addition, if New Zealand lags behind other countries in amending its regulations to accommodate low-carbon shipping, it risks making New Zealand a less attractive place for international trade.

Chapter 3 sets out the purpose and scope of this review. Chapter 4 then provides some context for the review, including an overview of New Zealand's maritime transport industry and emissions-reduction options in the maritime transport industry. Readers already familiar with New

Zealand's maritime transport industry and the options for reducing GHG emissions from shipping can skip Chapter 4.

Chapters 5 through to 7 consider New Zealand's regulatory regime, the potential barriers to zero-emission shipping in the regulatory regime, and some high-level options for addressing the key regulatory barriers.

3 Purpose and scope of this review

PURPOSE

1. Identify which barriers to zero-emission shipping the New Zealand regulatory system is creating.
2. Propose high-level remedies to address such barriers.

SCOPE

1. Identify specific issues in the New Zealand **regulatory system** that would need to be amended to better enable (or encourage) **a move towards zero-emission shipping**.
2. Propose some ways in which these regulatory issues could be addressed.

OUT OF SCOPE

The following areas are out of scope of this report:

1. Domestic maritime activities where the primary use of the vessels is for reasons other than transportation (eg, fishing vessels).
2. Detailed advice on which low-carbon fuels and energy sources are likely to be the “winners” for reducing carbon emissions from shipping.
3. Detailed assessment of how specific legislation should be changed (including determining the appropriate balance between different objectives).
4. Consideration of the role that government should play in supporting private sector organisations (financially or otherwise) in the transition to zero-emission shipping.

Some definitions:

- **regulatory system**—we have used the MoT’s definition of regulatory system in its *Transport System Regulatory Stewardship Plan 2019-2022*:

*A regulatory system is a set of formal and informal rules, norms and sanctions, given effect through the actions and practices of designated actors, which work together to shape people’s behaviour or interactions in pursuit of broad goals or outcomes.**

- **zero-emission shipping**—refers to greenhouse gas (GHG) emissions from shipping – we have not considered the objective of lowering sulphur emissions
- **move towards**—our analysis considers barriers to both the end point (achieving zero-emission shipping) and the transition to zero-emission shipping
- **all regulation**—our analysis considers all regulation that could impact the adoption of zero- or lower-emission shipping (including, for example, maritime transport regulation, fuel and environmental standards, health and safety regulation).

* p4, Ministry of Transport (2019).

4 Context

This chapter provides a high-level overview of:

- New Zealand’s maritime transport industry
- options for reducing shipping’s GHG emissions
- the global transition to zero-emissions shipping.

Appendix A provides more detailed information and statistics about the current state of New Zealand’s domestic and international shipping.

4.1 New Zealand’s maritime transport industry

New Zealand’s maritime transport industry can be broken into two parts—domestic maritime transport activities and international ship voyages to New Zealand.

4.1.1 New Zealand’s domestic marine transport industry

The domestic maritime transport activities in New Zealand covered by this report are:

- coastal shipping of freight, including the Cook Strait ferries
- other vehicle and passenger ferries and tourism transport²

Coastal ships in New Zealand move containers and two main bulk cargoes (oil products and cement) on dedicated vessels. Coastal shipping also includes the Cook Strait ferries, which carry freight, vehicles, and passengers.

² Excluded from the scope of this report are commercial work boats, fishing vessels, vessels used in aquaculture activities, and vessels used for tourism activities (such as whale watching) or recreation. However, some of the regulatory barriers identified will also be applicable to these types of vessels.

In competition with domestic coastal shipping are international vessels carrying domestic cargo between two New Zealand ports of call, as part of a longer international voyage.

Ferries other than the Cook Strait ferries (including water taxis), currently operate in several locations around New Zealand, with Auckland having the most significant passenger ferry network. Some local ferry operations are notable in that they have been among the first in the world to move to zero-emission shipping—the first all-electric ferry in the Southern hemisphere was commissioned in Wellington in 2022, and four electric ferries are under construction for use in Auckland.

4.1.2 International ship voyages to New Zealand

As an island nation whose principal exports are primary commodities and who imports a high proportion of manufactured consumer goods, international shipping is crucial to New Zealand’s economy. In 2022, 99.7% of New Zealand’s trade volume and 84.0% of New Zealand’s trade value were transported by sea.³

The largest ships to visit New Zealand are bulk carriers (for transporting primary commodities such as timber, livestock, ore, and coal), container ships, and fuel tankers. Other significant categories include vehicle carriers and cruise ships.

From an emissions perspective, international shipping is more significant than domestic shipping. In 2022, international shipping to New Zealand accounted for almost eight times more emissions than domestic shipping.⁴

³ The remainder was transported by air. Source: FIGS trade dashboard ([FIGS trade \(mot-analytics.gitlab.io\)](https://mot-analytics.gitlab.io)).

⁴ Source: MBIE stats.

International shipping may also present the most immediate challenges for New Zealand's regulatory ability to accommodate low carbon shipping, as (non-electric) alternative-fuelled international ships are likely to emerge on New Zealand's shores sooner than (non-electric) alternative-fuelled domestic ships. For example, two Chinese vehicle manufacturers have announced that they are building liquefied natural gas (LNG) fuelled vehicle ships to serve the Australian and New Zealand markets, with the first voyage to New Zealand expected in 2025.⁵

Approximately two-thirds of international shipping voyages to New Zealand went via Australia in 2021. Singapore is another key destination. Singapore is the most significant trading hub in the Asia-Pacific region and is also pursuing green economy agreements with a number of countries, including the "Climate Change and Green Economy" pillar of the Singapore-New Zealand Enhanced Partnership that was launched in 2022.

4.2 Emissions-reduction options for shipping

For existing ships, the principal options for reducing GHG emissions are through:

- More energy efficient operating practices (eg, speed optimisation, voyage planning, weather routing, hull cleaning).
- Energy efficiency modifications to existing vessels. These range from relatively established modifications such as low resistance hull coatings, more efficient propellers, energy efficient hotel loads (eg, LED lighting), and heat recovery, through to more innovative

⁵ As set out later in this report, current regulations do not cover LNG as a fuel for shipping.

⁶ 'Drop-in' alternative fuels are those which can be used in existing ships engines without needing significant modification.

technologies such as bulbous bow retrofits, fixed sail installation, and Flettner rotor sail installation.

- Fuel switching to lower carbon 'drop-in'⁶ fuels (eg, biofuel blends), and using shore power when in port.

There may also be options to retrofit existing ships to use low-carbon propulsion systems. However, retrofitting a vessel with new propulsion systems is generally very expensive. Likewise, while there is growing interest in ship-based carbon capture and storage (CCS) systems, the economics are even more challenging than for land-based systems for industrial boilers. This is due to the capital costs of the systems, the energy needs and on-board storage space requirements of such systems, and the need for the development of CO₂ offloading, transport and permanent storage facilities at, or close to, ports. Based on current knowledge, ship-based CCS seems a less-immediate decarbonisation technology than other measures.

For new vessels, GHG emissions reductions can be achieved through:

- Efficient ship design⁷ (eg, modern ships are increasingly designed for fuel efficient operation over a range of optimised operating speeds and loadings, rather than a previous single design speed and draft).
- Low-carbon fuel propulsion systems.

⁷ All new ships over 5,000 GT must now have an Energy Efficiency Design Index (EEDI) rating which meets a non-prescriptive minimum energy efficiency requirement for new ships depending on ship type and size. It is expected that the minimum efficiency will increase over time, continuing to drive down GHG emissions.

Box 1 Electricity arrangements and nuclear power

One key decarbonisation option is battery electric propulsion: either as a complete option for coastal shipping, or as an auxiliary option for international shipping (eg, for bow thrusters for in-port manoeuvring). Furthermore, the use of shore power (using shoreside electrical power to maintain a ship's essential services while in port) can reduce the need for engines to operate to provide on-board power while ships are moored.

Another potential low-carbon fuel is nuclear power. Small modular reactors (SMRs) have been used as a propulsion fuel for military vessels (ships and submarines) for decades by overseas navies and, in some limited cases, for non-military vessels such as icebreakers. They have been suggested as a potential decarbonisation route for large commercial ships. Nuclear propulsion does have some advantages over other low-carbon shipping options—it does not require large fuel tanks and can go years without refuelling. However, nuclear propulsion is very expensive, so we don't expect it to emerge as a widespread commercial technology within the next couple of decades.⁸

⁸ In addition, the New Zealand Nuclear Free Zone, Disarmament, and Arms Control Act 1987 explicitly prohibits nuclear-powered ships from entering New Zealand waters. We talk about this further in subsection 6.4.3.

As is illustrated in Box 2 on page 13, a variety of lower-carbon fuel options are being introduced for different types of ships. There are significant differences in the relative pros and cons of the fuels across different key characteristics such as:

- cost of production and supply (\$/GJ)
- extent of GHG reduction relative to petroleum fuel, with some 'low-emissions' fuels actually *increasing* net GHG production⁹
- energy density (which is a key determinant of suitability for long-distance shipping)
- capital cost of ships to operate the fuel, with some fuels requiring more expensive engines and on-board fuel handling facilities
- extent and cost of port-based facilities and personnel for fuel storage and handling
- 'incident' risk of fuels, relating to their toxicity to human health or the local environment, or risk of explosion, if the fuel were to escape.

⁹ For example, fuels that have lower emissions than fuel oil or diesel per GJ of combustion may have higher emissions when also including the emissions associated with their production. This can include fuels such as methanol produced from natural gas. Furthermore, the sulphur emissions associated with fuel oil combustion, while causing human health costs and, in some cases, local environmental damage, actually *reduced* global warming. Therefore, switching away from these fuels to a fuel which has little (or negative) combustion emission improvement may cause more climate change harm. Globally, it is estimated that the switch away from shipping fuel containing sulphur will *increase* global temperatures by around 0.05C by 2050. This is equivalent to approximately two additional years of emissions. (Source: [How low-sulphur shipping rules are affecting global warming - Carbon Brief](#)).

Given these different pros and cons for lower-carbon fuels, and significant uncertainties over future costs for many options, a winner or winners are yet to emerge. Indeed, given these different dynamics, it is likely that the 'winning' fuel could be different for different maritime vessels and applications. In addition, the preferred fuels or energy sources are likely to change over time due to further fuel innovation and potentially changes in the relative cost of different fuels. This creates a challenge when designing regulation, which will need to be robust to whichever low-carbon fuels emerge as the key shipping decarbonisation options.

This uncertainty also poses challenges for shipping companies and ports who may need to invest in ships and fuel-handling facilities.

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Box 2 *Alternative shipping fuels and energy sources*

Table 2, overleaf, sets out the relative GHG reduction potential, energy density, and fuel/energy cost for several alternative shipping fuels and energy sources. The table is intended to be indicative only—it is based on a subjective assessment and does not include all possible fuels and energy sources (eg, blue hydrogen). Fuels/energy sources are ordered by GHG reduction potential and then energy density.

The GHG reduction potential is based on net lifecycle production emissions. For example, direct emissions from biodiesel are similar to diesel, but net lifecycle emissions include CO₂ absorption by photosynthesis when growing the biomass and so significantly reduces net emissions.

The fuel/energy cost indicates the current fuel or energy cost of the fuel or energy source, which could change over time. The fuel/energy cost does not include capital costs. However, an asterix (*) is used to indicate where the capital cost for that fuel/energy source may be higher (*) or significantly higher (**) than conventional fuels.

Cells shaded **dark green** indicate that the fuel or energy source performs very well in the relevant attribute (ie, it has a very high GHG reduction potential, very high energy density, or a very low fuel/energy cost). Cells shaded **red** indicate that the fuel or energy source performs very poorly in the relevant attribute (ie, it has a very low GHG reduction potential, very low energy density, or very high fuel/energy cost). Cells shaded **green**, **light green**, **yellow**, or **orange** fall somewhere in between.

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Table 2: GHG reduction potential, energy density, and fuel/energy cost for alternative shipping fuels/energy sources

Fuel/energy source	Description	GHG reduction potential	Energy density	Fuel/energy cost
Battery electric	Renewable electricity stored in batteries and used to drive an electric motor	Very high	Very low	Very low cost**
Biodiesel	Biodiesel (methyl ester) made from wastes or sustainability grown oils and fats, can be blended or substituted for distillate fuels	High	High	Medium cost
HVO	Hydrotreated vegetable oil, made from waste or sustainably grown oils and fats, can fully substitute for diesel fuel	High	High	High cost
Synthetic renewable fuel	Renewable diesel fuel made from gasification of biomass, can fully substitute for diesel fuel	High	High	Very high cost
e-fuels	Production of synthetic diesel fuel from hydrogen and CO ₂ , with hydrogen produced from electrolysis using renewably generated electricity	High	High	Very high cost
e-methanol	Produced from hydrogen and CO ₂ , with hydrogen produced by electrolysis using renewably generated electricity	High	Medium	Very high cost*
Ammonia (green)	Ammonia produced from green hydrogen, used in an ammonia engine	High	Medium	Very high cost*
Hydrogen (green)	Hydrogen produced by electrolysis using renewable electricity, compressed or liquefied for storage and used in a hydrogen fuel cell to drive an electric motor (liquefied hydrogen higher cost)	High	Low	High cost**
Bio-LNG	Liquefied biogas (biomethane) – GHG reduction includes risk of methane leakage	Medium	High	High cost*
Compressed biogas	Compressed biogas (bioethane) – GHG reduction includes risk of methane leakage	Medium	Medium	Low cost*
Bio-methanol	Produced from gasification of biomass	Medium	Medium	Very high cost*
LNG	Liquefied natural gas – refrigerated to -160°C	Very low	High	Medium-low cost*
CNG	Compressed natural gas	Very low	Medium	Low cost*
LPG	Liquefied petroleum gas (propane and butane)	Very low	Medium	Medium-low cost*
Methanol	Produced from natural gas (existing NZ production exported)	Very low/negative	Medium	Low cost*
Ammonia (grey)	Ammonia produced from fossil fuels, used in an ammonia engine	Very low/negative	Medium	Medium-low cost*
Hydrogen (grey)	Hydrogen produced from fossil fuels and compressed or liquefied for storage, and used in a hydrogen fuel cell to drive an electric motor (liquefied hydrogen higher cost)	Very low/negative	Low	Low cost**

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4.3 International regulatory drivers of shipping decarbonisation

4.3.1 International Maritime Organization's role in supporting shipping decarbonisation

The International Maritime Organization (IMO) is the United Nations agency that is responsible for developing and maintaining a regulatory framework for shipping internationally. The IMO has 176 member states and New Zealand has been a member since 1960.

In 2023, the IMO adopted a Strategy on Reduction of GHG Emissions from Ships. This strategy has the following ambitions:

1. carbon intensity of ships to decline through further improvement of the energy efficiency of new ships
2. carbon intensity of international shipping reduces by at least 40% by 2030, compared to 2008
3. uptake of zero or near-zero GHG emission technologies, fuels, and/or energy sources to increase to at least 5%, striving for 10%, of the energy used by international shipping by 2030
4. GHG emissions from international shipping to peak as soon as possible and reach net zero by 2050.

The IMO's primary legal vehicle for implementing this strategy is the convention *Regulations for the Prevention of Air Pollution from Ships (MARPOL Annex VI)*. MARPOL Annex VI seeks to address the impact of air pollution from shipping activities on human health and environments in and around port communities and contains measures to reduce GHG

¹⁰ [COP26: Clydebank Declaration for green shipping corridors - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/news/cop26-climate-agreement-sets-targets-for-reducing-ship-emissions)

emissions for all ships. New Zealand signed up to MARPOL Annex VI from 26 August 2022.

The main change implemented in New Zealand since New Zealand signed up to MARPOL Annex VI has been a reduction in sulphur in marine fuels sold in New Zealand and the requirement for international ships to use these fuels here. (Noting, as per footnote 9 previously, this is likely to have *increased* global warming).

New Zealand is also a signatory to the Clydebank Declaration made in 2021 at COP26. The Declaration supports the establishment of green shipping corridors – zero-emission shipping routes between two or more ports. Signatories pledged to facilitate the establishment of partnerships between ports, operators and others in the value chain to establish green shipping routes, and to identify and address barriers to the formation of green corridors including regulatory frameworks.¹⁰

4.3.2 Regulatory initiatives in other jurisdictions to support shipping decarbonisation

In addition to IMO-driven regulatory change, some jurisdictions have taken additional regulatory actions to encourage reductions in GHG emissions from shipping.

The European Union (EU) has put in place a range of regulations, including:

- requiring shipping companies to report GHG emissions released during voyages to and/or from ports in the European Economic Area (EEA) – this is already required for cargo and passenger ships of at least 5,000 gross tonnage (GT) and will be extended to other ships from 2025¹¹

¹¹ [FAQ – Maritime transport in EU Emissions Trading System \(ETS\) - European Commission \(europa.eu\)](https://ec.europa.eu/eu-ets/faq-maritime-transport)

- extending the EU's Emissions Trading Scheme (ETS) to include emissions from maritime transport, with the following key features:¹²
 - cargo and passenger ships of at least 5,000 GT will be covered from 2024 and offshore ships of at least 5,000 GT from 2027
 - it will apply to 100% of emissions from voyages between two EU ports and when ships are within EU ports, and 50% of emissions from voyages that start or end outside the EU
 - shipping companies will be required to surrender ETS allowances equal to 40% of 2024 emissions, increasing to 100% for 2026 emissions
- requiring passenger ships and container ships to use shore power when moored at major EU ports from 2030.¹³

California already requires some ships to use shore power when in port. Shore power regulations were introduced in California in 2007 but have been updated recently to cover more vessel types and to include smaller port terminals. The regulations apply to ocean-going vessels (including container, refrigerated cargo, cruise vessels, tankers, and roll on-roll off).¹⁴

In the United Kingdom, the UK ETS will be expanded to include emissions from domestic shipping from 2026.¹⁵ The ETS will capture emissions from any vessels over 5,000 GT travelling between UK ports. There is no publicly

announced intention to include emissions from international shipping in the UK ETS. However, the UK Government has recently announced its intention to include international shipping emissions in its sixth carbon budget (covering the period 2033-2037).¹⁶ Like the EU, shipping operators are required to report emissions data for voyages to and/or from UK ports and within UK ports (for ships over 5,000 GT).¹⁷

¹² For more information, see: [FAQ – Maritime transport in EU Emissions Trading System \(ETS\) - European Commission \(europa.eu\)](https://ec.europa.eu/eu-transport-fairness/faq-maritime-transport-in-eu-emissions-trading-system-ets)

¹³ [FuelEU maritime initiative: Council adopts new law to decarbonise the maritime sector - Consilium \(europa.eu\)](https://ec.europa.eu/eu-transport-fairness/fuel-eu-maritime-initiative-council-adopts-new-law-to-decarbonise-the-maritime-sector)

¹⁴ For more information, see: <https://www2.arb.ca.gov/sites/default/files/2023-04/At%20Berth%20FAQ.pdf>

¹⁵ p104, UK Government et. al (2023)

¹⁶

<https://publications.parliament.uk/pa/cm5804/cmselect/cmenvaud/509/summary.html#>

¹⁷ <https://www.gov.uk/government/publications/min-669-mf-reporting-emissions-data-into-the-uk-mrv-regime/min-669-mf-reporting-emissions-data-into-the-uk-mrv-regime>

5 Current regulatory regime

The regulatory regime considered in this report is made up of several regulatory systems that have overlapping components and, in some cases, competing objectives. These regulatory systems could all have an impact on the uptake of fuels and technologies that support a transition to zero-emission shipping in New Zealand. This chapter maps out the current regulatory regime, including discussion of what regulation is in place and who the regulatory agencies and regulated parties are.

Box 3 Some regulatory definitions

In our consideration of the current regulatory regime (this chapter) and our assessment of the regulatory barriers (chapter 6) we have adopted three definitions included in the Government's *Government Expectations for Good Regulatory Practice*¹⁸, which are:

- A **regulatory system** is a set of formal or informal rules, norms and sanctions, given effect through the actions of designated actors, that work together to shape people's behaviour or interactions in pursuit of a broad goal or outcome.
- A **regulated party** is a person or organisation that is subject to behavioural expectations, obligations and/or sanctions within a regulatory system.
- A **regulatory agency** is any agency (other than courts, tribunals and other independent appeal bodies) that has any of the following responsibilities for the whole or part of a regulatory system:

monitoring; evaluation; performance reporting; policy advice; policy and operational design; legislative design; implementation; administration; information provision; standard-setting; licensing and approvals; or compliance and enforcement.¹⁹

There are two broad types of legislation in New Zealand:

- An **Act** is a law passed by Parliament. Often referred to as **primary legislation**.
- **Secondary legislation** is made under a power formally delegated in a particular Act. It can have titles such as "regulations", "rules", or "Order in Council".²⁰

Note that when we refer to a **regulatory system** in this report, we are generally referring to an Act and the secondary legislation that is made under that Act. A regulatory system can include documents incorporated by reference.

¹⁸ New Zealand Government (2017).

¹⁹ p1, *ibid*.

²⁰ See www.legislation.govt.nz/glossary.aspx for more information.

5.1 Mapping of the regulatory regime

5.1.1 Categories of regulatory system

The regulatory systems making up the current regulatory regime can be grouped into three broad categories, based on the key objective(s) of each regulatory system. Some regulatory systems fall into more than one of the categories because they have multiple objectives.

The three categories are:

- health and safety (H&S)
- environment and decarbonisation (E&D)
- infrastructure and supply (I&S).

5.1.2 Significance of each regulatory system

The regulatory systems differ in the level of significance they have in supporting the transition to, and the achievement of, zero-emission shipping. To capture these differences, we have rated each regulatory system as being of central, intermediate, or peripheral significance.

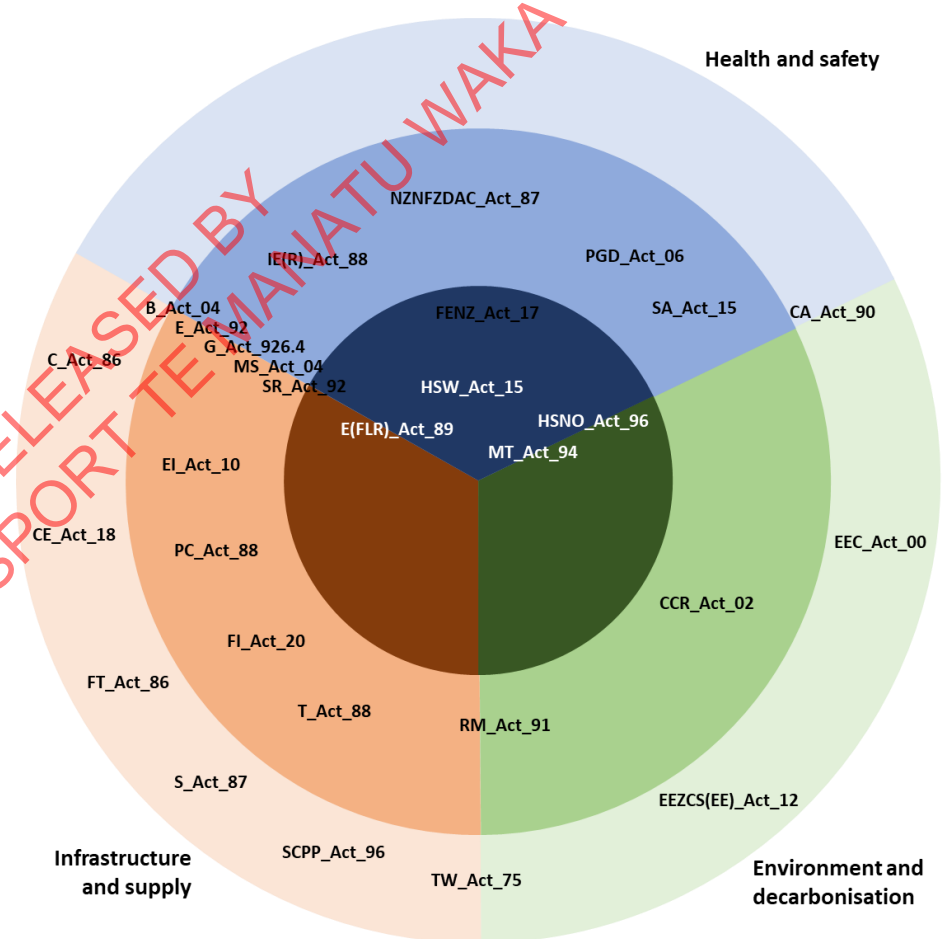
5.1.3 Mapping of the regulatory regime

Figure 1 maps the categorisation and ranking of each of the regulatory systems.

Table 3, Table 4, and Table 5 on the following pages, provide more detail on the regulatory systems in each of the health and safety, environment and decarbonisation, and infrastructure and supply categories.²¹

²¹ Note that some regulatory systems appear in more than one table as they fall in more than one category.

Figure 1: Categorisation of regulatory systems



See Table 3, Table 4, and Table 5 for names of regulatory systems shown in this diagram.

5.1.4 Regulatory systems in the health and safety area

Within the health and safety area, we have grouped regulatory systems into three broad categories:

- Use and supply of hazardous substances and dangerous goods
- Shipping-specific operation and safety
- Supply of infrastructure and qualifications of providers.

The key regulatory systems in the health and safety area relate to protecting people from the impacts of hazardous substances (which will include alternative lower-carbon shipping fuels) and maintaining safety at sea and ports.

Table 3, overleaf, lists the regulatory systems under the three groupings listed above with a colour-coding based on Figure 1 to indicate whether the legislation is of central, intermediate, or peripheral significance (darkest, mid, or lightest shading, respectively). The far right-hand of the table indicates whether the legislation also falls within the other two categories of legislative purpose:

- environment and decarbonisation (E&D)
- infrastructure and supply (I&S).

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Table 3: Regulatory systems in the health and safety area

Area of H&S	Act	Purpose	Relevant secondary legislation		
1. Use and supply of hazardous substances and dangerous goods	HSNO_Act_96	Hazardous Substances and New Organisms Act 1996	To protect the health and safety of people and the environment by preventing or managing adverse effects of hazardous substances and new organisms.	<ul style="list-style-type: none"> Hazardous Substances (Hazardous Property Controls) Notice 2017 	Also E&D
	HSW_Act_15	Health and Safety at Work Act 2015 ²²	To prevent harm to workers and workplaces from hazards (including hazardous substances).	<ul style="list-style-type: none"> Health and Safety at Work (Risk and Workplace Management) Regulations 2016 Health and Safety at Work (Hazardous Substances) Regulations 2017 Health and Safety at Work (Major Hazard Facilities) Regulations 2016 Health and Safety in Employment (Pipelines) Regulations 1999 Health and Safety in Employment (Pressure Equipment, Cranes, and Passenger Ropeways) Regulations 1999 Safe work instruments 	
	E(FLR)_Act_89	Energy (Fuels, Levies, and References) Act 1989	To provide for regulations in relation to fuel quality and related matters, such as specifications for refuelling equipment and vehicle refuelling inlets, and provision of information for consumers.	<ul style="list-style-type: none"> Energy (Petrol, Engine Fuel, and Gas) Levy Regulations 2017 Energy Services (Gas) Order 2003 Engine Fuel Specifications Regulations 2011 	Also I&S ²³
	FENZ_Act_17	Fire and Emergency New Zealand Act 2017	To set framework under which Fire and Emergency New Zealand operates, including processes for responding to hazardous substance emergencies.		
	IE(R)_Act_88	Imports and Exports (Restrictions) Act 1988	To restrict the import and export of particular goods, such as dangerous goods.		
	SA_Act_15	Standards and Accreditation Act 2015 ²⁴	For the development, approval, and maintenance of New Zealand standards. It makes provision for		

²² Some of the regulations under the HSW_Act_15 relate to the supply of infrastructure (rather than the use and supply of hazardous substances).

²³ In addition to setting out minimum standards for fuel performance, the Engine Fuel Specifications Regulations 2011 also include provisions limiting fuel components that could be harmful to the environment or public health. Therefore, the Energy (Fuels, Levies, and References) Act 1989 regulatory system could also be categorised as “environment and decarbonisation”.

²⁴ The SA_Act_15 also relates to the supply of infrastructure.

Area of H&S	Act		Purpose	Relevant secondary legislation	
			standards that protect the health and safety of individuals.		
2. Shipping-specific operation and safety	MT_Act_94	Maritime Transport Act 1994	To set the legal framework for maritime safety and protection of the marine environment, including licensing of ships and crews; investigation of maritime accidents; oil spills planning and preparedness; and other aspects of maritime law.	<ul style="list-style-type: none"> Marine Protection Rules²⁵ Maritime Rules Transport instruments New Zealand Marine Oil Spill Readiness and Response Strategy 	Also E&D
	MS_Act_04	Maritime Security Act 2004	To meet the obligations under the International Convention for the Safety of Life at Sea, enhance ship and port security, and prevent international terrorism.		Also I&S
	SR_Act_92	Ship Registration Act 1992	To set which ships are required or entitled to be registered in New Zealand.		Also I&S
3. Supply of infrastructure and qualifications of providers	B_Act_04	Building Act 2004	To set the rules for the construction, alteration, demolition, and maintenance of new and existing buildings. Aims to encourage better design and construction of buildings.		Also I&S
	E_Act_92	Electricity Act 1992	To protect the health and safety of the public and promote prevention of damage to property in relation to the supply and use of electricity.	<ul style="list-style-type: none"> Electricity (Safety) Regulations 2010 	Also I&S
	G_Act_92	Gas Act 1992	To protect the health and safety of the public and promote prevention of damage to property in relation to the supply and use of gas.	<ul style="list-style-type: none"> Gas (Safety and Measurement) Regulations 2010 	Also I&S
	PGD_Act_06	Plumbers, Gasfitters, and Drainlayers Act 2006	To protect the health and safety of the public by ensuring competency of persons engaged in provision of plumbing, gasfitting, and drainlaying.		

The intensity of blue shading matches that in Figure 1 on page 18, and indicates the significance of the regulatory system in supporting the transition to, and achievement of, zero-emission shipping – regulatory systems with the darkest shading have central importance.

²⁵ Note that Part 199 of the Marine Protection Rules implements MARPOL.

5.1.5 Regulatory systems in the environment and decarbonisation area

Within the environment and decarbonisation area, we have grouped regulatory systems into four broad categories:

- Marine environment
- Impact of fuel use on environment²⁶
- Climate change
- Impact of other resource use on environment.

The *impact of fuel use on environment* category captures both climate change and non-climate change impacts on the environment. For example, the environmental impacts include the impact of fuel use on air quality and marine pollution. Under the *climate change* category, we've included the *Climate Change Response Act 2002* which relates to all climate change impacts (not just from fuel use).

Table 4, overleaf, lists the regulatory systems under these four groupings with a colour-coding based on Figure 1 to indicate whether the legislation is of central, intermediate, or peripheral significance (darkest, mid, or lightest shading, respectively). The far right-hand of the table indicates whether the legislation also falls within the other two categories of legislative purpose:

- health and safety (H&S)
- infrastructure and supply (I&S).

We note that some of the regulatory systems could fall under more than one category of environment and decarbonisation (for example the

Maritime Transport Act 1994 (MTA) and the Marine Protection Rules could also fit under *Impact of fuel use on environment* and even *Climate change*). However, we have just allocated each regulatory system to one category for simplicity.

²⁶ Including flora and fauna.

Table 4: Regulatory systems in the environment and decarbonisation area

Area of E&D	Act		Purpose	Relevant secondary legislation	
1. Marine environment	MT_Act_94	Maritime Transport Act 1994	Sets out the legal framework for maritime safety and protection of the marine environment, including licensing of ships and crews; investigation of maritime accidents; oil spills planning and preparedness; and other aspects of maritime law.	<ul style="list-style-type: none"> Marine Protection Rules²⁷ Maritime Rules Transport instruments New Zealand Marine Oil Spill Readiness and Response Strategy 	Also H&S
	EEZCS(EE)_Act_12	Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012	Regulates the environmental effects of minerals mining activities (and other seabed activities) beyond the territorial sea.		
2. Impact of fuel use on environment	HSNO_Act_96	Hazardous Substances and New Organisms Act 1996	To protect the environment and the health and safety of people by preventing or managing adverse effects of hazardous substances and new organisms.		Also H&S
3. Climate change	CCR_Act_02	Climate Change Response Act 2002	Puts in place the legal framework to enable New Zealand to meet its international obligations under the United Nations Framework Convention on Climate Change, the Kyoto Protocol and the Paris Agreement.	<ul style="list-style-type: none"> Climate Change (Liquid Fossil Fuels) Regulations 2008 	
4. Impact of other resource use on environment	RM_Act_91	Resource Management Act 1991	To ensure that activities don't harm our neighbours or communities, or damage the air, water, soil and ecosystems that we and future generations need to survive.	<ul style="list-style-type: none"> New Zealand Coastal Policy Statement 2010 Resource Management (Marine Pollution) Regulations 1998 	Also I&S
	EEC_Act_00	Energy Efficiency and Conservation Act 2000	To promote energy efficiency, energy conservation, and the use of renewable sources of energy.		
	TW_Act_75	Treaty of Waitangi Act 1975	Provides for the observance, and confirmation, of the principles of the Treaty of Waitangi by establishing a Tribunal.		Also I&S

The intensity of green shading matches that in Figure 1 on page 18, and indicates the significance of the regulatory system in supporting the transition to, and achievement of, zero-emission shipping – regulatory systems with the darkest shading have central importance.

²⁷ Note that Part 199 of the Marine Protection Rules implements MARPOL Annex VI.

5.1.6 Regulatory systems in the infrastructure and supply area

Within the infrastructure and supply area, we have grouped regulatory systems into three broad categories:

- Port and maritime infrastructure
- Energy (incl. fuel) infrastructure and supply
- Commerce/general supply.

Table 5, overleaf, lists the regulatory systems under these three groupings with a colour-coding based on Figure 1 to indicate whether the legislation is of central, intermediate, or peripheral significance (darkest, mid, or lightest shading, respectively). The far right-hand of the table indicates whether the legislation also falls within the other two categories of legislative purpose:

- health and safety (H&S)
- environment and decarbonisation (E&D).

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Table 5: Regulatory systems in the infrastructure and supply area

Area of I&S	Act		Purpose	Relevant secondary legislation	
1. Port and maritime infrastructure	B_Act_04	Building Act 2004	Sets out the rules for the construction, alteration, demolition, and maintenance of new and existing buildings. Aims to encourage better design and construction of buildings.		Also H&S
	MS_Act_04	Maritime Security Act 2004	To meet the obligations under the International Convention for the Safety of Life at Sea, enhance ship and port security, and prevent international terrorism.		Also H&S
	PC_Act_88	Port Companies Act 1988	To promote and improve efficiency, economy, and performance in the management and operation of the commercial aspects of ports.		
	RM_Act_91	Resource Management Act 1991	To ensure that activities don't harm our neighbours or communities, or damage the air, water, soil and ecosystems that we and future generations need to survive.	<ul style="list-style-type: none"> New Zealand Coastal Policy Statement 2010 Resource Management (Marine Pollution) Regulations 1998 	Also E&D
	SR_Act_92	Ship Registration Act 1992	Sets out what ships are required or entitled to be registered in New Zealand.		Also H&S
	S_Act_87	Shipping Act 1987	Promotes fair dealing and safeguards competition in New Zealand's outwards shipping services, and discourages discrimination against New Zealand shipping and trading interests by foreign governments. Most of the Act is now repealed.		
	SCPP_Act_96	Submarine Cables and Pipelines Protection Act 1996	Provides for protection of submarine cables and pipelines and enables the implementation of obligations on New Zealand under various international conventions relating to protection of submarine cables and pipelines.		
	TW_Act_75	Treaty of Waitangi Act 1975	Provides for the observance, and confirmation, of the principles of the Treaty of Waitangi by establishing a Tribunal.		Also E&D

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Area of I&S	Act	Purpose	Relevant secondary legislation		
2. Energy (incl. fuel) infrastructure and supply	E(FLR)_Act_89	Energy (Fuels, Levies, and References) Act 1989	Makes provision for regulations in relation to fuel quality and related matters, such as specifications for refuelling equipment and vehicle refuelling inlets, and provision of information for consumers.	<ul style="list-style-type: none"> Energy (Petrol, Engine Fuel, and Gas) Levy Regulations 2017 Energy Services (Gas) Order 2003 Engine Fuel Specifications Regulations 2011 	Also H&S ²⁸
	E_Act_92	Electricity Act 1992	To protect the health and safety of the public and promote prevention of damage to property in relation to the supply and use of electricity.	<ul style="list-style-type: none"> Electricity (Safety) Regulations 2010 	Also H&S
	EI_Act_10	Electricity Industry Act 2010	Provides a framework for the regulation of the electricity industry.		
	FI_Act_20	Fuel Industry Act 2020	Includes (among other things) a wholesale fuel pricing regime and rules governing contracts between wholesale fuel suppliers.		
	G_Act_92	Gas Act 1992	To protect the health and safety of public and promote prevention of damage to property in relation to supply and use of gas.	<ul style="list-style-type: none"> Gas (Safety and Measurement) Regulations 2010 	Also H&S
3. Commerce/general supply	T_Act_88	Tariff Act 1988	Sets framework for applying import tariff duty on goods.	<ul style="list-style-type: none"> 2010 Tariff Document 	
	C_Act_86	Commerce Act 1986	Prohibits certain conduct and business arrangements that restrict competition. Part 4 sets out particular goods and services, including electricity and gas distribution and transmission, that are subject to specific regulation.		
	CE_Act_18	Customs and Excise Act 2018	Is the authorising framework for the New Zealand Customs Service's three core functions – protecting New Zealand's border, promoting and facilitating trade and travel, and collecting revenue.		
	FT_Act_86	Fair Trading Act 1986	States that companies can't misrepresent the qualities of a product they sell.		

The intensity of orange shading matches that in Figure 1 on page 18, and indicates the significance of the regulatory system in supporting the transition to, and achievement of, zero-emission shipping – regulatory systems with the darkest shading have central importance.

²⁸ In addition to setting out minimum standards for fuel performance, the Engine Fuel Specifications Regulations 2011 also include provisions limiting fuel components that could be harmful to the environment or public health. Therefore, the Energy (Fuels, Levies, and References) Act 1989 regulatory system could also be categorised as “environment and decarbonisation”.

5.2 Key regulatory agencies

A regulatory agency is any agency (other than courts, tribunals, and other independent appeal bodies) that has any of the following responsibilities for the whole or part of a regulatory system:

- monitoring
- evaluation
- performance reporting
- policy advice
- policy and operational design
- legislative design
- implementation
- administration
- information provision
- standard-setting
- licensing and approvals
- compliance and enforcement.²⁹

Most regulatory systems have more than one regulatory agency. 0 lists the regulatory agencies for each of the regulatory systems considered in this report.

The key regulatory agencies that have responsibilities under the central regulation systems considered in this report are:

- Maritime New Zealand (MNZ) – MNZ's role is discussed in Box 4 on page 28
- the Ministry of Transport (MoT) – responsible for administering the MTA, the Maritime Security Act 2004, the Port Companies Act 1988, and the Ship Registration Act 1992
- the Ministry of Business, Innovation and Employment (MBIE) – responsible for administering the Health and Safety at Work Act 2015 (HSWA), the Energy (Fuels, Levies, and References) Act 1989, the Electricity Act 1992, and the Gas Act 1992
- the Environmental Protection Authority (EPA) – responsible for approving hazardous substances under the Hazardous Substances and New Organisms Act 1996
- WorkSafe – the key regulator of workplace health and safety under the HSWA and regulator for energy safety under the Electricity Act 1992 and Gas Act 1992.

²⁹ New Zealand Government (2017).



Box 4 Maritime New Zealand's role

Maritime New Zealand | Nō te rere moana Aotearoa (MNZ) is a Crown agent established under the Maritime Transport Act 1994. It is a regulatory, compliance, and response agency that has responsibilities for:

- regulation and compliance in the maritime industry
- provision of maritime safety infrastructure
- response to incidents.

MNZ's regulatory and compliance role

MNZ's regulatory and compliance role includes developing and maintaining the Maritime Rules and Marine Protection Rules (collectively the "Rules") that govern national safety, security, and environmental protection in relation to operation of vessels, ports, and offshore installations in New Zealand waters. The Rules contain detailed technical standards and procedures.

The process for introducing new rules and amending existing rules includes policy gap identification, drafting of rules, informal and formal consultation, the final rule being signed into law by the Minister of Transport, and ongoing evaluation of the rule once it comes into force.³⁰

MNZ's functions and responsibilities under different Acts

MNZ has functions and responsibilities under seven different Acts:

- Maritime Transport Act 1994 (MTA) – enforcement; development of the Rules on behalf of the Minister of Transport
- Maritime Security Act 2004 – enforcement
- Ship Registration Act 1992 – maintaining a register of ships
- Health and Safety at Work Act 2015 (HSWA) – enforcement of Act for work on board ships and ships as places of work (and from July 2024, at New Zealand's commercial ports)
- Hazardous Substances and New Organisms Act 1996 (HSNO) – responsible for ensuring provisions are applied to all ships
- Civil Aviation Act 1990 – responsible for search and rescue operations
- Submarine Cables and Pipelines Protection Act 1996 – responsible for certain exemptions and applications.

MNZ's funding

MNZ is funded by a mix of levies (eg, Oil Pollution Levies), fees (eg, seafarer certification fees), and Crown funding. Each source of funding is for specific roles undertaken by MNZ. Some of these sources of funding may reduce in the future (eg, the Oil Pollution Levy due to less reliance on oil), while MNZ's responsibilities may become more complex (eg, dealing with a range of different ship fuels), which has potential to create a funding gap. We discuss this potential funding gap in chapter 7.

³⁰ [The rules process - Maritime NZ](#)

5.3 Some regulatory reform is already in the pipeline

Some of the regulatory systems listed in section 5.1 are already being partially or fully reviewed, have been earmarked for some level of review, or are having some other changes made to them. These reviews/changes could have implications for the achievement of zero-emissions shipping.

Key pieces of regulatory reform already in progress or in the pipeline that are relevant to transitioning to zero-emissions shipping are:

- The MoT and MNZ are seeking a ministerial mandate to review the MTA and Maritime Security Act. The MoT and MNZ consider the review is required because the legislation does not easily accommodate new technologies, includes inadequate tools to manage maritime incidents, poor quality vessels, or maritime security risks, and creates confusion around the differing roles of national and local regulation.³¹
- MBIE is leading a first principles review of the health and safety at work regulatory framework. MBIE has noted that a lack of regulations for some circumstances and the continued reliance on outdated regulations is creating unnecessary costs for businesses and the regulator.³²

³¹ For more information see: p26, Ministry of Transport (2023b) and p25, Maritime New Zealand (2023b).

³² pp19-20, Ministry of Business, Innovation and Employment (2023).

³³ [Updating regulatory settings for distribution networks | Our projects | Electricity Authority \(ea.govt.nz\)](#).

- The Electricity Authority is looking at how the regulatory settings for distribution networks can be improved to better support the electricity sector's transition to a low-emissions economy.³³
- The Ministry for Foreign Affairs and Trade (MFAT) are currently negotiating an Agreement on Climate Change, Trade and Sustainability (ACCTS), which is likely to include an extensive list of environmental goods for which tariffs would be permanently removed.³⁴

MNZ is also undertaking the *40 Series Reform Project* to revamp the rules (in the Maritime Rules) that govern domestic commercial vessels' design, construction, and equipment. While not directly relevant to achieving zero-emission shipping, the goals that MNZ has set out for this reform project will be relevant to any other reform of the rules (and potentially other regulation).³⁵ The goals are to:

- provide a clear rules structure
- have outcome-based rules that are flexible
- include details in transport instruments rather than in the rules
- consolidate rules across vessel types where possible
- take a risk-based approach to setting standards (to ensure that MNZ does not over-regulate or under-regulate).³⁶

³⁴ For more information, see: <https://www.mfat.govt.nz/en/trade/free-trade-agreements/trade-and-climate/agreement-on-climate-change-trade-and-sustainability-accts-negotiations>.

³⁵ The goals are consistent with the ten regulatory design characteristics that are set out in New Zealand Government (2017) and summarised in Box 5 on page 40.

³⁶ For more information, see: <https://www.maritimenz.govt.nz/rules/40-series-reform-project/>

6 Assessment of the regulatory barriers

Regulatory barriers to moving towards zero-emission shipping in New Zealand occur both in the design of legislation (“regulatory design”) and in the delivery of regulation (“regulatory delivery”). Regulatory design and regulatory delivery are the two core components of a regulatory system and need to work together to deliver an effective regulatory system.

In this chapter, we first define what regulatory barriers are. We then introduce a system for categorising each of the regulatory barriers and finally we present our assessment of the key regulatory barriers to moving towards zero-emission shipping in New Zealand.

Box 5 What does good regulatory practice look like?

Regulation should be designed and delivered in a way that delivers the best outcomes for New Zealand.

Government Expectations for Good Regulatory Practice (2017) set out ten regulatory design characteristics that a regulatory system should have to make it more likely that the regulatory system delivers durable outcomes of real value to New Zealanders—these characteristics, in summary form, are that the regulatory system:

- has clear **objectives**
- seeks to achieve those objectives in a **least cost way**
- is **flexible** enough to allow regulators to adapt their regulatory approach and for regulated parties to adopt efficient or innovative approaches
- has processes that produce **predictable** and consistent outcomes
- is proportionate, **fair** and equitable
- is **consistent with international standards and practices**
- is **well-aligned** with requirements in related or supporting regulatory systems
- **conforms to legal and constitutional principles**
- is **easy to navigate and understand**
- has **scope to evolve** in response to changing circumstances or new information.³⁷

³⁷ These characteristics are paraphrased from p2, *Government Expectations for Good Regulatory Practice (2017)*.

6.1 What are regulatory barriers?

We consider regulatory barriers to zero-emission shipping to be any elements of regulatory design or delivery that could affect New Zealand's ability to transition to and/or achieve zero-emission shipping.

6.1.1 Regulatory design barriers

Regulatory *design* barriers to zero-emission shipping are requirements (or lack of requirements) within legislation itself that impede the transition to and/or achievement of zero-emission shipping. A regulatory design barrier generally relates to one or more of the characteristics listed in Box 5 on page 30. Regulatory design barriers can occur because of:

- a **competing objective** – this occurs when a regulatory system (or part of a regulatory system) has an objective that competes with the objective of zero-emission shipping³⁸
- **unfair or undue burdens being placed on regulated parties** – eg, if regulation places excessive costs on some (or all) regulated parties
- a **lack of flexibility and/or durability** in regulation – eg, if regulation is too specific and does not allow regulated parties to adopt efficient or innovative approaches
- a **lack of clarity** in regulation – this includes both regulation that is unclear about the actions a regulated party needs to take and regulation that is ambiguous about the powers of regulatory agencies

³⁸ When there are competing objectives, it may not be appropriate to address the regulatory barrier because the competing objective may be considered more important than achieving zero-emission shipping (eg, health and safety objectives often carry greater weight than other objectives).

- **overlapping regulatory powers or requirements** – eg, if multiple regulatory agencies have overlapping regulatory powers, or a regulatory system includes requirements that overlap or conflict with requirements in another regulatory system
- a **lack of regulation** – this could be a lack of regulatory requirements for new or evolving technologies and fuels
- **inconsistency with international standards and practices.**

6.1.2 Regulatory delivery barriers

Regulatory *delivery* relates to how regulators operate in practice to achieve the outcomes of regulation. In this review, a regulatory delivery barrier occurs when regulators operate in a way (within the bounds of the regulation in place) that makes it more difficult to transition to, and/or achieve, zero-emission shipping. Regulatory delivery barriers include:

- a regulatory agency taking too long to deliver regulatory change
- a lack of monitoring and enforcement by a regulatory agency
- different regulatory agencies (eg, local councils) taking different approaches to the same legislation
- a lack of clarity on the roles of different regulatory agencies.

Regulatory delivery barriers are often caused by resourcing constraints (both in capacity and capability). Therefore, to reduce or eliminate these barriers will require these resourcing constraints to be addressed.

6.2 What are the impacts of regulatory barriers?

Regulatory barriers to zero-emission shipping can impact New Zealand's ability to transition to and achieve zero-emission shipping in four ways:

- **Limiting options:** regulatory barriers can limit the pathways/options for achieving zero-emissions shipping (eg, by limiting which fuels it is feasible to use to achieve zero-emission shipping or reducing the number of shipping operators willing to operate in New Zealand).
- **Reducing speed:** regulatory barriers can reduce the speed at which New Zealand transitions to zero-emission shipping (eg, by requiring processes that slow down the adoption of lower-carbon fuels).
- **Increasing cost:** regulatory barriers can increase the cost of achieving zero-emission shipping (eg, by requiring regulated parties to pay fees to get approval for new lower-carbon fuels).
- **Increasing risk:** regulatory barriers can increase the risk of adopting lower-emission technologies or fuels. This risk could be (one or more of) investment, technical, safety, environmental, or security risk.

These four types of impact are interlinked. In most cases, a regulatory barrier will impact New Zealand's ability to transition to and/or achieve zero-emission shipping in more than one way. For example, regulation that limits which low-carbon shipping fuels can be used will likely reduce the speed of the transition, increase the cost of achieving zero-emission shipping, and increase investment risks.

In our assessment of regulatory barriers (in section 6.3 below), we rate each type of impact for each regulatory barrier on a scale from *no impact*

through to *significant impact*. This assessment is subjective but has been informed by comments made by stakeholders.³⁹ Our assessment of the impact only considers how significantly the barrier will impede the achievement of zero-emission shipping and takes no account of the effort or cost required to address the barrier.

As a guide, our rating of each type of impact for each regulatory barrier is based on the following factors:

- **No impact:** the regulatory barrier is not expected to have any impact.
- **Minimal impact:** the impact of the regulatory barrier may make it slightly more difficult to transition to and/or achieve zero-emission shipping. The impact may only affect certain technologies or fuels that are not expected to be central to New Zealand's move to zero-emission shipping (eg, nuclear-powered ships). There may be workarounds within the current regulatory regime to avoid this impact.
- **Moderate impact:** the impact of the regulatory barrier is likely to make it more difficult to transition to and/or achieve zero-emission shipping. The impact could affect multiple lower-carbon fuels and technologies. There may be partial workarounds within the current regulatory system to limit this impact.
- **Significant impact:** the impact of the regulatory barrier is likely to make it very difficult to transition to and/or achieve zero-emission shipping. The impact is likely to affect multiple potential pathways for achieving zero-emission shipping. There are unlikely to be any workarounds within the current regulatory regime to avoid this impact.

³⁹ These stakeholders included both regulatory agencies and regulated parties. A list of the stakeholders we spoke to is included in Appendix B.

6.3 Identified regulatory barriers to zero-emission shipping

Our analysis of potential regulatory barriers to zero-emission shipping indicates that the barriers can be split into six groups. These groups fit across the three categories of regulatory systems (health and safety, environment and decarbonisation, and infrastructure and supply) that we used to map the regulatory regime in section 5.1.

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Table 6, overleaf, lists the six groups of potential regulatory barriers and shows how they fit across the three categories of regulatory regime. The table also includes a brief comment on the types of regulatory barrier in each group. In section 6.4, we provide more detail on each of the potential regulatory barriers and how they might impact New Zealand's ability to transition to, and achieve, zero-emission shipping.

Note that we refer to *potential regulatory barriers* in the remainder of this chapter (and in chapter 7) because some of the regulatory barriers require a more detailed assessment (which is outside the scope of this

report) to determine whether they will affect New Zealand's ability to transition to and/or achieve zero-emission shipping. For example, while some stakeholders have told us that separation distances required for hazardous substances under the Health and Safety at Work (Hazardous Substances) Regulations 2017 (HS Regulations) could affect ports' (and potentially other facilities) ability to store multiple low-carbon fuels, more analysis is required to determine whether this will pose a barrier to achieving zero-emission shipping.

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Table 6: Potential regulatory barrier groups

Regulatory barrier group	Regulatory regime category			Comment
	Health and safety	Environment and decarbonisation	Infrastructure and supply	
A. Maritime safety and protection of the marine environment	2. Shipping-specific operation and safety	1. Marine environment		The potential regulatory barriers in this group are in the MTA and the secondary legislation that sits under it. Most of the potential barriers relate to a lack of flexibility or durability in the legislation, although a lack of clarity and regulatory delivery timelines are also issues.
B. Use of low-carbon fuels as hazardous substances	1. Use of hazardous substances and dangerous goods	2. Impact of fuel use on environment		The potential regulatory barriers in this group are largely in the HSNO and the regulations that sit under the HSWA. Key potential barriers relate to getting/having a hazardous substance approval and health and safety requirements for hazardous substances.
C. Use of other low-carbon energy sources	1. Use of hazardous substances and dangerous goods		2. Energy (incl. fuel) infrastructure and supply 3. Commerce/ general supply	The key potential regulatory barriers in this group relate to the installation and use of battery-electric propulsion and shore power. Less significant regulatory barriers relate to the importing of equipment for low-carbon technologies and the use of nuclear-powered ships.
D. Use of ports and other facilities	3. Supply of infrastructure and qualifications of providers	4. Impact of other resource use on environment	1. Port and maritime infrastructure	Most of the potential regulatory barriers in this group relate to the design and delivery of the Resource Management Act 1991 (RMA) and the implications this has for ports (and potentially other facilities) to develop the necessary infrastructure to support zero-emission shipping.
E. Achieving emission reduction targets		3. Climate change		There are just two potential barriers in this group—the first is that international shipping emissions are not captured in the emissions reduction target, and the second is the lack of legislative framework for defining the GHG intensity of low-carbon fuels.
F. Low-carbon fuel specifications and commercial regulation			3. Commerce/ general supply	The potential regulatory barriers in this group relate to a lack of engine fuel specifications for most low-carbon fuels (except for first-generation biofuels) and the Commerce Commission not being able to consider the use of gas pipelines for lower-carbon gases (such as hydrogen) as a regulated service.

6.4 Assessment of regulatory barriers

The following subsections (6.4.1 through to 6.4.6) discuss the potential regulatory barriers in each of the six regulatory barrier groups.

6.4.1 Potential regulatory barriers related to maritime safety and protection of the marine environment

Our assessment of regulatory barriers identified that there were four potential regulatory barriers related to maritime safety and protection of the marine environment. The potential barriers we have identified in this group all relate to the MTA and/or the secondary legislation that sits under the MTA (particularly the Rules). These potential barriers are listed below in Table 7, in order from the barrier we expect would have the biggest impact on the ability to achieve zero-emission shipping down to the barrier likely to have the smallest impact. We discuss these potential regulatory barriers in more depth following the table.

Table 7: Potential regulatory barriers related to maritime safety and protection of the marine environment

Potential regulatory barrier		Type of regulatory barrier		Impact on ability to achieve zero-emission shipping			
Code	Name	Regulatory design barrier	Regulatory delivery barrier	Limits options	Reduces speed	Increases cost	Increases risk
MT02	Maritime rules, marine protection rules, and transport instruments take a long time to develop and amend		✓				
MT05	Some maritime legislation (including sections of the Maritime Transport Act and Maritime Rules and Marine Protection Rules) are too prescriptive and not objective-based	✓					
MT06	International conventions, which are implemented through Maritime Transport Act, are oil focussed	✓					
MT01	Lack of legislation around responding to, and protecting from, marine spills of low-carbon fuels	✓					

Key: no impact / minimal impact / moderate impact / significant impact

The MTA and Rules are too prescriptive and not objective based

The MTA and Rules were developed based on conventional technologies, in a world where ships were fuelled by marine diesel. Therefore, the legislation in the MTA and Rules does not always apply well when vessels are designed or modified to be more energy efficient and/or ships use lower-carbon energy sources. In addition, much of the legislation relating to maritime safety and the protection of the marine environment is prescriptive rather than objective-based. This makes it difficult, and ultimately expensive, to introduce new fuels, ship designs, and technologies. MNZ noted these issues in their 2023 Briefing for the Incoming Minister:

“Some maritime rules and legislation are heavily based on conventional technologies and will need to be adjusted. This means that operators have to seek expensive exemptions or pay fees to go through safety case processes to operate their new technologies. We work closely with these operators to support them. Additionally, the legislation does not allow for full cost recovery when a safety case is submitted. Depending on the nature of the technology, applications can be complex and require significant resources to process. Ultimately, the rules and legislation will need to change to become more enabling, and it will be necessary to provide more support for processing applications as the number increases.”⁴⁰

The MTA has been amended numerous times since it was passed 30 years ago but has never been reviewed in its entirety. A wholesale review of the MTA could help ensure that it does not hold New Zealand back from

⁴⁰ p25, Maritime New Zealand (2023b).

adopting fuels, ship designs, and technologies that will reduce New Zealand’s GHG emissions from shipping.⁴¹ However, it is likely that the Rules, which are developed and enforced by MNZ, are a bigger barrier to taking steps to decarbonising New Zealand’s shipping. The Rules contain the detailed standards and requirements for shipping. While the Rules contain a lot of detail by necessity, there is scope for the Rules to be more objective-based to allow for different approaches to achieve the same outcomes. This would allow shipping operators to use the most effective and efficient methods to achieve the desired outcomes.

Rules are taking a long time to develop and amend

The Maritime Rules and Marine Protection Rules often take a long time to amend. There could be a range of reasons contributing to this:

- rule changes need to go through a thorough process to ensure they are fit for purpose
- the Rules are technical and therefore time needs to be taken to make sure that amendments are technically robust
- the structure of the Rules makes it difficult to amend them (eg, the Rules don’t always align well with IMO conventions)
- the Rules are needing to incorporate emerging technologies and fuels and there is a lack of New Zealand (and sometimes worldwide) expertise on these technologies and fuels
- MNZ lacks the necessary resource (in capacity and/or capability) to make amendments quickly.

⁴¹ The Ministry of Transport and MNZ are currently seeking a ministerial mandate to review the MTA (as discussed in section 5.3), however this review may be more targeted rather than a wholesale review.

Given the rate of change in the shipping industry as we move towards a zero-emission future, delays in Rule changes could have a big impact on the time it takes for New Zealand to achieve zero-emission shipping.

Transport Instruments could be used to speed up regulatory change

The Minister of Transport can make provisions that allow the Director of MNZ to make Transport Instruments. Transport Instruments are a form of secondary legislation allowed by the MTA that may be suitable for provisions that are detailed, technical, or likely to change often. Because Transport Instruments are made by MNZ (and do not need to be signed off by the Minister of Transport) they should be able to accommodate technological change more quickly than Rules. It is too early to tell if this will be the case in practice.

There is a lack of legislation around responding to, and protecting from, marine spills of low-carbon fuels

The MTA includes provisions around responding to, and protecting from, marine oil spills, but does not include any equivalent provisions for spills of non-oil fuels.

The MTA provisions include plans and responses to protect marine environment from marine oil spills (Part 23), financing plans and responses to protect the marine environment from marine oil spills (Part 24), and compensation from the International Oil Pollution Compensation Fund and Supplementary Fund for pollution damage (Part 26). In addition, MNZ's functions (listed in section 431(1) of the MTA) include "to ensure New

Zealand's preparedness for, and ability to respond to, marine oil pollution spills" [underline added].

In addition, the Resource Management (Marine Pollution) Regulations 1998⁴² allow for discharge of substances for the purpose of avoiding, remedying, or mitigating the adverse effects of an oil spill, but don't include any similar provisions for spills of other fuels.⁴³

Low-carbon fuels that are toxic to marine life (such as ammonia) should have regulation in place that provides processes for responding to, and minimising the impact of, marine spills before they are used as a marine fuel. If a range of low-carbon fuels are used for shipping, a diversity of response equipment and capability is likely to be required (both by MNZ and regional councils who are responsible for smaller spills) to be able to effectively respond to spills of different low-carbon fuels.

There are two IMO conventions for hazardous substances which could be appropriate for managing spills of low-carbon fuels—the HNS Convention⁴⁴ sets the liability for hazardous substance spills, while the Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances (OPRC-HNS Protocol)⁴⁵ includes readiness and response frameworks for hazardous substances. However, New Zealand is not a party to either of these conventions. If New Zealand were to accede to either (or both) of these conventions it would need to be implemented through the MTA and Rules. Whether New Zealand should accede to these conventions could be considered under a review of the MTA.

⁴² Secondary legislation under the RMA.

⁴³ Regulation 8 of the Resource Management (Marine Pollution) Regulations 1998. The discharge cannot contravene Part 23 of the MTA or any Marine Protection Rules made under Part 27 of the MTA.

⁴⁴ <https://www.imo.org/en/MediaCentre/HotTopics/Pages/HNS-2010.aspx>

⁴⁵ [https://www.imo.org/en/About/Conventions/Pages/Protocol-on-Preparedness,-Response-and-Co-operation-to-pollution-Incidents-by-Hazardous-and-Noxious-Substances-\(OPRC-HNS-Pr.aspx\)](https://www.imo.org/en/About/Conventions/Pages/Protocol-on-Preparedness,-Response-and-Co-operation-to-pollution-Incidents-by-Hazardous-and-Noxious-Substances-(OPRC-HNS-Pr.aspx)).

6.4.2 Potential regulatory barriers related to the use of low-carbon fuels as hazardous substances

Any fuel that is explosive, flammable, oxidising, toxic, corrosive, and/or toxic to the environment is a hazardous substance.⁴⁶ Box 6 summarises the key regulations that apply to hazardous substances.

Box 6 Regulation of low-carbon fuels as hazardous substances

The key legislation for hazardous substances includes:

- The **Hazardous Substances and New Organisms Act 1996 (HSNO)** which places controls on hazardous substances to protect public health and the environment. The HSNO includes the requirement that a hazardous substance needs to be approved by the EPA before it can be imported or manufactured for use in New Zealand. However, if a hazardous substance is being transhipped (including remaining in a fuel tank of a ship operating in New Zealand waters),⁴⁷ approval for transhipment may be able to be obtained instead,⁴⁸ but this is not an ideal long-term solution for new fuel types.
- The **Health and Safety at Work Act 2015 (HSWA)** sets requirements to ensure work health and safety. There are two key sets of hazardous substances regulations sitting under the HSWA:
 - the **Health and Safety at Work (Hazardous Substances) Regulations 2017 (HS Regulations)** include requirements for the use, handling, and storage of hazardous substances and emergency management. The regulations do not apply to hazardous substances that are used as the motive power for a

ship when they are contained in one of the ship's systems (eg, the fuel system).⁴⁹

- the **Health and Safety at Work (Major Hazard Facilities) Regulations 2016 (MHF Regulations)** require facilities that have a high quantity of specified hazardous substances present to be designated major hazard facilities. Operators of major hazard facilities need to meet certain requirements (such as preparing an emergency plan and, if it is an upper tier major hazard facility,⁵⁰ preparing a safety case for WorkSafe's approval) to help prevent and minimise the impact of incidents at major hazard facilities.

In addition to the hazardous substances' legislation listed above, the **Engine Fuel Specifications Regulations 2011 (EFS Regulations)** include provisions that limit fuel components that could be harmful to the environment or public health. However, these regulations currently only apply to petrol, diesel, biodiesel, and ethanol (including blends of these).

The potential regulatory barriers in this group largely sit in the HSNO, HS Regulations, and MHF Regulations. However, there are also potential regulatory barriers in the Gas Act 1992 (Gas Act), the Gas (Safety and Measurement) Regulations 2010 (GSMR), and the Plumbers, Gasfitters, and Drainlayers Act 2006 (PGDA). The potential regulatory barriers are listed below in Table 8, listed in order from the barrier we expect would have the biggest impact on the ability to achieve zero-emission shipping down to the barrier likely to have the smallest impact.

⁴⁶ *Hazardous substance* is defined in Section 2 of HSNO.

⁴⁷ *Transhipment* is defined in Section 2 of the HSNO to be "the importation into New Zealand of a hazardous substance or new organism solely for the purpose of export within 20 working days to another destination outside New Zealand".

⁴⁸ This may apply if a fuel remains on the ship it is fuelling.

⁴⁹ But the regulations will apply when the hazardous substance being used as a motive power for the ship is stored elsewhere (eg, at a port).

⁵⁰ Major hazard facilities are designated as either a *lower tier* or *upper tier* major hazard facility. A major hazard facility can be designated an *upper tier* if WorkSafe considers there's an increased potential for a major incident to occur at the facility.

Table 8: Potential regulatory barriers related to the use of low-carbon fuels as hazardous substances

Potential regulatory barrier		Type of regulatory barrier	Impact on ability to achieve zero-emission shipping				
Code	Name	Regulatory design barrier	Regulatory delivery barrier	Limits options	Reduces speed	Increases cost	Increases risk
HSNO01	The first importer or manufacturer of a low-carbon fuel that does not have a hazardous substance approval bears the cost of obtaining an approval	✓					
HSNO04	A hazardous substance approval can not be given to a low-carbon fuel if the controls under the Health and Safety at Work (Hazardous Substances) Regulations 2017 are not adequate for that low-carbon fuel	✓					
HSNO02	The ability to use a low-carbon fuel that does not already have a hazardous substance approval (eg, LNG) may be delayed because of the time taken to get an approval	✓	✓				
HSW05	Separation distance requirements for above ground stationary tanks holding flammable liquids or gases are higher for most low-carbon fuels than for diesel	✓					
HSW09	An 8 metre separation distance applies between some transfer points for low-carbon fuels (which doesn't apply for diesel)	✓					
HSW02	Separation distances between a hazardous substance and protected or public places are higher for low-carbon fuels (on an energy basis) than for diesel	✓					
G01	Gases are required to be odorised, but you can't odorise hydrogen as it affects the quality of the fuel	✓					
HSW01	Flammable gases must be kept separate from flammable liquids	✓					
HSW10	Ship re-fuelling exclusion for control of ignition does not apply to low carbon fuels	✓					
PGD01	Hydrogen gas fitters are required to be registered under the Plumbers, Gasfitters, and Drainlayers Act 2006 but knowledge required to pass tradesman or certifying examinations may not cover capabilities required to handle high-pressure gases such as hydrogen	✓					
G03	The Gas Act 1992 is not entirely clear on whether some potential low-carbon shipping gaseous fuels (including hydrogen and LNG) are covered by the Act	✓					
G02	The Gas (Safety and Measurement) Regulations 2010 require gases used as an automotive fuel to be of a specification that is suitable and safe for the use as an automotive fuel but there is no standard setting out these specifications for low-carbon gases	✓					
HSNO03	The ability to use, and requirements for use of, a specific low-carbon fuel can be changed under the HSNO Act	✓					
HSW03	Some low-carbon fuels (including ammonia and methanol) must meet additional storage and emergency requirements due to their toxicity and/or corrosive substance classifications	✓					
HSW04	Design and use of cylinders and cylinder fittings for gases under pressure must meet certain requirements	✓					
HSW06	Ports (and other facilities) storing low-carbon fuels may become Major Hazard Facilities and need to meet the requirements of a major hazard facility under the Major Hazard Facility regulations	✓					
HSW07	Lack of appropriate standards for pipelines used to pipe hydrogen (or potentially other low-carbon fuel gases)	✓					

Key: no impact / minimal impact / moderate impact / significant impact.

Hazardous substances legislation (including the HSNO, HS Regulations, and MHF Regulations) is in place to protect health (in the workplace and of the public), protect the environment, and ensure safety. The objectives of this legislation can (at times) compete with the objective of achieving zero-emission shipping because it can increase the cost of, and slow down the transition to, zero-emission shipping. It can also reduce the options that can be used for reducing GHG emissions from shipping.

Zero-emission shipping should not be achieved at the cost of health, safety, and the environment. However, there may be instances where hazardous substances legislation could be amended so that it still protects health and the environment, and ensures safety, but also supports the adoption of low-carbon fuels.

In the remainder of this subsection, we discuss the key potential regulatory ‘barriers’ related to the use of low-carbon fuels as hazardous substances.

The word ‘barriers’ is in quotes as we note that it may not be possible to address some of these factors to improve the uptake of such fuels without negatively impacting health, safety, and/or the environment. In some cases, therefore, a regulatory ‘barrier’ to the uptake of a low-carbon fuel may be appropriate given the potential health, safety, or environmental consequences if regulatory settings were loosened.

Determining the ‘correct’ balance between health, safety, and environmental protection objectives against the objective of zero-emission

shipping is beyond the scope of this report and is ultimately up to policy makers to determine.

If a low-carbon shipping fuel does not have a hazardous substance approval this may impede its future use in New Zealand

Most of the potential low-carbon shipping fuels (discussed in Box 2 on page 13) already have a hazardous substance approval. The key exception is LNG. Before LNG can be used to fuel ships that enter New Zealand waters, LNG will either need to get a hazardous substance approval from the EPA or each shipping operator using an LNG-fuelled ship will need to get a transshipment approval (which will need to be periodically renewed).⁵¹

For LNG to get a full hazardous substance approval will require the first importer or manufacturer of LNG to apply for the approval. For a fuel like LNG this would be a major exercise—LNG has quite different properties to fuels already used in New Zealand and requires specific storage conditions, so the EPA would need to determine if the existing regulatory framework for flammable gases is fit for purpose for LNG. If the regulatory framework, including the controls under the HS Regulations, are not adequate for LNG then the EPA will not be able to give an approval.

We consider there are three key ways in which the current lack of a hazardous substance approval for LNG (or any other fuel that does not have approval) may impede the use of LNG for shipping in New Zealand:

⁵¹ In most cases a hazardous substance approval will take longer to obtain than a transshipment approval, but a transshipment approval will not allow the substance to be manufactured or imported for use in New Zealand. However, a transshipment approval may be sufficient for LNG if LNG-power ships are re-fuelled outside New Zealand.

- a potential lack of adequate regulatory controls around the use of LNG (particularly in the HS Regulations) may prevent the EPA from granting a hazardous substance approval for LNG until regulations are reformed
- the requirement that the first importer or manufacturer of LNG apply for the approval may discourage shipping companies that operate LNG-fuelled ships from being the first LNG-fuelled ship to visit New Zealand (so they don't bear the cost of obtaining approval), thus delaying the use of LNG-fuelled ships in New Zealand waters
- the time taken to get a hazardous substance approval will delay the use of LNG-fuelled ships in New Zealand waters.

These may not be substantial barriers in the near term given that a transshipment approval could be obtained by each shipping operator instead. We understand that the EPA is already considering whether a transshipment approval can be obtained for LNG-fuelled ships. A transshipment approval is a relatively minor exercise for the EPA, particularly for a fuel that is used widely overseas. However, as noted in Box 6 on page 39, a transshipment approval is only a temporary solution.

Longer-term, it will be necessary to ensure that the HS Regulations include appropriate controls for new and emerging low-carbon shipping fuels. In addition, it may be worth considering whether a government agency could apply for a full hazardous substance approval for LNG rather than relying on a shipping operator to apply. This is considered further in chapter 7 below.

⁵² Section 62 of the HSNO.

The conditions of a hazardous substance approval can be amended which could create uncertainty

The HSNO allows the EPA to reassess the conditions under which a hazardous substance is approved. The grounds under which the EPA can reassess a hazardous substance are quite broad, and include:

- significant new information relating to the effects of the substance has become available
- there have been changes in the controls under the HSWA
- another substance with similar or improved beneficial effects and reduced adverse effects has become available
- information showing a significant change of use, or a significant change in the quantity manufactured, imported, or developed has become available
- the substance has been included in the reassessments work plan required by section 20C of the HSNO.⁵³

A reassessment of a low-carbon fuel could result in the conditions under which the fuel can be used becoming more restrictive. In addition, during a reassessment the EPA can temporarily restrict use of the hazardous substance if the EPA has reasonable cause to believe that there is actual or likely danger to human health, safety, or the environment from the use of the substance. If the EPA has reasonable cause to believe that there is a significant actual or imminent danger to human health, safety, or the environment the EPA can prohibit all use of the substance until a decision has been made following the reassessment.⁵³ However, this risk is likely to be low—the EPA has never used these provisions and they would only use

⁵³ Sections 64 and 64A of the HSNO.

them if they were reassessing existing uses where there were concerns rather than new prospective uses where the reassessment would be to apply controls to an area not already controlled.

The risk of a reassessment could create some uncertainty, which could make shipping operators hesitant to use any low-carbon fuels that might be at greater risk of being re-assessed. This risk might be higher for fuels that are, in addition to being flammable, also toxic (such as ammonia and methanol) and for emerging fuels.

However, some risk of reassessment will exist for all hazardous substances and the heightened risk of some low-carbon fuels is unlikely to be significant enough to create a barrier to their use.

Furthermore, the ability for regulations for hazardous substances to be amended in the event of updated understanding of risks is likely to be fundamentally appropriate.

Hazardous substances regulation may affect ports' willingness or ability to store low-carbon shipping fuels

There are some requirements in the HS Regulations and MHF Regulations that may reduce ports' willingness and/or ability to store low-carbon shipping fuels. These requirements generally depend on the classification of the fuel as a hazardous substance (eg, whether it's a gas or liquid and how flammable and/or toxic it is) and include:

- The HS Regulations require:
 - some hazardous substances to be separated from protected and public places. The requirements depend on the hazard classification and quantities of the hazardous substance, as well as the nature of the site.
 - some above ground stationary tanks holding flammable gases or liquids to be separated from other above stationary tanks holding flammable gases or liquids. The separation distances depend on the hazard classification of the hazardous substance and the size of the tanks.
 - that "incompatible" hazardous substances don't come into contact with each other and are stored separately to reduce the risk of toxic fumes, fire, or explosion. Flammable gases that are in class 2.1.1 (which includes hydrogen, ammonia, and CNG) are incompatible with flammable liquids in class 3.1 (which includes methanol, diesel, and petrol).⁵⁴
 - that design and use of cylinders and cylinder fittings for gases under pressure meet certain requirements.
 - ammonia and methanol to meet additional storage and emergency requirements due to their toxicity and/or corrosive substance classifications.

⁵⁴ New Zealand now uses the international GHS 7 system to classify hazardous substances rather than the alphanumeric hazardous substances classification system we have used to in this report. However, the alphanumeric system is still used in the HS Regulations, which have not been updated to the GHS 7 system. We have referred to the alphanumeric system in this report for ease of reference (as we only refer to classifications in reference to the HS Regulations).

- The MHF Regulations include additional requirements for facilities that hold high quantities of specified hazardous substances (see Box 6 on page 39).

Many of the requirements in the HS Regulations listed above are less stringent for diesel than for most of the other low-carbon fuels being considered because diesel is a relatively low-risk fuel. Diesel is classified as a low hazard flammable liquids (3.1D), while the other low-carbon fuels being considered (other than biodiesel) are high or medium hazard flammable gases (2.1.1A or 2.1.1B, respectively) or very high or high hazard flammable liquids (3.1A or 3.1B, respectively).

The separation distance requirements and requirements for incompatible hazardous substances could make it difficult for ports, who are often land constrained and located close to urban centres, to be able to store multiple low-carbon shipping fuels at their port. Whether this creates a barrier to zero-emission shipping will depend on how many ships need to re-fuel in New Zealand, whether it is necessary for all (or many) ports to supply each fuel, whether low-carbon shipping fuels can be stored elsewhere, and whether low-carbon fuels can be provided using bunker barges.

In addition, some of the regulations relating to separation distances and incompatibility may also not be suitable for LNG (which has different properties to fuels already in New Zealand and specific storage requirements).

Ports may also be reluctant to hold large supplies of low-carbon fuels if this puts them above the threshold to be a major hazard facility.⁵⁵

⁵⁵ Or moves them from being a lower tier major hazard facility to being an upper tier major hazard facility, which puts more substantial requirements on the operator.

Whether the health, safety and environment requirements for low-carbon fuels are too strict is a highly technical consideration that is beyond the scope of this study.

Ship refuelling exclusion for control of ignition sources does not apply to low-carbon fuels

The HS Regulations contain five methods that a person conducting a business or undertaking (PCBU) can use to reduce the likelihood of unintended ignition of certain flammable gases and liquids (including diesel and the low-carbon fuels under consideration in this report).

The first of these methods involves control of ignition sources. If a PCBU uses this method, there is an exclusion for the management conditions for ships that are being re-fuelled and have their engine turned off. However, this exclusion only applies if the ship is being re-fuelled with petrol, aviation gasoline, racing gasoline, or LPG. An exclusion also exists for ships being re-fuelled with a class 3.1D substance (which includes diesel)—in this case the ship's engine can remain on.

No exclusion exists for the low-carbon fuels (other than biodiesel) that are considered in this report. It may be worth considering whether the exclusion that applies for petrol, aviation gasoline, racing gasoline, and LPG can be applied more widely to include potential low-carbon fuels.

Gas regulations require gases to be odorised

The GSMR require all gases supplied into a distribution system, in or supplied from a distribution system, supplied into an installation, and

supplied from a container to be odorised. This requirement is in place so that the presence of the gas in the atmosphere can be readily detected.

However, odorization is not appropriate for hydrogen as it affects the quality of the fuel. WorkSafe can grant an exemption if it is satisfied that safety will be ensured, but it would be more efficient for the regulations to include alternative detection options.

There are no standards ensuring low-carbon gases used as an automotive fuel are suitable and safe

The GSMR require gases used as an automotive fuel to be of a specification that is suitable and safe for the use as an automotive fuel, but there are no standards setting out what these specifications should be for low-carbon gases. The GSMR includes standards setting out specifications for reticulated natural gas (NZS 5442) and LPG (NZ 5435), but these do not apply to (and will not be appropriate for) low-carbon fuel gases (such as hydrogen or LNG). The lack of standards for these low-carbon fuels increases the risk that appropriate specifications are not met.

In April 2024, Standards New Zealand published an interim standard (NZS 5442(Int):2024) for the safe blending of biomethane within the reticulated gas network.⁵⁶ However, there is further work to be done for other low-carbon fuel gases, including when they are not supplied through the reticulated gas network.

The Gas Act is not entirely clear on which gaseous fuels it applies to

The Gas Act defines a gas to be "any fuel that is supplied through pipes or in containers and is a gas at a temperature of 15°C and an absolute pressure of 101.325 kilopascals"⁵⁷ and explicitly lists specific fuels that are

⁵⁶ [NZS 5442\(Int\):2024 revision leads the way for biomethane use: Standards New Zealand](#).

gases. The list includes biogas but does not include other low-carbon fuels that are a gas at a temperature of 15°C and an absolute pressure of 101.325 kilopascals (eg, hydrogen and LNG).

While our interpretation is that a gas does not need to be explicitly listed to be covered by the Gas Act, this could be open to interpretation. The Gas Act provides the legislative framework to protect the health and safety of the public and promote prevention of damage to property in relation to the supply and use of gas, so it is important that potential low-carbon gaseous fuels are covered by the Gas Act.

Registration requirements to become a hydrogen gas fitter not likely to be appropriate

The PGDA requires gas fitters to be registered. This will apply to hydrogen gas fitters as well. However, the trades and certifying examinations have been set based on the risks associated with handling natural gas or LPG and may not cover the capabilities required to handle high-pressure gases such as hydrogen, which have different risks. It may be appropriate to require additional training or testing for gas fitters that work with hydrogen. We are not aware of any current standards that exist for assessing whether a gas fitter is component to work with hydrogen.

⁵⁷ Section 2 of the Gas Act ([Gas Act 1992 No 124 \(as at 23 December 2023\), Public Act Contents – New Zealand Legislation](#)).

6.4.3 Potential regulatory barriers related to the use of other low-carbon energy sources

The potential regulatory barriers in this group relate to the supply of electricity for battery-electric vessels and shore power, importing of low-carbon technologies, and the use of nuclear power to fuel ships. The potential regulatory barriers are listed below in Table 9, listed in order from the barrier we expect would have the biggest impact on the ability to achieve zero-emission shipping down to the barrier likely to have the smallest impact.

Table 9: Potential regulatory barriers related to the use of other low-carbon energy sources

Potential regulatory barrier		Type of regulatory barrier		Impact on ability to achieve zero-emission shipping			
Code	Name	Regulatory design barrier	Regulatory delivery barrier	Limits options	Reduces speed	Increases cost	Increases risk
EI01	Inefficiently high upfront electricity connection costs could prevent or discourage ports from upgrading electricity connections	✓		Yellow	Yellow	Orange	Green
OTH01	Lack of regulatory incentive or requirement for visiting ships to use shore power	✓		Yellow	Orange	Green	Yellow
T01	Tariff duty could apply to some low-carbon technologies but not some equivalent higher-carbon technologies	✓		Green	Yellow	Yellow	Green
NZNFZDAC01	Nuclear powered ships are prohibited from entering New Zealand waters	✓		Yellow	Green	Green	Green

Key: **no impact** / **minimal impact** / **moderate impact** / **significant impact**.

Legislation could better support and encourage the use of shore power and battery-electric vessels

Charging ships from shore and/or providing shore power infrastructure would require upgrades to electricity connections in ports. In some cases, New Zealand’s electricity market arrangements are resulting in barriers to the development of such connections, particularly relating to the pricing of an initial connection.

Currently electricity distributors are free to decide what proportion of costs they want to recover upfront (connection pricing) and what proportion is recovered on an ongoing basis (network pricing). It is likely that some initial connection charges are inefficiently high, which could prevent or discourage ports from upgrading electricity connections.

This issue is not unique to the development of shore charging and shore power arrangements for shipping. It is also an issue for other parts of New Zealand’s economy which are undergoing step-changes in electricity demand due to electrification (eg, bus depots, airports, and industrial process heat facilities). The issue is also highly technical in nature. The Electricity Authority is currently reviewing distribution pricing to help deliver better outcomes for consumers.

Currently, New Zealand legislation provides no incentive or requirement for visiting ships to use shore power when in port. As discussed in section 4.3, California already requires many ocean-going ships to use shore power when in port and from 2030 the European Union is requiring all passenger and container ships to use shore power (or an alternative zero-emissions technology) when moored in major European Union ports. New Zealand

could consider introducing a similar requirement here, but it will be important to consider the costs of such a requirement and who should bear the costs.

Tariff duty has applied to some low-carbon technologies but not some equivalent higher-carbon technologies in the past, and this could occur again

The Tariff Document (referred to in the Tariff Act 1988) classifies all goods imported into New Zealand and then sets import tariff duties for each classification of good. Many goods do not attract a tariff duty, while a 5% or 10% duty is applied to some goods.

In the past, tariff duties have applied to some low-carbon technologies (eg, lithium-ion batteries) but not applied to equivalent higher-carbon technologies (eg, marine diesel engines). However, as far as we are aware, these discrepancies in tariff duties (for technologies used in shipping) have now been removed through tariff concessions (eg, lithium-ion batteries used for marine propulsion have been made duty free through a tariff concession)⁵⁸. Therefore, we do not consider the current tariff duty settings are a barrier to zero-emission shipping.

However, there is potential for discrepancies in tariff duties to become a regulatory barrier to zero-emission shipping in the future as new low-carbon technologies emerge (particularly for any technologies that are primarily supplied by jurisdictions that New Zealand does not have a free trade agreement with). Any new low-carbon technologies could be granted

⁵⁸ See: https://www.customs.govt.nz/globalassets/documents/technical-lists-and-guides/consolidated_list_of_approvals_29_may_2024.pdf (tariff item no. 8507.60.00, *Lithium-ion energy storage system, of a kind suitable for use with marine propulsion, water cooled or forced air cooled, rated capacity greater than 5 kWh, nominal operating voltage of 50 volts or higher*).

a tariff concession, but a tariff concession takes time to process and includes a three-week period publication period to allow for New Zealand producers or manufacturers to lodge an objection. Therefore, the tariff concession process could delay the use of the low-carbon technology in a New Zealand built ship (or supporting infrastructure).

Nuclear-powered ships are prohibited from entering New Zealand waters, but widespread use of nuclear-powered ships is unlikely in the near future

The New Zealand Nuclear Free Zone, Disarmament, and Arms Control Act 1987 prohibits any nuclear vessel from entering New Zealand waters. If use of nuclear-powered ships became more widespread this prohibition would mean that New Zealand is unable to be visited by these ships. However, as discussed in subsection Box 1, given the very high cost of nuclear propulsion this is unlikely to happen any time soon.

6.4.4 Potential regulatory barriers related to the use of ports and other facilities

The potential regulatory barriers in this group largely relate to the impact of the RMA on port developments required to support low-carbon shipping options. However, there are also potential regulatory barriers that we have already discussed in subsections 6.4.2 and 6.4.3 that relate to the use of ports and other facilities (such as requirements for storing low-carbon fuels and the provision of shore power and charging infrastructure).

The potential regulatory barriers related to the use of ports and other facilities are listed below in Table 10, listed in order from the barrier we expect would have the biggest impact on the ability to achieve zero-emission shipping down to the barrier likely to have the smallest impact.

Table 10: Potential regulatory barriers related to the use of ports and other facilities

Potential regulatory barrier		Type of regulatory barrier		Impact on ability to achieve zero-emission shipping			
Code	Name	Regulatory design barrier	Regulatory delivery barrier	Limits options	Reduces speed	Increases cost	Increases risk
RM02	Difficult for ports (and potentially other facilities) to get the resource consents needed for them to support lower-emission shipping	✓					
HSW08	Maritime New Zealand's and WorkSafe's changing and intertwined responsibilities may create gaps and/or overlaps in the regulation of health and safety at ports (including the use and supply of low-carbon shipping fuels (which are hazardous substances) at ports)	✓					
RM03	Uncertainty created by conflicting policies in the New Zealand Coastal Policy Statement 2010 could hamper port development required to support lower-emission shipping	✓					
RM01	Differing interpretation and application of the RMA could lead to inconsistent resource consent decisions for developments required to support lower-emission shipping		✓				

Key: no impact / minimal impact / moderate impact / significant impact.

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It may be difficult for ports (and potentially other facilities) to get the resource consents needed for them to support lower-emission shipping

Ports (and other facilities supporting low-emission shipping) may require resource consents to build facilities (eg, storage) for low-carbon fuels and other GHG emission reduction options. Obtaining a resource consent takes time, particularly if it is a publicly notified consent and/or a hearing is required. This is likely to be a bigger problem for ports located near a residential base (as most of the large ports are).

If the Fast-track Approvals Bill becomes law, some consent applications could go through the fast-track approval process if the project would have significant regional or national benefits (which could include supporting climate change mitigation). However, many of the upgrades of port (or other) facilities to support zero-emission shipping may not meet the significant regional benefit threshold.

Differing interpretation and application of the RMA could lead to inconsistent resource consent decisions

Local councils are responsible for issuing most resource consents. However, local councils may lack the knowledge and expertise to assess consent applications for developments supporting emerging low-carbon fuels. Consent decisions could also potentially differ by council. Resource consents for developments related to emerging low-carbon fuels may be better managed by the EPA, who will have a better understanding of the risks and challenges of different fuels.

Conflicting policies in the New Zealand Coastal Policy Statement could create uncertainty and hamper port development

The New Zealand Coastal Policy Statement 2010 (NZCPS) is secondary legislation under the RMA. Policy 9 of the NZCPS recognises the importance of ports in a sustainable national transport system, but this policy can conflict with other policies in the NZCPS (such as policy 13, which requires that adverse effects in areas of outstanding natural character are avoided).

A Supreme Court decision in 2023 (Port Otago Limited v Environment Defence Society) found (among other things) that "...there can be no presumption that one directive policy will always prevail over another... The appropriate balance between the avoidance policies and the ports policy must depend on the particular circumstances, considered against the values inherent in the various policies and objectives in the NZCPS (and any other relevant plans or statements)"⁵⁹.

These conflicting policies and how they should be interpreted could create uncertainty for ports about whether development activity required to support lower-carbon emission shipping will be allowed. One of the ports we spoke to thought that the NZCPS needed strengthening to improve clarity.

⁵⁹ Paragraphs 77-78, Port Otago Limited v Environment Defence Society (2023).

6.4.5 Potential regulatory barriers related to achieving emission reduction targets

There are just two potential barriers in this group—the first is that international shipping emissions are not captured in New Zealand’s emissions reduction target, and the second is that New Zealand lacks a legislative framework for defining the GHG intensity of low-carbon fuels. These two potential barriers are listed in Table 11 below.

Table 11: Potential regulatory barriers related to achieving emission reduction targets

Potential regulatory barrier		Type of regulatory barrier		Impact on ability to achieve zero-emission shipping			
Code	Name	Regulatory design barrier	Regulatory delivery barrier	Limits options	Reduces speed	Increases cost	Increases risk
CCR01	International shipping emissions are not captured in emissions reduction target	✓		Green	Yellow	Green	Yellow
OTH02	New Zealand lacks a legislative framework for defining the GHG intensity of low-carbon fuels	✓		Green	Green	Green	Yellow

Key: **no impact** / **minimal impact** / **moderate impact** / **significant impact**.

International shipping emissions are not captured in emissions reduction target

The current emissions reduction target includes emissions from domestic shipping (which are covered by the Paris Agreement) but excludes emissions from international shipping. Liquid fossil fuel suppliers are also required to surrender emission units under the New Zealand Emissions Trading Scheme (ETS) but emissions from fuel used for international shipping (and aviation) are exempt. This means international shippers are not bearing the cost of their emissions (while domestic shippers are), which means they are less incentivised to reduce emissions. It also gives international shippers cost advantages over domestic shippers on coastal routes.

The Climate Change Commission is required (under section 5R of the Climate Change Response Act 2002) to provide written advice to the

Minister by 31 December 2024 on whether the 2050 target should be amended to include emissions from international shipping and aviation. The Climate Change Commission has started a review in advance of providing this advice. If a decision is made to include international transport emissions in New Zealand’s emissions reduction targets, it is likely that will result in international shipping starting to face a cost of their emissions – potentially through inclusion in the New Zealand ETS. As noted in subsection 4.3, emissions from international shipping have been included in the European Union’s ETS from 2024 (for ships of at least 5,000 GT), while in the United Kingdom, the UK’s share of international shipping emissions have been included in its sixth carbon budget (covering 2033-2037).

A less intrusive approach could be to somehow incentivise shipping operators visiting New Zealand to reduce their carbon emissions. One option would be to require shipping operators to publish data on their

carbon emissions (as required in the EU and UK). However, this seems (at best) only a short-term solution.

Lack of standards to classify the GHG intensity of low-carbon fuels

New Zealand doesn't have any standards to classify the GHG (or carbon) intensity of hydrogen, ammonia, or methanol. Typically, colours are used to indicate how a fuel is produced (eg, 'green hydrogen' is produced by electrolysis using renewable electricity and 'grey hydrogen' is produced using natural gas (while 'blue hydrogen' is also produced using natural gas but with carbon capture, utilisation, and storage (CCUS)). However, these colour classifications can fail to capture key information such as the GHG intensity of the fuel.

Standards that classify the GHG intensity of low-carbon fuels would help avoid discrepancies in measuring the GHG intensity of these fuels. However, there are some drawbacks of introducing low-GHG standards that could introduce different barriers to uptake of low-carbon fuels—these include the additional cost and complexity of having standards and the potential to suppress innovation (if the standards are inflexible). In addition, if the standards are not set carefully, they could create a bias towards certain fuels and/or have unintended environmental impacts.

New Zealand has already been looking at the potential for low-carbon hydrogen classification standard—New Zealand led an APEC project *Low-Carbon Hydrogen International Standard* looking at the merits of developing a low-carbon hydrogen international standard. Standards New Zealand has also completed a review of hydrogen standards in 2023 and is now considering the direct-adoption of 15 international standards, as well as the modified-adoption of an additional 8 international standards. The

hydrogen standards review also recommended progressive updates and revisions to existing standards. It may be necessary for similar reviews to occur for other potential low-carbon fuels such as ammonia and methanol.

The IMO has developed guidelines on the lifecycle GHG intensity of marine fuels. The guidelines are based on a lifecycle assessment (LCA) methodology that assesses the GHG emissions from fuel production through to the end-use by a ship (known as “well-to-wake”). Further development of the LCA framework will be discussed at a working group meeting in September 2024.⁶⁰

Ideally any GHG intensity standards introduced in New Zealand for shipping fuels would be consistent with any international standards that have been developed, particularly those being developed by the IMO.

⁶⁰ [Guidelines on life cycle GHG intensity of marine fuels \(LCA Guidelines\) \(imo.org\)](https://www.imo.org/en/About/Pages/press-releases.aspx?topic=environment&id=13172)

6.4.6 Potential regulatory barriers related to low-carbon fuel specifications and commercial regulation

There are three potential regulatory barriers in this group—the Commerce Commission’s limited ability to consider the use of gas pipelines for lower-carbon gases as a regulated service, the lack of applicability of the EFS Regulations to most low-carbon fuels, the lack of a monitoring levy for most low-carbon fuels. There are also potential regulatory barriers in the Gas Act and GSMR related to specification of low-carbon gaseous fuels, but these were considered above in section 6.4.2. The three potential barriers in this group are listed in Table 12 below.

Table 12: Potential regulatory barriers related to low-carbon fuel specifications and commercial regulation

Potential regulatory barrier		Type of regulatory barrier		Impact on ability to achieve zero-emission shipping			
Code	Name	Regulatory design barrier	Regulatory delivery barrier	Limits options	Reduces speed	Increases cost	Increases risk
C01	Under the current legislative framework in Part 4 of the Commerce Act, the Commerce Commission is limited in its ability to consider the use of gas pipelines for lower carbon gases (such as hydrogen) as a regulated service	✓					
E(FLR)02	Engine Fuel Specification Regulations do not apply to most low-carbon fuels and marine fuel oil specifications are not appropriate for all low-carbon fuels	✓					
E(FLR)01	Petroleum or engine fuel monitoring levy does not apply to most low-carbon fuels	✓					

Key: no impact / minimal impact / moderate impact / significant impact.

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The Commerce Commission is limited in its ability to consider the use of gas pipelines for lower carbon gases as a regulated service

Part 4 of the Commerce Act provides for the regulation of the price and quality of goods and services in markets where there is little or no competition and little or no likelihood of a substantial increase in competition. Part 4 includes requirements for information disclosure and price-quality disclosure of certain gas pipeline services, where gas pipeline services means the conveyance of natural gas by pipeline.

In the Commerce Commission's *Default price-quality paths for gas pipeline businesses from 1 October 2022: Final Reasons Paper* published in May 2022, the Commerce Commission noted that:

- *“while ‘natural gas’ is not a defined term under the Act our view is that natural gas as that term is used in s 55A does not include hydrogen gas and biogas (clean gases).”⁶¹*
- *“Part 4 does not regulate infrastructure but a service, and the service of conveyance of natural gas by pipeline cannot be equated with the (currently non-existent) market for conveyance of clean gases by pipeline.”⁶²*
- *“We consider a blend of biogas or hydrogen with natural gas where natural gas is the most significant component could be considered ‘natural gas’. The threshold at which a mixture would cease to be regulated is difficult to determine, but we consider that a blend of natural gas and other gas that does not require pipeline or appliance conversion is a reasonable threshold for consideration under Part 4.”⁶³*

⁶¹ paragraph 2.59, Commerce Commission (2022).

⁶² Ibid., paragraph 2.60.

⁶³ Ibid., paragraph 2.64.

The Commerce Commission has requested that MBIE explore the definition of gas pipeline services, including whether the definition should include using the pipelines for hydrogen or biogas (or other clean gases). This is an issue that is not unique to use of hydrogen for shipping—it will also apply to other industries considering the use of hydrogen.

The lack of applicability of the EFS Regulations to most low-carbon fuels

The EFS Regulations (secondary legislation under the Energy (Fuels, Levies, and References) Act 1989), include comprehensive fuel specifications for some fuels including minimum standards for fuel performance and provisions limiting fuel components that could be harmful to the environment or public health. However, the EFS Regulations only apply to a specified list of engine fuels—petrol, diesel, biodiesel, and ethanol (including blends of these four fuels) that are used in an internal combustion engine.⁶⁴ The EFS Regulations do not apply to most low-carbon fuels such as LNG, ammonia, methanol (in neat form), and hydrogen.

In addition, the EFS Regulations set requirements for marine fuel oil sold by retail sale and non-retail sale. The requirements are for a diesel-based fuel and won't necessarily be appropriate for all low-carbon fuels.

The lack of applicability of the EFS Regulations to most low-carbon fuels does not prevent the use of these fuels in the shipping. However, it will mean that there won't be minimum standards for fuel performance of these fuels. The key environmental and health risks of low-carbon fuels should already be dealt with under the HSNO and the HSWA (particularly the HS Regulations). Therefore, the potential regulatory barriers in the

⁶⁴ Fuels used as an aviation fuel, for motor vehicle racing, for powerboat racing, or as a fuel for jet boats excluded.

HSNO and HSWA (discussed above in subsection 6.4.2) will be of greater importance than the barriers in the EFS Regulations.

The petroleum or engine fuel monitoring (PEFM) levy does not apply to most low-carbon fuels

The Energy (Petrol, Engine Fuel, and Gas) Levy Regulations 2017 set a petroleum or engine fuel monitoring (PEFM) levy. The PEFM levy only applies to motor spirits, diesel, biodiesel, and ethyl alcohol, so would not apply to most low-carbon fuels (eg, LNG, methanol, ammonia or hydrogen-based fuels). This would reduce the cost of using these low-carbon fuels (relative to fuels where the PEFM levy is payable), so would encourage use of these low-carbon fuels rather than being a barrier.⁶⁵ However, this would mean that as the use of low-carbon fuels increases (and use of fuels on which the levy is payable declines), the PEFM levy would have a smaller levying base. This would mean that either levy revenue would fall or the rate at which the levy is charged would need to increase. The PEFM levy helps to fund some of EECA's activities, so it may be necessary to reconsider how this levy is applied.

⁶⁵ The Energy (Petrol, Engine Fuel, and Gas) Levy Regulations 2017 also set a gas safety, monitoring, and energy efficiency (GSMEE) levy that applies to piped gas. The GSMEE levy will apply to low-carbon gaseous fuels that are piped but will not apply to low-carbon fuels that are not piped or are liquids. When the GSMEE levy does apply, this will reduce or eliminate any cost-advantage that low-carbon fuel has against fuels that are liable to the PEFM levy.

7 Pathway forward

Globally, there will continue to be a combination of different energy sources (including low-carbon fuels), technologies, and energy efficiency measures used to reduce GHG emissions from shipping. There is significant uncertainty around which energy sources and technologies will be commercially prevailing, and different solutions are likely to be appropriate for different maritime transport types (eg, while it may be commercially viable for short-distance ferries to be battery-electric powered, this won't be the case for long-distance container ships).

This uncertainty represents a key challenge in designing regulations that will be technology neutral, robust to whichever low-carbon fuels emerge as the key shipping decarbonisation options, and developed in time to meet low-carbon shipping requirements.

For example, the required regulations and associated systems and processes for managing incidents (prevention, and response should they occur) relating to ammonia, say, may be materially different to those for the current oil-focussed regulations, and may be materially different again relating to hydrogen.

These challenges associated with moving to a multi-fuel shipping environment are likely to increase regulatory costs, both in terms of developing regulation but also in terms of implementing regulation. For example, regulation will need to be developed to ensure appropriate response to spills of different low-carbon fuels, and this regulation is likely to require diversification of response equipment and capability for spills of these different fuels.

Our assessment of regulatory barriers (set out above in chapter 6) has identified some areas where regulatory design and delivery could hinder

progress towards zero-emission shipping in New Zealand. To ensure that New Zealand's maritime transport industry can efficiently transition to a zero-emissions future, these potential regulatory barriers need to be further assessed by policy experts to determine what regulatory change is required. A programme of work to implement the required regulatory change in a systematic manner then needs to be developed.

However, regulatory barriers are not the only obstacles to transitioning to zero-emission shipping. Therefore, how regulatory barriers to zero-emission shipping are addressed will need to be considered in the context of:

- the often-higher cost of lower-carbon fuels and the potentially insufficient supply of these fuels
- the significant capital costs associated with supporting some alternative shipping energy sources (eg, the cost of electricity connections for shorepower, and providing storage and supply facilities for low carbon fuels)
- the challenges that shipping companies and ports will face determining which type of ships, fuel-handling facilities, and other infrastructure to invest in given the uncertainty around which low-carbon fuel(s) will emerge as preferred solutions
- New Zealand's history of being visited by older ships with relatively high emissions (due to New Zealand's small size and location)
- a lack of space at many New Zealand ports to provide the infrastructure needed to support multiple shipping energy sources
- ensuring that New Zealand has dedicated the appropriate resources to be able to respond to any emergencies that arise from the use of new energy sources to power ships.

In addition to addressing regulatory barriers, the government may have a role to play in helping private sector organisations navigate the transition to zero-emission shipping through explicit policies which provide financial or other forms of support. However, consideration of such policies (whether maritime specific, or economy-wide (eg, the ETS)) is outside the scope of this report.

In this chapter, we've made some recommendations on which of the potential regulatory barriers listed in chapter 6 should be assessed further, including which ones should be highest priority. We've also made some high-level suggestions on how these regulatory barriers could be addressed.

7.1 Regulatory barriers that should be assessed further

Our assessment of potential regulatory barriers to zero-emission shipping (set out in chapter 6) identified some regulatory barriers that we consider should be assessed further to determine:

- for each of these regulatory barriers, a more thorough understanding of what impact the barrier is likely to have on achieving zero-emission shipping
- how each regulatory barrier could be addressed or reduced while still meeting other regulatory objectives such as health and safety (if possible)
- priorities for addressing these regulatory barriers.

We have also identified some regulatory barriers that are already being considered or addressed elsewhere. These regulatory barriers generally have wider implications than just for zero-emission shipping. While these regulatory barriers could have implications on the ability to achieve zero-emission shipping we do not consider that the MoT needs to drive further work on these barriers. Instead, the MoT should ensure it keeps abreast of developments in addressing these regulatory barriers.

Table 13 lists the key regulatory barriers that we consider need to be assessed further, as well the barriers that the MoT should keep a watching brief on.

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Table 13: Key regulatory barriers to assess further or keep a watching brief on

Regulatory barrier group	Key regulatory barriers to assess further	Key regulatory barriers to keep a watching brief on
A. Maritime safety and protection of the marine environment	<ul style="list-style-type: none"> The time taken to develop and amend the Rules. The Rules and parts of the MTA are too prescriptive and not objective based. A lack of legislation around prevention and response for marine spills of low-carbon fuels. 	
B. Use of low-carbon fuels as hazardous substances	<ul style="list-style-type: none"> The first importer or manufacturer of a low-carbon fuel that does not have a hazardous substance approval bears the cost of obtaining an approval. The time taken to get hazardous substance approval (if needed). Separation distance requirements for flammable gases and liquids. Requirement that gases be odorised, which is not appropriate when using hydrogen as a fuel. 	
C. Use of other low-carbon energy sources	<ul style="list-style-type: none"> Lack of regulatory incentive or requirement for visiting ships to use shore power. 	<ul style="list-style-type: none"> Electricity distribution pricing making it difficult and costly to get connections for shore power and/or battery charging at ports. Tariff duty could be applied to some low-carbon technologies but not some equivalent higher-carbon technologies.
D. Use of ports and other facilities	<ul style="list-style-type: none"> Uncertainties created by conflicting policies in NZCPS. 	<ul style="list-style-type: none"> Time taken to get resource consents for port infrastructure developments.
E. Achieving emission reduction targets	<p><i>No key regulatory barriers to assess further.</i></p>	<ul style="list-style-type: none"> International shipping emissions not included in current emissions reduction target or captured under the ETS. Lack of legislative framework for defining GHG intensity of low-carbon fuels.
F. Low-carbon fuel specifications and commercial regulation	<p><i>No key regulatory barriers to assess further.</i></p>	

7.2 What a programme of work to implement regulatory change might look like

Some of the key regulatory barriers identified in this report are maritime-specific and require action by the MoT, and at times MNZ, to address. Other regulatory barriers are outside the remit of the MoT—some of these barriers are already being considered in streams of work by other government agencies (these are barriers listed in the last column of Table 13 above), while other barriers could benefit from MoT engagement with other government agencies to determine whether, and how, the regulatory barrier could be removed or reduced.


Table 14, below, sets out the key actions we consider should be taken by both the MoT and other government agencies to address regulatory barriers to zero-emission shipping. This table does not include regulatory barriers that are already being considered in other streams of work (ie, those listed in the last column of Table 13 above).

Of the actions listed in Table 14, we believe that wholesale reviews of the MTA and the Rules are of greatest priority. Ensuring that the MTA and Rules are fit-for-purpose, by ensuring that they allow for whatever low-carbon energy sources and technologies become commercially prevailing, will have the greatest impact on ensuring that New Zealand can have an orderly transition to zero-emission shipping. A wholesale review of the Rules is likely to require an increase in MNZ's resourcing, so reviewing MNZ's resourcing should also be a priority.

The other actions listed in Table 14 relate to more specific regulatory barriers. We encourage the MoT to engage with the other government agencies suggested to see whether there are any "quick-wins" and also to ensure that these government agencies are aware of the specific issues, as they relate to zero-emission shipping, so that they are in a position to act if opportunities arise to remove or reduce these regulatory barriers.

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Table 14: Regulatory change pathway

Action		Government agencies to involve							
		MoT	MNZ	MFAT	EPA	MBIE	WorkSafe	EA	MfE
	 <div style="border: 1px solid blue; border-radius: 10px; padding: 5px; display: inline-block;"> These actions should be prioritised </div>								
Wholesale review of MTA	Review MTA in its entirety to ensure it is fit-for-purpose for the transition to zero-emission shipping. Review should consider how the MTA can be more objective-based and fuel- and technology-neutral. It is also essential that the MTA provides appropriate capability for MNZ to respond to incidents involving low-carbon fuelled ships.	●	●	○					
Wholesale review of Rules	Review of Rules in their entirety to ensure they are fit-for-purpose for the transition to zero-emission shipping. The Rules structure could be changed so they are easier to update (including to incorporate IMO policy changes). The Rules should be fuel- and technology-neutral where possible.	○	●						
Review of MNZ resourcing	Review of MNZ’s resourcing capacity and capability to process rule amendments, undertake a wholesale review of the Rules, and to support a wholesale review of the MTA.	●	○						
Review process for hazardous substance approvals of low-carbon fuels	Determine whether hazardous substance approvals for new low-carbon fuels (such as LNG) can be front-footed (eg, by MoT applying on behalf of shipping operators).	●	○		●				
Consider changes to separation distances for low-carbon fuels	Consider whether any changes can be made to separation distances (for low-carbon fuels) to help ports support the transition to zero-emission shipping without sacrificing health or safety. Changes could be made to the regulations, through a safe work instrument, or through exemptions.	○	○			●	●		
Consider alternative hydrogen detection method	Consider alternative method(s) for detecting hydrogen (other than odorization which is not appropriate when hydrogen is used as a fuel).					●			
Consider shore power requirements	Assessment of whether use of shore power should be incentivised (or required).	●	●					○	
Address conflicting policies in the NZCPS	Consider how the NZCPS can be amended to address conflicting policies related to port development.	●							●

The shading matches the shading in Table 13 and indicates which regulatory barrier group the action is responding to. Government agencies are: MoT – Ministry of Transport, MNZ – Maritime New Zealand, MFAT – Ministry of Foreign Affairs and Trade, EPA – Environmental Protection Authority, MBIE – Ministry of Business, Innovation and Employment, EA - Electricity Authority, and MfE – Ministry for the Environment. Key or lead agencies are indicated with a solid circle (●), while supporting agencies are indicated with a clear circle (○).

In addition to actions set out in Table 14, above, MoT and MNZ both have supervisory and co-ordination roles to play in enabling the overall transition to zero-emission shipping. MoT and MNZ are already partially filling some of these roles but to ensure that regulatory barriers do not prevent an orderly transition it will be essential that MoT and MNZ prioritise these supervisory and co-ordination roles. These roles could involve:

- Monitoring what is going on the maritime transport industry globally to reduce carbon emissions (eg, which low-carbon fuels are becoming the fuels-of-choice and how is technology developing) so that regulatory change can be made proactively.
- Co-ordination between policy developers across a range of regulatory systems.
- Providing cross-agency advice on any policy developments that could hinder or, conversely, support the transition to zero-emission shipping.
- Developing a national policy strategy for achieving zero-emission shipping that could help focus efforts on eliminating (or reducing) the key regulatory barriers to zero-emission shipping.

In 2020, the IMO adopted a resolution to encourage IMO member states to develop and submit voluntary national action plans to address GHG emissions from ships.⁶⁶ The resolution suggested that a national action plan could include plans to improve domestic institutional and legislative arrangements for the effective implementation of existing IMO instruments (among other things). If New Zealand developed a national action plan this could help enable coordination across regulatory agencies to support the transition to zero-emission shipping.

⁶⁶ <https://www.imo.org/en/ourwork/environment/pages/relevant-national-action-plans-and-strategies.aspx>

Glossary of abbreviations

ACCTS	Agreement on Climate Change, Trade and Sustainability	LCA	Lifecycle assessment
CCS	Carbon capture and storage	LNG	Liquefied natural gas
CCUS	Carbon capture, utilisation and storage	LPG	Liquefied petroleum gas
CNG	Compressed natural gas	MBIE	Ministry of Business, Innovation and Employment
DWT	Dead weight tonnage	MFAT	Ministry of Foreign Affairs and Trade
E&D	Environment and decarbonisation	MGO	Marine gas oil
EEA	European Economic Area	MHF Regulations	Health and Safety at Work (Major Hazard Facilities) Regulations 2016
EEDI	Energy Efficiency Design Index	MNZ	Maritime New Zealand
EFS Regulations	Engine Fuel Specifications Regulations 2011	MoT	Ministry of Transport
EPA	Environmental Protection Authority	MTA	Maritime Transport Act 1994
ETS	Emissions trading scheme	NZCPS	New Zealand Coastal Policy Statement 2010
EU	European Union	PCBU	Person conducting a business or undertaking
Gas Act	Gas Act 1992	PEFM levy	Petroleum or engine fuel monitoring levy
GHG	Greenhouse gas	PGDA	Plumbers, Gasfitters, and Drainlayers Act 2006
GSMEE levy	Gas safety, monitoring and energy efficiency levy	RMA	Resource Management Act 1991
GSMR	Gas (Safety and Measurement) Regulations 2010	RoRo	Roll-on roll-off
GT	Gross tonnage	Rules	Maritime Rules and Marine Protection Rules
H&S	Health and safety	SMR	Small modular reactor
HS Regulations	Health and Safety at Work (Hazardous Substances) Regulations 2017	UCOME	Used cooking oil methyl ester
HSNO	Hazardous Substances and New Organisms Act 1996	UK	United Kingdom
HSWA	Health and Safety at Work Act 2015	ULSFO	Ultra low sulphur fuel oil
HVO	Hydrotreated vegetable oil	VLSFO	Very low sulphur fuel oil
I&S	Infrastructure and supply		

Appendix A Detailed description of New Zealand's shipping context

This appendix provides more detailed information and statistics on the current state of New Zealand's domestic and international shipping than provided in Chapter 4.

New Zealand's domestic maritime transport industry

The domestic maritime transport activities covered by this report are:

- coastal shipping of freight, including the Cook Strait ferries
- other vehicle and passenger ferries and tourism transport.

Excluded from the scope of this report are commercial work boats, fishing vessels, vessels used in aquaculture activities, and vessels used for tourism activities (such as whale watching) or recreation.

Coastal shipping

In 2019, 10 million tonnes of freight was moved by the coastal shipping sector, which was 3.5% of the total freight task nationally. The Cook Strait roll-on roll-off (RoRo) ferries comprised around 35% of this freight movement, 28% was container movements, 13% dry bulk (cement, aggregates, fertilizer, grain), and 24% oil products⁶⁷.

In 2019, 2.5 million tonnes of oil products were moved by coastal ships.⁶⁸ However, in 2022 this fell to less than 0.5 million tonnes as the two dedicated coastal oil tankers (MT Matuku and MT Kokako), which were

previously leased by Coastal Oil Logistics Limited from Silver Fern Shipping Ltd, left New Zealand permanently and were reflagged. Since the closure of the Marsden Point refinery, oil products are now delivered to ports south of Auckland directly from overseas refineries. Oil products from the import terminal at Marsden Point are delivered to the Port of Auckland by the oil product barge/tanker, Awanuia.

The New Zealand ships currently providing domestic shipping services are listed below in

Table 15.

Table 15: New Zealand vessels providing coastal shipping services

Vessel name	Operator ⁶⁹	Cargo	Carrying capacity (DWT) ⁷⁰	Year built
Aotearoa Chief	Golden Bay Cement (Swire Shipping)	Cement	8,024	2016
Buffalo	Holcim Ltd	Cement	9,092	1998
Awanuia	Seafuels	Oil products	3,900	2009
William Fraser	McCallum Bros	Aggregate RoRo	1,500	2019
Anatoki	Coastal Bulk Shipping Ltd	Bulk Cargo	820	1992
Rangitata	Coastal Bulk Shipping Ltd	General cargo	2,387	2007
Moana Chief	Pacifica (Swire Shipping)	Container	23,305	2011
Kaitaki	Interislander (KiwiRail)	RoRo Ferry	5,794	1995
Aratere	Interislander (KiwiRail)	RoRo Rail Ferry	5,464	1998
Kaiarahi	Interislander (Kiwirail)	RoRo Ferry	7,012	1998
Connemara	Bluebridge (StraitNZ)	RoRo Ferry	7,657	2007
Strait Feronia	Bluebridge (StraitNZ)	RoRo Ferry	7,910	1997

⁶⁷ [Coastal Shipping Research – Consultant's Concluding Report July 2021 \(published 14 August 2023\) \(nzta.govt.nz\)](#)

⁶⁸ [Freight and logistics | Ministry of Transport](#)

⁶⁹ <http://nzsf.org.nz/about-the-nzsf>

⁷⁰ Dead weight tonnage (DWT) is a measure of how much weight a ship can carry – it is the sum of cargo, fuel, fresh water, ballast water, provisions, passengers, and crew weights.

In competition with domestic coastal shipping are international vessels carrying domestic cargo between their ports of call.⁷¹ A significant part of domestic container shipping is the relocation of empty containers from where import cargoes are unloaded to where export cargoes are loaded. The import and export of containerised freight is discussed further below.

The New Zealand Shipping Federation represents the country's coastal shipping operators.

GHG emissions in coastal shipping

The Ministry for the Environment's Emissions Tracker reported that in 2021, emissions from domestic navigation totalled 203,000 tonnes CO₂-e coming from Residual Fuel Oil.⁷² This is 20% lower than emissions from domestic navigation in 1990. A further significant reduction in reported domestic shipping emissions is expected in data from 2022 following the removal of the domestic oil tankers. The delivery to ports of oil products is now mainly undertaken by international vessels and so will no longer be captured in domestic emissions reporting.

Replacement rail-enabled RoRo ferries for the Interislander service, including redevelopment of the Picton and Wellington terminals, had been planned by KiwiRail. The iReX ferries included hybrid technology which was to use electrical propulsion from generators fuelled by diesel and batteries recharged by electrical shore power. The batteries would have powered 30% of the journey.⁷³ The KiwiRail Board was advised in December 2023 by

⁷¹ When incidental to an international voyage, freight moved between domestic ports by international ships are not subject to the ETS, unlike the same cargoes carried between the same ports on domestic ships. This is discussed further in section 6.4.5.

⁷² [NZ's Interactive Emissions Tracker \(environment.govt.nz\)](https://www.environment.govt.nz/interactive-emissions-tracker)

⁷³ [New ferries' electric propulsion system will help KiwiRail meet emission goals | KiwiRail](#)

the Government that it has decided not to provide further funding for the iReX project, and the project is now being wound down.⁷⁴

In September 2022, Move Logistics announced⁷⁵ it had secured \$10 million of co-funding from New Zealand Transport Authority's (NZTA) coastal shipping activity class⁷⁶ towards a RoRo vessel for freight planned to be capable of operating at 13 ports without new port infrastructure. The vessel design included future methanol-fuel capability. Move Logistics has since cancelled the project due to issues with the vessel design being unable to meet requirements.⁷⁷

Box 7 Shipping already has lower GHG emissions intensity than road freight

Shipping is widely recognised as having a significantly lower energy intensity (energy per freight tonne.km) than road freight, and consequently lower GHG emissions intensity. Shipping's energy intensity is similar to that of rail freight. In New Zealand in 2011, the energy intensity of coastal shipping and rail were both just over 0.5 PJ per billion tonne.km, while the energy intensity of road freight was more than three times this at around 1.7 PJ per billion tonne.km.⁷⁸ The utility of shipping as a transport mode is limited to navigable routes and cargoes that are not time sensitive.

⁷⁴ [KiwiRail statement on Project iReX | KiwiRail](#)

⁷⁵ [MOVE Recipient of \\$10 million Co-funding for Oceans Strategy | MOVE Logistics](#)

⁷⁶ [Coastal shipping factsheets Move Ltd \(nzta.govt.nz\)](https://nzta.govt.nz/coastal-shipping-factsheets)

⁷⁷ [Move scraps coastal shipping plans, promises to lift performance | TRANSPORTtalk: Truck and Industry Equipment News](#)

⁷⁸ [Changes in energy use : New Zealand \(natlib.govt.nz\)](https://www.natlib.govt.nz/changes-in-energy-use). More recent data on freight energy intensity by mode in New Zealand could not be identified.

Ferries and tourism transport

Ferries other than the Cook Strait ferries (including water taxis), currently operate in Auckland, Wellington, Christchurch (Diamond Harbour), Marlborough Sounds, Queenstown Lakes, Dunedin, Bluff, Bay of Islands, and the Hokianga. Auckland has the largest use of passenger ferries, with 13 routes in current operation, and is part of the Auckland Transport AT Metro's integrated fare system.

NZTA reported that there were 4.8 million public transport passenger boardings on ferries in 2022/23, down from 6.7 million in 2018/19. Of the public transport ferry boardings, 92% were in Auckland and 4% in Wellington. The size of the national public transport ferry fleet is 34 vessels, of which 29 are in Auckland and three in Wellington. There is also one NZTA funded public transport passenger ferry in the Bay of Islands and one in Christchurch.

Vehicle ferries (other than the Cook Strait ferries) are operated in the Auckland and Northland regions, while private passenger ferry services operate on specific routes in the Southland and Otago regions. Water taxis operate in various locations areas around the country, with charter vessels also available in many locations.

The Marine Transport Association represents operators of passenger ferries, water taxis, charter vessels and work boats in New Zealand.

Efforts to reduce GHG emissions of ferries and tourism transport

The Wellington fleet of public transport ferries includes the Southern Hemisphere's first battery electric passenger ferry. The electric ferry was built in Lower Hutt for East by West Ferries by its sister company, the

⁷⁹ [WEBBCo \(electricboatbuilders.co.nz\)](http://WEBBCo (electricboatbuilders.co.nz))

⁸⁰ [Wellington's Ika Rere is the first full-electric ferry in the southern hemisphere \(thisnzlife.co.nz\)](http://Wellington's Ika Rere is the first full-electric ferry in the southern hemisphere (thisnzlife.co.nz))

Wellington Electric Boat Building Company.⁷⁹ It has been in commercial operations since early 2022 on the Wellington CBD to Day's Bay route across Wellington Harbour. East by West Ferries has proposed a new electric ferry route from Wellington CBD to the Miramar Wharf, with an onward last mile bus connection to Wellington Airport.⁸⁰

Four electric ferries are under construction for use in the Auckland public transport ferry network. Two 100% battery electric ferries carrying 200 passengers are under construction by EV Maritime/McMullen and Wing in Auckland for Auckland Transport,⁸¹ while two plug-in hybrid-electric 300 passenger ferries are being built by Q-West in Whanganui for ferry operator Fullers360 and will operate primarily on Auckland Transport's Devonport to Downtown ferry route. When operating on the Devonport route, the ferries will use only the batteries for propulsion energy, charged from grid electricity.

International ship voyages to New Zealand

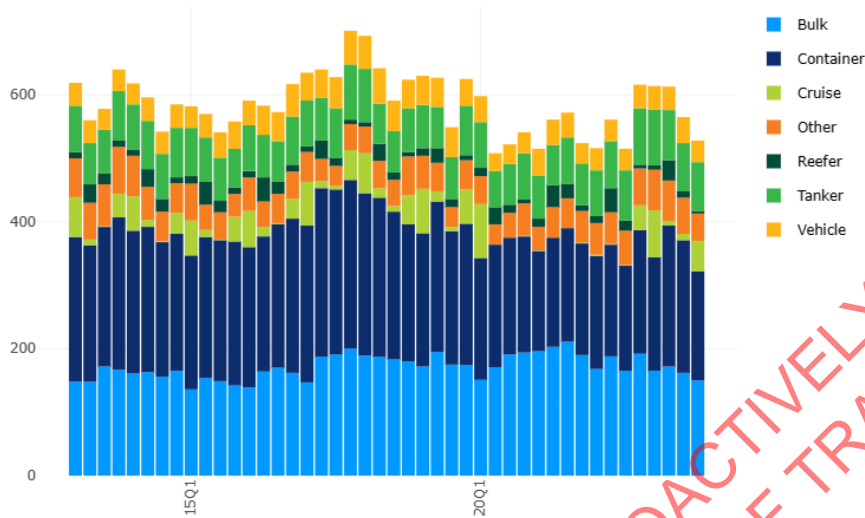
In 2023 there was a total of 2,320 international ship voyages to New Zealand. Each ship voyage includes stops at one or more ports around the country as part of a ship's schedule. Figure 2 presents the number of voyages by international ships to New Zealand from 2013 to 2023 by quarter, by type of ship.

Container ships comprised the largest single type of vessels visiting the country in 2023. Container movements are discussed further below. Bulk carriers include ships carrying livestock, logs, woodchips, ore, and coal. Tankers include ships carrying oil products, bitumen, chemicals, and LPG (including ships exporting fuels to the Pacific Islands). Reefer vessels are

⁸¹ [Auckland's Low Emission Ferry Programme shifts up a gear: Fourth vessel confirmed \(at.govt.nz\)](http://Auckland's Low Emission Ferry Programme shifts up a gear: Fourth vessel confirmed (at.govt.nz))

refrigerated ships which carry perishable goods, either in refrigerated containers which can be plugged in during the voyage, or with refrigerated holds avoiding the need for refrigerated containers, which are highly sought after.

Figure 2: International ship visits to New Zealand, by quarter, Q1 2013 – Q4 2023⁸²



Vehicle ships are RoRo vessels carrying new and used import cars, buses, trucks, and mobile machinery which are driven off the ship onto the wharfs awaiting further distribution. Cruise ships have made a seasonal return to New Zealand in 2022 and 2023, post COVID-19. Other ships include general cargo vessels, multi- and special-purpose ships, research ships and off-shore tugs.

⁸² [FIGS overseas ship visits \(mot-analytics.gitlab.io\)](https://mot-analytics.gitlab.io)

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Container transport

In 2023, New Zealand exported just over one million containers (twenty-foot equivalent units – TEU) and imported just over one million TEU.⁸³ The Port of Auckland and the Port of Tauranga handle the majority of container imports and exports, as shown in

Table 16.

Table 16: Container volumes by port, 2019

Port	All trade		Import		Export	
	TEU	%	TEU	%	TEU	%
Tauranga	720,312	42%	231,937	30%	488,375	53%
Auckland	437,414	26%	378,687	48%	58,727	6%
Lyttelton	200,467	12%	88,280	11%	112,187	12%
Napier	135,519	8%	26,858	3%	108,661	12%
Otago (Dunedin)	92,583	5%	17,539	2%	75,044	8%
Centreport (Wellington)	53,065	3%	27,516	4%	25,549	3%
Nelson	29,759	2%	3,847	0%	25,912	3%
South Port (Bluff)	26,255	2%	5,106	1%	21,149	2%
PrimePort (Timaru)	18,598	1%	4,638	1%	13,960	2%

In 2019, 79% of export containers were full while 70% of the import containers were full. Empty containers are shipped for global repositioning, and reflect that imports rely on dry 40-foot containers, while exports rely

⁸³ [FIGS containers \(mot-analytics.gitlab.io\)](https://mot-analytics.gitlab.io)

⁸⁴ [Slow speed ahead - Exporter Today](#)

⁸⁵ [SAIC MOTOR](#)

on refrigerated (reefer) containers. Empty container repositioning within New Zealand is an important task for coastal shipping. Container import and export volumes are down from 2019, although growing again.

Efforts to reduce GHG emissions in international shipping

Slow steaming to save fuel costs and reduce emissions is now in place with many carriers. However, this has also meant that goods are taking ten to fifteen days longer to arrive in Europe than they would have done five years ago.⁸⁴

Two Chinese vehicle manufacturers have announced that they are building LNG fuelled vehicle ships to serve the Australian and New Zealand markets. SAIC started operating hybrid LNG diesel ships (with a capacity for 7,600 cars) in 2024,⁸⁵ with the first voyage expected to New Zealand in 2025. BYD will have hybrid electric LNG ships⁸⁶ with a first voyage to New Zealand scheduled for early 2025. Methanol-fuelled ships are already visiting New Zealand, principally methanol carriers visiting Methanex in Taranaki.⁸⁷

⁸⁶ [Autofile - News / BYD's ro-ro sets sail](#)

⁸⁷ [Methanol Powered Vessel Arrives in New Zealand - Methanex | Methanex](#)

Box 8 Marine fuels in New Zealand

New Zealand shipping uses Residual Fuel Oil for energy, also known as bunker fuel. Internationally, there are six grades of residual fuel oil, with the most common being Marine Gas Oil (MGO). Very Low Sulphur Fuel Oil (VLSFO) is MGO with a sulphur content not exceeding 0.50%, while Ultra Low Sulphur Fuel Oil (ULSFO) has a sulphur content not exceeding 0.10% sulphur.

A register of marine fuel suppliers is kept by Trading Standards New Zealand. Fuel suppliers at key ports are listed in Table 17.

International ships visiting New Zealand may purchase bunker fuels in New Zealand or may continue their international voyage using existing fuel in their tanks. Ships which do not operate with MARPOL compliant fuel when visiting New Zealand are required to complete a Fuel Oil Non-Availability Report for MNZ.⁸⁸

From 2024, BP is also offering bio-VLSFO in New Zealand, which includes a 24% blend of Used Cooking Oil Methyl Ester (UCOME) with VLSFO. BP estimates the blend reduces lifecycle carbon dioxide emissions associated with the fuel by up to 20% compared to standard marine fuel oil equivalents.⁸⁹ StraitNZ (Bluebridge) is an initial customer of the biofuel blend fuel.

Marine Diesel Fuel is also widely available and used by passenger ferries and other smaller commercial vessels in New Zealand. It meets the same fuel quality specifications as automotive diesel fuel in New Zealand, with a maximum sulphur content of 10 ppm and may contain up to 7% biodiesel.

⁸⁸ This is not an exemption, but may be used when considering if enforcement action will be taken by MNZ. [Fuel Oil Non-Availability Report for entry into New Zealand waters \(maritimenz.govt.nz\)](https://www.maritimenz.govt.nz/fuel-oil-non-availability-report-for-entry-into-new-zealand-waters).

Table 17: Availability of marine fuels at New Zealand ports⁹⁰

Port	Suppliers*	Fuels	Delivery method to vessels**
Auckland	Allied; BP; Gull; Mobil; McFall; Z	VLSFO; ULSFO	P; B; RT
Bluff	Allied; BP	ULSFO	RT
Dunedin	Allied; BP; NPD; Z	ULSFO	P; RT
Gisborne	McFall	ULSFO	RT
Lyttelton	Allied; BP; Mobil; NPD; Z	ULSFO	P; RT
Marsden Point	BP	VLSFO; ULSFO	P; B
Mt Maunganui	Gull; Mobil; Z	ULSFO	P; B; RT
Napier	Allied; BP; Gull; McFall	ULSFO	P; RT
Nelson	Allied; BP; NPD; Z	ULSFO	P; RT
New Plymouth	Allied; BP; Gull	ULSFO	RT
Northport	BP; Gull; McFall	ULSFO	RT
Port Whangarei	McFall	ULSFO	RT
Taranaki	McFall	ULSFO	RT
Tauranga	Allied; Gull; McFall	ULSFO	RT
Timaru	Allied; NPD; Tasman; Z	ULSFO	P; RT
Wellington	Allied; BP; Mobil; Gull; McFall	ULSFO	P; RT

* Allied – Allied Petroleum; McFall – McFall Fuel; Tasman – Tasman Fuels; Z – Z Energy

** B – barge; P – pipeline; RT – road tanker

⁸⁹ [bp in marine biofuel first for Wellington Harbour | News | Home](https://www.bp.com/presscentre/press-releases/2024/bp-in-marine-biofuel-first-for-wellington-harbour)

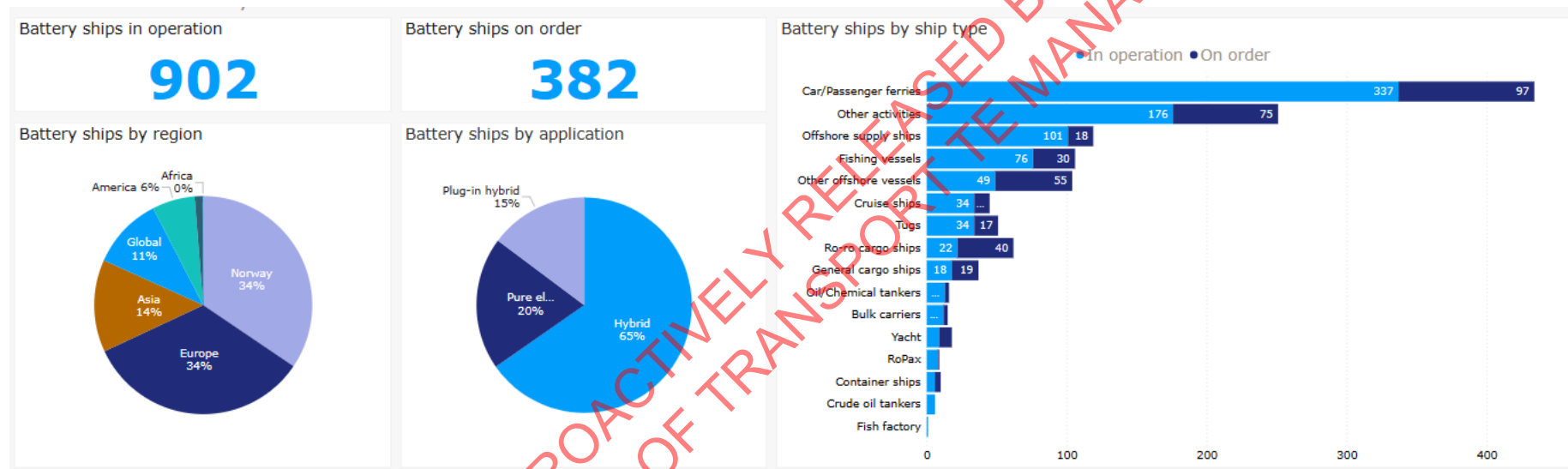
⁹⁰ [Register of marine fuel suppliers | Fuel Quality Monitoring \(tradingstandards.govt.nz\)](https://www.tradingstandards.govt.nz/register-of-marine-fuel-suppliers)

Global efforts to reduce emissions in the shipping sector

DNV's Alternative Fuel Insight platform⁹¹ tracks the number of battery electric ships in operation and on order globally. Over 900 battery electric ships are now in operation, with a further 380 on order. Norway, with a

similar population and geography to New Zealand and high levels of renewable electricity generation, has led the uptake of battery electric ships, principally for car and passenger ferries. DNV's battery ship dashboard is given in Figure 3 as of April 2024.

Figure 3: Battery electric ship dashboard, DNV



⁹¹ [Alternative Fuels Insights for the shipping industry – AFI platform \(dnv.com\)](https://www.dnv.com/alternative-fuels-insights)

The DNV AFI platform also gives statistics on the number of alternative fuelled vessels in operation and on order globally. This is reproduced in Figure 4 as of April 2024. LNG is the leading alternative fuel type for ships, with more than 1,000 vessels in operation. Container ships and car carriers

are the top two users of LNG fuelling technology. Methanol is also finding an application amongst container ships. Note that as biofuels can be used by conventional ships, the use of biofuels is not captured in these statistics.

Figure 4: Alternative fuel ship dashboard, DNV



Appendix B Legislation relevant to achieving zero-emission shipping

Table 18: Legislation relevant to achieving zero-emission shipping

	Act	Secondary legislation	Area of regulation			Regulatory agencies ⁹²
			H&S	E&D	I&S	
Central legislation						
E(FLR)_Act_89	Energy (Fuels, Levies, and References) Act 1989	<ul style="list-style-type: none"> Engine Fuel Specifications Regulations 2011 [EFS_Reg_11] 				MBIE – administers
HSNO_Act_96	Hazardous Substances and New Organisms Act 1996	<ul style="list-style-type: none"> Hazardous Substances (Hazardous Property Controls) Notice 2017⁹³ 				MfE – administers MNZ – responsible for ensuring provisions are applied to all ships
HSW_Act_15	Health and Safety at Work Act 2015	<ul style="list-style-type: none"> Health and Safety at Work (General Risk and Workplace Management) Regulations 2016 (GRWM) [HSW(GRWM)_Reg_16] Health and Safety at Work (Hazardous Substances) Regulations 2017 [HSW(HS)_Reg_17] Health and Safety at Work (Major Hazard Facilities) Regulations 2016 (MHF regulations) [HSW(MHF)_Reg_16] Health and Safety in Employment (Pipelines) Regulations 1999 [HSE(P)_Reg_99] Health and Safety in Employment (Pressure Equipment, Cranes, and Passenger Ropeways) Regulations 1999 (PECPR) [HSE(PECPR)_Reg_99] 				MBIE – administers MNZ – enforces for work on ships (and from July 2024, on ports) WS – enforces elsewhere
MT_Act_94	Maritime Transport Act 1994	<ul style="list-style-type: none"> Marine Protection Rules [MPR] Maritime Rules [MR] New Zealand Marine Oil Spill Readiness and Response Strategy [NZMOSRRS] 				MoT – administers MNZ – enforces

⁹² See key below table for glossary of abbreviations.

⁹³ This Notice includes requirements relating to the transshipment of hazardous substance on foreign flagged vessels (to which the Health and Safety at Work Act 2015 does not apply). This Notice essentially cross refers to the Health and Safety at Work (Hazardous Substances) Regulations 2017.

	Act	Secondary legislation	Area of regulation			Regulatory agencies ⁹²
			H&S	E&D	I&S	
Intermediate legislation						
B_Act_04	Building Act 2004	-				MBIE – administers
CCR_Act_02	Climate Change Response Act 2002	<ul style="list-style-type: none"> Climate Change (Liquid Fossil Fuels) Regulations 2008 [CC(LFF)_Reg_08] 				MfE – administers
E_Act_92	Electricity Act 1992	<ul style="list-style-type: none"> Electricity (Safety) Regulations 2010 (ESR) [E(S)_Reg_10] 				MBIE – administers WS – enforces
EI_Act_10	Electricity Industry Act 2010	-				MBIE – administers
FENZ_Act_17	Fire and Emergency New Zealand Act 2017	-				DIA – administers FENZ - enforces
FI_Act_20	Fuel Industry Act 2020 ⁹⁴	-				MBIE - administers
G_Act_92	Gas Act 1992	<ul style="list-style-type: none"> Gas (Safety and Measurement) Regulations 2010 (GSMR) [G(SM)_Reg_10] 				MBIE – administers WS – enforces
IE(R)_Act_88	Imports and Exports (Restrictions) Act 1988	-				MBIE – administers
MS_Act_04	Maritime Security Act 2004	-				MoT – administers MNZ – enforces
PC_Act_88	Port Companies Act 1988	-				MoT – administers
PGD_Act_06	Plumbers, Gasfitters, and Drainlayers Act 2006	-				MBIE – administers
RM_Act_91	Resource Management Act 1991	<ul style="list-style-type: none"> New Zealand Coastal Policy Statement 2010 [NZCPS_10] Resource Management (Marine Pollution) Regulations 1998 [RM(MP)_Reg_98] 				MfE – administers
SA_Act_15	Standards and Accreditation Act 2015	-				MBIE – administers
SR_Act_92	Ship Registration Act 1992	-				MoT – administers MNZ – maintains register

⁹⁴ Note that the Fuel Industry (Improving Fuel Resilience) Amendment Act 2023 comes into force on 1 July 2024 and amends the Fuel Industry Act 2020.

	Act	Secondary legislation	Area of regulation			Regulatory agencies ⁹²
			H&S	E&D	I&S	
T_Act_88	Tariff Act 1988	<ul style="list-style-type: none"> 2010 Tariff Document [TD] 				MBIE – administers NZCS – maintains TD
Peripheral legislation						
C_Act_86	Commerce Act 1986	-				MBIE – administers
CE_Act_18	Customs and Excise Act 2018	-				NZCS – administers
EEC_Act_00	Energy Efficiency and Conservation Act 2000	-				MBIE – administers
EEZCS(EA)_Act_12	Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012	-				MfE – administers
FT_Act_86	Fair Trading Act 1986	-				MBIE – administers
S_Act_87	Shipping Act 1987	-				MoT – administers
SCPP_Act_96	Submarine Cables and Pipelines Protection Act 1996	-				MoT – administers MNZ – responsible for certain exemptions and applications
TW_Act_75	Treaty of Waitangi Act 1975	-				MMD-TPK – administers

The intensity of blue, green, and orange shading matches that in Figure 1 on page 18, and indicates the significance of the regulatory system in supporting the transition to, and achievement of, zero-emission shipping.

Key:

CCC Climate Change Commission

ComCom Commerce Commission

DIA Department of Internal Affairs

EA Electricity Authority

EPA Environmental Protection Authority

FENZ Fire and Emergency New Zealand

GIC Gas Industry Company

MBIE Ministry of Business, Innovation and Employment

MfE Ministry for the Environment

MMD-TPK Ministry of Māori Development – Te Puni Kōkiri

MNZ Maritime New Zealand

MoT Ministry of Transport

NZCS New Zealand Customs Service

WS WorkSafe

Appendix C Stakeholders

We spoke to the stakeholders listed below. When speaking to international companies we spoke to their New Zealand representatives/office.

CentrePort	A port and logistics business that includes Wellington's port. Also has container, bulk cargo, and log hubs located in central New Zealand.	Fullers Group (Fullers360)	An Auckland-based ferry operator.
Channel Infrastructure	Fuel infrastructure company (including import terminal for fuel) based at Marsden Point.	Hiringa Energy	Producers of zero-emission green hydrogen and developers of hydrogen infrastructure.
CMA CGM	A global shipping and logistics company. New Zealand operations include a route between Tauranga and Europe and trans-Tasman services (which can also include coastal shipping).	Hydrogen Regulatory Settings Working Group	A working group formed by MBIE to enable government agencies to work collaboratively to achieve the Government's national hydrogen objectives.
Custom Brokers and Freight Forwarders Federation of New Zealand (CBAFF)	A national federation for promoting the interests of its members within the custom broking and freight forwarding industry.	KiwiRail (Interislander)	A state-owned enterprise that (among other things) operates the Interislander ferry service.
East by West Ferries	A Wellington-based ferry operator.	Maritime New Zealand Nō te rere moana Aotearoa	A Crown agent that is the national regulatory, compliance and response agency for the safety, security, and environmental protection of coastal and inland waterways.
Environmental Protection Authority Te Mana Rauhi Taiao (EPA)	A Crown agent responsible for regulating activities (including use of hazardous substances) that affect the environment and health of New Zealanders.	Matson	A U.S. owned and operated transportation services company. New Zealand operations include small container ships operating between Auckland and the Pacific.
EV Maritime	Designers of zero-emission fast ferries.	Methanex	A Canadian firm that is the world's largest supplier of methanol. Its production facilities include methanol production facilities in Taranaki.
		Ministry of Business, Innovation and Employment Hīkina Whakatutuki (MBIE) – Engine Fuels team	The engine fuels team within MBIE is responsible for administering the Engine Fuel Specifications Regulations 2011.

Ministry of Transport | Te Manatū Waka A Government department that is the system lead on transport. Works in partnership with several transport agencies, including Maritime New Zealand.

Mitsui & Co. A Japanese owned trading and investment company. Small presence in New Zealand.

Naut An electric propulsion technology company based in Northland.

New Zealand Shipping Federation A national federation representing the interests of the New Zealand coastal shipping sector.

Northport Owner and operator of port located at Marsden Point.

Port of Auckland | Tāmaki Herenga Waka Owned by Auckland Council, the independent operator of Auckland’s port, which is New Zealand’s largest import port.

Scion (New Zealand Forest Research Institute Limited) A Crown research institute that specialises in research, science and technology development for the forestry, wood product, wood-derived materials, and other biomaterial sectors.

Seafuels Provides a refuelling vessel service for ships calling at the Port of Auckland. Fuel is provided directly to ships from a tanker that collects fuel from Marsden Point.

Standards New Zealand | Te Mana Tautikanga o Aotearoa A business unit within MBIE. Is New Zealand’s independent national standards body.

Swire Shipping A Singapore-based shipping and logistics company. New Zealand operations include coastal shipping services (including its bulk cement carrier) and services to eastern Pacific islands.

Wellington Electric Boat Building Co Builders of fully-electric passenger ferries.

Worksafe | Mahi Haumarū Aotearoa A Crown agent that is New Zealand’s primary workplace health and safety regulator.

Some other stakeholders were also given the opportunity to contribute but declined to take up the opportunity.

We also participated in a Green Shipping Corridors Workshop held on 24 November 2023.



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Acts and regulations

<https://legislation.govt.nz/>

Maritime Rules and Marine Protection Rules

<https://www.maritimenz.govt.nz/rules/all-rules/>

MARPOL Annex VI

http://www.marpoltraining.com/MMSKOREAN/MARPOL/Annex_VI/index.htm

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