NATIONAL INTEREST ANALYSIS

Proposes accession to Annex VI regulations for the prevention of air pollution from ships contained in the Protocol of 1997 to the International Convention for the Prevention of Pollution from Ships 1973/78 (MARPOL)

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1 Executive summary

1. The Ministry of Transport recommends that New Zealand accede to Annex VI of the International Convention for the Prevention of Pollution from Ships (The MARPOL Convention/MARPOL). Annex VI seeks to address the impact of shipping emissions on:

    - human health and environments in and around port communities; and
    - climate change and ozone layer depletion.

2. Ninety-four states representing 97 percent of world tonnage (freight capacity) are party to Annex VI. Until now, New Zealand's non-accession to Annex VI has not had any significant material effect. However, new regulations to be introduced change that. These include a new low sulphur limit for marine fuels (reducing from 3.5 percent to 0.5 percent by mass) to be introduced from 1 January 2020; and new measures to reduce greenhouse gas emissions to be agreed and implemented by 2023.

3. The primary benefits of New Zealand's accession to Annex VI would be to:

    - reduce adverse public health effects of marine air pollution on communities close to ports and harbours;
    - strengthen New Zealand's ability to play a credible role in International Maritime Organization negotiations on climate change, to both push for global ambition and improve New Zealand's ability to protect its trade and economic interests; and
    - demonstrate New Zealand's commitment to playing its part in the multilateral system.

4. The most significant health benefits, and economic costs, relate to the Annex VI requirement for domestic ships to comply with new low sulphur regulations (effectively all ships travelling internationally, including all ships involved in New Zealand's international trade, will have to comply regardless). Certification requirements for certain marine engines to demonstrate compliance with nitrogen oxide emissions would also involve one-off costs for many ship operators.

5. Although accession will have only a limited macro-economic impact, the low sulphur limit could have a significant impact on a small number of operators, namely those operating large commercial fishing vessels. Further exploration is required to assess the likely impact for these companies and any flow-on effects for Maori commercial fishing interests, including to determine whether they would be disproportionately affected relative to their domestic and international competitors.

6. Overall, stakeholder engagement has shown strong support for New Zealand's accession, even from some of those that would be most materially affected by the new regulations. The key feedback has related to the timing of accession. Fuel companies and large ship operators have stressed the importance of certainty and setting clear, reasonable and transparent timelines to enable preparations to be made in a way that minimises economic impacts. The proposed November 2021 timeframe for depositing the Instrument of Accession with the IMO, which is the realistic timeframe to fulfil the legislative requirements before New Zealand can accede, meets this objective while also delivering the benefits set out above. Annex VI would come into effect in New Zealand three months after the Instrument of Accession is deposited.

2 Nature and timing of the proposed treaty action

7. The recommendation is for New Zealand to accede to Annex VI: Regulations for the Prevention of Air Pollution from Ships (Annex VI) of the International Convention for the Prevention of Pollution from Ships (MARPOL Convention/MARPOL).

The MARPOL Convention

8. The International Maritime Organization (IMO) adopted MARPOL in 1973 and modified it by a Protocol in 1978. MARPOL came into force in 1983 and applies to ships registered ('flagged') to states party to it, wherever they may operate. MARPOL aims to prevent and minimise operational and accidental pollution of the marine environment by ships.

9. MARPOL has six annexes categorised by pollution type. Two annexes are compulsory for all states party to MARPOL. Four are optional, including Annex VI, which came into force internationally in 2005.

10. New Zealand acceded MARPOL in 1998 and is party to four of the six annexes, as set out in Table 1.

Table 1: MARPOL annexes, Contracting States and New Zealand treaty status (as at 11 July 2019)

MARPOL Annex and pollution type	Contracting States		New Zealand treaty status
	No. of States	% of World tonnage	
Annex I: oil and oily water (compulsory annex)	158	99%	acceded
Annex II: noxious substances (compulsory annex)			
Annex III: harmful substances	148	98%	acceded
Annex IV: sewage[1]	143	96%	not acceded
Annex V: garbage	153	98%	acceded
Annex VI: air pollution	**94**	**97%**	**not acceded**

Timing of Treaty Action

11. The Ministry proposes to complete binding treaty action as soon as practicable to deposit the Instrument of Accession with the IMO by November 2021. Annex VI would come into force three months after the Instrument of Accession is deposited with the IMO, i.e. early 2022.

12. Implementing legislation would need to be in place before the Instrument of Accession is deposited. If Cabinet agrees in principle to accession, Annex VI will be presented to the House for Parliamentary treaty examination, including select committee hearings.

[1] Annex IV sets out international standards for sewage discharges from vessels on international voyages that are over 400 gross tonnes, or carrying greater than 15 persons. New Zealand has not signed up to Annex IV because there are more appropriate ways for New Zealand to meet the same objectives, specifically though the Resource Management (Marine Pollution) Regulations 1998, which control the discharge of sewage from maritime sources into the marine environment.

If a decision to accede is taken, it will take up to eighteen months to align domestic regulations with Annex VI.

Application to Tokelau, the Cook Islands and Niue

13. New Zealand's accession to Annex VI would have no impact on the Cook Islands or Niue. Both are already party to Annex VI and have their own ship registries.

14. Officials will consult with Tokelau during the implementation of Annex VI to ensure it is not negatively impacted by New Zealand's accession.

15. Officials will also consult with Tokelau regarding whether it would like New Zealand's ratification of Annex VI to be extended to include Tokelau. Tokelau ship owners are able to register their ships as New Zealand ships and it does not have its own ship registry. The two vessels that operate overseas from Tokelau (the cargo ship and ferry) are flagged to the Cook Islands, and as such must already comply with the requirements of Annex VI. As Tokelau's closest neighbour, Samoa, is party to Annex VI and therefore all ships entering its ports must comply with the regulations, Tokelau ships are likely to be required to comply regardless of how its ships are flagged or New Zealand's accession.

3 Reasons for New Zealand becoming party to Annex VI

16. MARPOL provides standards to address pollution from ships. It is one of four major treaty instruments that regulate international shipping.

17. Annex VI seeks to address the impact of shipping emissions on:

- human health and environments in and around port communities, by regulating emissions of harmful pollutants from ships[2]; and
- climate change and ozone layer depletion, through both air quality regulations and energy efficiency measures.

18. As noted in Table 1, ninety-four states representing 97 percent of world tonnage (freight capacity) are party to Annex VI. Almost all foreign merchant and passenger ships entering New Zealand ports are flagged to states party to Annex VI.[3] Mexico is the only other Organisation for Economic Co-operation and Development (OECD) country that has not acceded to Annex VI.

19. Until now, New Zealand's non-accession to Annex VI has had limited material effect. However, from 1 January 2020, Annex VI "Sulphur 2020" regulations to reduce maritime emissions of sulphur dioxides will come into force internationally. From that date, the allowable sulphur content of marine fuels will fall from 3.5 percent to 0.5 percent by mass. New global greenhouse gas emissions regulations are also being negotiated at the IMO, and are likely to be implemented under Annex VI by 2023. It has become an anomaly that New Zealand is not party to Annex VI, and is not subject to its requirements.

[2] Sulphur oxides (SOx), particulate matter (PM), nitrogen oxides (NOx), volatile organic compounds (VOCs), ozone depleting substances (ODS) and emissions from shipboard incineration.

[3] All but six of the 1,001 foreign ships that came to New Zealand in 2018 were flagged to Annex VI states (four from Thailand and two from Maldives).

20. The primary benefits of New Zealand's accession to Annex VI would be to:

- reduce adverse public health effects of marine air pollution on communities close to ports and harbours;
- strengthen New Zealand's ability to play a credible role in IMO negotiations on climate change, to both push for global ambition and improve New Zealand's ability to protect its trade and economic interests; and
- demonstrate New Zealand's commitment to playing its part in the multilateral system from which we benefit.

21. New Zealand will derive material benefit from visiting ships' compliance with Annex VI, so it is important we play our part.

22. The Ministry's engagement with stakeholders has demonstrated a high level of support for New Zealand to accede. Even some of the operators likely to be most affected, including fuel companies and some large fishing companies, have expressed strong support for accession, for environmental sustainability and reputational reasons, as well as to strengthen New Zealand's influence in IMO negotiations on issues affecting them.

23. The key question raised throughout the stakeholder engagement process was the timing of accession, rather than accession itself. Accession as soon as possible would support New Zealand's ability to play a credible role in the negotiations on new climate change measures to be adopted by 2023. Some stakeholders, including the Ministry of Health, have pushed for early accession to derive the health and environmental benefits as soon as possible. Refining New Zealand and fuel companies had requested that accession be delayed to e.g. the end of 2023, but in more recent discussions have indicated that an earlier accession would be manageable. However, fuel companies and large ship operators have emphasised the importance of certainty and setting clear, reasonable and transparent timelines to enable preparations to be made in a way that minimises economic impacts on their businesses and flow-on effects for their markets.

24. The Ministry considers that the proposal to deposit the Instrument of Accession with the IMO by November 2021, which is a realistic timeframe to fulfil the legislative requirements before New Zealand can accede, would provide a reasonable balance between stakeholder objectives. Accession at that time would also mean New Zealand ships are likely to be insulated from any initial price spikes from 1 January 2020 when the low sulphur regulations are implemented internationally.

4 Advantages and disadvantages to New Zealand of the treaty entering into force

25. The following section details the advantages and disadvantages to New Zealand of the Treaty entering into force, set out under the heading of environment, social, culture and economic. The analysis draws on:

- a New Zealand Institute of Economic Research (NZIER) report, commissioned by the Ministry of Transport[4];

[4] NZIER report: 'MARPOL IV and VI: Assessing the economic and environmental impact of international maritime measures on New Zealand', November 2018 and updated in September 2019.

- reports on MARPOL Annex VI by Emission Impossible Limited, commissioned by the Ministry of Health[5] and the Auckland Regional Public Health Service[6] to support their submissions on New Zealand's accession; and

- the information and views received through the Ministry's public consultation process (November 2018 - February 2019), and subsequent engagement with key stakeholders.

26. The primary material effect of New Zealand's accession to Annex VI would be the requirement for ships to comply with the reduced sulphur limits for marine fuels. When Sulphur 2020 comes into force internationally on 1 January 2020, all ships from states party to Annex VI visiting New Zealand will have to comply with the regulations, regardless of whether New Zealand accedes to Annex VI. Similarly, under the IMO principle that ships of non-Parties should be given no more favourable treatment, New Zealand ships travelling to Annex VI party states will also have to comply, regardless of whether New Zealand accedes to Annex VI.

Environment

New Zealand's accession would strengthen New Zealand's ability to play a credible role in IMO negotiations on climate change

27. Annex VI is the primary international regulatory mechanism for addressing the climate change impacts from shipping, in line with the goals of the Paris Agreement.[7] The IMO has estimated that CO_2 emissions from shipping accounted for about 2.2 percent of global anthropogenic emissions in 2012 (roughly the same as Germany's total national emissions), and projected emissions levels would increase 50-250 percent by 2050 (compared to 2008) if no action were taken.

28. New Zealand's accession to Annex VI would demonstrate its commitment to playing its part in the IMO and the wider multilateral system from which we benefit.

Accession would improve New Zealand's ability to work with like-minded parties to push for global ambition in future regulations

29. Under current Annex VI requirements, New Zealand's accession would have negligible impact on New Zealand's greenhouse gas emissions from shipping. This is because the current Annex VI measures would not result in material changes. Climate change-related measures were introduced under Annex VI in 2013, but these are mainly focused on technical requirements, which would not materially affect New Zealand as it does not build large ships. Small greenhouse gas emissions reductions under Annex VI

[5] Emission Impossible Ltd report prepared for the Ministry of Health: 'MARPOL Annex VI: Air quality, climate change and health issues for New Zealand', January 2019

[6] Emission Impossible Ltd report prepared for Auckland Regional Public Health Service: 'MARPOL Annex VI: 'Air quality, climate change and health issues for Auckland' December 2018. Available online at: www.arphs.health.nz/resources

[7] The Paris Agreement was agreed at the twenty-first Conference of Parties (COP21) to the United Nations Framework Convention on Climate Change in December 2015. Its central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.

would primarily stem from the energy efficiency measures and nitrogen oxide emissions standards, as well as indirect effects from reducing emissions of sulphur oxides.[8]

30. However, future climate-related regulations would likely have a bigger impact. The IMO adopted an "Initial IMO Strategy on Reduction of GHG Emissions from Ships" in 2018. The Strategy sets out a vision to reduce greenhouse gas emissions from international shipping and, "as a matter of urgency, aims to phase them out as soon as possible in this century". New mandatory measures to meet the Strategy's targets are being negotiated in the IMO and are likely to be implemented under Annex VI from 2023.

31. Accession would give New Zealand a stronger mandate to work with like-minded parties to push for appropriate and effective climate change mitigation measures in upcoming IMO negotiations, consistent with the Government's goal to be a leader on climate issues. New Zealand is one of only a few members of the "High Ambition Coalition" (a grouping in UN climate negotiations) that has not acceded to Annex VI. Not acceding would be inconsistent with the Government's commitment to international leadership on climate change action.

32. Accession would also enable New Zealand to better support and advocate for Pacific Island countries in areas of common interest in the IMO, consistent with New Zealand's commitment to bolstering engagement on priority issues for the Pacific. Pacific Leaders have identified climate change as the single greatest threat to the livelihoods, security and wellbeing of the peoples of the Pacific. Several Pacific Island countries also have large shipping registries and depend heavily on international shipping, but are unable to attend IMO negotiations.[9]

33. During the consultation process, a large majority of submitters (32 of 49), including some stakeholders for which Annex VI regulations would have material economic effects, indicated support for New Zealand's accession to Annex VI for climate and environmental sustainability reasons. Comments focused on New Zealand playing its part in global emissions reductions, as well as benefits for its credibility and influence in international climate change negotiations and wider reputational benefits. The Ministry of Health and other submitters have also highlighted the public health benefits from addressing climate change.

Social

Accession to Annex VI would reduce adverse public health effects of marine air pollution on communities close to ports and harbours

34. The Annex VI requirement for domestic ships[10] to comply with the low sulphur limit would provide health benefits from improved air quality in and around ports. The adverse public health effects of exposure to harmful emissions are well established.[11] The Annex VI emissions controls limit would specifically reduce:

[8] Emission Impossible notes that, although sulphur dioxides do not have a direct warming effect, they react with other gases and increase greenhouse gas concentrations.

[9] Pacific Island states that are party to Annex VI: Cook Islands, Kiribati, Marshall Islands, Niue, Palau, Samoa, Tonga, Tuvalu, Vanuatu. States not party to Annex VI: Fiji, Solomon Islands, Nauru and Papua New Guinea. New Caledonia and French Polynesia are subject to Annex VI requirements through France.

[10] The term "domestic ship" covers both New Zealand-registered (flagged) ships of 24 metres in length or 100 gross tonnage) and the smaller unregistered vessels that comprise the majority of New Zealand's domestic fleet.

[11] A 2016 Finnish study estimated that by not reducing the SO_x limit for ships from 2020, the air pollution from ships would contribute to more than 570,000 additional premature deaths worldwide between 2020-2025. "Air Pollution

- sulphur dioxide (SO_2), which can aggravate respiratory and cardiovascular conditions. It can trigger bronchospasm in asthmatics and its effects are heightened by exercise. Sulphur dioxide also forms secondary (fine) particulate matter[12]

- particulate matter (PM_{10} and $PM_{2.5}$), which predominantly affects respiratory and cardiovascular systems. Effects can range from reduced lung function, increased medication use and more hospital admissions through to reduced life expectancy and death.[13] The Ministry of Health has highlighted that there is no safe threshold for particulate matter emissions, meaning any reduction will improve health outcomes.

- nitrogen oxides (NO_x), which cause increased susceptibility to infections and asthma. They reduce lung development in children and have been associated with increasingly serious health effects, leading to reduced life expectancy.[14]

35. Unlike greenhouse gas emissions, the effects of sulphur, particulate matter and nitrogen oxides are primarily localised, so they will have the highest impact on communities living close to ports and harbours. NZIER estimates around 60 percent of New Zealand's resident population lives around the 13 main ports, and Emission Impossible estimates that roughly 200,000 New Zealanders may be living and working in reasonably close proximity to harmful ship emissions. Adverse health effects from air pollution are typically disproportionately borne by the more vulnerable groups of the population, such as the elderly, children (including babies, infants and unborn babies), people with pre-existing health conditions (heart or lung disease, respiratory conditions, asthmatics, diabetics), pregnant women and Māori.[15]

36. During the public consultation process, a large number of stakeholders (including 34 of 49 submitters) referenced the benefits of accession in supporting health outcomes and protecting local environments in port communities.

37. Modelling the health effects of domestic ships moving to low sulphur fuels presents significant challenges. No studies estimate the health or environmental impact of harmful emissions from shipping in New Zealand.[16] Measurements of shipping

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and Energy Efficiency – Study on effects of the entry into force of the global 0.5 percent fuel oil sulphur content limit on human health", Submitted by Finland to the Marine Environment Protection Committee, 19 August 2016

[12] For further information on health effects of sulphur dioxide, see WHO, 2006. "Air Quality Guideline Global Update 2005" at page 398. See also WHO, 2013. "Review of evidence on health aspects of air pollution – REVIHAAP Project", p 142.

[13] For further information on the health effects of particulate matter, see WHO, 2006. "Air Quality Guideline Global Update 2005" at page 247. See also WHO, 2013. "Review of evidence on health aspects of air pollution – REVIHAAP Project" pp 6-46.

[14] For information on the health effects of nitrogen oxides, see (UK) Committee on the Medical Effects of Air Pollutants, 2015. "Statement on the evidence of effects of nitrogen dioxide on health" and New Zealand's Environmental Reporting. The OECD's 2018 figures show burning marine gas oil results in lower NO_x emissions than heavy bunker fuel oil.

[15] Emission Impossible 2019 citing Ministry for the Environment, 2011. "Clean healthy air for all New Zealanders". Wellington

[16] The most comprehensive study measuring anthropogenic emissions is Kuschel et al, 2012. "Updated Health and Air Pollution in New Zealand Study" (HAPINZ). Auckland. New Zealand. As set out in the NZIER report, the HAPINZ model estimated a monetised value of air pollution costs of $4 billion in 2006, but that model did not consider shipping in its attribution of emissions to different sources and is not informative of the outcomes of marginal emission changes.

emissions in New Zealand are limited and attributing pollutants to shipping is difficult, as is attributing health impacts to air quality.

38. An alternative is to draw on reputable international studies. However, different models provide significantly different results; and impacts cannot be directly applied to New Zealand because of environmental differences and lower shipping volumes (i.e. health impacts can depend on concentration levels).

39. Notwithstanding these limitations, NZIER has estimated the value of public health benefits from the Annex VI low sulphur limit, based on a report from the UK (DEFRA, 2019)[17] that presents up-to-date guidance on air quality damage costing. The report contains estimated health costs per tonne of different emissions (including SO_2, NO_x and PM). The expected health benefits can then be estimated by multiplying these values by the expected emissions reductions attributable to Annex VI accession.

40. The DEFRA values have been applied without adjustment to New Zealand (apart from currency conversion). The estimates should therefore be seen as illustrative only and as an upper limit: population density around New Zealand ports is generally lower than in the UK, and the windy conditions in New Zealand tend to disperse pollutants and dilute their concentration in the air. The estimates of ship emissions that people are exposed to are counted up to 10 kilometres out from ports.[18] Subject to those caveats, the estimated upper limit of health benefits from New Zealand's accession can be broken down as:

- $14.4 million from Cook Strait ferries
- $18.7 million from other domestic freight shipping[19]

41. The estimated upper limit of monetised public health benefits from Sulphur 2020 applying to international ships visiting New Zealand ports is $74.7 million. These figures are broken down in Table 2.

42. The impact of the low sulphur limit on air quality from New Zealand's accession to Annex VI would be highest around ports with significant concentrations of ship movements, namely Picton and, to a lesser extent (because of geographical attributes) Wellington, based on the level of Cook Strait ferry activity.

43. The price of heavier (higher sulphur) fuels is expected to fall when Sulphur 2020 comes in. If New Zealand does not accede to Annex VI, lower pricing may act as a disincentive for domestic ships to switch voluntarily to low sulphur fuels.

Table 2: Indicative estimate of annual monetised health benefits of moving to low sulphur fuels using DEFRA 2019 values

Indicative estimates for illustrative purposes only. Emissions counted up to 10km out to sea. New Zealand dollar values in June 2019 prices

[17] Department for Environment, Food and Rural Affairs (DEFRA 2019) 'Air quality damage cost guidance' www.gov.uk/guidance/air-quality-economic-analysis

[18] By contrast, estimates in the 2018 NZIER report, which count emissions three kilometres from port, are considered understated. The 2019 Emission Impossible report prepared for the Auckland Regional Public Health Service counts emissions by ships as far as 130km out to sea, which is unrealistic.

[19] Domestic freight shipping includes the coastal fuel tankers and cargo carriers.

		DEFRA value per tonne			
		$11,466	**$11,331**	**$193,452**	
Cook Strait ferries	**Port calls**	SO_2 tonnes/year **Value NZD**	NO_x tonnes/year **Value NZD**	$PM_{2.5}$ tonnes/year **Value NZD**	CO_2 tonnes/year **Value NZD**
Baseline	8,000	421	1,985	70	86,589
New sulphur limit	8,000	-341	-41	-52	NIL
Total $14.4 million		**$3.9 million**	**$0.5 million**	**$10.1 million**	**NIL**
Other domestic ships	**Port calls**	SO_2 tonnes/year **Value NZD**	NO_x tonnes/year **Value NZD**	$PM_{2.5}$ tonnes/year **Value NZD**	CO_2 tonnes/year **Value NZD**
Baseline	2,500	706	1,119	80	19,738
New sulphur limit	2,500	-581	-54	-59	NIL
Total $18.7 million		**$6.7 million**	**$0.6 million**	**$11.4 million**	**NIL**
International ships	**Port Calls**	**SO_2 tonnes/year Value NZD**	**NO_x tonnes/year Value NZD**	**$PM_{2.5}$ tonnes/year Value NZD**	**CO_2 tonnes/year Value NZD**
Baseline	6,788	2,761	4,396	325	83,565
New sulphur limit	6,788	-2,272	-198	-240	0
Total $74.7 million		**$26.1 million**	**$2,2 million**	**$46.4 million**	**NIL**

Source: NZIER, using values from the UK Department for Environment, Food and Rural Affairs (DEFRA)

Accession to Annex VI would also have benefits for the local environment, particularly in port communities

44. Implementing the Annex VI air quality regulations may have a small impact on reducing:

- adverse effects on ecosystems (e.g. acidification and deposits of toxins such as heavy metals and dioxins);
- emissions-related property damage. Sulphur and nitrogen compounds in the air can combine with rainwater to form acids that can corrode building facades, plant and machinery, and increase cleaning costs.

New Zealand will already derive significant benefit from visiting foreign ships' compliance with Sulphur 2020…

45. Almost all ships visiting New Zealand from Annex VI Party States will be required to comply with Sulphur 2020 from 1 January 2020.[20] New Zealand can therefore expect a substantial drop in harmful emissions and particulate pollution around ports and harbours that experience significant foreign shipping traffic, with consequent improvements for air quality and health outcomes, even if it does not accede to Annex VI.[21]

…but accession would enable New Zealand to enforce the regulations for both domestic and international ships

46. Accession would give New Zealand jurisdiction to inspect foreign ships in its ports for compliance with the Annex VI regulations and, if necessary, take enforcement action. If New Zealand does not accede to Annex VI, there will be no mandate for such action, which could enable deliberate non-compliance of other vessels. For example, ships equipped with engine exhaust cleaning systems ("scrubbers") as a means of compliance could turn them off to save money, if there is no ability for authorities to monitor or enforce the regulations. Given the number of international ship visits, and the relative size of the ships, the ability to enforce the regulations is important both to deliver maximum health benefits and for New Zealand to play its part in preserving the integrity of the international regulatory system.

47. Local governments[22] have highlighted the benefits of implementing the low sulphur regulations domestically. Although local governments have a role in monitoring and regulating ambient air quality, they cannot introduce marine emissions controls. This is because controls over emissions from shipping in the coastal marine area are implemented by regulations under the Resource Management (Marine Pollution) Regulations 1998 to provide national consistency in conformance with relevant international law.

Cultural

48. Clean, healthy air is a valued part of New Zealand's cultural identity, way of life and overall "clean, green" image. Air and air quality can be described as taonga for Māori, and measures to reduce harmful emissions are consistent with the concept and practice of kaitiakitanga (guardianship and protection) of the natural environment.

49. The new low sulphur limit under Annex VI are not expected to affect Māori cultural fishing rights, because ships involved in these operations would not use higher sulphur fuels.

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[20] All but six of the 1,001 foreign ships that came to New Zealand in 2018 were flagged to Annex VI states.

[21] For example, Peeters S, 2018. "Auckland air emissions inventory 2016 - Sea transport" (July, 2018), prepared for Auckland Council, estimated the PM10 emissions from an 'average' cruise ship in port in New Zealand using 3.5 percent sulphur fuel to be roughly equivalent to the daily emissions of 280,000 cars. According to Statistics New Zealand data, cruise ships made 759 visits to ports in New Zealand in 2017, and numbers are growing. These ships will all have to comply with 0.5 percent sulphur restrictions from 1 January 2020. (The equivalent figure for NOx was 210,000 cars.)

[22] Auckland Council, Environment Canterbury, Northland Regional Council, Environment Southland made submissions. The Ministry of Transport and the Marlborough District Council jointly hosted a public meeting in Picton, covering Marlborough and Nelson.

Economic

Accession to Annex VI would improve New Zealand's ability to protect its trade and economic interests in negotiations on new greenhouse gas emissions reduction measures for ships

50. The new mandatory climate-related measures to be adopted by the IMO by 2023 are relevant not only to New Zealand's interests in pushing for global ambition, but also to protecting our trade and economic interests in negotiations.

51. As New Zealand is a trading nation distant from markets, new measures could have a significant effect on its imports and exports. Over 99 percent of New Zealand's exports by weight, and almost 84 percent by value, are transported by sea.[23] Effectively, all of New Zealand's imports and exports are carried on ships from states party to Annex VI, which will therefore be required to comply with new mandatory measures. This means New Zealand would be affected regardless of its accession to Annex VI.

52. For example, one of the new measures proposed is slow steaming, which seeks to reduce CO_2 emissions by imposing a speed limit on international shipping to save fuel. It is widely used in international shipping as a fuel-saving measure for economic and environmental reasons, where time to market is not critical. Slow steaming could, however, have a high impact on New Zealand, given the long supply chain, by reducing the value of chilled exports, particularly to Europe. NZIER estimates the economic impact of slow steaming would be a decrease in real GDP of between $3.7 million and $9.8 million per year depending on speed limits.[24]

53. To date, not being party to Annex VI has not significantly affected New Zealand's ability to engage in the IMO process. However, New Zealand's ability to influence decisions in IMO negotiations will likely be constrained if it does not take steps to become a party to Annex VI. Cabinet's approval to accede would send a strong signal about New Zealand's intentions. Even so, once the IMO gets to the stage of voting on specific regulations, New Zealand's vote would only be counted if it is a party to Annex VI. If, following consideration, New Zealand decides not to accede to Annex VI, its credibility and influence on emissions-related matters in the IMO may be further reduced.

54. A number of stakeholders from the shipping and export sectors have emphasised the importance of New Zealand being able to participate fully in the IMO negotiations, highlighting that new measures could directly affect not only importers and exporters, but also the wider New Zealand supply chain.

The low sulphur limit would have economic and operational implications for ship operators, fuel companies and the Marsden Point Refinery

55. The primary costs of New Zealand's accession relate to the requirement for domestic ships to comply with a reduced sulphur limit for fuel, from the current limit of 3.5 percent to 0.5 percent by mass.

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[23] Statistics NZ (2019) Overseas cargo statistics (Annual-Jun).

[24] This is based on the diversion of some of New Zealand's chilled exports to Europe to closer markets. Chilled exports to the European Union, including beef, sheep meat, some dairy, fruit and vegetables, currently account for 2.6 percent of New Zealand's total merchandise exports (NZIER based on Statistics New Zealand Data). NZIER has also set out that slow steaming would increase logistical costs for importers and exporters of all goods to and from New Zealand, but has not modelled these costs. "Speed optimisation" is an alternative measure to achieve similar objectives. Speed optimisation addresses GHG emissions by combining speed reduction with other factors such as sea state, weather and routing considerations, taking into account commercial imperatives.

56. The likely impact on different groups is detailed in Section 7. In brief:

- **Importers and exporters** will already be affected by Sulphur 2020. This is because all of New Zealand's internationally traded commodities are carried on ships that are flagged to states already subject to Annex VI, and will therefore have to comply regardless of whether New Zealand is a party to it. Importers and exporters have strongly supported New Zealand's accession as soon as possible, so that New Zealand can participate fully in negotiations on strengthened climate change mitigation and measures that will directly affect them, with consequent impacts across the whole domestic supply chain.

- **Large New Zealand-flagged ships that travel overseas** for maintenance or trading purposes will, in addition to Annex VI requirements, need to comply with Sulphur 2020, regardless of New Zealand accession. These ships, which include the Cook Strait ferries, two fuel tankers and a container cargo carrier, account for most of New Zealand's use of heavier marine fuel oils.

- **Almost all small ships** (under 1,000 gross tonnage (GT)), which represent the majority of New Zealand's fleet, already use low sulphur fuel (automotive diesel), so they would not be affected by the regulations.

- **Ships over 1,000 GT** operating only domestically are most likely to be affected, but the relative impact will be determined by a range of factors, including the current fuel used, options for compliance and international fuel prices. There are 31 ships in this category (excluding those that travel internationally). Based on an informal survey of the operators, the Ministry of Transport found:

  - Eleven of these ships already use low sulphur fuels and will not be affected.

  - Two large ships would be significantly affected but the Ministry of Transport considers this would be manageable for their operators. One is a dedicated marine fuel barge; the other's main competitor already uses low sulphur fuel.

  - Eighteen are commercial fishing vessels. New Zealand's largest fishing company, which operates six vessels over 1,000 GT, has expressed support for accession, including for sustainability reasons. However, two other companies (operating five ships total) fishing for low-value species have said a switch to low sulphur fuels could significantly affect their business viability. A fourth company, which is 50 percent Māori-owned and operates seven vessels over 1,000 GT, has not commented on the relative impact switching to low sulphur fuels would have on its business. Some of these companies catch fish on behalf of iwi quota holders, so there may be flow-on economic effects for iwi. (A fifth fishing company operating six vessels over 1,000 GT has already switched to automotive diesel, and therefore is not included in these figures.)

- **Refining New Zealand** has made a business decision not to produce a compliant low sulphur fuel, because the costs of retooling the Marsden Point oil refinery would be prohibitive. Although Refining New Zealand requested in its submission that New Zealand delay accession until the end of 2023 to allow it time to pursue other markets for its residual products, it has since indicated it is comfortable with the proposed timeframe. This is because the majority of the fuel oil Refining New Zealand's supplies for shipping is to international ships, which will be affected by Sulphur 2020 regardless of whether New Zealand accedes.

- **Fuel companies** have advised that significant investment would be necessary to modify their fuel storage and associated infrastructure to accommodate low sulphur fuels at additional ports for the domestic market.

57. Further exploration is required to better understand the impacts, particularly for affected commercial fishing vessel operators and Māori commercial fishing interests, including to determine whether they would be disproportionately affected relative to their competitors, both internationally and domestically. The Ministry is planning, as the next step, to host a series of roundtables with affected parties in the lead-up to accession.[25]

Regulatory certainty and sufficient lead times will be critical to ensure security of supply and to manage economic impacts

58. The ability for New Zealand ship operators to comply will depend on compliant, low sulphur fuels being available to the New Zealand market. Fuel companies have highlighted that the single biggest risk for their customers and the wider economy is that New Zealand accedes without being able to supply sufficient compliant fuel.

59. Fuel companies have emphasised the importance of setting clear, reasonable and transparent timelines for implementation, to enable the required changes to be made in such a way as to mitigate the economic impacts. In their submissions, fuel companies variously requested that we allow at least two years lead-time for accession, or a delay in accession until the end of 2023. Subsequent engagement with fuel companies has indicated that the later timeframe is not necessary but the companies have stressed the importance of providing as much time as possible.

Accession to Annex VI will provide for easier movement of New Zealand-flagged ships to other states, by aligning domestic and international processes

60. Some submitters, including KiwiRail and the New Zealand Shipping Federation, which represents the operators of 11 large ships, have emphasised the benefits of aligning domestic regulations with IMO regulations, to make compliance easier for ships travelling overseas and to avoid the need to maintain compliance with dual regulatory regimes.

61. Under the MARPOL Convention, any New Zealand-flagged vessel wishing to visit the port of a state party to Annex VI must hold certificates demonstrating compliance with Annex VI requirements.[26] Currently a Document of Compliance can be obtained from a recognised organisation, subject to a survey to verify that the vessel is compliant with the Convention.[27] If New Zealand accedes to Annex VI, Maritime NZ, or a delegated recognised organisation, would be able to issue the certificate required by the Convention.

[25] The Ministry of Transport has participated in one of a series of roundtables hosted by the Australian Maritime Safety Authority (AMSA), which provides a useful model for New Zealand. Australia is already party to Annex VI and will have to comply with the low sulphur regulations from 1 January 2020, so its workshops have focused on the impact on affected parties.

[26] The certificates include: International Air Pollution Prevention Certificate; Engine International Air Pollution Prevention Certificate; International Energy Efficiency Certificate; statement of compliance re data submission.

[27] Under IMO conventions, a flag Administration may entrust inspections and surveys to organisations recognised by it, typically the classification societies that establish and maintain technical standards for ship construction and operation.

5 Legal obligations which would be imposed on New Zealand by the treaty action, the position in respect of reservations to the treaty, and an outline of any dispute settlement mechanisms

62. The substantive legal obligations that would be imposed on New Zealand are set out below. Annex VI identifies the specific regulations that would apply.

i) All New Zealand-flagged ships must comply with the low sulphur limit (Regulations 14 & 18)

63. The primary obligation stemming from New Zealand's accession to Annex VI is that fuel oil used in all ships must not exceed specified limits for sulphur content. Compliance can be achieved by:

- using fuel with no more than 0.5 percent sulphur by mass; or
- using an exhaust gas cleaning system ("scrubber") to reduce sulphur emissions from fuels exceeding the sulphur limit to a level equivalent to burning fuel with less than 0.5 percent sulphur content.

64. Fuel oil supplied to ships subject to Annex VI must conform to quality requirements specified in Regulation 18.

65. Documentation confirming compliance with minimum fuel quality standards and the sulphur limit must be kept on board ships and retained for three years after delivery of oil and a fuel sample must be retained on board for not less than 12 months.

ii) All ships over 400 GT must meet energy efficiency requirements (regulations 5, 6, 20, 21, 22 & 22A)

66. Annex VI energy efficiency requirements apply to ships with a mass of 400 GT or more. These ships would be required to:

- have a Ship Energy Efficiency Management Plan (SEEMP). SEEMPs set out how ship operators can address climate change impacts by improving the operational efficiency of a ship over its lifespan. The national regulator is required to verify that ships have SEEMPs (but not the content); and
- conform to the Energy Efficiency Design Index (EEDI) for new ships or ships that undergo major conversion. The EEDI requires a minimum energy efficiency level per capacity mile (e.g. tonne mile) for different ship types and size segments.

67. All ships over 400 GT that travel overseas must have an International Energy Efficiency Certificate (IEEC) to demonstrate their compliance with EEDI and SEEMP requirements before travelling overseas, as issued by Maritime NZ or an authorised organisation. (This already applies to New Zealand ships travelling to Annex VI party states, regardless of New Zealand's accession.)

iii) Certain marine diesel engines in ships must comply with nitrogen oxide emissions standards (Regulation 13)

68. Annex VI sets NO_x emissions standards for marine diesel engines (for propulsion or onboard power generation) with a power output of 130 kilowatts[28] or more, installed on a ship or after 1 January 2000, or that have undergone major conversion since that date. These engines must meet certification requirements to demonstrate their compliance with the standards.

iv) Shipboard incinerators must meet specified standards (Regulation 16)

69. Under Annex VI, any incinerator on a ship constructed on or after 1 January 2000, or installed on or after 1 January 2000, must meet specified performance standards and must be operated by trained personnel. Shipboard incineration of certain substances, such as exhaust-gas cleaning residues, is prohibited.

v) New Zealand must have port reception facilities for residues and wastes (Regulation 17)

70. Annex VI requires states to ensure the availability of reception facilities for i) ozone-depleting substances and equipment containing such substances, and ii) exhaust-gas cleaning residues (from closed-loop scrubbers, which retain exhaust filtering contaminants on-board for disposal on land).

Reservations

71. There is no provision in the MARPOL Convention for parties to make reservations.

Dispute resolution

72. Article 10 (Settlement of disputes) of the MARPOL Convention outlines the process for settling disputes by negotiation between two or more Parties to the Convention concerning the interpretation or application of the Convention. If settlement by negotiation has not been possible, and if the Parties do not otherwise agree, then either Party can request that an Arbitration Tribunal be established, as set out in Protocol II to the Convention.

6 Measures which the Government could or should adopt to implement the treaty action, including specific reference to implementing legislation

73. The Government would implement Annex VI regulations and requirements through primary and secondary legislative changes. Appendix 2 provides a full summary of the indicative legislative changes required to implement Annex VI.

Implementation options

74. Implementation through the use of existing statutory powers and new secondary regulations is the only feasible option. Although Annex VI cannot be implemented without legislative action, it is not necessary to introduce new primary legislation in order to implement obligations under Annex VI.

[28] Marine diesel engines of this size are typically used for the propulsion and onboard power of commercial vessels, but can also be found on larger recreational craft such as super-yachts. Under Annex VI Regulations 5, the application of survey requirements for ships under 400 GT is at the discretion of the national Administration.

Primary legislation

75. New Zealand primary legislation already provides the framework of compliance, enforcement, rule-making and regulation-making powers necessary to implement Annex VI. Minor amendments to the **Maritime Transport Act 1994**, administered by the Ministry of Transport, would be necessary to ensure that:

- marine protection rules made under the Act can impose limits on emissions to air of substances regulated under Annex VI
- the Director of Maritime NZ can detain or impose conditions on a ship for non-compliance with Annex VI requirements and take samples of fuel oil.

76. Subject to Cabinet's agreement in principle to proceed, officials will explore options and timing for a suitable legislative mechanism for these amendments.

Secondary legislation

77. Subject to the amendments to the Maritime Transport Act set out above, all Annex VI obligations that require legislative action can be implemented through secondary legislation.

78. **Rules made under the Maritime Transport Act 1994** would implement:

- survey and certification requirements for ships
- controls over emissions from ships of sulphur oxides, nitrogen oxides, ozone-depleting substances and volatile organic compounds
- technical requirements for shipboard incineration equipment
- energy efficiency requirements for ships

79. The rules would supplement the existing suite of maritime protection rules that implement obligations under other MARPOL Annexes to which New Zealand has already acceded.

80. Amendments to the **Marine Protection (Offences) Regulations 1998** would be necessary to support enforcement of the Annex VI obligations implemented by the marine protection rules.

81. The **Resource Management (Marine Pollution) Regulations 1998 under the Resource Management Act 1991**, administered by the Ministry for the Environment, impose discharge controls on ships and offshore installation that will need to be reviewed for consistency with Annex VI.

82. The **Engine Fuel Specifications Regulations 2011 under the Energy (Fuels, Levies, and References) Act 1989**, administered by the Ministry of Business, Innovation and Employment, prescribe specifications for certain types of engine fuel. The regulations could be amended to prescribe a specification for marine fuel supplied in New Zealand

to reflect the quality requirements specified (including the sulphur content limit) for marine fuel under Annex VI.

Notification of compliance requirements

83. Affected parties would be informed of compliance requirements through the statutory notification and consultation process for maritime and marine protection rule making. The maritime and marine protection rules will be complemented by guidance and technical support from Maritime NZ to assist them in complying with the new requirements.

Enforcement strategy

84. Enforcement of Annex VI requirements would be achieved through the established flag and port state control regime for ships under MARPOL and other IMO conventions. Maritime NZ maintains oversight of foreign ships' compliance through port state ship inspections and follow-up enforcement action where necessary. It coordinates its port state control activity with fellow members of the Memorandum of Understanding on Port State Control in the Asia Pacific Region (Tokyo MOU), [29] to share information and implement targeted inspection campaigns. Effective Annex VI implementation is a Tokyo MOU priority.

85. As the flag state authority for New Zealand ships, Maritime NZ would monitor and enforce domestic ships' compliance through inspections, audits and follow-up action where non-compliances occur. Compliance information would feed into operators' risk profiles and inform Maritime NZ's ongoing oversight and compliance actions.

IMO supervisory system

86. If New Zealand accedes to Annex VI, administration of its requirements will be included in the IMO's existing five-yearly audit cycle. The first IMO audit that covers Annex VI, would be expected in 2025. (The next IMO audit is scheduled for 2020 but New Zealand would not have acceded by then.)

7 Economic, social, cultural and environmental impacts and effects of the treaty action

87. The economic, social, cultural and environmental impacts of New Zealand's accession to Annex VI are set out at a high level in Section 4. This section provides more detail on the effects of the legal obligations.

i) Low sulphur emissions limit

88. The reduced sulphur limit under Annex VI will have by far the most significant impact, both in terms of health benefits (as set out in Section 4) and economically. This section expands on the likely economic impact on various stakeholders.

[29] http://www.tokyo-mou.org/

The relative economic impacts of the low sulphur limit will depend on a range of factors

89. For New Zealand ship operators, switching to a compliant, low sulphur fuel is likely to be the only practical option to comply with the 0.5 percent sulphur limit. Fitting scrubbers is unlikely to be viable in terms of both cost and practicality (size, weight and associated equipment and waste disposal requirements). [30]

90. For ships affected by the new low sulphur limit, costs would be associated with:

- **higher fuel costs**. Fuels with a lower sulphur content are more expensive than higher sulphur fuels.

- **one-off conversion costs** to replace or modify fuel systems, recalibrate engines or change engine components to run on lighter fuel oils.

91. Fuel cost impacts under Annex VI are difficult to estimate, because of the uncertainty around future fuel prices and because ship operators do not usually share fuel consumption data for commercial reasons. However, fuel is generally the single highest cost for any ship operator, so changes in price can have a significant impact on total operating costs. The relative impact of the low sulphur limit on operators will depend on many factors, including:

- the type of fuel they are currently using. The higher the sulphur content of fuel, the cheaper it is; and

- the type of fuel that they switch to. The most likely options for compliant low sulphur fuel in New Zealand would be:

  i. automotive gas oil (AGO), i.e. automotive diesel. This is currently the only IMO 2020 compliant fuel available in New Zealand and is readily available through existing infrastructure

  ii. marine gas oil (MGO), which is widely used overseas but not currently available in New Zealand. MGO can be blended with heavier fuel oil specifically to provide a cheaper option than automotive diesel to meet 0.5 percent sulphur limit.

  iii. low sulphur fuel oil (LSFO), e.g. residual fuel oil refined to meet 0.5 percent sulphur limit. Until global supplies become sufficiently large and reliable, the availability of LSFO in New Zealand is uncertain.

92. Internationally, marine gas oil blends are expected to be the favoured replacement for high sulphur residual oil initially, despite being more expensive than low sulphur fuel oils. This is because many ship engines can readily switch to this fuel with minimal operational change and no significant capital expense or time out of service; and because supply of low sulphur fuel oil is expected to be constrained in the early years of IMO 2020 implementation.[31]

[30] StraitNZ estimates the one-time cost for installation of scrubbers for each of its Bluebridge vessels would be approximately $10 million, and ongoing costs in the order of $1.3 million per vessel.

[31] According to updated information from NZIER, the IEA suggests production of LSFO may be constrained in the early years of implementation, as refineries have deferred investment in production capacity for LSFO until the scale of market demand has become more apparent.

93. Refining New Zealand, which operates the Marsden Point oil refinery, has stated that it will not produce an IMO 2020 compliant, low sulphur fuel because the costs of retooling the refinery would be prohibitive (estimated at NZ$1 billion). Low sulphur fuel for the New Zealand market, other than automotive diesel, would therefore have to be imported into New Zealand (either as a finished product or to be blended in New Zealand).

94. Fuel companies Exxon Mobil and BP have announced that they will import compliant, low sulphur fuel to supply to foreign ships at selected bunkering terminals (Auckland and Tauranga) from 1 January 2020, while continuing to supply high sulphur fuel for the domestic market. Visiting ships generally bunker in Singapore and Australia and "top up" in New Zealand as required, and this is not expected to change.

95. The sulphur content and relative costs of different fuels currently used by domestic ships are set out in Table 3 below. If compliant, low sulphur fuel were available to domestic ships, the costs of switching would be lower than for automotive diesel.

Table 3: Sulphur content and relative price of shipping fuels in New Zealand

Prices are based on real prices October-December 2018*

Fuel Type	Approx. sulphur content by mass	Price per gigajoule** $NZ
Heavy Bunker Fuel Oil (HBFO) (380 cst*** residual fuel, i.e. the by-product of refining distillates)	3.2%	**17.40**
Medium Fuel Oil (MFO) (80 cst, mostly residual fuel, blended with AGO)	2.5%	Information not available
Light Fuel Oil (LFO) (40cst, 50/50 blend residual and AGO)	1.9%	21.62
Marine Gas Oil Blends	<0.5%	N/A
Low Sulphur Fuel	<0.5%	N/A
Automotive Gas Oil (AGO)	0.001%	28.54

* Data source: MBIE oil data tables
** A gigajoule is a unit of energy
*** Centistoke. The higher a fuel's centistoke, the greater is its 'heaviness' (resistance to movement).

International fuel price forecasts vary considerably

96. The Ministry of Transport cannot predict the future prices of low sulphur fuels, as they will be driven by global markets, based on capacity and demand. Low sulphur fuels are, however, expected to trade at a premium compared to higher sulphur fuels, but international price forecasts vary considerably.

97. Any global supply chain impacts and economic effects of the new low sulphur limit are expected to be most significant in the first few years, due to the step change in international demand for low sulphur fuels. In its November 2018 report, the NZIER reported that, according to international literature, marine fuel costs were predicted to

increase as much as 40 percent above the pre-1 January 2020 prices in the immediate short term. This would in turn raise overall operating costs by 6 percent to 12 percent (on the basis that fuel costs account for 15 percent to 30 percent of international shipping's total operating costs). Forecasts for fuel prices after 2020 were more mixed: some predicted a gradual decrease from the peak, while others thought the rapid uptake of sulphur scrubbers fitted to ships could lead to a return to pre-2020 levels within two to eight years.

98. More recent literature cited by the NZIER suggests that the worst-case narratives of a year ago are likely to have been overstated, and significant price rises (beyond "normal" market fluctuations) are not expected when Sulphur 2020 comes in. Some commentators have argued that if fuel consumers or speculators believed a price spike were likely, they would have hedged against this by securing future contracts at current low futures prices, but there is no evidence of increased trading in, or rising prices of, the relevant futures contracts.[32] Other commentators still expect a price spike, but one that will be short-lived. Recent assessments suggest there should be no constraint on the availability of compliant fuel (including marine gas oil), at least in areas near to the main global hubs for refined oil product trade.

99. Conversely, the international price of higher sulphur fuels is expected to fall when Sulphur 2020 comes in. As set out in the NZIER report, the International Energy Agency (IEA) foresees the international bunker fuel demand landscape changing dramatically in 2020, with demand for high sulphur fuel oil declining by around 60 percent in a year.[33]

100. As accession would not come into effect in New Zealand until early 2022, New Zealand ships would likely be insulated from the worst of any price spikes for low sulphur fuels. Until such time as New Zealand accedes, New Zealand domestic ship operators that use high sulphur fuels could benefit from reduced fuel prices.

Significant investment would be required to supply low sulphur fuel for the domestic market

101. Fuel companies and major shipping operators have advised that significant one-off investment would be required to modify fuel storage and associated infrastructure to accommodate compliant, low sulphur fuels to supply the domestic market. Fuel companies have indicated this would likely involve converting existing infrastructure for high sulphur fuel oil to low sulphur fuel oils, rather than running dual pipelines for a period and subsequently retiring the old infrastructure. As set in paragraph 94, fuel companies will supply compliant fuel for international ships at Auckland and Tauranga from 1 January 2020, but decisions about investment these ports will not be made until New Zealand's direction in relation to Annex VI is clear.

Importers and exporters will be affected by Sulphur 2020 regardless of New Zealand's accession

102. All of New Zealand's seaborne imports and exports are carried on ships that are flagged to parties to Annex VI. These ships will therefore all have to comply with the low

[32] Charles River Associates (CRA), June 2019. 'Economic analysis of IMO 2020'

[33] IEA. (2018). 'Market Report Series: Oil 2019: Analysis and Forecasts to 2024'. https://webstore.iea.org/market-report-series-oil-2019.

sulphur limit from 1 January 2020. That is, they will be subject to cost impacts, which will passed on to consumers, regardless of whether New Zealand is party to Annex VI.[34]

103. Importers and exporters have, however, expressed strong support for accession so that New Zealand can participate fully in negotiations on strengthened climate change mitigation and measures that could disproportionately affect New Zealand. Other submitters across the domestic supply chain have added support for this view, citing the New Zealand business community's reliance on international shipping. KiwiRail noted that, as its ferries are a vital part of the freight supply chain for importers and exporters, it would be directly impacted by any new measures.

Ships required to travel overseas will need to comply regardless of New Zealand accession

104. If New Zealand does not accede to Annex VI, domestic ships will be able to continue to use fuel blends with a higher sulphur content while operating domestically. However, as soon as a ship needs to travel overseas it will need to comply with the low sulphur regulations, regardless of New Zealand's accession.

105. The increase in fuel costs for large ships from switching to low sulphur fuels when travelling overseas is expected to be significant, due to the amount of fuel consumed and because they currently use heavier, cheaper fuels. Conversion and cleaning costs to switch fuels for an overseas trip are also likely to be significant, but this depends on the ship.[35]

106. New Zealand ships that are larger than 170 metres in length or with beams over 22.5 metres are unable to undertake out-of-water inspections, maintenance and repairs in New Zealand, because there are no dry-docking facilities that can accommodate them. These ships will therefore have to travel overseas (usually to Australia or Singapore) periodically. Passenger ships are required to have out-of-water inspections at least once every three years, and non-passenger ships at least once every five years. Ships falling into this category and their current fuel blends are set out in Table 4.

107. Ships travelling to Annex VI party states will not be permitted to have any non-compliant fuel oil on board. KiwiRail estimates that each of its ships' international visits is likely to incur costs of up to NZ$0.25 million for cleaning to remove all non-compliant fuel, as well as around two weeks' additional time out of service. Depending on the relative cost of higher sulphur fuels, it may not make sense for any of these ships to revert to higher sulphur fuels on return to New Zealand.

108. KiwiRail has announced its intention to replace the three Interislander ferries with two new purpose-built ferries by 2024. It therefore has the opportunity to ensure the new ships can meet Annex VI requirements (and KiwiRail's own carbon reduction goals) from the outset. KiwiRail expects the new ferries to have a 30-year in-service lifespan.

[34] NZIER's 2018 report estimated that the IMO 2020 impact of higher prices on international trade would reduce GDP by between $2 million and $33 million per year for the period 2020 to 2025, depending on the scale of international fuel price increases and their duration. The recent revision by NZIER of its 2018 predictions suggest that price shocks will not be as large and the impact of the regulations coming in internationally is will be smaller.

[35] StraitNZ, for example, estimated that reconfiguring its Bluebridge ships to use compliant fuel would cost about NZ$1 million, plus significant ongoing maintenance costs. However, one of its ships has previously run on low sulphur fuel prior to its acquisition by StraitNZ, meaning conversion costs for that ship are expected to be significantly lower.

Table 4: New Zealand ships required to travel overseas for maintenance and repair

Ship	Current fuel	Comment
Cook Strait ferries		
KiwiRail (Interislander) *Aratere* *Kaitaki*	Medium Fuel Oil	The *Kaiarahi,* is UK-flagged and must comply with the 0.5 percent sulphur limit from 1 January 2020. The three Interislander ships will be replaced with two new purpose-built ships by 2024.
Bluebridge (StraitNZ) *Strait Feronia* *Straitsman*	Medium Fuel Oil	The *Strait Feronia* previously operated on low sulphur fuel and is able to switch between fuels.
Fuel tankers		
Coastal Oil Logistics (COLL) *Kokako* *Matuku*	Heavy Bunker Fuel Oil	Coastal tankers are also traded internationally from time to time, primarily to Australia, Singapore, China and South Korea. COLL has said decisions on whether to use 0.5 percent fuel versus scrubbers (in order to burn high-sulphur fuel) will be driven by economic and operational considerations.
Container cargo carrier		
China Navigation *Moana Chief*	Heavy Bunker Fuel Oil	China Navigation is exploring the possibility of operating a second coastal cargo carrier

Accession would have a significant – but manageable – effect on other heavy bunker fuel oil users

109. Aside from the ships in Table 4 that need to travel overseas to dry dock, the Ministry of Transport is aware of only two other ships that currently use heavy bunker fuel oil.

110. One is a dedicated marine fuel barge, the *Awanuia*, chartered by Z Energy to supply ships in Auckland Harbour with fuel oil from Marsden Point oil refinery. Z Energy has indicated its support for accession to Annex VI and is preparing for the change.

111. The other is China Navigation's bulk cement carrier, the *Aotearoa Chief*. Although the additional costs are likely to be significant, they could be passed on to customers (with likely limited impact on them). New Zealand's other bulk cement carrier, the *Buffalo*, already uses automotive diesel.

Most smaller vessels will not be affected by the low sulphur limit as they already use automotive diesel

112. The great majority of vessels operating in New Zealand already use automotive diesel, so their fuel choice would be unaffected by the low sulphur limit.

113. Maritime NZ has 177 powered vessels of over 24 metres in length or 100 gross tonnage (GT) on its ship register, including the seven ships required to access dry docks overseas. It does not collect information about fuel types, but estimates can be made based on size and tonnage.

114. Almost all, if not all, of the 104 vessels below 400 GT are assumed to already be using automotive diesel. This is because ships of this size generally cannot accommodate the equipment necessary to use heavier fuels, and smaller ports can only supply automotive diesel. Vessels below 24 metres in length are not registered, but are also assumed to be using automotive diesel.

115. Based on engagement with the industry, a further 35 vessels above 400 GT but below 1,000 GT are also considered likely to be using automotive diesel. There may be some exceptions to this, but they are unlikely to be using significant amounts of fuel.

116. 11 ships above 1,000 GT also already use automotive diesel.[36] Some operators of these ships have cited environmental sustainability reasons for doing so.

The low sulphur limit could have a significant impact on a small number of operators

117. Based on informal advice from major fishing operators,[37] 18 commercial fishing vessels above 1,000 GT and trawlers are understood to be using light fuel oil. Talley's, which operates six fishing vessels above 1,000 GT (eight in total), has advised it has already moved from light fuel oil to automotive diesel, so its vessels are not included in the 18.

118. The requirement to move to low sulphur fuels under Annex VI could have a significant economic impact on some of these companies. The additional costs associated with switching to low sulphur fuels could particularly affect companies fishing low-value species, meaning they have little margin to absorb additional costs. New Zealand is an international price taker for fish, meaning these companies are unlikely to be able to pass on additional costs to their customers. However, their international competitors will face similar cost pressures from 2020, so the global prices of some low-value species could rise.

119. Sanford, New Zealand's largest seafood company (by revenue and Quota Management System holding), operates six of the fishing vessels above 1,000 GT. It has advised that, although accession to Annex VI would have material operational and financial implications for its business, it has anticipated and supports accession. Sanford cites both its sustainability drivers and that it considers it crucial that New Zealand be able to participate fully in IMO negotiations, given the business community's reliance on international shipping. Some of its vessels already run on diesel, and it has confirmed that its six vessels currently operating on light fuel oil are capable of operating on low sulphur fuel (specifically marine gas oil).

120. Two companies have, however, told us that the requirement to move to low sulphur fuel could potentially affect their business viability:

- Independent Fisheries has estimated that, based on current prices and exchange rates, switching its three vessels from light fuel oil to marine gas oil would cost an additional NZ$3.6 million per annum. It estimates the one-off cost of conversion to be $50,000 per vessel, relating to changes in seals and adjustments to fuel injectors to avoid fuel leakage and other problems

[36] Eight fishing vessels and trawlers, one bulk cement carrier, one dredge and one research vessel

[37] Independent Fisheries (three vessels above 1,000GT), Maruha (two vessels above 1,000 GT), Sanford (six vessels above 1,000 GT)), Sealord (seven vessels above 1,000 GT) and Talleys (six vessels above 1,000 GT)

- Maruha has estimated the additional fuel cost of switching its two ships to be $1.95 million per annum.[38]

121. Sealord, which is 50 percent Māori-owned, has advised that switching its seven vessels above 1,000GT to marine gas oil would, at current prices, cost an additional $4.6 million per annum, which would affect returns to shareholders. However, it has not commented on the relative impact this would have on its business.

122. Actual costs would be lower if cheaper low sulphur fuels become available. As set out in paragraph 57, further work is required to understand better the likely impact on these companies and Māori commercial fishing interests.

123. If New Zealand did not accede to Annex VI, these operators would likely benefit from the expected drop in the international price of higher sulphur fuels when Sulphur 2020 comes into play internationally.

124. The indicative impacts by vessel type are set out in Table 4.

[38] Both Independent Fisheries' and Maruha's vessels are around 30 years old and are expected to be in operation for up to another 20 years. Maruha has noted that replacing its ships' engines with modern technology would save fuel costs, but cost an estimated $16 million. Maruha purchased one vessel for under $6,000,000 in 2017.

Table 4: Indicative fuel use by type of ship

Indicative figures based on a limited survey of ship operators

Type of ship on New Zealand Ship Register	Ships under 1,000 GT	Ships of 1,000 GT or more *Red indicates ships using higher sulphur fuels that operate only domestically* ** indicates ships using higher sulphur fuels that must travel overseas to dry-dock*				Total
	Automotive Gas Oil (automotive diesel) 0.001% ultra-low sulphur		**Light Fuel Oil** (40cst) 1.9% sulphur	**Medium Fuel Oil** (80cst) 2.5% sulphur	**Heavy Bunker Fuel Oil** (380cst) 3.2% sulphur	
Aquaculture	6					6
Bulk cement carrier		1			1	2
Cargo	10				1*	11
Launch/yacht	2					2
Deck cargo	1					1
Dredges	9	1				10
Fishing research	1					1
Fishing ship/trawler	35	8	18			61
Floating crane	1					1
Passenger catamaran	4					4
Cook Strait ferry				4*		4
Passenger vehicle ferry	10					10
Passenger vessel	31					31
Patrol boat	1					1
Pile driver pontoon	1					1
Powered barge	4					4
Research	1	1				2
Survey	1					1
Fuel tanker					2* 1	3
Tug	17					17
Work boat	4					4
Total	**139***	**11**	**18**	**4**	**5**	**177**

*There is a possibility that some ships under 1,000 GT could be using LFO. This would be precluded outside main ports, where automotive diesel is generally the only marine fuel available.

Marsden Point Refinery would need to find alternative uses for its high sulphur residual product

125. Refining NZ is the only oil refinery in New Zealand. It supplies approximately 40 percent of the total energy needs of New Zealand and 70 percent of the transport fuel needs, with the remaining 30 percent imported from larger refineries in the Asia Pacific (Korea, Singapore, and Japan).

126. The refinery produces high sulphur bunker oil as a by-product of the refining process to produce higher-value distillates (e.g. diesel, petrol and jet fuel). Residual fuel oil constitutes a small proportion of the refinery's overall output. [39] Shipping is currently the primary market for this residual product.

127. Regardless of New Zealand's accession, Sulphur 2020 will reduce the market for the refinery's higher sulphur fuel oils from 2020, as international ships will no longer be able to use it unless they use scrubbers.[40] As outlined above, the international price of residual fuel is also expected to drop significantly from 2020, because of the drop in demand.

128. New Zealand's accession to Annex VI would further reduce this market. According to MBIE data, the domestic market represented approximately one-quarter of residual fuel blends for shipping in 2018:

- 270,040 tonnes supplied to international ships
- 83,450 tonnes supplied to New Zealand-flagged ships

129. Refining New Zealand has advised it is exploring opportunities for alternative uses for its high sulphur residual product (i.e. converting it into asphalt, effectively sequestering the sulphur and carbon into New Zealand roads). The refinery supports New Zealand's accession to Annex VI, but in its submission requested that accession be delayed until 2023, to allow it time to find viable alternatives for its residual products. However, as set out in paragraph 56, more recently Refining New Zealand has advised that it is comfortable with an earlier timeframes, because the majority of the bunker fuel it supplies goes to international ships, which will be affected by Sulphur 2020 regardless of whether New Zealand accedes. Only a small portion of its bunker fuel is supplied to New Zealand's ships that would be affected by New Zealand's accession.

ii) Energy efficiency requirements

130. The Energy Efficiency Design Index (EEDI), which sets out technical measures for new ships or major conversions above 400 GT, would have little direct impact, as New Zealand does not build large ships. KiwiRail noted its new ships will need to be built in full compliance with the EEDI and that there has been significant discussion around its application to roll-on/roll-off cargo and passenger ships at the IMO. However, New Zealand's ability to influence these discussions, as a non-party to Annex VI, has been limited.

131. All ships above 400 GT would be required to have a Ship Energy Efficiency Management Plan (SEEMP). The focus of SEEMPs is on operational measures to

[39] According to the MBIE's fuel production and consumption data for 2018, fuel oil blends represented approximately 11.8 percent of the refinery's output by weight in 2018, of which 6.8 percent was for total shipping. These figures would be less by value, on the basis that heavier fuel oils are more expensive than distillate products.

[40] The IEA estimates that around 4,000 scrubbers will be installed on large vessels in 2020, maintaining some demand for the high sulphur fuel.

improve efficiency, which could result in reduced fuel costs (and emissions). As the plans would be specific to each ship, it is not possible to generalise the economic or environmental impact. Some operators, including those operating only domestically, have indicated that they already have SEEMPs in place.

132. Ships travelling overseas are required to have an International Energy Efficiency Certificate (IEEC) before travelling overseas, to show compliance with these requirements. Under Annex VI, Maritime NZ would be able to issue an IEEC, which is considered a benefit for these operators.

iii) Nitrogen oxide emissions standards for diesel engines

133. Marine diesel engines installed in many New Zealand vessels would have been built before 2000, in which case the Annex VI nitrogen oxide emissions standards would not apply, unless the engine had since undergone a major conversion after 1 January 2000. Engines installed on vessels constructed after that date would almost certainly have been imported from states that are party to Annex VI and would therefore comply with the standards. Major conversions would also take into account NO_x requirements.

134. However, the Annex VI requirement to demonstrate their compliance with the standards will affect many New Zealand vessel operators. Initially, affected operators would incur one-off costs associated with verification and certification that an engine and its technical file comply with the regulations. Once initial compliance has been established, continuing compliance is likely to have little practical effect on operators. Because New Zealand does not maintain a registry of the type or age of engines installed on vessels, it is not possible to accurately quantify the number of affected operators and the impact of the NO_x regulations on them.

iv) Shipboard incineration standards

135. Similar to the NO_x emissions standards, the shipboard incineration requirements are likely to have limited economic or environmental impact, as large ships operating under a New Zealand flag have typically been built overseas to the standards.

v) Waste reception facilities

136. The requirement for parties to ensure the availability of port reception facilities, including for waste products from closed-loop scrubbers[41], overlaps to an extent with existing requirements under MARPOL Annex 1 (oil and oily water). Waste reception capacity at ports is currently not fully used, and significant numbers of ships using closed-loop scrubbers are not expected to visit New Zealand, at least in the short term. However, issues relating to resource consent to dispose of the product (given its nature) would need to be resolved.

8 Compliance Costs

Government agency costs

137. As New Zealand's port and flag state administration, Maritime NZ would use its existing powers and systems in undertaking Annex VI compliance, enforcement and administrative activity. Additional activity required in these three areas as a result of accession would increase the agency's operational costs.

[41] A closed-loop or "dry" scrubber retains exhaust filtering contaminants on-board for disposal on land. An open-loop or "wet" scrubber discharges treated water into the sea.

138. Costs would also be incurred in the period before accession in relation to:

- developing the rules necessary to implement Annex VI
- training Maritime NZ staff to undertake inspections and other compliance and enforcement measures required for the purposes of Annex VI
- develop communications and guidance material to prepare ship operators and fuel suppliers for their new obligations under Annex VI
- providing "assisted compliance" to operators unfamiliar with the new requirements work through the process of meeting their new compliance obligations
- providing internal technical and legal resources to support the provision of the activities mentioned above.

139. Costs incurred before accession could in part be funded through a combination of the Ministry of Transport's ongoing Transport sector rules programme and revenue from the maritime levy on commercial ships (from which Maritime NZ has made provision for meeting some regulatory costs not covered by Crown funding). Reprioritisation of some planned regulatory or compliance activities may be necessary to accommodate the Annex VI costs.

140. Following accession, some Annex VI-related costs could be recovered through fees from vessel operators and some from the maritime levy. A key uncertainty is the number of domestic ships that will need to comply with Annex VI requirements, particularly among the 2,400 commercial vessels in the Maritime Operator Safety System (MOSS) regime. The number of ships affected can be ascertained with certainty only once decisions have been taken on how Annex VI requirements will be reflected in maritime and marine protection rules. Maritime NZ will have to ensure that all affected vessels are brought into compliance and their documentation updated accordingly by the time Annex VI comes into force. Depending on the number of vessels involved, the scale of this activity could place demands on Maritime NZ resources that affect its ability to deliver other regulatory compliance and enforcement functions.

141. According to Maritime New Zealand estimates, there may be a funding gap (depending on the factors above). If this is the case, the Ministry would work with Maritime New Zealand to address it, including through reprioritisation. The Maritime NZ midpoint funding review scheduled for 2022/23 will also provide an opportunity to factor Annex VI administration costs into the organisation's future funding requirements.

Costs to operators

142. New Zealand operators will incur fees for the certification of vessels, engines and amendments to operating plans. These would be one-off costs, which would be determined by how difficult it is for operators to obtain engine documentation and by the amount of Maritime NZ staff time involved. Maritime NZ would ensure that these requirements can be met as efficiently and cost-effectively as is reasonably possible. To the extent audits of Annex VI compliance are required, they would be conducted as part of routine scheduled audits and the cost would be recovered through the maritime levy. Any follow-up compliance activity, fuel sampling or fuel testing would be charged to operators at the regulated hourly rate.

143. Following Cabinet's agreement in principle to accession, the Ministry of Transport would work with Maritime New Zealand to define processes and costs, prior to the formal treaty examination process.

9 Completed or proposed consultation with the community and parties interested in the treaty action

Interagency consultation

144. The Ministry of Transport has engaged with the Ministry of Business, Innovation and Employment (Resources and Tourism), the Ministry for the Environment, the Ministry of Health, the Ministry of Foreign Affairs and Trade, the Ministry for Primary Industries, Te Puni Kōkiri, the Department of Conservation, the Environment Protection Authority and Maritime NZ and the Treasury. The Department of the Prime Minister and Cabinet was informed.

Public consultation

145. The Ministry released a discussion document and ran a formal public consultation process from 8 November 2018 to 11 February 2019 on whether or not New Zealand should accede to Annex VI. As part of this process (and following it), the Ministry met with shipping and petroleum sector interests, and co-hosted a public meeting with the Marlborough District Council in Picton (one of the main ports affected by marine air pollution).

146. Forty-nine submissions were received from key representative organisations including domestic shipping carriers and port companies, as well as fuel companies, local governments, non-governmental organisations, health interests and the public. Appendix 3 provides a summary of submissions.

147. Overall, there has been strong support for accession. Forty-five submissions expressed support for accession, and none expressed opposition. The key substantive feedback received related to the timing of accession, as set out in Section 3.

148. In August and September 2019, the Ministry informally surveyed a range of ship operators to verify as far as possible technical details and seek further information on the likely impact of the regulations.

149. The Ministry of Transport is planning specific engagement with Māori to feed into the parliamentary treaty examination process. As set out above, this will include examining any potential impact of accession on Māori commercial fishing interests. Separate to New Zealand's accession, specific engagement with Māori has been recommended in relation to managing discharge from open-loop scrubbers to water. This is associated with Annex VI Sulphur 2020 coming in internationally, and not New Zealand's accession. The Ministry of Transport will be following up with relevant agencies on this.

150. The Ministry of Transport envisages ongoing engagement with industry (in particular those identified as likely to be most affected by the Annex VI regulations), environmental groups, the public, and central and local government in the lead-up to accession.

10 Subsequent protocols and/or amendments to the treaty and their likely effects

151. The IMO's Marine Environment Protection Committee (MEPC) is the primary forum in which air pollution and climate change matters are considered. As discussed above, future amendments relating to measures to reduce maritime global greenhouse emissions are expected to be implemented under Annex VI by 2023.

152. Article 16 of the MARPOL Convention specifies the amendment procedure for the convention and its annexes. Amendments can be proposed by the IMO itself or by Conference (at least one third of states party).

Tacit acceptance procedure

153. Amendments must be adopted by a two-thirds majority of the parties to the Convention present and voting. At the time of adoption, the MEPC can deem amendments to be accepted on the date on which it is accepted by two thirds of the parties whose combined merchant fleet constitutes not less than 50 percent of the world's shipping tonnage. Otherwise, an amendment is deemed to be accepted unless one third of parties or parties whose combined merchant fleet constitutes not less than 50 percent of the world's shipping tonnage, communicate an objection. The period to lodge an objection must not be less than 10 months. Under these circumstances, a party can notify the Secretary-General of the IMO that its express approval will be necessary before the amendment enters into force for that Party.

154. An amendment enters into force six months after its acceptance for all parties, through tacit acceptance, unless a party has made a declaration that its express approval is necessary for the amendment to enter into force for them. Previous practice with MARPOL and its Annexes indicates amendments have been relatively common.

155. New Zealand could opt not to accept a particular amendment. In that case, New Zealand would need to advise the IMO of its non-acceptance. The amendment would then not come into force for New Zealand unless it subsequently accepted it. Non-acceptance of a particular amendment would not affect the continued application of Annex VI to New Zealand.

156. All amendments would be subject to the New Zealand treaty process.

11 Withdrawal or denunciation provisions in the Convention

157. In line with Article 7 of the MARPOL Convention, any party may denounce Annex VI by written notification to the Secretary-General of the IMO at any time after five years from the date on which it enters into force for that party. Denunciation takes effect one year after receipt or longer if specified in the notification.

158. Denunciation would be subject to the New Zealand treaty-making process.

12 Agency Disclosure Statement

159. This NIA has been prepared by the Ministry of Transport, in consultation with other relevant government agencies. The NIA identifies the substantive legal obligations in MARPOL Annex VI that would require legislative implementation, and analyses the advantages and disadvantages to New Zealand in becoming a party to Annex VI.

160. The NIA identifies supply and pricing uncertainties associated with the reduced Annex VI limit on the sulphur content of marine fuel. The indicated monetised public health benefits from reduced marine emissions are illustrative only, as they are derived from UK guidance, so do not take into account differences in port population density and climatic conditions.

161. The NIA identifies additional costs that some New Zealand ship operators would incur in order to switch from high sulphur content fuel to more expensive low sulphur content fuel New Zealand were to accede to Annex VI. In the absence of more precise

information, the NIA assumes that operators of smaller ships (under 1,000 GT) will be unaffected because they use automotive diesel, which complies with the sulphur content limit.

162. Annex VI obligations would not impair private property rights, market competition, or the incentives on businesses to innovate and invest; or override fundamental common law principles.

Melanee Beatson
Principal Adviser, International Connections
Ministry of Transport

Signature ***Date*** 3 October 2019

Appendix 1:
Annex VI regulations: powers and key obligations

Annex VI Regulation	Key Provisions
5	Ships of 400 gross tonnage and above, and fixed and floating drilling rigs and other platforms are required to be surveyed and issued with certificates in accordance with the regulation Annex VI applies to all ships, but surveys and certificates are not required for ships below 400 gross tonnage. This regulation requires an Administration to establish appropriate measures for such ships
6	The International Air Pollution Prevention Certificate and the International Energy Efficiency Certificate are issued after the surveys required under Regulation 5 have been successfully completed A Statement of Compliance is issued to ships over 5,000 GT engaged in international voyages with respect to IMO data collection system requirements provided for under Regulation 22A
10	Allows a Party to inspect foreign ships in its ports or an offshore terminal under its jurisdiction to ensure Annex VI compliance
11	Provides additional powers for the exercise of Port State Control over ships in the ports or offshore terminals of a Party and for cooperation between Parties in the detection, investigation and reporting of alleged contraventions of the provisions of Annex VI
13	Marine diesel engines (other than emergency engines) with a power output of more than 130kW installed on ships built on or after 1 January 2000 and existing engines undergoing major conversion (which includes installing new engines in existing ships) must comply with specified emission standards for NO_x using the test procedure and test methods set out in the NO_x Technical Code Once the Annex enters into force, the NO_x requirements will apply retrospectively to engines with a power output of over 5,000kW installed on ships constructed before 1 January 2000
14	The sulphur content of fuel used on board ships must not exceed the limits specified in the regulation.
16	Shipboard incinerators installed on or after 1 January 2000 must meet performance standards and must meet the requirements of Annex VI, Type Approval and Operating Limits for Shipboard Incinerators, and must be approved by a Recognised Organisation on behalf of the national Administration The incineration of certain substances, such as oil cargo residues and garbage containing more than traces of heavy metals, is prohibited
17	Each state party must ensure the provision of reception facilities to receive ozone-depleting substances and equipment containing such substances, and exhaust-gas cleaning residues
18	Fuel oil supplied to ships must meet minimum quality standards and the sulphur content documented by the supplier by means of a bunker delivery note. This document is to be kept on board a ship and retained for three years

	after delivery of the oil and a fuel sample must be retained on board until the fuel is substantially consumed but in any case for not less than 12 months.
19	Regulations 20-22 on energy efficiency apply to all ships of 400GT and above.
20-21	The Energy Efficiency Design Index (EEDI) applies to new ships and to existing ships that have undergone a major conversion and is the primary *technical* means to address the climate change impacts of international shipping, as it specifies the design efficiency of ships and their propulsion systems
22 & 22A	Each ship must have a Ship Energy Efficiency Management Plan (SEEMP), an operational, performance-based approach to improve ship energy efficiency The SEEMP regime applies to new and existing ships and is the primary *operational* means to address the climate change impacts of international shipping Each ship of 5,000 GT or more engaged in international voyages must report fuel consumption data to the Administration or Recognised Organisation which in turn will submit aggregated data to the IMO.

Appendix 2:
Potential changes to New Zealand law that may be required to implement MARPOL Annex VI

This is an indicative list of potential legislative changes, to be confirmed after in-depth interagency engagement including regulatory design.

Table 1: Survey, Certification and Means of Control

Annex VI regulation		Is it an existing obligation, an update, or a new obligation?	What legislative change is needed?
5	**Surveys**	**Update to existing obligation** Survey requirements for every ship of 400 GT and above and every fixed and floating drilling rig and other platforms.	**New Marine Protection Rule potentially required** **Marine Protection(Offences) Regulations 1998** Offence provision for non-compliance with survey requirements.
6	**Issue or endorsement of Certificate**	**New obligation** Requirements for *International Air Pollution Prevention Certificate* (IAPP Certificate) issued, after an initial or renewal survey, in accordance with the provisions of Regulation 5. This regulation applies to marine diesel engines installed on every ship of 400 GT and above. It addresses: • ozone depleting substances • NO_x • SO_x and particulates • VOCs • shipboard incineration *International Energy Efficiency Certificate* issued after a survey in accordance with Regulation 5.4 The regulation applies to every ship of 400 GT and above. It evidences that the ship's Attained Energy Efficiency Design Index has been verified	**New Marine Protection Rule potentially required** **Marine Protection(Offences) Regulations 1998** Offence provision for non-compliance with certification requirements.

Annex VI regulation		Is it an existing obligation, an update, or a new obligation?	What legislative change is needed?
		and the Ship Energy Efficiency Management Plan is on board.	
7	**Issue of a Certificate by another Government**	**New obligation** Enables a State Party to the Annex VI to issue, endorse or authorise the endorsement of an IAPP Certificate to a ship registered to another State party.	**New Marine Protection Rule potentially required**
8	**Form of Certificate**	**New obligation** The International IAPP Certificate shall be drawn up in a form corresponding to the model outlined in Appendix I to Annex VI.	**No change required**
9	**Duration and Validity of Certificates**	**New obligation** Duration of the IAPP Certificate and conditions by which it remains valid or ceases to be valid.	**New Marine Protection Rule potentially required** **Marine Protection(Offences) Regulations 1998** Offence provision for invalid certificate
10	**Port State Control on Operational Requirements**	**Update to existing obligations** Enables inspection of foreign ships in port with respect to the operational requirements of Annex VI.	Sections 54 and 396 of the Maritime Transport Act 1994 provide for inspection of foreign ships in New Zealand ports.
11	**Detection of violations and enforcement**	**Update to existing obligations** States party are required to co-operate in the detection of violations and the enforcement of the provisions of Annex VI, using all appropriate and practicable measures of detection and environmental monitoring, adequate procedures for reporting and accumulation of evidence.	**No change required** *Sections 55/397 of the Maritime Transport Act* If inspection of a foreign ship reveals it to be substandard, Maritime NZ will have the power to detain it until it is brought up to standard, or to impose conditions on its operation.

Table 2: Requirements for Control of Emissions from Ships

Annex VI regulation		Is it an existing obligation, an update, or a new obligation?	What legislative change is needed?
13 14 16	**NO_x** **SO_x and particulates** **Shipboard Incineration**	**New obligation**	**Maritime Transport Act 1994** Amendment to ensure that rule-making powers under the Act can give effect to limits on emissions to air under Annex VI. **Marine Protection(Offences) Regulations 1998** Offence provisions for non-compliance with emission controls, fuel sulphur content limit, record-keeping and certification requirements.
14 18	**Sulphur content of fuel and fuel oil quality**	**New obligation**	**Maritime Transport Act 1994** Amendment to ensure that the Director of Maritime NZ can detain or impose conditions on a ships for non-compliance with Annex VI requirements and take samples of fuel oil. **Marine Protection(Offences) Regulations 1998** Offence provisions for non-compliance with record-keeping and fuel sample retention requirements.
12	**Ozone depleting substances (ODSs)**	**Update to existing obligations** Prohibits deliberate emissions of ozone-depleting substances. Prohibits new installations which contain ozone-depleting substances shall be prohibited on all ships. Requires that substances referred to in this regulation, and equipment containing such substances, shall be delivered to appropriate reception facilities when removed from ships.	**New Marine Protection Rule required** To give effect to the record-keeping requirement. No change required in relation to Regulation 12 prohibitions. New Zealand is signatory to the Montreal Protocol on Substances that Deplete the Ozone Layer and its Kigali Amendment. In 2015, New Zealand banned hydrochlorofluorocarbons

Annex VI regulation		Is it an existing obligation, an update, or a new obligation?	What legislative change is needed?
		Ships of over 400GT that travel to a port in another jurisdiction must maintain an ozone-depleting substances record book if equipped with recharging systems that contain such substances.	ahead of their 1 January 2020 prohibition in new installations under Regulation 12 of Annex VI. **Marine Protection(Offences) Regulations 1998** Offence provision for non-compliance with emission controls and record-keeping requirements. r
13	**NO_x**	**New obligation** Provides for the control of diesel engine NO_x emissions through survey and certification leading to the issue of an Engine International Air Pollution Prevention (EIAPP) Certificate and the subsequent demonstration of compliance with the *NOx Technical Code 2008*.	**New Maritime Rule required** Inspection and certification with respect to Annex VI provisions to control emissions of nitrogen oxides from marine diesel engines. **Marine Protection(Offences) Regulations 1998** Offence provision for non-compliance with certification requirements.
14	**SO_x and particulate matter**	**New obligation** Provides for SO_x and particulate matter emission controls for marine fuels (defined in Regulation 2.9 of Annex VI), combustion equipment and devices on board. Applies to main and auxiliary engines, boilers and inert gas generators.	**New Maritime Rule potentially required** To give effect to the Annex VI ban on the carriage or heavy fuel oil (except as cargo) unless the ship is fitted with engine exhaust abatement technology **No change required** *Engine Fuel Specifications Regulations 2011* Provides minimum standards for fuel performance and limit fuel components harmful to public health or the environment
15	**Volatile organic compounds (VOCs)**	**New obligation** Mainly applies to tankers. Also applies to gas carriers only if the types of loading and containment system allow safe retention of non-methane VOCs	**New Maritime Rule potentially required**

Annex VI regulation		Is it an existing obligation, an update, or a new obligation?	What legislative change is needed?
		on board or their safe return ashore. This regulation provides for two aspects of VOC control: • *Vapour emission control systems* to control VOCs emitted into the atmosphere at ports or terminals • *VOC Management Plan* requirements for tankers carrying crude oil.	
16	**Shipboard incineration**	**New obligation** • Requires that incineration is only undertaken in equipment designed for that purpose • Prohibits the incineration of certain listed materials.	**New Marine Protection Rule potentially required** Addresses shipboard incineration **Marine Protection(Offences) Regulations 1998** Offence provision for non-compliance.
17	**Reception facilities**	**New obligation** Port reception facilities for the efficient delivery of specified residues and wastes from ships.	**Marine Protection Rules amendment** *Marine Protection Rules Part 100: Port Reception Facilities* Facilities to receive ship waste associated with the control of ozone depleting substances and exhaust gas cleaning residues
18	**Fuel oil quality**	**New obligation** Places an obligation to regulate fuel oil suppliers through the competent authorities of the State by requiring the Party: • to ensure that it designates an appropriate authority or agency to register and control fuel oil suppliers • take “all reasonable steps” to promote the availability of compliant fuel oil • take action against ships which do not use compliant fuel • report instances of non-compliant fuel to other	**Marine Protection Rules amendment** Potential need for installation of dedicated sampling points to enable testing of fuel in accordance with Annex VI sulphur fuel requirements (Regulation 14) and fuel quality requirements (Regulation 18) Existing powers under section 396 of the Maritime Transport Act, to carry out audits and inspections will require amendment to provide for fuel.

Annex VI regulation		Is it an existing obligation, an update, or a new obligation?	What legislative change is needed?
		Parties and take action on reports received The regulations also include obligations on the part of fuel oil suppliers which are required to document the sulphur content of the fuel oil.	sampling as indicated at the beginning of this table.

Table 3: Regulations on Energy Efficiency for Ships (directly addresses climate change impacts)

Annex VI regulation		Is it an existing obligation, an update, or a new obligation?	What legislative change is needed?
20	**Attained Energy Efficiency Design Index** (attained EEDI)	**New obligation** Calculation of attained (actual) EEDI for new ships and existing ships that have undergone a major conversion, with reference to the relevant IMO guidelines.	**New Marine Protection Rule potentially required**
21	**Required EEDI**	**New obligation** Calculation of required (design) EEDI for new ships and existing ships that have undergone a major conversion.	**New Marine Protection Rule potentially required**
22	**Ship Energy Efficiency Management Plan** (SEEMP)	**New obligation** Both new and existing ships are required to keep on board a SEEMP.	**New Marine Protection Rule potentially required** **Marine Protection(Offences) Regulations 1998** Offence provision for non-compliance.
22A	**Collection and reporting of ship fuel oil consumption data**	**New obligation** This regulation: • applies to ships of 5,000 GT or more • obliges the ships to collect and report on fuel consumption data for each calendar year or portion thereof The State Administration issues a Statement of Compliance on receipt and verification of the fuel consumption data.	**New Marine Protection Rule potentially required**

Annex VI regulation		Is it an existing obligation, an update, or a new obligation?	What legislative change is needed?
		The Party transmits aggregated data to the IMO Ship Fuel Oil Consumption Database.	
23	**Promotion of technical co-operation and transfer of technology relating to the improvement of energy efficiency of ships**	**New provision**	**This provision need not be incorporated in national legislation**

Table 4: Other amendments to legislation and regulations

Maritime Transport Act 1994		Issue addressed
Part	**Section**	
18 Preliminary provisions relating to marine pollution	**222 Interpretation**	Clarity that marine environment includes the air above the water
19 Protection of marine environment from harmful substances	**225 Interpretation**	
27 Making of marine protection rules and regulations and taking of other measures to protect marine environment	**388 Marine protection rules in relation to harmful and other substances**	Ensure that marine protection rules can impose limits on discharges of substances regulated under Annex VI into the marine environment, including discharges from New Zealand ships operating outside New Zealand's extended continental shelf
	397 Detention, etc, of ships and seizure of marine protection products	Ensure that the grounds for actions under subsection (2) are sufficient to allow the Director to detain or impose conditions on a ship for non-compliance with Annex VI requirements.

Appendix 3:
Summary of public consultation on New Zealand's potential accession to MARPOL Annex VI: Prevention of air pollution from ships

Highlights

49 submissions received:

- 13 industry organisations
- 10 local councils
- 3 academics
- 2 NGOs
- 13 individuals
- 6 health organisations
- 2 community organisations
- 1 ports' organisation

Should we accede?

- In favour:44
- Not opposed: 1
- Opposed: 0
- Not specified: 4

Timing of accession

- **34** submitters want immediate accession
- **9** industry submitters seek lead time before accession, to enable compliance with strengthened Annex VI sulphur fuel/emissions regulations that come into force internationally on 1 January 2020
- **2** submissions sought a delay in accession to 2023, in order to insulate the domestic petroleum sector and carriers from the higher fuel price impacts of strengthened Annex VI sulphur fuel regulations
- The possibility of implementing Annex VI requirements in a staged manner was identified, as was restricting its application to SOLAS ships (large passenger and merchant vessels).

Key issues identified

Accession

- The majority of submitters recognised the need to address climate change and pollution in ports
- Accession would benefit New Zealand's international reputation and climate change engagement
- Alignment of domestic and Annex VI regulations was cited as a benefit.

Annex VI sulphur fuel / emissions regulations

- Regardless of accession, New Zealand will be increasingly affected as the global implementation of the strengthened Annex VI sulphur regulations approaches. Many submissions discussed associated impacts (positive and negative) and requirements (compliance and infrastructure)
- A key issue identified was the cost and availability of compliant low sulphur fuel
- Port facilities will be required to receive waste residues from the operation of closed-loop scrubbers, which remove sulphur from ship exhaust
- The need for policies on the use of wet (open-loop) scrubbers that discharge residues into the marine environment was also identified.

MARPOL Annex VI submitters by sector and issues identified								Jan 2020 sulphur fuel requirements
Submitter type	**No.**	**Timing of potential accession**			**Issues**			**Issues**
		ASAP *stated or implied*	**Lead time required**	**Not specified**	**Climate change**	**Health & local environs**	**Regulatory consistency & certainty**	• **Compliance** • **Infrastructure** • **Markets**
Industry:								
• Carriers	**4**		3	1			3	4
• Shippers	**1**		1		1			1
• Petroleum	**7**		5	2	1			7
• Tourism	**1**					1		1
Ports	**1**			1	1			1
Health	**6**	6			6	6	2	1
Community	**2**	2				2		1
Local Government	**10**	8		2	8	9	5	5
NGOs	**2**	2			2	2	1	2
Academic	**3**	3			2	2	2	1
Individuals	**13**	13			11	12	3	5
Total	**49**	**34**	**9**	**6**	**32**	**34**	**16**	**29**

MARPOL Annex VI submissions received

Submitter	Sector	Region
Andrew Jeffs *University of Auckland*	Academic	Auckland
Dr Bevan Marten *Victoria University of Wellington*	Academic	Wellington
NZ Centre for Planetary Ecology *Massey University*	Academic	Palmerston North
Interislander (KiwiRail)	Carrier	Wellington
International Container Lines Committee	Carrier	Auckland
New Zealand Shipping Federation	Carrier	Wellington
StraitNZ Bluebridge Limited	Carrier	Wellington
Banks Peninsula Community Board	Community	Akaroa
Picton Air Quality	Community	Picton
Auckland Regional Public Health Service	Health	Auckland
Bay of Plenty District Health Board *Toi Te Ora Public Health*	Health	Bay of Plenty
Canterbury District Health Board	Health	Christchurch
Hawke’s Bay District Health Board	Health	Hawke's Bay
Ministry of Health	Health	Wellington
Nelson Marlborough District Health Board	Health	Nelson
Auckland Council	Local government	Auckland
Bay of Plenty Regional Council	Local government	Tauranga
Environment Canterbury	Local government	Canterbury
Environment Southland	Local government	Invercargill
Greater Wellington Regional Council	Local government	Wellington
Marlborough District Council	Local government	Marlborough
Nelson City Council	Local government	Nelson
Northland Regional Council	Local government	Northland
Tasman District Council	Local government	Richmond
Generation Zero	NGO	National
WWF-New Zealand	NGO	Wellington

Submitter	Sector	Region
Blended Fuel Solutions NZ Ltd	Petroleum	Te Horo
BP Oil New Zealand Limited	Petroleum	Auckland
Coastal Oil Logistics Ltd	Petroleum	Wellington
Methanex Corporation	Petroleum	New Plymouth
Mobil Oil New Zealand Limited	Petroleum	Auckland
Refining NZ	Petroleum	Auckland
Z Energy	Petroleum	Wellington
Port Company CEO Group	Ports	National
Alan Mills	Individual	Opotiki
Angele Toomey	Individual	Hutt
Brian Wheeldon	Individual	Auckland
Florian Burch	Individual	Auckland
Jenny Easton	Individual	Nelson
John Riding	Individual	Wellington
Josh Smith	Individual	Australia
Karen Wealleans	Individual	Auckland
Lorraine Steele	Individual	Opotiki
Mark Watson	Individual	Christchurch
Mesha Prathamesh Bhaswande	Individual	Wellington
Sarah Lorraine Thomson	Individual	Auckland
Vladimir Stoilov	Individual	Auckland
New Zealand Shippers Council	Shippers	National
Real Journeys	Tourism	Milford