MINISTRY OF TRANSPORT
TE MANATŪ WAKA

OC260287

29 May 2026

Spencer Jones
fyi-request-34431-c52e7e78@requests.fyi.org.nz

Tēnā koe Spencer,

I refer to your email dated 8 April 2026, requesting the following under the Official Information Act 1982 (the Act):

"Copies of any documents held from 1 January 2015 to present that:

1. *Assess or analyse the atmospheric impacts of shipping emissions, including:*
   - *sulphur dioxide (SO_2)*
   - *sulphate aerosols*
   - *particulate matter*
2. *Evaluate or discuss:*
   - *aerosol–cloud interactions*
   - *cloud condensation nuclei (CCN)*
   - *cloud formation or reflectivity*
   - *rainfall or precipitation effects*
3. *Relate to implementation or impacts of:*
   - *MARPOL Annex VI*
   - *Marine Protection Rules Part 199*
4. *Include any modelling, monitoring, or scientific assessments of:*
   - *coastal air quality near ports*
   - *secondary sulphate formation*
   - *observable "ship track" phenomena"*

On 20 April 2026, we contacted Maritime New Zealand (MNZ), Ministry for the Environment (MfE) and Earth Sciences New Zealand (formerly GNS Science and NIWA) to request a partial transfer of your request, as the Ministry did not hold information in scope of points 1, 2 or 4 of your request.

MNZ advised it had already received your request and was responding.

MfE advised that it does not monitor, analyse or assess shipping emissions, as this is not done centrally. Regional and unitary councils have responsibility for monitoring local air quality under the Resource Management Act, including monitoring and dealing with local polluters (e.g. factories, ships). As far as it is aware, this is the closest government function to what has been requested.

Further, MfE confirmed that what limited documentation it did hold was shared with it from regional councils and Earth Sciences New Zealand and is already published on FYI, linked below. You may wish to contact the relevant council of the area you are interested in for more information.

https://fyi.org.nz/request/33818-request-for-information-regarding-the-basis-of-no-evidence-claims-about-ship-emissions-and-weather-impacts#incoming-141050

On 7 May 2026, we advised you that parts 2 and 4c of your request were being partially transferred to Earth Sciences New Zealand for response. We also advised that due to consultations necessary to decide on your request, a proper response could not reasonably be made within the original time limit. We advised that we would be extending the due date on your request by up to 16 working days.

There are nine documents within the scope of your request, two of which are released in full and five are refused in full under section 18(d) of the Act as they are publicly available.

We intend to release the other two documents to you in part. However, further consultations are required on these papers before a decision can be communicated to you. We plan to provide these to you no later than 12 June 2026. The papers in question are titled *Briefing: OC250051 International Maritime Organisation: Approach to Upcoming Decarbonisation Negotiations* and *Briefing: OC250591 International Maritime Organisation: Seeking Decisions on Net-Zero Framework Negotiations*.

The document schedule attached as Annex 1 outlines how the remaining documents you requested have been treated under the Act.

You may also be interested in the MARPOL Annex VI Treaty page on the Ministry's website here: https://www.transport.govt.nz/area-of-interest/maritime-transport/marpol.

Specifically, the *National Impact Analysis report* is located here: https://www.transport.govt.nz/assets/Uploads/Report/MARPOL-Annex-VI-National-Interest-Analysis.pdf.

If you would like to discuss this decision with us, please do not hesitate to contact us at OIA@transport.govt.nz.

You have the right to seek an investigation and review of this response by the Ombudsman, in accordance with section 28(3) of the Act. The relevant details can be found on the Ombudsman's website www.ombudsman.parliament.nz.

The Ministry publishes our Official Information Act responses and the information contained in our reply to you may be published on the Ministry's website. Before publishing we will remove any personal or identifiable information.

Nāku noa, nā

Mary Craythorne
Manager, Environment

Annex 1: Document Schedule

Doc #	Reference number	Date	Document title	Decision on request
1.	N/A	11/2017	UCL Energy Institute Impact assessment of IMO Greenhouse Gas Reduction Strategies on New Zealand's economy – November 2017	Released in full.
2.	N/A	8/06/2021	Cabinet paper: International Maritime Organisation – Climate Change Negotiation Mandate 2021	Refused under section 18(d). This is publicly available on the Ministry's website. Please refer to the below link: https://www.transport.govt.nz//assets/Uploads/Redacted-International-Maritime-Organisation-Climate-Change-Negotiation-Mandate-Cabinet-Paper.pdf
3.	OC220051	21/03/2022	Response relating to OIA request on NZ's position on shipping decarbonisation at the International Maritime Organisation (IMO) from 2015 to 30 January 2022	Refused under section 18(d). This is publicly available on the Ministry's website. Please refer to the below link: https://www.transport.govt.nz/assets/Uploads/FormulatingAPositionOnShippingDecarbonisation.pdf
4.	N/A	25/05/2023	Emissions Reduction Governance Group (ERG) fortnightly meeting Approach to International Maritime Organisation (IMO) Negotiations	Released in full.
5.	OC230961	15/12/2023	Response relating to OIA request concerning the pricing of international aviation or maritime emissions through mechanisms or resolutions of the International Civil Aviation Organisation or the International Maritime Organisation, dated between 1 January 2021 and 17 November 2023	Refused under section 18(d). This is publicly available on the Ministry's website. Please refer to the below link: https://www.transport.govt.nz/assets/Uploads/AdviceRegardingOptionsforPricingInternationalAviationandShippingEmissions.pdf
6.	OC240671	10/07/2024	Cover briefing and Cabinet paper: International Maritime Organisation: Climate Change Negotiation Mandate	Refused under section 18(d). This is publicly available on the Ministry's website. Please refer to the below link: https://www.transport.govt.nz/assets/Uploads/OC240671-International-Maritime-Organisation-cover-briefing-and-cabinet-paper.pdf
7.	N/A	9/09/2024	Cabinet and Cabinet Business Committee Minutes of Decision: International Maritime Organisation: Climate Change Negotiation Mandate	Refused under section 18(d). This is publicly available on the Ministry's website. Please refer to the below link: https://www.transport.govt.nz/assets/Uploads/Proactive-release-IMO-Minute-of-Decision-and-Cabinet-Report.pdf

UCL ENERGY INSTITUTE

Impact assessment of IMO Greenhouse Gas Reduction Strategies on New Zealand's economy

Philip Krammer and Tristan Smith

November 2017

Terms of reference

On behalf of the Government of New Zealand, the Ministry of Foreign Affairs and Trade (MFAT) asked the UCL Energy Institute for analysis of impacts on New Zealand, including the non self-governing territory of Tokelau, of potential International Maritime Organization (IMO) targets and measures to control greenhouse gas (GHG) emissions from international shipping.

Context

New Zealand is engaging at the IMO on the development of a "Comprehensive IMO strategy on reduction of GHG emissions from ships" (the IMO Strategy), which could potentially include levels of ambition expressed as quantified targets to limit GHG emissions from international shipping, and a suite of emissions reduction measures. Officials need to understand the potential impacts of this strategy on New Zealand in order to determine and seek Ministerial agreement to an appropriate negotiation mandate.

Scope

The work involves evaluating, where possible in quantifiable terms, the impacts of potential IMO GHG reduction targets and measures on New Zealand's trade and ultimately its economy. This includes a summary of

- the likely impacts on transport costs on New Zealand's imports and exports, without presuming any specifics about the IMO policy/policies that will be needed to decarbonise shipping, and by taking into account commensurate technology pathways in shipping,
- the likely impacts of IMO GHG policies on New Zealand's trade flows, national income and prices,
- how these potential impacts on New Zealand's trade costs and economy compare with the impacts on other economies, and
- the likely impacts specific to Tokelau.

Summary of findings

Steps taken to reduce GHG emissions from international shipping could increase the cost of shipping services and this in turn could have an impact on global trade, and New Zealand's competitiveness and GDP. The estimated overall impacts of GHG mitigation related increases in costs of international shipping on the New Zealand economy are relatively small, as they appear to be similar to the world average impact in spite of New Zealand's comparative remoteness. This conclusion is derived in two steps. First, the report establishes a theory of the likely impacts of New Zealand by looking at the specifics of trade and transport cost data by economic sector (Section 3.1). Second, changes in real income as a result of GHG mitigation policies in international shipping are calculated using a CGE model of trade and transport between 123 countries, New Zealand being one of it (Sections 3.2 and 4). The established theory about the likely impacts is in agreement with the modelled results. Given the many data limitations and modelling assumptions, it is important to note that the calculated results stated in this report can only serve as an informative benchmark of the likely impacts for comparison. These results must not be interpreted as all-inclusive.

General observation

- Policy to address GHG emissions from international marine bunker fuels will impact the industry sector[1] in each country through higher consumer prices, and thus affect the volume, direction, and composition of international trade. Countries with a higher dependency on international trade will be affected to a greater extent than those relying more on domestic markets.

Data-informed observations based on economic theory:

- New Zealand's merchandise trade is balanced in terms of its value of imports and value of exports. The trade deficit is therefore small. However, New Zealand primarily exports food products and primarily imports manufactured goods. Given these inherent differences in imports and exports, and although the trade deficit is small, New Zealand's economic dependence on trade is relatively large and thus significant.
- For exports, transport costs represent a relatively small share of about 6% of the price of the food products exported. This is a result of New Zealand's comparative advantage in exporting high in unit value food products (e.g. meat). The price increases associated with GHG mitigation in international shipping will therefore be small and the demand for food products from New Zealand will therefore only slightly decrease.

[1] The industry sector includes the agriculture, hunting, forestry, fishing, mining and quarrying (incl. crude petroleum), manufacturing (of all sectors), electricity, and gas sectors. Not included are the sectors construction, wholesale and retail trade, and water works and supply.

- For imports, transport costs also represent a small share of about 5% to 6% of the price of manufactured goods imported by New Zealand. In this case too, per unit prices are high (e.g. cars) and the demand implications of Market Based Measures (MBMs) in international shipping will be small for New Zealand's economy, as prices of manufacturing imports will raise only marginally.
- New Zealand is one of the most remote countries and exports to and imports from markets which are more than 15,000km away. On average, countries export to and import from markets which are only 7,000km away. Given its remoteness, New Zealand's ad valorem transport costs (these are the transport costs relative to the goods price) should therefore be higher than the costs of many other countries. As a result of exporting and importing goods which are high in unit value however, the ad valorem transport costs that New Zealand faces remain comparable to world average. Moreover, while ad valorem transport costs in exports and imports at the world average remained roughly constant over the last 15 years, New Zealand was able to reduce these costs significantly as a result of both the decline in containerized shipping costs as well as the specialisation in the export and import goods which are high in unit value. If New Zealand continues to drive this underlying trend, its economy will be less vulnerable to price shocks in international transport.

Model-informed observations

- If a carbon price of 25$/t$CO_2$ is introduced (e.g. through the means of a MBM) in international shipping, New Zealand's real income drops by approximately 16$ per person. These price changes materialise into a drop of $76 million in GDP or a drop of 0.038% in GDP respectively and on a once only basis if the carbon price remains constant over time. The economic impacts for New Zealand are higher at higher carbon prices (see Figure 7). The results are calculated using a *one-sector* model, and are therefore likely to be estimates at the lower end. As New Zealand's exports goods which are different from its imports, the elasticity of substitution between sectors will be relatively small which would thus in turn result into larger impacts in a *multi-sector* model. Further economic costs are to be expected if New Zealand opts to buy carbon credits to offset emissions *in addition* to the carbon price imposed by the MBM.

Conclusion

- The reductions in real income for New Zealand resulting from MBMs in international shipping are similar to the reductions in real income at the world average. This is the result of a combination of relatively high and low impacts to New Zealand's economy. The specifics to

New Zealand's economy that reduce its economic impacts from MBM measures in international shipping include the export and import of goods which are high in unit value as well as the balance between the level of exports and the level of imports resulting into a low trade deficit. The specifics to New Zealand's economy that increase its economic impacts from MBM measures in international shipping include the relatively remote location of New Zealand in combination with New Zealand's high dependence on trade, with trade related activities accounting for approximately 40% of its gross industry output. In combination, the specifics to New Zealand's economy that decrease its impacts on the one hand and the specifics to New Zealand's economy that increase its impacts from MBMs in international shipping on the other, result in impacts that are comparable with the impacts at the world average (Figure 10).

Likely impacts on Tokelau

- Given that Tokelau is one of the most remote countries in the world and that exports and imports are low in unit value, it is very likely that Tokelau is more prone to price shifts in international transport. Tokelau is an island developing country and a non self-governing territory of New Zealand. Given its lack of resources and constraints to economic development, it is therefore likely to be excluded from IMO policies which enforce mandatory emissions reductions. If it is included however, or if Tokelau decides to voluntarily participate in IMO GHG reduction policies, its economic impacts from MBMs in international shipping are likely to be above world average.

1 Background

International sea transport is dependent on fossil fuels, which, when burned, form carbon dioxide (CO_2) emissions. Increase in the atmospheric concentration of CO_2 and other greenhouse gases (GHG) are key drivers of global climate change (IPCC 2007). In 2012, the international maritime industry released 796 million tonnes of CO_2, representing a 2.2% share of global CO_2 emissions (Smith et al. 2014). These emissions are predominantly related to the import and export of goods and natural resources through international shipping activities.

Despite significant technological progress, emissions from international sea transport have been growing rapidly over the last couple of years and are thus of increasing concern. Given the increasing importance of international trade in a globalised world, international shipping emissions are likely to further increase in the future, with a projected average emissions growth of 7% of 2012 emissions (Smith et al. 2014).

In contrast to the ICAO, the IMO has to this date neither put long-term sectoral aspirational goals in place, nor agreed on a baseline year for peak CO_2 emissions (ICS 2017). Given the progress made at the UNFCCC in 2015 in Paris and the progress made at the ICAO in 2016 through implementing a Carbon Offsetting and Reduction Scheme for International Aviation[2] (CORSIA) by 2020 (ICAO 2016), the IMO is under pressure to agree on CO_2 reduction goals as soon as possible. IMO Member States have begun the development of an initial strategy to reduce GHG emissions in June 2017, with the intention to reach agreement of this by 2018. A revised strategy will be prepared by 2023.

Economic activity is linked to trade via exports and imports. This interdependence results from having access to goods at lower cost from foreign countries. The prices paid by consumers for these goods are lump-sum prices consisting of manufacturing and transport costs. As shippers strive to absorb as little as possible of the associated cost increases in international transport, they will be passed down the supply chain to consumers in the form of price increases. Steps taken to mitigate the GHG emissions of shipping, may increase costs, and could therefore impact the industry sector in each country through higher consumer prices, and thus affect the volume, direction, and composition of international trade. Countries with a higher dependency on international trade will be affected to a greater extent than those relying more on domestic markets. It could also be the case that countries a greater distance from markets have a higher proportion of transport cost in the total cost of exported goods, and

[2] In CORSIA, airlines have the option to offset emissions—in excess of the baseline target of a carbon neutral growth—by buying credits from the carbon market. Participation in the pilot phase from 2021-23 and first phase from 2024-26 is voluntary. During the second phase from 2027-35, all states with an individual share of aviation activities above 0.5% of the total, or whose cumulative share reaches 90% of the total, are required to participate. Least developed countries, Small Island Developing States (SIDS), and landlocked developing countries (LLDCs) are exempted from participation, unless they volunteer to participate in the scheme.

therefore become disproportionally affected by GHG mitigation related increases in transport cost.
This report looks first at the general evidence that can inform how world trade might be impacted by increases in transport cost, and then at the specifics of New Zealand. A review of the related literature is included in the appendix.

2 GHG emissions and international shipping

In line with the Paris Agreement, a global emissions pathway is needed for international shipping in which emissions start declining as soon as possible. The IMO should therefore agree on a target for shipping that ensures reductions consistent with the overall ambition of the Paris Agreement. There are a number of different ways to achieve this. A study prepared by the University Maritime Advisory Services (UMAS, Smith et al. 2016) found that, to allow a gradual transition, net emissions from international shipping will need to peak in 2025, with absolute emission reductions amounting to approximately 400 million tonnes in net emissions by 2050 (approximately a 50% absolute reduction from the 2012 emissions). Consistent with the Paris Agreement, emissions will then need to reduce to zero during the second half of the 21st century.
The current literature on the subject of carbon prices and climate policy can be used to obtain indicative information for shipping's carbon prices. In May 2017, a High Level Commission on Carbon Prices led by Joseph Stiglitz and Nicolas Stern (CPLC 2017), concluded that a global carbon price of $40-$80 per tonne is needed in 2020, rising to $50-$100 per tonne by 2030 to keep global average temperature increase below 2 degrees. These results take into account uncertainties of the cost and rate of development of technology and indicate that costs of decarbonisation likely to need to increase over time, both as the lower cost "low hanging fruit" are taken up and the absolute emissions reductions relative to a "no policy" pathway increase. Costs of emissions reductions in international shipping may be higher or lower than these ranges identified for the global economy. They provide however some indication of the possible scales of cost associated with GHG reduction in international shipping.
Figure 1 (left) illustrates the relationship between carbon cost and abatement potential using the concept of Marginal Abatement Cost Curves (MACC). MACCs use a simplified representation of the combinations of technologies that can abate increasing quantities of GHG emissions. The results in Figure 1 address the interaction between different technological and operational modifications in international shipping, and include a number of low and zero emission alternative fuels and machinery options such as biofuels, synthetic fuels (e.g. hydrogen), and electrification (batteries). Once these abatement options at small or zero cost are exhausted however, the costs associated with further abatement increase rapidly, as illustrated by the shape of the curve in Figure 1. Beyond 40% of abatement, the abatement curve reaches a plateau which is determined by the costs of those zero emission fuel and machinery combinations. As a

result, the cost increase in 2030 in international shipping associated with an increasing global ambition from 40-60% emission reduction is smaller than the cost increase associated with increasing global ambition from 20-40% emission reduction.

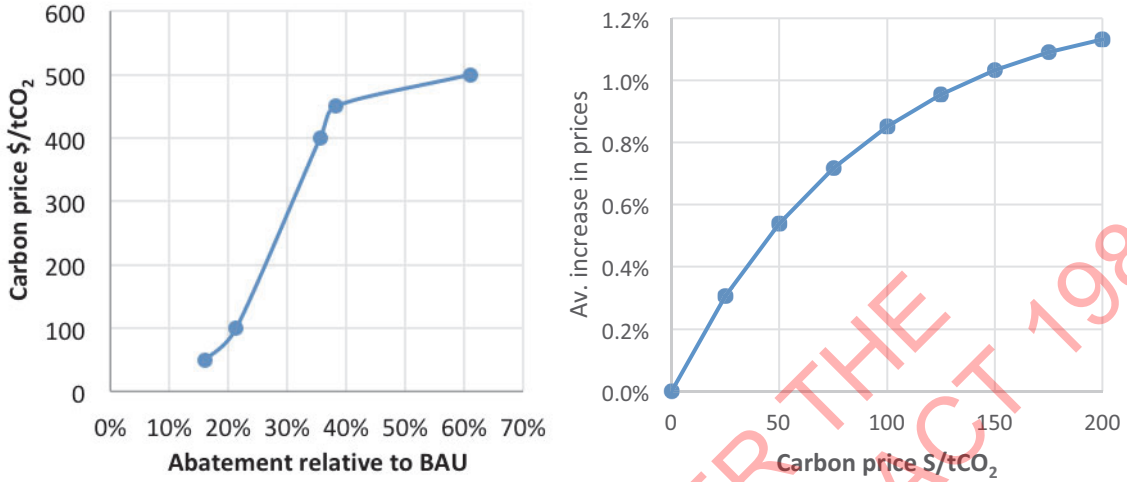

Figure 1: Left: Simulation model GloTraM (Smith et al. 2011) derived estimate of a MACC in international shipping in 2030, displayed as % abatement relative to a Business As Usual, BAU (no further policy) emissions. Right: Average increases in prices of worldwide traded goods at different levels of carbon prices in international shipping (Data source: Krammer & Schäfer 2017).

Figure 1 (left) is an early output of the simulation model GloTraM (Smith et al. 2011). The model produces estimates of the aggregate (whole fleet) relationship between carbon price and emissions abated and includes limited biofuel and hydrogen but no electrification technologies. As more up to date data and additional technologies are added to the model, it is expected that the costs displayed in Figure 1 (left) will reduce in magnitude. The estimates for GHG reduction costs and carbon prices in Figure 1 (left) should therefore be considered to be a conservative, upper-bound estimate for international shipping.

If shippers are confronted with a global bunker fuel levy through a MBM imposed by the IMO, they will strive to absorb as little as possible of the associated cost increases. As a result, the cost increases associated with MBMs in international shipping will be passed down the supply chain to consumers in the form of price increases. The right graph in Figure 1 shows the associated price increases of goods traded worldwide on average as calculated in Krammer & Schäfer (2017). For example, at a carbon price of 25$/tCO$_2$, the prices of goods traded between countries will increase by 0.03% on average. Given that demand is elastic, consumers will therefore choose to substitute a fraction of the goods which are imported with domestically produced goods. This has two important implications. First, as only a fraction of the imported goods will be substituted, consumers in each country will be confronted with higher prices of the goods imported. Secondly, as exports will reduce in each country due to a substitution away from imports to domestically produced goods, income in each country will reduce marginally. Both these factors will be used to quantify the economic impacts of MBMs in international shipping on the economy of New Zealand in the sections below.

Although the price increases and economic impacts for New Zealand are calculated at different levels of carbon prices (Figures 1 and 7), the carbon price of 25$/tCO2 is often chosen as a reference in the text throughout this report. This is because the carbon price of 25$/tCO2 is similar to the estimated social cost of carbon (e.g. Nordhaus 2014, 2017) and therefore often used as benchmark in the literature.

3 Economic impacts at the national level

This section starts by discussing the trade's significance to the New Zealand economy. Subsection 4.1 then discusses the likely impacts on New Zealand's imports and exports if there is an increase in international shipping's costs due to mitigation of GHG using data on transport costs. Subsection 4.2 then provides and discusses the results on the likely impacts on New Zealand's economy, which have been calculated using a Computable General Equilibrium (CGE) model.

New Zealand is the 54th largest export economy in the world with $35.8 billion in exports in 2015 (Simoes & Hidalgo 2011). Its imports are of similar size. Exports and imports are therefore balanced, resulting into a close-to-zero trade deficit. Differences however exist in the types of goods exported and imported. New Zealand's income from trade results largely from exports of food products (Figure 2). These include animal products including dairy products ($6.4 billion) as well as sheep, goat and frozen bovine meat ($4.4 billion) (Simoes & Hidalgo 2011). The manufacturing industry in New Zealand is relatively small, and many of the manufactured goods consumed domestically need therefore be imported from other countries (Figure 2). These include machines, transportation equipment as well as chemical products ($17.9 billion$). Although New Zealand's trade is balanced in terms of its import and export values, these differences highlight that New Zealand's economy is heavily dependent on trade. To see this, it is useful to consider the hypothetical case of autarky. In an autarky scenario, New Zealand would need to shift employment from the food sector to the manufacturing sector and establish the industries needed to become independent from imports. The manufactured goods produced domestically will likely be more expensive than the manufactured goods imported from foreign countries, given that skilled labour and technology would first need to be established.

On a global level, New Zealand's comparative advantage lies undoubtedly in food products (Figure 2). In recent years, this comparative advantage manifested in its economy, with large shifts away from mining and manufacturing sectors, to the agriculture and food sectors (Figure 3). Comparative advantage can also be utilised by economies of scale. A larger industry can produce at a lower unit cost. New Zealand's specialisation in food products for exporting is therefore a direct result of trade liberalisation.

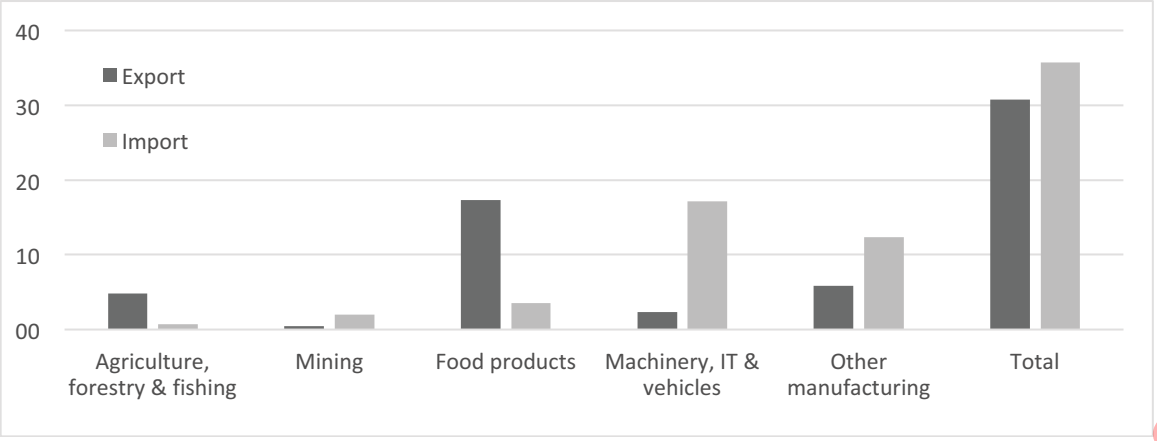

Figure 2: New Zealand 2016 exports and imports by sector in billion USD (Data source: WITS via World Bank 2016)

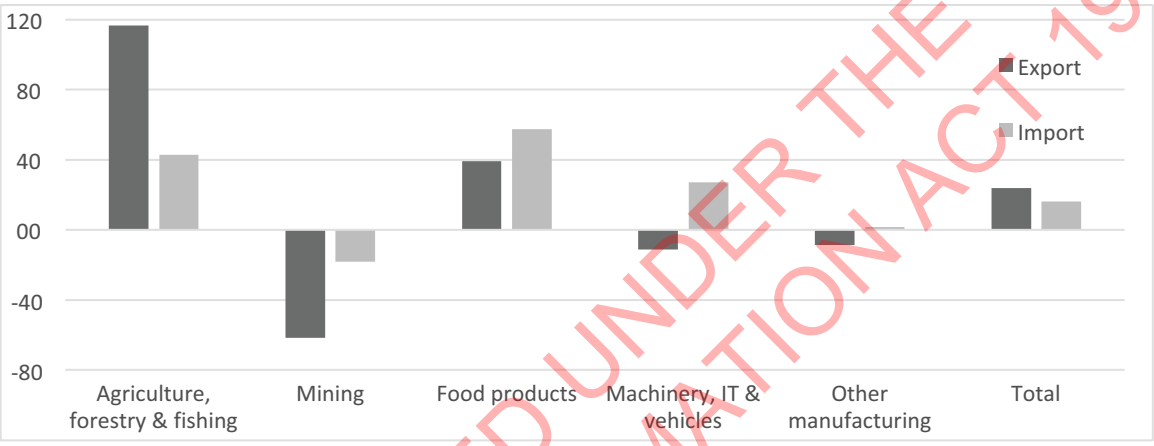

Figure 3: New Zealand's exports and imports percent 2007-16 growth by sector (Data source: WITS via World Bank 2016)

Changes in ad valorem transport costs

What are the likely impacts on New Zealand's imports and exports if there is an increase in international shipping's costs due to mitigation of GHG? If demand is elastic, the changes in imports and exports can be determined by the level of transport costs relative to the average prices of the exported and imported goods. These costs are referred to as ad valorem transport costs in the literature, as they are calculated by dividing the associated transport cost t by the price of the good p_{fob} (FOB) in the exporting country (the price at the factory gate) and normalised using $1+t/p_{fob}$. FOB refers to the free on board customs valuation. Ad valorem transport costs increase if transport costs t increase, holding prices fixed (Figure 1 right). Ad valorem transport costs can also increase if prices p_{fob} decrease, holding transport costs fixed. Ad valorem transport costs are therefore not informative towards measuring actual transport or freight costs, as the changes in prices need to be additionally accounted for. They however provide the right means to measure the economic impacts of changes in transport costs on prices, which ultimately matter to evaluate the impacts on the economy.

Figure 4 shows that ad valorem transport costs for food products are relatively small, with an average value of 6% for exports from New Zealand. Because transport costs are small relative to the price of food products exported, the associated price increases as a result of any GHG

mitigation related increase in international shipping's costs will be small. Given the small price increases, worldwide demand for food products from New Zealand will therefore only slightly decrease. The low ad valorem transport costs are a result of food products with a relatively high per unit price[3] (e.g. meat). Dairy products with relatively lower per unit prices (or per unit values) may be subject to higher reductions in demand if transport costs raise[4]. The extent of which these price increase materialise into economic impacts depends on the level of imports and exports of these goods as well as the sector's contribution to gross output.

Figure 4 also shows that ad valorem transport costs are low for manufacturing imports, which account for almost all of New Zealand's imports (Figure 2). In this case too, the demand implications of cost increases in international shipping will be small for New Zealand's economy, as prices of manufacturing imports will raise only marginally. The low ad valorem transport costs of manufacturing goods are a result of relatively high per unit prices of the imported goods (e.g. cars).

Agriculture, forestry and fishing as well as mining are the two sectors with the highest ad valorem transport costs. These two sectors are therefore subject to relatively larger price shifts, if transport costs increase. The mining sector might be less of a concern, as New Zealand's exports in mining are decreasing (Figure 3). New Zealand's agriculture, forestry and fishing sector however might be more vulnerable to changes in transport costs, as exports in this sector are increasing (Figure 3). For New Zealand's economy as a whole however, the overall changes in income and prices—resulting from the changes in demand of exports and changes in prices of imports—from the agriculture, forestry and fishing as well as the mining sector will be small. This is because the exports and imports in these two sectors only represent a small fraction of New Zealand's overall import and export levels (Figure 2).

Figures 5 and 6 illustrate the ad valorem transport costs have a declining trend throughout all sectors. If this underlying trend continues, the potential economic impacts on New Zealand resulting from increases in transport costs will reduce over time. As mentioned above, the decreasing trend could either be due to decreasing transport costs or increasing per unit prices of the exported or imported goods. The report of New Zealand's Productivity Commission (2012, Figures 4.12 and 4.13) shows that per unit transport costs in bulk shipping remained fairly constant over a similar (1989-2010) time period whereas that transport costs in container shipping have been reducing by almost 40%. The decline in ad valorem transport cost as indicated in Figures 5 and 6 is therefore a result

[3] For a given product category, the per unit value of a traded good can be obtained by dividing the import value in US dollars by the import quantity in tonnes.

[4] It should be noted that a disaggregation by product group inevitably results into some parts that are more valuable than others. The range of the per unit values of intermediates therefore increases the higher the level of product differentiation. For the calculation of economic impacts however, only products with a significant share in imports and exports are of significance.

of both declining transport costs as well as exporting and importing goods which are higher in unit values. The latter corresponds to the Alchian & Allen (1967) hypothesis, stating that because freight costs are increasing with the price of the good, firms tend to sell goods with higher unit values in foreign markets (exports), while selling goods with lower unit values in the domestic or home market. This effect is also known as "shipping the good apples out" as formulised by Hummels & Skiba (2004).

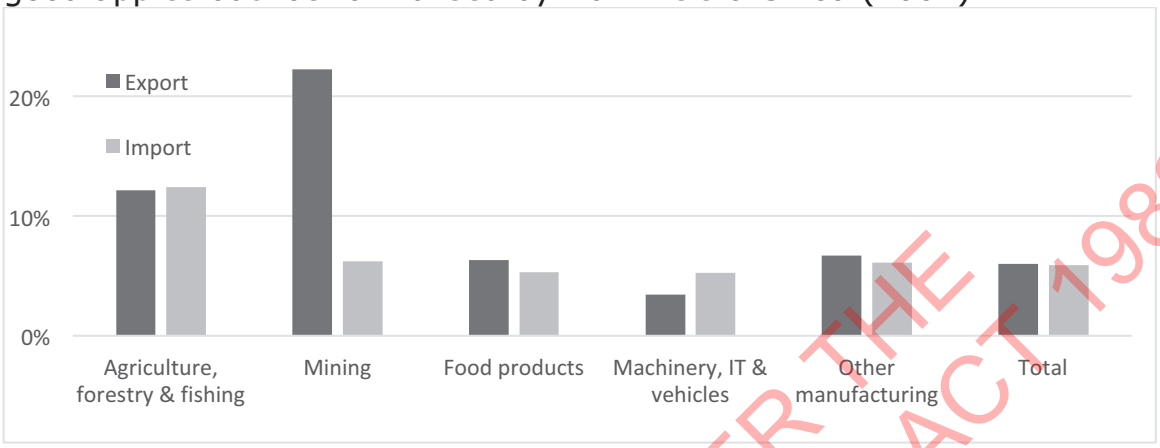

Figure 4: New Zealand ad valorem transport costs in 2007 imports and exports by sector (Data source: OECD 2007)

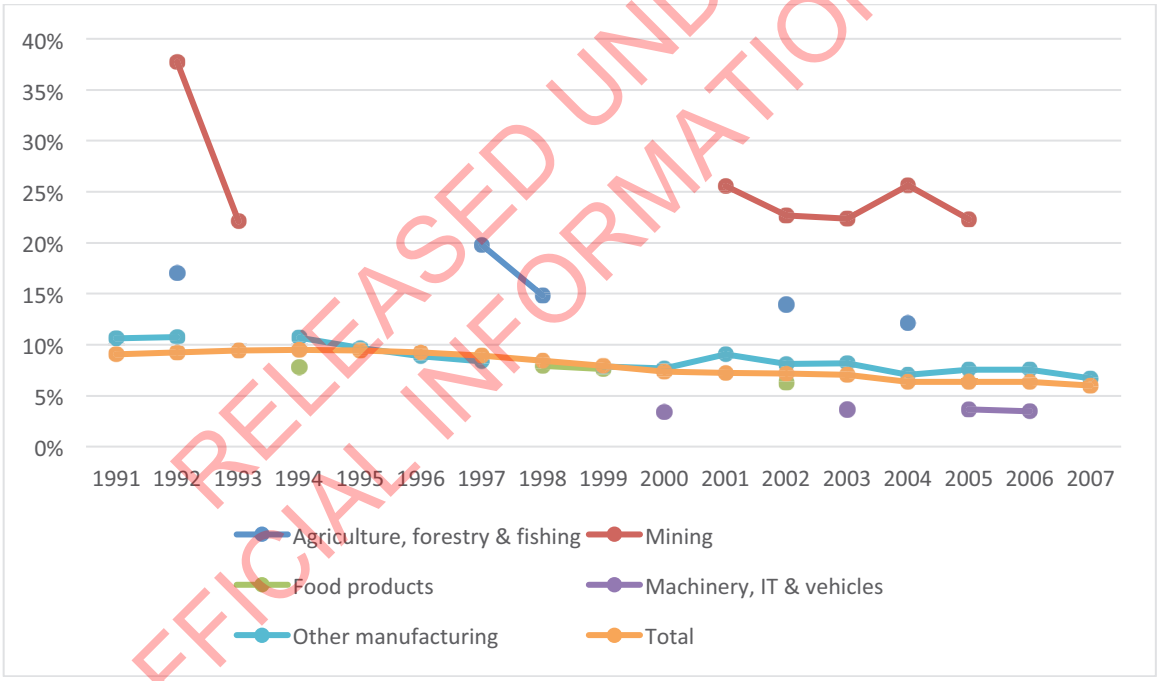

Figure 5: New Zealand ad valorem transport costs in exports by sector over time (Data source: OECD 2007)

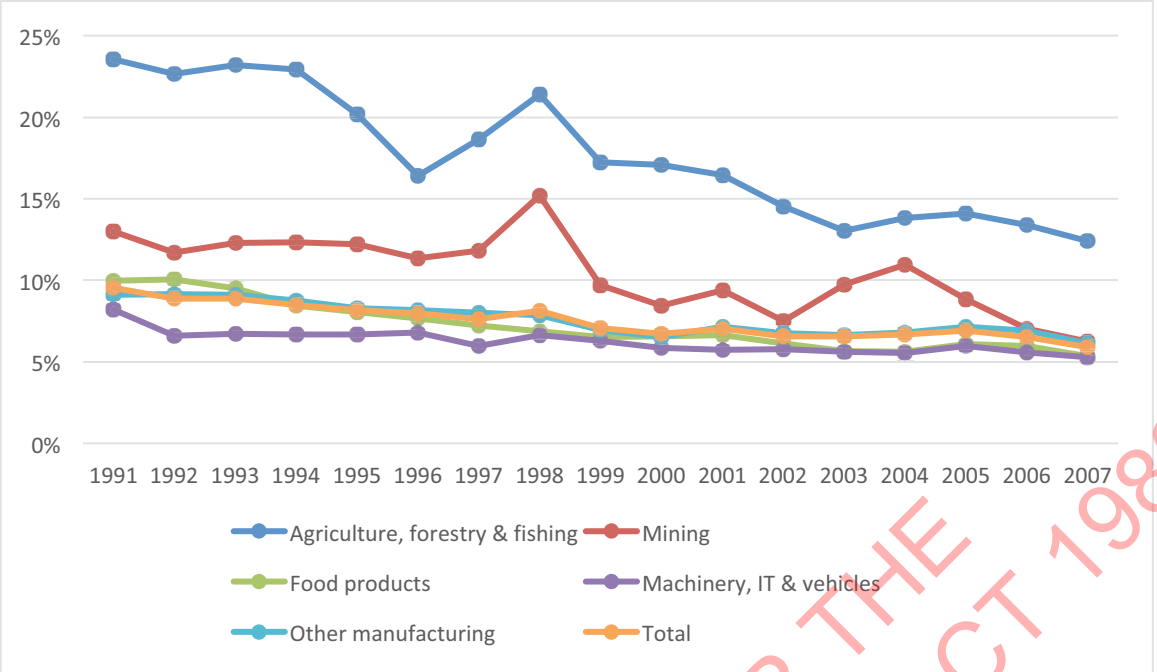

Figure 6: New Zealand ad valorem transport costs in imports by sector over time (Data source: OECD 2007)

Changes in real income

Results in this section are taken from a Computable General Equilibrium (CGE) framework developed by Krammer & Schäfer (2017) which links a theoretical framework of consumer demand with a theoretical framework of transport supply to calculate the welfare implications associated with cost increases in international transport for 123 countries. Demand takes the form of the gravity equation in international trade. Transport supply takes the form of a cost function of a representative transport firm (a shipper). Mitigation of international shipping's GHG emissions is driven by MBM policies, which are modelled using an exogenously determined carbon price, which takes the form of a global bunker fuel levy charged per tonne of fuel purchased for consumption. Demand and supply are balanced using equilibrium prices. The model then calculates changes in real income in each country, after a carbon price on international shipping activities has been introduced.

The demand responses due to price shocks in international trade have implications on a country's overall consumption as well as income. This is because a country engages in exports (leading to additional income) as well as imports (leading to purchasing goods from abroad usually at lower prices).

On the consumption side, the price increases of imports as well as substitution away from imports towards domestically produced goods will result into a higher consumer price index. The price increases due to substitution need further clarification. With prices rising, demand for imports will reduce. Reduced import demand essential implies that more domestic goods will be consumed (assuming that total consumption remains unchanged). Because domestic goods are probably more expensive than the imported goods, the substitution away from imports to domestically produced goods also increases the consumer price index.

The changes in income are twofold. First, income will increase if a country is importing less as a result of more goods being produced domestically. If more goods are produced domestically, the demand for labour will increase which thus results into higher income. If the same country however exploits its comparative advantage in producing goods which are exported, any increase in transport costs would at the same time also result into a reduction in exports. Because a reduction in imports results in an increase in income whereas a reduction in exports results in a decrease in income, trade economists often argue that the net effect in terms of income related to trade remains relatively small, especially if a country's trade deficit is small. In the majority of cases therefore, the economic impacts due to foreign price shocks as a result of changes in income will be much smaller than the economic impacts as a result of changes in the consumer price index.

The calculated results in this section are based on a *one-sector* model. Hence, all trade related activities from all sectors (agriculture, good, mining and manufacturing) enter the model in aggregated form. This limitation has important ramifications on the interpretation of the calculated results. In a multi-sector model, the calculated economic impacts may be slightly higher, subject to the value of the elasticity of substitution between sectors. As New Zealand's exports goods which are different from its imports, the elasticity of substitution between sectors will be relatively small. Costinot & Rodriguez-Clare (2014) note that the impacts on trade are higher if the elasticity of substitution between sectors is small. New Zealand's impacts from trade are therefore very likely to be higher than the ones calculated in this report using a one-sector model. A multi-sector model would be possible to establish but require to estimate a larger number of missing observations of ad valorem transport costs by country pair. Data limitations also exist with respect to estimating the elasticity of substitution between sectors for all of the 123 countries in the model. Results of this model would therefore be of limited informative value as they would be based on large parts of estimated data.

Figure 7 shows the calculated changes in per capita real income and GDP in New Zealand *at different levels of carbon prices* in international shipping. At a carbon price of 25$/t$CO_2$, real income drops by approximately 16$ per person. These price changes materialise into a drop of $76 million in GDP or a drop of 0.038% in GDP respectively. It is important to note that these changes to the economy occur on a once only basis if the carbon price remains constant over time. That is, once a carbon price of 25$/t$CO_2$ has been introduced as a foreign price shock to the global economy, the changes in real income and GDP occur as a result of reaching a new equilibrium state of the economy. After the carbon price has been introduced and the economy is in a new equilibrium, no further changes in real income and GDP are to be expected, provided that the carbon price remains unchanged. If the carbon price increases over time, a new equilibrium state of the economy evolves, with higher impacts in real income and GDP as illustrated in Figure 7.

As a result of a number of economic features related to the import and export of goods, New Zealand's overall economic impact from MBMs in international shipping are relatively small for the following reasons:

1. First, given that New Zealand's trade deficit is small, impacts in terms of income are small.
2. Second, because New Zealand imports goods which are high in unit value, the increases in the consumer price index remain small.
3. Third, because New Zealand exports goods which are high in unit value, the overall demand impacts of New Zealand's exports remain small.

Economic impacts on New Zealand are however relatively larger due its remoteness and therefore higher transport costs in comparison to many other countries. The relatively larger impacts as a result of being a remote country will become clearer in the next section when comparing the economic impacts of New Zealand with the economic impacts of other countries.

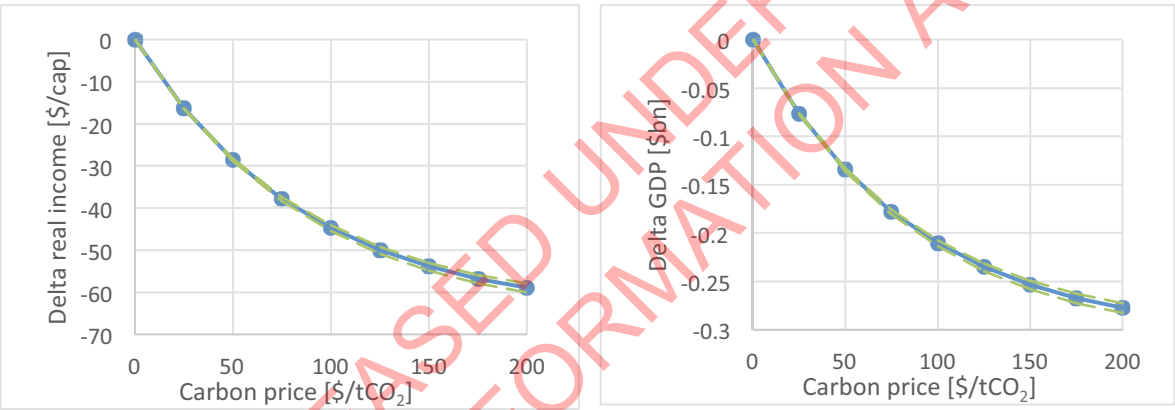

Figure 7: New Zealand's drop in real income and GDP under different levels of carbon prices in international shipping. Mean results are calculated using a trade elasticity of five, upper and lower boundaries (dashed lines) using a trade elasticity of three and seven (Data source: Krammer & Schäfer 2017)

4 Economic impacts at the global level

This section compares the likely economic impacts on New Zealand to the likely economic impacts on other countries— and in particular Australia, China, the USA and the EU15. The modelling uses the same hypothetical MBM and carbon levy as applied in Section 4.2.

A first analysis of likely economic impacts on New Zealand, relative to these other countries can be obtained by looking at their comparative ad valorem transport costs (Figure 8) and remoteness (Figure 9). This shows that although Australia is as remote as New Zealand to its trading partners (Figure 9), its ad valorem transport costs for exports are almost three times as large as the ad valorem transport costs for exports from New Zealand (Figure 8). This is because Australia exports goods which are much lower in unit values such as iron ore and coal (see Simoes & Hidalgo 2011 for an overview of exports and imports). Australia's exports will therefore be more vulnerable to price increases that result from an MBM in

international shipping. Similar arguments can be made for imports of China and the EU15 (importing lots of mineral products and metals). The ad valorem transport costs in exports of the EU are strikingly low, which is a result of exporting lots of manufactured products which are high in unit value (e.g. cars). New Zealand's ad valorem transport costs in imports and exports are only slightly above the world average. Although being a remote country therefore, New Zealand's comparative advantage in exporting food products which are high in unit value results into comparatively low transport costs. As New Zealand is primarily importing manufactured goods which are high in unit value, the ad valorem transport costs also remain comparatively low in imports.

Figure 9 displays a trade-weighted distance index for these countries, which has been calculated using bilateral trade and sea distance data. The results are in agreement with report by the New Zealand Productivity Commission (2012), stating that New Zealand is one of the most remote countries in the world, closely followed by Australia however. On average, countries export to and import from markets which are 7,000km away. In contrast, on average, New Zealand exports and imports to markets which are on average more than 15,000km away.

Given its remoteness, New Zealand's ad valorem transport costs should therefore be higher than the costs of many other countries. As a result of exporting and importing goods which are high in unit value however, the ad valorem transport costs that New Zealand faces remain comparable to world average (Figure 8). Secondly, Figures 12 and 13 illustrate that although ad valorem transport costs in exports and imports at the world average remained roughly constant over the last 15 years, New Zealand was able to reduce these costs significantly. As mentioned above, this a result of both, the decline in containerized shipping costs as well as the specialisation in the export and import goods which are high in unit value (Figure 4).

If the carbon revenue from an MBM in international shipping is not used as a rebated lump-sum to consumers, all countries face a reduction in real income after an MBM in international shipping has been introduced[5]. All values shown in Figure 10 are therefore negative.

The reductions in real income for New Zealand resulting from a carbon price of 25$/t$CO_2$ are similar to the reductions in real income at the world average. This is the result of a combination of economic features that have an increasing as well as decreasing influence.

The specifics to New Zealand's economy that reduce its economic impacts from GHG mitigation related increases in cost of international shipping include the export and import of goods which are high in unit value as well as the balance between the level of exports and the level of imports. New Zealand imports goods which are high unit value, ad valorem transport

[5] It should be noted that rebating mechanism are not included in the CGE model developed by Krammer & Schäfer (2017) to obtain unbiased estimates of the likely impacts to the economy. Subject to each country's import intensity, a rebating mechanism could potentially outweigh any welfare losses and even result into welfare gains.

costs in imports therefore only take a small fraction of the overall price of these imported goods. If transport costs increase, consumers in New Zealand are faced with a relatively small price increase of these goods. Overall, the changes in the consumer price index will therefore be small. On the exporting side, New Zealand exports goods which are also high in unit value. Given the relatively low share of ad valorem transport costs in these goods, any changes in transport costs will result into a relatively small drop in worldwide demand of goods exported by New Zealand. The changes in income from a reduction in exports will therefore also be small. Third, because the level of imports is equivalent to the level of exports, simultaneous changes in imports and exports will only result in negligible changes in income.

The specifics to New Zealand's economy that increase its economic impacts from GHG mitigation related increases in cost of international shipping include the relatively remote location of New Zealand in combination with New Zealand's high dependence on trade, with trade related activities accounting for approximately 40% of its gross industry output. New Zealand's remote location means that it faces higher transport costs to export to and import goods from foreign markets, thus resulting into relatively higher ad valorem transport costs. The increase in income and the price index will therefore be larger if transport costs increase. Second, New Zealand's high dependence on trade will result in larger shifts in income and the price index, as a higher fraction of consumption and gross output at the country level is affected by price increases as well as reductions in demand.

In combination, the specifics to New Zealand's economy that decrease its impacts on the one hand and the specifics to New Zealand's economy that increase its impacts from MBMs in international shipping on the other, result into impacts that are comparable with the impacts at world average (Figure 10).

The overall reductions in real income for Australia in Figure 10 are larger as a result of exporting goods which are low in unit value (Figure 8), in combination with its relatively remote location (Figure 9). The US faces lower reductions in real income due to the export and import of goods which are relatively low in unit value (Figure 8). China on the other hand faces low reductions in real income due to its lower dependence on international trade, with almost 90% of its gross industry output related to domestic consumption. The opposite case is true for Germany[6] with a large dependence on international trade and thus higher reductions in real income.

The absolute level of impacts are shown in Figure 11. If including the size of the economy, smaller impacts on a per capita level (as in Figure 10) become larger for countries with a relatively high gross industry output such as the US and China, whereas they become smaller for countries

[6] Germany is not representative for the EU15 but has been selected as a country for Figures 10 and 11 instead of the EU15 in all other plots to ease the visualisation of the calculated results in these figures.

with a relatively smaller gross industry output such as New Zealand and Australia.

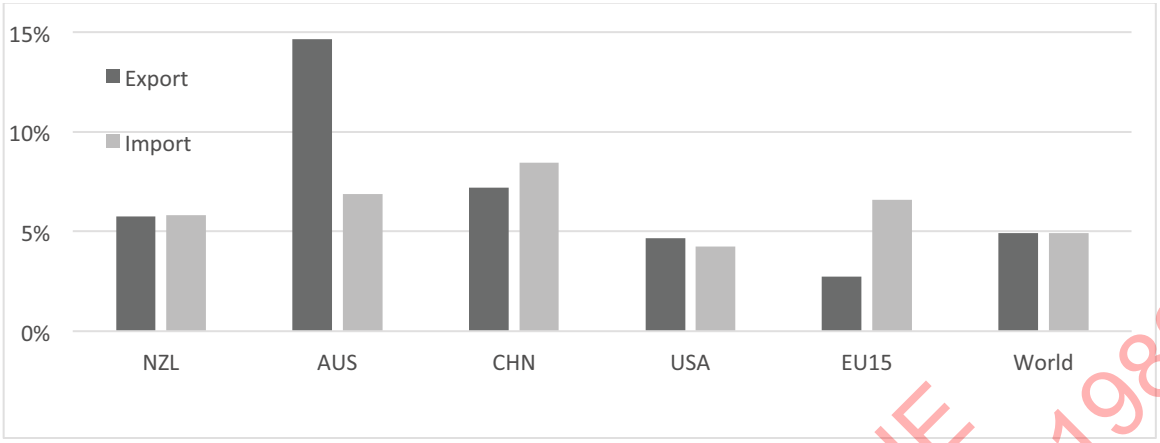

Figure 8: Ad valorem transport costs in 2007 imports and exports by country (Data source: OECD 2007)

Figure 9: Trade weighted distance index by country (Data source: WITS via World Bank 2016, using bilateral trade data of 123 countries and sea distance data from Newton 2009)

Figure 10: Delta in real income [$/cap] by country as a result of a carbon price of 25$/t$CO_2$ in international shipping (Data source: Krammer & Schäfer 2017)

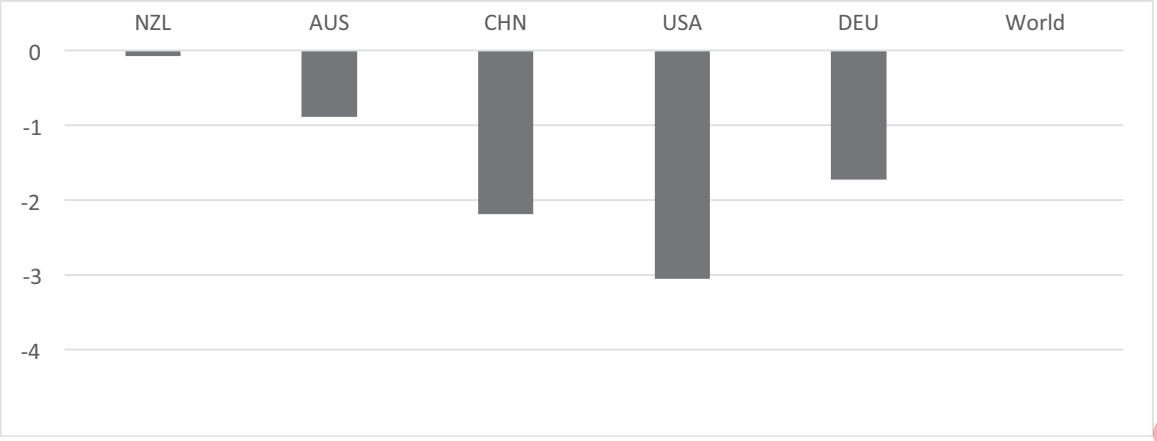

Figure 11: Delta in GDP [$ billion] by country as a result of a carbon price of 25$/t$CO_2$ in international shipping (Data source: Krammer & Schäfer 2017)

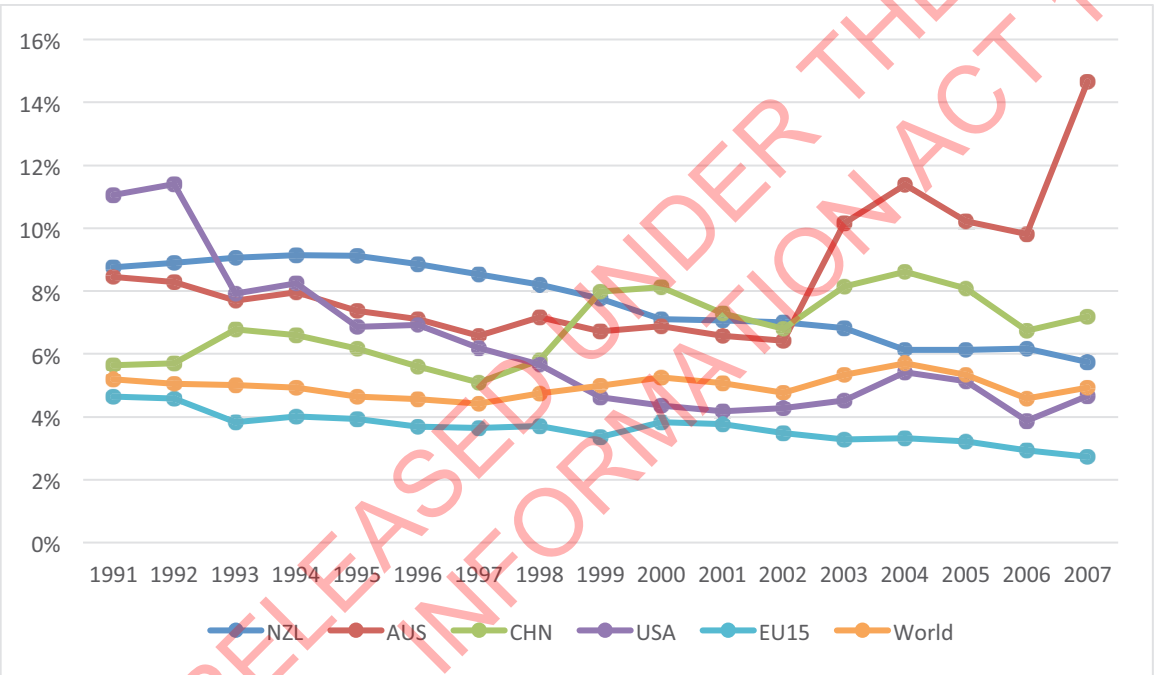

Figure 12: Ad valorem transports in exports by sector over time by country (Data source: OECD 2007)

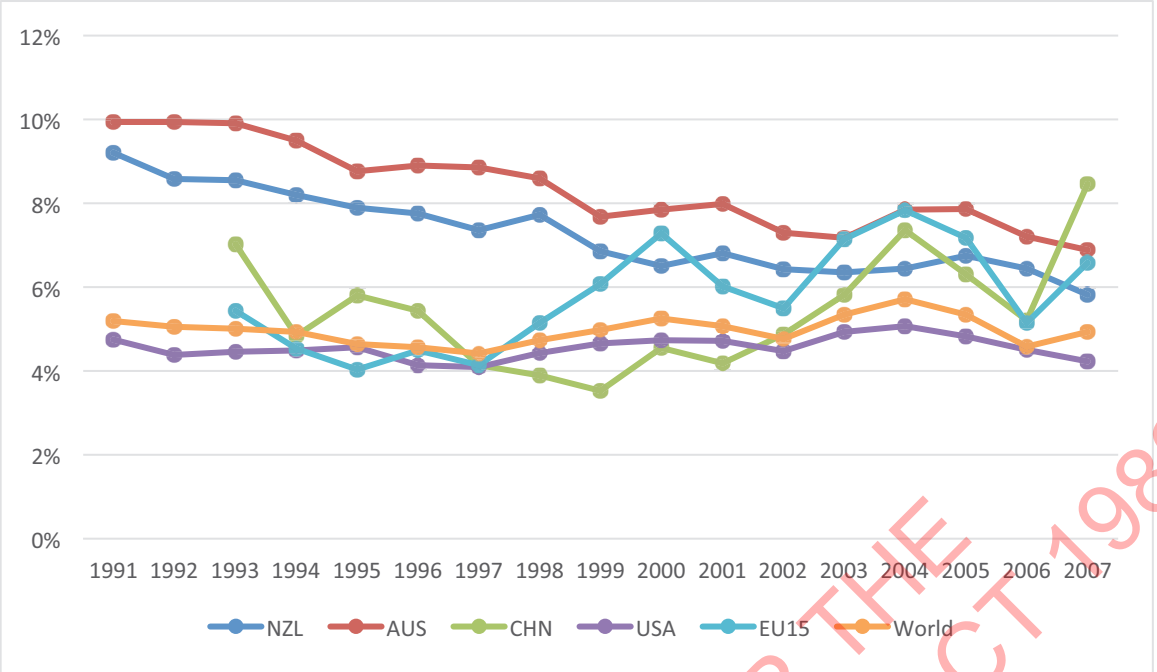

Figure 13: Ad valorem transports in imports by sector over time by country (Data source: OECD 2007)

5 Specifics to Tokelau

Detailed economic data on trade and transport costs equivalent to those used for New Zealand as a whole are not available for Tokelau. So a separate analysis has been undertaken using data and assumptions about the ships servicing Tokelau's international links.

International transport and potential international transport cost increase

The principal sources of revenue come from sales of copra, postage stamps, souvenir coins, and handicrafts as well as financial aid from New Zealand (Factbook C.I.A. 2017). Tokelau exports stamps, copra and handicrafts and imports foodstuffs, building materials and fuel (Factbook C.I.A. 2017). Transportation is constrained to offshore anchorage. No ports and airports exit. Air services were however put forward as part of Tokelau's proposed development initiative

Tokelau's main route for imports and exports is via Apia in Samoa. Using data from the Samoa Shipping corporation, timestables and specifications of the ships servicing that link were obtained. These were then used to estimate the total annual fuel consumption of these ship's voyages, and associated CO_2 emissions. The calculated values are shown in Table 1. The estimates were obtained using a round-trip distance of 560nm. When not sailing on passage, the ship's fuel consumption was assumed to be negligible which may slightly underestimate actual fuel consumption especially if auxiliary system power requirements are significant. To compensate, the ship's machinery is assumed to operate at maximum power output in order to obtain the ships' respective service speeds. A specific fuel consumption was assumed for the machinery on both ships of 220g/kWh, which is representative for medium and high speed marine

diesels, but may also underestimate fuel consumption depending on how these ships are operated and maintained.

Table 1: Estimates of shipping activity and total annual CO2 emissions associated with Samoa-Tokelau shipping services

	number of voyages per annum	installed power (kW)	speed (kts)	sailing time per annum (hours)	power consumption per annum (kWh)	annual fuel consumption (t)	annual CO2 (t)
Lady Naomi	24	1760	12	1120	1971200	434	1344
Fasefulu	12	670	9	747	500267	110	341

The total CO_2 emissions from all the voyages made by both vesels is estimated at 1685 tonnes per annum. A conservative assumption for the increased annual cost of the Apia-Tokelau shipping services can be obtained by multliplying this total CO_2 by the range of carbon prices that were considered feasible for international shipping and used in the CEGE modelling for New Zealand nationally $25-200 per tonne. The results are shown in Figure 14. The estimate is conservative because this assumes no change in energy efficiency, fuel consumption or fuel choice for the service, whereas in practice the addition of the carbon price may stimulate take-up of some CO_2 reduction action which then mitigates some of the increased cost.

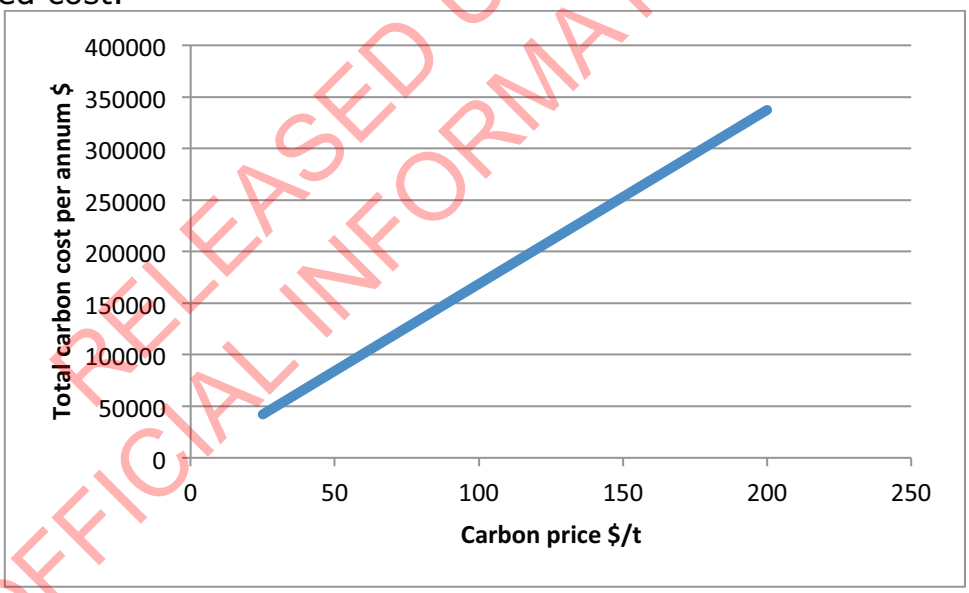

Figure 14: Estimates of total carbon costs (in USD) associated with annual shipping links between Samoa and Tokelau, for a range of carbon prices

A study carried out in 2014 "How much do Tokelauans consume – and throw away – in one year?"[7], estimated the total value of imports to Tokelau as $5.2 NZ. Converting to USD and comparing the total carbon cost per annum indicates that this could be between 1 and 7.6% of the total value of imports. The total carbon cost is a round-trip

7 https://www.tokelau.org.nz/site/tokelau/files/TokelauNSO/WhatTokelauansConsumedIn2014-15jul16.pdf

cost, and so this could also be distributed over the exports which would reduce the impact on the prices of imported goods, but would lead to reductions in Tokelau's export's competitiveness and therefore revenue.

Like at the ICAO for the CORSIA, SIDS could be asked to only voluntarily participate in greenhouse gas reduction schemes which are enforced by the IMO. Evidence that this is likely comes from the consistent reference to the High Level Action Plan at IMO that emphasises the need to evaluate and as required mitigate, against risks to adverse economic impacts on SIDS and LDCs. Tokelau, as a territory of New Zealand and not a fully autonomous SIDS, may not necessarily qualify for any exemption. However, because its main international transport link is shipping to and from Samoa, which is a SIDS, this route is likely to qualify for an exemption. It is therefore possible that there could be international mechanisms, in addition to any national policy options, to mitigate any economic consequences on Tokelau of the potential shipping carbon costs identified in Figure 14.

Domestic shipping CO_2 emissions, which would include any shipping services within Tokelau, is not included in IMO policy, and therefore remains a matter for New Zealand's Nationally Determined Contribution or relevant domestic policy.

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Appendix

Review of the existing literature on the economic impacts of increased transport costs

Transport costs always played an important role in theoretical and empirical research related to trade. This is because transport costs are one distinct type of trade costs that inhibit trade. As such, the comparison of observed trade with predicted frictionless trade provides a measure of trade frictions and their influences such as transport costs and tariffs. Sources of bilateral resistance to trade therefore also play a unique role in all international trade theories as a result of the no-arbitrage condition that equates differences in domestic and foreign prices with transport costs and tariffs.

Transport costs (denoted with a t) are often expressed as an ad valorem tax equivalent to the supply prices p, given by $1 + t/p$, instead of an additive component given by $t + p$. This is a direct result of the use of transport costs in gravity equations of international trade. The gravity equation is the workhorse tool for trade economists. As evidenced by numerous studies in the field, gravity equations are one of the most empirically robust and theoretically sound findings in all of economics (Head & Mayer 2014, Costinot & Rodriguez-Clare 2014). In its most simplistic form, the gravity equation indicates that bilateral trade is directly proportional to the product of the countries' GDPs and inversely proportional to the distance between these two countries. The analogy to Newton's law of universal gravitation provided the means to refer to it as *gravity* equation in the economics literature.

Transport costs are typically a small, but variable, component of trade costs

Using the gravity equation as a benchmark model, Anderson & Van Wincoop (2004) find that the ad valorem tax equivalent of trade costs at the aggregated world average level can be as large as 170%, consisting of 21% transport costs (including a 9% tax equivalent of the time value of goods in transit), 44% trade barriers (other than transport costs) and 55% retail and wholesale distribution costs.

Increases in transport cost can reduce quantities of goods imported

Data on transport costs in international trade are also informative towards measuring the price elasticity of demand in a gravity type setting. The trade elasticity, also known as the Armington elasticity, indicates the sensitivity of consumers to changes in prices of imported goods. That is, if prices of imported goods rise and demand is elastic, a proportion of goods which are imported will be substituted with goods which are produced domestically.

Given that some countries are more dependent on certain types of goods than others, the trade elasticity varies by product group and country pair. Estimates of the trade elasticity therefore often vary widely. Head & Mayer (2014) collect 435 trade elasticity estimates based on either tariffs or

transport costs data from 32 papers and obtain a median value of 5, with a standard deviation of 9.3. The high standard deviation is a result of the large range of estimates obtained by different levels of disaggregation. Disaggregating by product group inevitably results into deviations from the central estimate of 5, as some goods may represent nearly perfect substitutes, while others may represent weak substitutes.
In terms of the demand responses, a trade elasticity of 5 means that imports (by value) reduce by 5% if transport costs in ad valorem terms rise by 1%. Import demand is therefore relatively elastic. It should however be noted that the 1% increase in transport costs refers to an increase in ad valorem transport costs. Given that transport costs are normalised using goods prices ($1 + t/p$), a 1% increase in unit transport costs implies a much smaller increase in ad valorem transport costs. For example, a 10% increase in unit transport costs results into a 5.5% (1+1.1*0.05) increase in ad valorem transport costs, assuming that ad valorem transport costs are around 10% of the goods value, which is a typical value in seaborne trade (Figure 8).

Changes in trade can impact a country's welfare

Changes in prices of imported goods lead to changes in consumption and can therefore be linked to a country's welfare from international trade. The thought experiment of moving to autarky provides a counterfactual benchmark to quantify these gains. Using the framework as in Arkolakis et al. (2012), Costinot & Rodriguez-Clare (2014) calculate the gains from trade to be 4% on average in a one-sector Armington trade model. That is, per capita real income would drop by 4% on average if countries choose to refuse to rely on imports. These results are calculated using counterfactual exercises that keep track of the changes in prices and hence the price index in moving to a hypothetical autarky case. The changes in the price index are a function of three parameters: the trade elasticity, the domestic consumption share (domestic expenditure relative to total expenditure), and the expenditure share (the size of the tradable goods sector to the size of the entire economy). A higher trade elasticity implies that the gains from trade are smaller as imported goods are more easily substituted with domestically produced goods. A higher domestic consumption share implies that a larger amount of the goods consumed in the importing country are produced domestically. In this case too, the gains from trade will be smaller as the economy is essentially less dependent on imports from foreign countries. A higher expenditure share of goods imports however implies that consumption is more dependent on the tradeable goods sector than it is on other sectors, which, in this case, results into larger gains from trade.

Changes in trade can also impact a country's income, but are often small

Changes in exports and imports however not only affect goods prices in a country, they also influence its income. A country exporting goods to foreign countries will experience an economic impact in terms of its income if the demand for exports decreases.

If imports and exports fall due to e.g. higher transport costs or tariffs, a country's economy exports less but also produces and sells more to the domestic market. Vice versa, if tariffs or transport costs are reduced, a country's income from the domestic market will reduce due to higher imports, but also increase due to higher exports. As the level of imports is often similar to the level of exports for many countries, the changes in income due to changes in transport cost will generally remain small.

Potential policies in shipping can impact transport costs

Transport costs consist of both fixed costs and variable costs. One potential policy solution for reducing international shipping's GHG emissions is a Market Based Measure of carbon price. To quantify the economic impacts that result from a MBM in international shipping, fixed costs may play only a subordinate role. This is because a carbon price levied on the fuel burned in the transportation process essentially only raises marginal transport costs, while leaving the fixed transport costs unchanged. If the carbon prices are high however, shippers may choose to invest into new and expensive abatement technologies and therefore increase their fixed costs through large changes in their capital costs (see Krammer & Schäfer 2017 for details).

Specifics of New Zealand's international transport services

The last part of this literature review summarises the findings of an inquiry of international transport services from the New Zealand Productivity Commission (2012).

With New Zealand being one of the most remote developed countries in the world, importers and exporters in New Zealand spend an estimated $5 billion each year on freight services. Crucial to these functioning is a highly efficient international freight system. Although the performance of current freight system has been good, the report finds that opportunities exist to make it better through improvements in infrastructure, government structures and workplace relationships.

Further, the study finds that New Zealand's small domestic market and distant location pose difficult challenges. Transport costs as well as the opportunity costs of time are substantial impediments to New Zealand's ability to participate effectively in the global economy through trade. As such, the study concludes that improving New Zealand's international freight system will help mitigate its disadvantage of being economically distant from key markets, raise the prosperity of New Zealand's businesses and workers and enhance consumers' purchasing power.

Emissions Reduction Governance Group (ERG) fortnightly meeting

Document 4

Meeting date	Thursday, 25 May 2023
Agenda Item no	#7
Title	Approach to International Maritime Organisation (IMO) Negotiations
Author	Michelle Palmer, Adviser, Environment and Emissions Strategy
Manager	Holly Walker, Manager, Environment and Emissions Strategy
Action required	Discussion

Purpose

Inform the Emissions Reduction Governance Group (ERG) of significant upcoming work in the international maritime emissions reduction space, including the adoption of a revised Greenhouse Gas (GHG) Strategy at the IMO.

Recommendations

We recommend that members:

a. **note** that a revised GHG Strategy, including agreement on key decarbonisation goals, is to be adopted at the IMO in July 2023 and that our current Cabinet negotiation mandate is fit for this purpose;
b. **note** that negotiations at the IMO on the development of mid- and long-term measures to reduce emissions from shipping will be ongoing and we anticipate that these negotiations may require a revised Cabinet mandate;
c. **note** that in late-2023 we propose to discuss international developments in relation to addressing maritime emissions with representatives from the maritime and export industries, including green shipping corridors, and how potential IMO measures may impact them. This engagement may inform the New Zealand delegation's approach to future IMO negotiations, as well as future advice to Ministers and the development of maritime initiatives in the second Emissions Reduction Plan (ERP2);
d. **note** that the current IMO negotiating mandate also commits us to establish a cross-agency team to prepare a national action plan and to commission research to understand the impacts to New Zealand of proposed IMO measures;
e. **note** that the first Emissions Reduction Plan (ERP1) and Decarbonising Transport Action Plan (DTAP) commit the Ministry and Maritime NZ to several maritime actions, including developing a national action plan to reduce maritime emissions;
f. **note** that actions outlined in recs d and e are currently paused due to resourcing constraints;

g. note the Climate Change Commission will provide the Government advice on the whether and how to include international maritime and aviation emissions in Aotearoa New Zealand's domestic emissions reduction targets by the end of 2024; and

h. note that we plan to brief Ministers on our approach to the IMO meeting in July, and likely next steps outlined above.

Background

1. A revised GHG Strategy, setting out key next steps for decarbonising shipping, is to be adopted by the IMO at the upcoming negotiations in July 2023. This includes an opportunity to set a 2050 goal which aligns with the Paris Agreement.

2. After July ongoing work at the IMO will still be required to ensure the adoption of mid-term measures to reduce emissions from international shipping. These measures will impact New Zealand's economy. Te Manatū Waka will need to undertake significant work to ensure that a) we can actively engage in upcoming negotiations and b) that the impacts on New Zealand and the Pacific of these measures are sufficiently understood.

July Negotiations

3. The July negotiations will focus on the adoption of a revised GHG Strategy and will be informed by our current Cabinet *'International Maritime Organization - Climate Change Negotiation Mandate'*.

4. While we foresee negotiation challenges ahead, we are confident that our current mandate gives us the necessary flexibility to actively and constructively participate in the July meetings, and support the adoption of an ambitious, 1.5C Paris-aligned GHG Strategy.

5. We intend to set out our approach to these negotiations in a briefing to the Associate Minister of Transport the week ending 9 June. The briefing will also be referred to the Ministers for Climate Change, Foreign Affairs, Trade and Export Growth, Environment, and Oceans and Fisheries.

6. New Zealand's position is that an ambitious and credible IMO GHG reduction strategy is essential to curb growing international shipping emissions, and to avoid the development of unilateral emission reduction actions (such as the changes to the EU ETS[1]) which may significantly disadvantage us and other countries in our region and increase inequalities rather than address them.

Ongoing IMO negotiations

7. The IMO has agreed to implement measures that will reduce GHG emissions. However, progress on developing and agreeing these measures has been slow. This has been largely due to divergent views between Members about the role of the shipping sector in reducing global GHG emissions; and the role of developed versus developing countries, small-island developing states (SIDS) and least-developed countries (LDCs).

[1] International maritime emissions will be included in the EU ETS from 2024 - in part due to inadequate global action. New Zealand and other States in our region far from market are concerned that we may be significantly disadvantaged in getting product to and from markets. Further work needs to be undertaken to understand what the implications to New Zealand will be from these changes.

8. Presently, the IMO is in Phase II (of III) of developing mid- and long-term measures. Phase II involves assessment and selection of measures to further develop, while Phase III relates to further development, finalization and adoption of the measures. Many proposed options are (or include) market-based-measures and a focus for the upcoming IMO meetings will include determining what measures are 'on and off the table'.

9. As discussions evolve on these measures, we believe our current mandate will not allow us to appropriately participate in negotiations at the level of granularity needed, for example, to take a position on an acceptable cost per tonne of CO_2 emitted. We anticipate that we will need to go back to Cabinet to update our negotiation mandate following the July negotiations, and we intend to signal this to Ministers now. At the earliest, the measures are to be adopted in early – mid 2024.

10. As a trading nation, distant from markets and reliant on foreign ships to carry our goods, we are impacted by changes in international conditions, including regulatory settings and GHG emission reduction measures for international shipping. Furthermore, New Zealand is party to Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL VI) - the main international agreement preventing air pollution and emissions from ships. Existing and future IMO GHG regulations will probably be incorporated into MARPOL VI and apply to New Zealand by 'tacit acceptance'.

11. To better understand how New Zealand and the Pacific will be impacted by these measures we will need to consult with industry. We intend to do this following the July negotiations.

12. Moreover, research is needed to fully understand the impacts to New Zealand of proposed IMO measures. While we commissioned preliminary research on the measures in mid-2022, [2] more detailed research considering the finer details and settings of the measures will be necessary once we have a fuller picture of what the measures are likely to be. Note we already have Cabinet agreement (as part of our current negotiation mandate), but no tagged resources to do this.

Reducing shipping emissions outside of the IMO

13. In addition to continuing IMO engagement, we will also commence work on the domestic actions needed to reduce maritime emissions under ERP1. This includes developing a maritime national action plan to reduce GHG emissions from ships. Note we also have agreement to do this in our current negotiation mandate with the support of a cross agency team. Responsibility to establish this team rests with the Ministry.

14. New Zealand is also pursuing bilateral efforts to reduce emissions from international shipping via green shipping corridors. At COP26, New Zealand signed the Clydebank Declaration, which seeks to establish zero-emissions shipping on 6 key trade routes by 2025, with more to follow by 2030. We are working with like-minded countries like Australia and Singapore, with participation from ports, operators, and others along the value chain, with a view to potentially establishing green shipping corridors.

[2] Key conclusions of this research included that the proposed measures and the criteria used to assess these measures have trade-offs inherent to them (e.g., price certainty versus emissions reduction certainty). Therefore, no measure will meet all criteria perfectly. The effectiveness of a measure also relies on the stringency of the settings, and the implementation, enforcement and review mechanisms. Ultimately, New Zealand's preferred measure will be determined by which criteria officials and Ministers place the greatest weight on.

15. Note, while this work aligns with the Government's high ambition agenda on climate change matters and complements existing work at the IMO to reduce emissions from shipping by creating a platform for demonstration of emissions reduction by early movers, it is challenging to pursue at pace within current resources. We see an opportunity to combine engagements with New Zealand industry on both green shipping corridors and GHG emission reduction measures at the IMO.

16. Progressing these work programmes will be important given that the Climate Change Commission will provide the Government advice (by the end of 2024) on the whether and how to include international maritime emissions in New Zealand's domestic emissions reduction targets. If international maritime emissions do come into our domestic targets after 2024, as we expect they will, the effects on New Zealand's economy and necessary climate change response are likely to be significant.

17. We would like to begin work as soon as possible to prepare the way for this, including by signalling enabling actions in ERP2 if possible. Understanding more about the impacts of the IMO measures on the maritime and export sectors should help us to understand what such enabling actions might look like.