

## Proactive Release

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Some information has been withheld on the basis that it would not, if requested under the Official Information Act 1982 (OIA), be released. Where that is the case, the relevant section of the OIA has been noted and no public interest has been identified that would outweigh the reasons for withholding it.

Listed below are the most commonly used grounds from the OIA.

<u>Section</u>	<u>Description of ground</u>
6(a)	as release would be likely to prejudice the security or defence of New Zealand or the international relations of the New Zealand Government
6(b)	as release would be likely to prejudice the entrusting of information to the Government of New Zealand on a basis of confidence by <ul style="list-style-type: none"> <li>(i) the Government of any other country or any agency of such a Government; or</li> <li>(ii) any international organisation</li> </ul>
6(c)	prejudice the maintenance of the law, including the prevention, investigation, and detection of offences, and the right to a fair trial
9(2)(a)	to protect the privacy of natural persons
9(2)(b)(ii)	to protect information where the making available of the information would be likely unreasonably to prejudice the commercial position of the person who supplied or who is the subject of the information
9(2)(ba)(i)	to protect information which is subject to an obligation of confidence or which any person has been or could be compelled to provide under the authority of any enactment, where the making available of the information would be likely to prejudice the supply of similar information, or information from the same source, and it is in the public
9(2)(ba)(ii)	to protect information which is subject to an obligation of confidence or which any person has been or could be compelled to provide under the authority of any enactment, where the making available of the information would be likely otherwise to damage the public interest
9(2)(f)(ii)	to maintain the constitutional conventions for the time being which protect collective and individual ministerial responsibility
9(2)(f)(iv)	to maintain the constitutional conventions for the time being which protect the confidentiality of advice tendered by Ministers of the Crown and officials
9(2)(g)(i)	to maintain the effective conduct of public affairs through the free and frank expression of opinions by or between or to Ministers of the Crown or members of an organisation or officers and employees of any public service agency or organisation in the course of their duty
9(2)(h)	to maintain legal professional privilege
9(2)(i)	to enable a Minister of the Crown or any public service agency or organisation holding the information to carry out, without prejudice or disadvantage, commercial activities
9(2)(j)	to enable a Minister of the Crown or any public service agency or organisation holding the information to carry on, without prejudice or disadvantage, negotiations (including commercial and industrial negotiations)

# Regulatory Impact Statement: Implementing more stringent harmful emissions standards

## Coversheet

Purpose of Document	
Decision sought:	Analysis produced for the purpose of informing: in-principle Cabinet decisions
Advising agencies:	Te Manatū Waka Ministry of Transport
Proposing Ministers:	Minister of Transport
Date finalised:	17 August 2022
<i>Note added May 2023: The RIS was prepared based on the expectation that an Amendment Rule would be completed by the end of 2022, thus the implementation options put forward for analysis in the RIS are slightly different to the currently proposed implementation dates. While option 3b in the RIS is still preferred, we have proposed updated dates and to remove the transition to Euro 6b and transition directly to Euro 6d, to account for the updated timeframes. We have also included phasing for new and existing vehicle models for new vehicles in response to industry feedback. Australia has recently adopted a requirement for Euro VI-C on new heavy vehicles starting late 2024.</i>	
Problem Definition	
<p>Motor vehicles in Aotearoa contribute a disproportionate amount of air pollution harm. This harm is estimated at over \$10.5 billion annually, accounting for premature death, respiratory illness such as childhood asthma, reduced activity days and hospital admissions.<sup>1</sup> Aotearoa is also far behind the rest of the developed world in adopting more stringent harmful emissions standards; the Land Transport: Vehicle Exhaust Emissions Rule 2007 (the Rule) has not been updated to require recent standards since 2012. Adopting the most recent Euro 6d standard for light vehicles, and Euro VI-e for heavy vehicles will reduce harmful emissions from vehicle imports and bring our standards in line with the rest of the world.</p> <p>It is important to note that this paper seeks to address harmful emissions, such as nitrogen dioxide and particulate matter, which are harmful to human health. It does not focus on carbon dioxide emissions, which are harmful to the climate. Although diesel vehicles are more economical on fuel and emit less carbon emissions when measured against a similar sized petrol vehicle, they contribute disproportionately larger levels of harmful emissions than their petrol equivalents.</p>	
Executive Summary	
<p>Government intervention is required for Aotearoa's motor vehicle pollution problem because the market has thus far failed to voluntarily adopt more stringent emissions standards. Currently Aotearoa accepts vehicle importers where they meet the Euro 5/V emissions standard (new vehicles) and the Euro 4/IV standard (used vehicles). If the latest Euro 6/VI standard (adopted in Europe in 2014) is not required through an update to the</p>	

<sup>1</sup> Kuschel *et al* (2022). *Health and air pollution in Aotearoa 2016 (HAPINZ 3.0): Volume 1 – Finding and implications*. Report prepared by G Kuschel, J Metcalfe, S Sridhar, P Davy, K Hastings, K Mason, T Denne, J Berentson-Shaw, S Bell, S Hales, J Atkinson and A Woodward for Ministry for the Environment, Ministry of Health, The Ministry of Transport and Waka Kotahi NZ Transport Agency, March 2022.

Rule, we expect a gradual voluntary shift towards Euro 6 for petrol cars this decade. It is important to note that diesel vehicles, which contribute the bulk of all harmful transport emissions, take longer to voluntarily shift, with this not expected to happen until well into the next decade.<sup>2</sup>

Requiring stringent standards would reduce the air quality impact from vehicles entering the fleet.

Three options have been considered to mitigate the impact of motor vehicle pollution on Aotearoa's air quality. These options are:

1. Taking no action
2. Waiting to require Euro 6/VI until Australian adoption of the standard
3. Requiring the most recent Euro standard, Euro 6d/VI-e for new and used vehicles (with phasing and timing options across three sub options, 3a (fastest), 3b (moderate) and 3c (slowest))

Option 3b is our preferred option, which will be reflected in an upcoming Cabinet paper to notify Cabinet of public consultation of this option.

Option 3b (moderate) would abate significant air pollution social costs out to 2050, upward of \$6.7 billion. This option would likely result in restriction of some vehicle models; however, we have assessed that shortages in some models caused by this timeframe to require Euro 6/VI could be met by other segments of the market. This option is unlikely to have equity implications but may impact sectors that rely on light diesel commercial vehicles (such as vans and utes) due to reduced vehicle model availability.

There are divergent views among the vehicle industry, with some who deem that option 3b will not be attainable, as moving to Euro 6d/VI-e will be impossible ahead of Australia. This is true for some players in the market, but not the entire new vehicle industry. Moving too fast to require Euro 6/VI (ie option 3a, which is not the preferred option) is likely to severely restrict available vehicle models, and would increase overheads, due to the increased cost of re-homologating vehicle models to meet the Euro 6/VI standard. So, while the likely benefits are high, so would be the likely costs to consumers.

### Limitations and Constraints on Analysis

Cabinet agreed to update the Rule to require Euro 6 for light vehicles in January 2021 (CAB-21-MIN-004), and officials have had direction from the Minister of Transport to begin this process. Adopting Euro VI for heavy vehicles is also an action included in the Government's 2022 Emissions Reduction Plan. Under action 10.3.1: Support the decarbonisation of freight it is agreed that the Government shall "consider the implementation timing of Euro VI standard for heavy vehicles."

Aotearoa has regulated harmful vehicle exhaust emissions for almost two decades by imposing legal minimum requirements (emissions standards) on vehicles before they are permitted to be used on our roads. Aotearoa has not historically used alternative incentives or levers. The analysis of this Regulatory Impact Statement (RIS) has looked in close detail at updating the Rule (which has not been updated since 2012) to utilise emissions standards, rather than additional incentives or policy levers, given resource constraints and Cabinet's direction. Internationally, such legal vehicle requirements are widespread and considered a bare minimum, with additional policies used to accelerate outcomes.

<sup>2</sup> Metcalfe J and Kuschel G (2022). *Estimating the impacts of introducing Euro 6/VI vehicle emission standards for Aotearoa*. Report prepared by Emission Impossible Ltd for NZ Ministry of Transport, 12 April 2022.

Additional policies, such as reducing vehicle kilometres travelled (VKT) and accelerating the uptake of zero-emissions vehicles are covered by the 2022 Emissions Reduction Plan. This sets a target to reduce VKT by cars and light vehicles by 20 percent by 2035 and increase zero-emission vehicles to 30 per cent of the light fleet by 2035.

Policies such as low-emission zones and behaviour change campaigns are being worked through by other policy teams in government, and as such are not options analysed in this RIS.

Consultation to date has primarily been focussed with the motor vehicle industry, surrounding the pace and ambition they can support. Consultation with iwi/Māori and groups affected by motor vehicle pollution, and who would most benefit by the pollution being reduced, has not occurred, and would have strengthened the analysis. However, this RIS is informed by a substantial set of high quality and up-to-date research. Engagement with the public, including iwi/Māori and groups disproportionately affected by motor vehicle pollution, is proposed for later in 2022.

Additional independent analysis on the costs imposed to industry and consumers of moving ahead of Australia on international emissions standards would have strengthened our analysis. There are little resources on this besides what we can obtain from engagement with industry.

Despite this limitation, we are satisfied with this analysis given the robust data and research used. This RIS has taken a balanced approach between ambition in reducing harmful emissions, industry concerns, and consumer costs.

#### Responsible Manager(s) (completed by relevant manager)

Joanna Pohatu  
Acting Manager  
Environment, Emissions and Adaptation  
Te Manatū Waka Ministry of Transport

*Joanna Pohatu 17/8/2022*

#### Quality Assurance (completed by QA panel)

Reviewing Agency: Te Manatū Waka Ministry of Transport, Waka Kotahi New Zealand Transport Agency

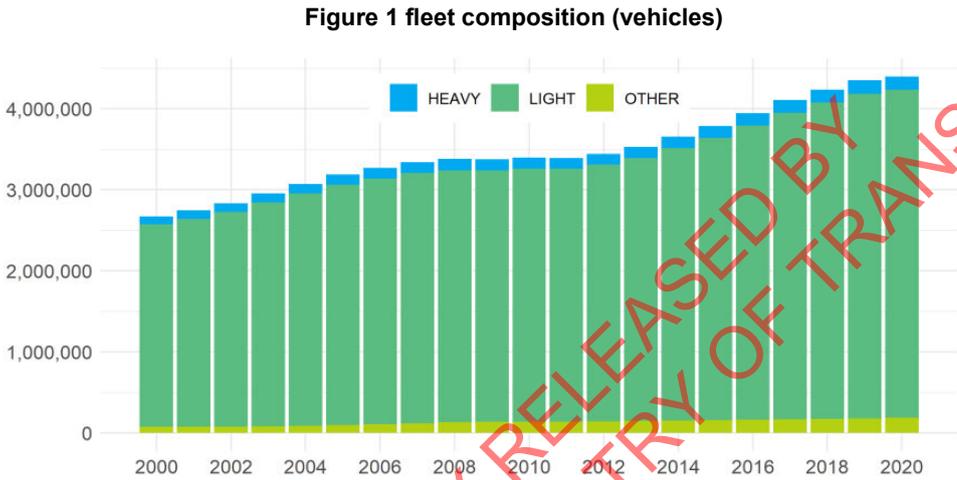
Panel Assessment & Comment: This Regulatory Impact Statement (RIS) has been reviewed by a panel of representatives from Te Manatū Waka Ministry of Transport and Waka Kotahi New Zealand Transport Agency. It has been given a 'meets' rating against the quality assurance criteria for the purpose of informing in-principle Cabinet decisions. The RIS is complete, convincing, and clear and concise. Some targeted consultation has occurred, and feedback from public consultation will be used to further develop the RIS before resubmission for final policy decisions to Cabinet. This review was subject to some agreed-upon additions to the context section regarding the existing market and regulation.

# Section 1: Diagnosing the policy problem

What is the context behind the policy problem and how is the status quo expected to develop?

## The current vehicle import market in New Zealand

1. New Zealand’s motor vehicle fleet has been increasing since 2000. Of the 4.4 million vehicles in the 2020 vehicle fleet, just over 90 percent are light vehicles – cars, vans, utes, four-wheel-drives, sports utility vehicles (SUVs), small buses and motor caravans (camper vans) with a gross vehicle mass up to 3.5 tonnes. The heavy fleet consists of trucks and buses. ‘Other’ includes motorcycles and unclassified vehicles such as agricultural equipment.<sup>3</sup>



2. New Zealand’s light fleet has an average age of about 14 years, which is older compared to other developed countries with similar levels of motorisation – like the United States of America (11.8 years for light vehicles in 2019), Australia (10.4 years for all vehicles in 2019) and Canada (9.7 years for light vehicles in 2017 – the most recent data). On average, New Zealand vehicles are scrapped at around 19 years of age.
3. There are 3000 motor vehicle traders in Aotearoa. A small number of those are new vehicle distributors, and most are small sized used vehicle importers. Most used vehicles are imported from Japan, whereas for new it is much more varied. Our new imports originate from predominantly Asian countries, including Japan, South Korea, Thailand, and a smaller proportion from Europe.<sup>4</sup>
4. On average, about 300,000 vehicles are imported into New Zealand every year. Used vehicle imports make up roughly 40 percent of these vehicles. The top selling vehicle brands in New Zealand for the year to date, are (in order of sales) Toyota, Mitsubishi, Nissan, Mazda and Ford.
5. Many of our larger vehicle importers are more closely tied to Australia, because they have organised themselves to treat Australia and Aotearoa as the same market for business planning purposes. This is because New Zealand has a much smaller population, and our two markets are right-hand drive, so to maximise efficiency and to keep overheads low, New Zealand and Australia are treated as one “Australasian” market.
6. The majority of our vehicles are also approved for sale (homologated) to the Australian Design Rule (Australia’s version of the Euro standard), and re-homologating vehicle

<sup>3</sup> <https://www.transport.govt.nz/statistics-and-insights/fleet-statistics/2020-annual-fleet-statistics/>

<sup>4</sup> <https://www.transport.govt.nz/statistics-and-insights/fleet-statistics/light-motor-vehicle-registrations/>

models to meet the Euro 6/VI standard, which is not required in Australia, could increase overheads significantly (by millions of dollars). Allowing sufficient lead time for vehicle importers to decouple from the Australian market would reduce the overheads inevitably passed on to consumers.

7. The homologation process and linkage of our vehicle market to Australia's can make requiring different standards to Australia challenging for many vehicle importers, whether they be harmful emissions standards, safety standards, or low-emissions vehicle requirements.

### Diesel vehicle numbers are rising

8. Diesel vehicles contribute the bulk of all harmful transport emissions in New Zealand. The below trends help to explain why air pollution from road transport is not improving and why in some urban locations, levels of nitrogen dioxide (NOx) are getting worse.
9. Since the 2012 Health and Air Pollution in New Zealand (HAPINZ) report was prepared the number of diesel vehicles has increased from 500,000 in 2010 to 800,000 in 2020 (figure three). On average, light diesel vehicles also travel further than their petrol counterparts, as illustrated by figure two below.

Figure 2 Diesel and petrol vehicle travel per year<sup>5</sup>

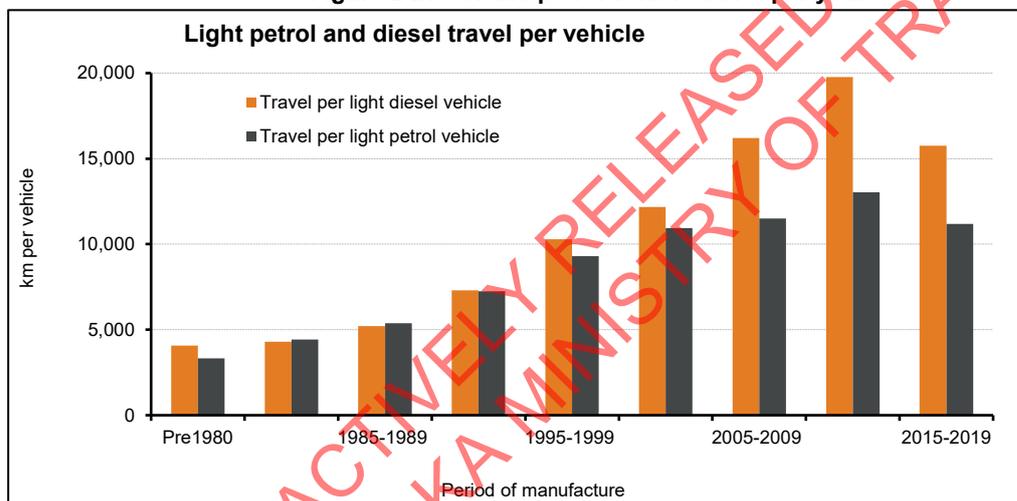
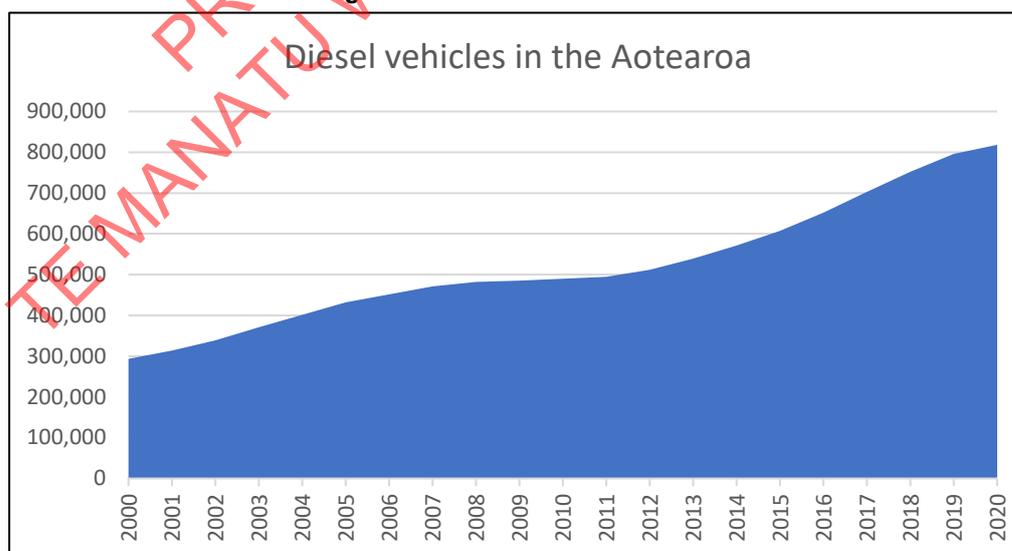


Figure 3 Number of diesel vehicles in the NZ fleet<sup>6</sup>



<sup>5</sup> <https://www.transport.govt.nz/statistics-and-insights/fleet-statistics/sheet/2020-annual-fleet-statistics>

<sup>6</sup> <https://www.transport.govt.nz/statistics-and-insights/fleet-statistics/sheet/2020-annual-fleet-statistics>

## Requiring new imports to meet emissions standards is the key tool to reduce the impact of motor vehicle pollution on the health of people in Aotearoa

10. European emissions (Euro) standards define the maximum limits for exhaust emissions of new vehicles sold in the European Union (EU) and European Economic Area member states. Since 2018, when Japan adopted the Euro standards, rather than continue to develop its own unique standards, Euro has become the most commonly recognised global standard.<sup>7</sup>
11. Light vehicle standards are referred to using Arabic numbers (i.e., 6) and heavy vehicle standards use roman numerals (i.e., VI). Since the introduction of Euro 6/VI, progressively tighter standards have been introduced, referred to by letter. The most recent are Euro 6d, and Euro VI-e.
12. Aotearoa currently requires Euro 5/V for new vehicle imports and Euro 4/IV for used vehicle imports. The most recent standard available internationally is Euro 6/VI, adopted by the EU in 2014.

### The status quo will change slowly without action

13. If Euro 6/VI is not required through an update to the Land Transport: Vehicle Exhaust Emissions Rule 2007 (the Rule), we expect a gradual voluntary shift towards Euro 6 for petrol vehicles over this decade. It is important to note that diesel vehicles, which contribute the bulk of all transport emissions, will take longer to voluntarily shift, and are not expected to shift towards this standard until well into the next decade.<sup>8</sup>
14. This baseline/status quo scenario was estimated based on conversations between Te Manatū Waka Ministry of Transport (the Ministry) officials and the Motor Industry Association (MIA), who represent businesses selling new vehicles in Aotearoa.
15. The MIA surveyed members showing there would be limited uptake of Euro 6 light vehicles in the short term: only about a third of light vehicle sales would achieve Euro 6 voluntarily by 2025, however almost all of these sales would be to the earliest (weakest) iteration of the standard. Only European-oriented distributors comprising a small volume of imports would voluntarily adopt the later (stricter) versions of the standard in the short term. The survey showed slightly better voluntary uptake for heavy vehicles, again with European-oriented brands more likely leading this transition.
16. Figures 4, 5 and 6 visually illustrate the baseline scenario for new vehicle imports.<sup>9</sup> These were compiled by Emissions Impossible, based off data gathered from the MIA surveyed members.
17. These graphs depict a slow uptake of cleaner vehicles. Petrol Euro 6 vehicles overtake their Euro 5 counterparts earlier in the timeline, but petrol vehicles cause minimal air pollution related harm compared to diesel vehicles. Diesel light and heavy Euro 6/VI vehicles only overtake their outdated Euro 5/V counterparts closer to 2030, and Euro 5/V vehicles continue to be imported well into the 2030s.
18. Given in Aotearoa vehicles tend to stay in the fleet for an average of 19 years, these vehicles will lock in air pollution related harm. It is assumed the last Euro 5/V vehicles

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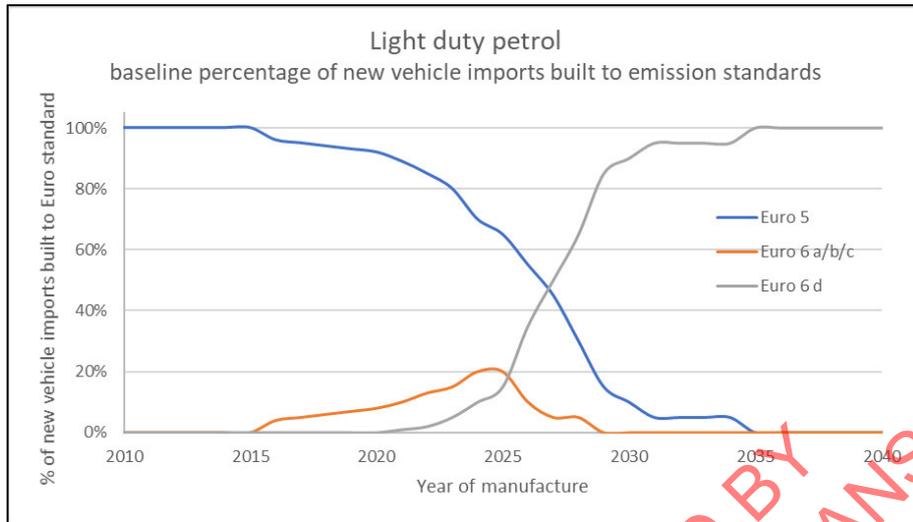
<sup>7</sup> Japan moved to utilise UN/ECE worldwide harmonised test procedures for light and heavy vehicles, and largely adopted similar emission limits, with some notable exceptions that weaken their stringency.

<sup>8</sup> Metcalfe J and Kuschel G (2022). Estimating the impacts of introducing Euro 6/VI vehicle emission standards for Aotearoa. Report prepared by Emission Impossible Ltd for NZ Ministry of Transport, 12 April 2022

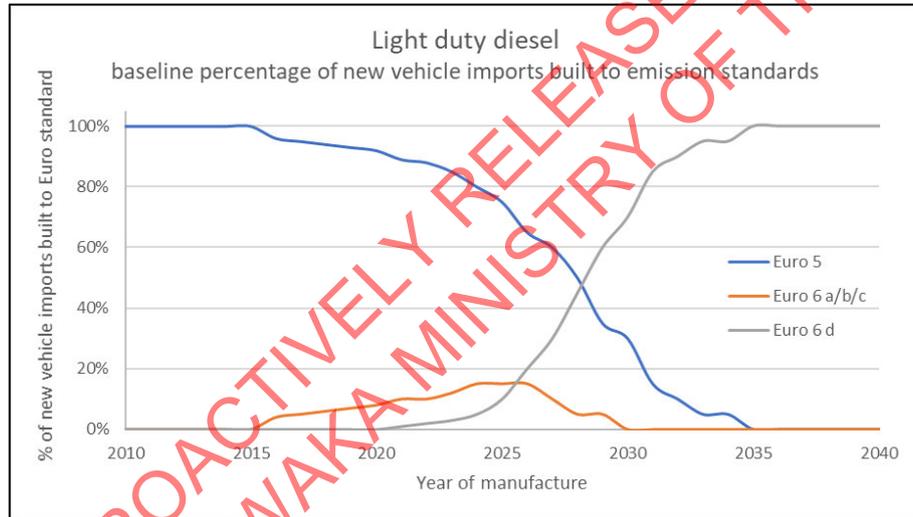
<sup>9</sup> Metcalfe J and Kuschel G (2022). *Estimating the impacts of introducing Euro 6/VI vehicle emission standards for Aotearoa*. Report prepared by Emission Impossible Ltd for NZ Ministry of Transport, 12 April 2022.

are imported in 2035; these vehicles will continue emitting, on average, until 2054 in Aotearoa.

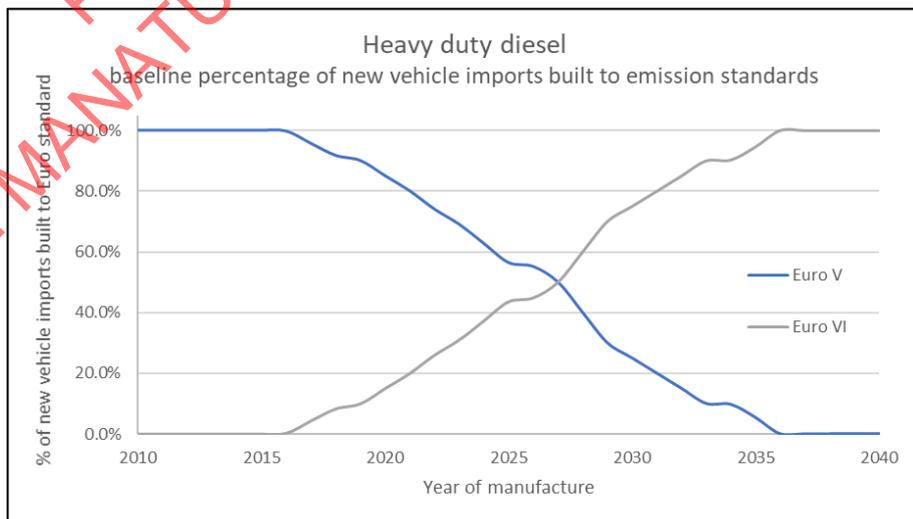
**Figure 4 Baseline fleet projection if Euro 6 is not required: Light duty petrol<sup>10</sup>**



**Figure 5 Baseline fleet projection if Euro 6 is not required: Light duty diesel**



**Figure 6 Baseline fleet projection if Euro VI is not required: heavy duty diesel**

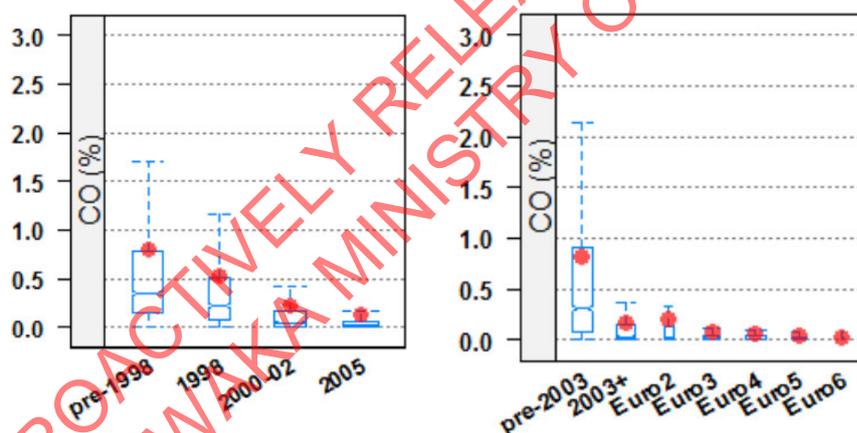


<sup>10</sup> Ibid.

## The existing regulatory framework to respond to air pollution

19. The primary tool for reducing harmful emissions from the transport sector has been implementing minimum exhaust emissions standards for vehicles as they enter the fleet. This approach has been in place since 2003 and the current legal framework dates from 2007 when the Rule was implemented.
20. This approach has been successful in reducing average carbon monoxide (CO) emissions from petrol vehicles, with studies showing significant reductions in emissions of CO from vehicles and in levels of CO found in atmospheric monitoring.
21. Air pollution from petrol vehicles is no longer modelled to be a significant concern in Aotearoa. Average emissions of CO, the main pollutant from petrol engines, is expected to have fallen to very low levels, as illustrated below in figure seven.
22. The majority of newly imported used vehicles are from Japan, which is why both the Euro standard and Japanese emissions standards (the right-hand graph) are referred to below.
23. Vehicles are heavily taxed in Japan after seven years, which often make it more economical for owners in Japan to sell their vehicles and purchase new ones. New Zealand imports a large volume of these vehicles which, being older, means they often have outdated safety, emissions, and efficiency technologies.

Figure 7 Comparison of the emissions of the monitored 2015 Aotearoa new and Japanese used petrol fleet for vehicles by emission standard<sup>11</sup>



24. However, the increasingly stringent emissions standards have not been as successful in reducing harmful emissions for diesel vehicles. Compared to petrol engines, diesel engines produce high levels of harmful NOx and particulate emissions, and these have not fallen as a result of earlier (Euro 1 to 5) standards. Euro 6/VI is the first standard that has been shown to significantly reduce harmful emissions from diesel vehicles in the real world.<sup>12</sup>
25. Figure eight illustrates the difference in real-world emissions of the Euro standards. Figure nine depicts the difference in the iterations of the Euro standard for heavy vehicles. Figure ten depicts the social costs of the average emissions of vehicles in Aotearoa per 10,000km, compared to Euro 6d.

<sup>11</sup> <https://www.nzta.govt.nz/assets/resources/research/reports/596/596.pdf>

<sup>12</sup> <https://www.nzta.govt.nz/assets/resources/research/reports/596/596.pdf>

Figure 8 Comparison of real-world NOx and PM emissions estimated from remote sensing. Results are grouped by Euro standard with diesel vehicles shown in blue and petrol vehicles in red<sup>13</sup>

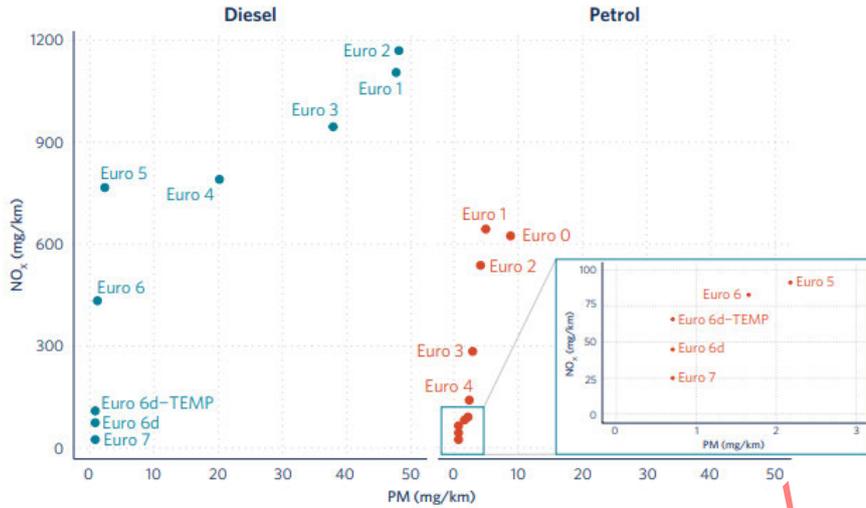


Figure 9 NOx emissions limits across the Euro standard for heavy vehicles<sup>14</sup>

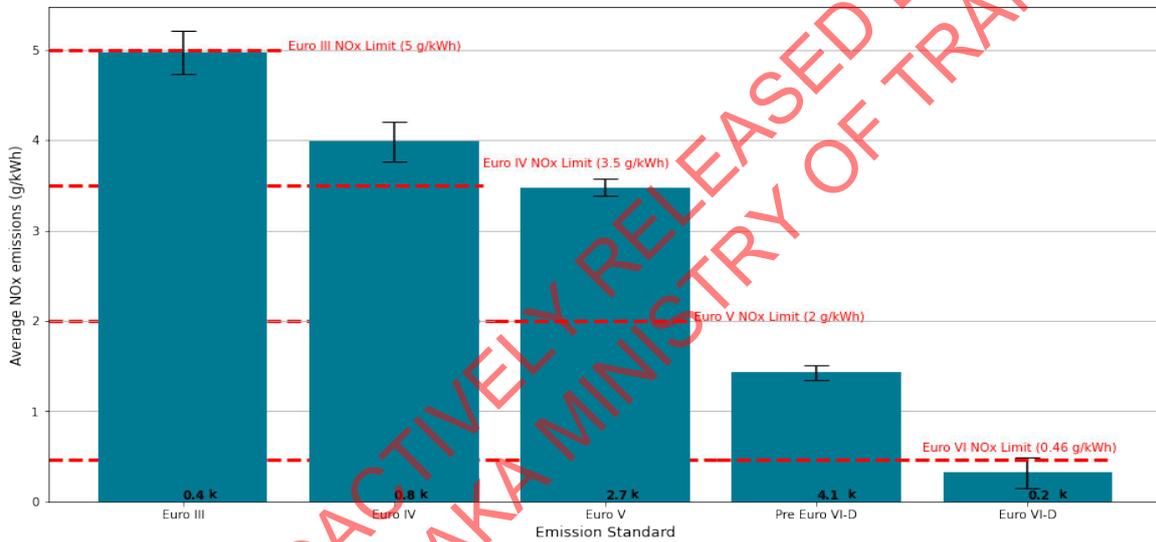
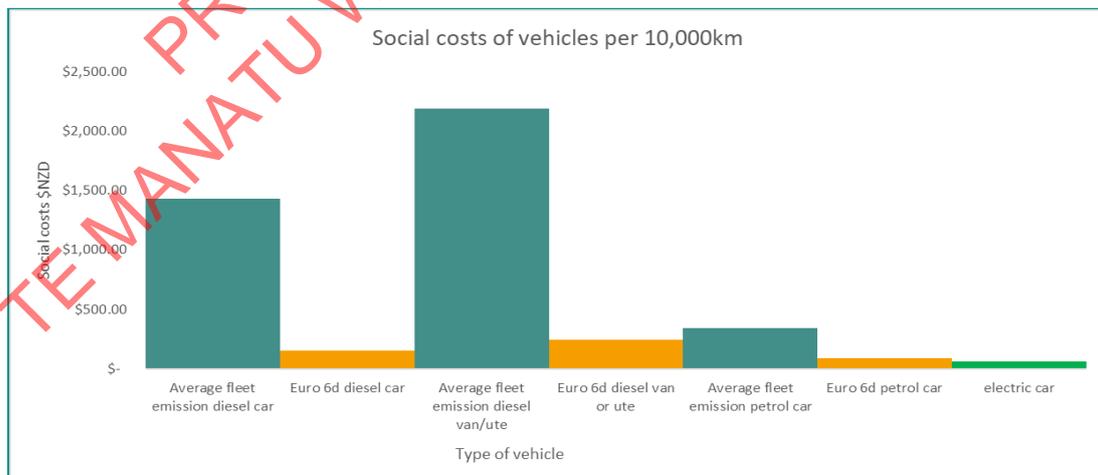


Figure 9 Social costs of vehicles by emission standard per 100,000km<sup>15</sup>



<sup>13</sup> <https://theicct.org/wp-content/uploads/2021/12/Impacts-of-LEZ-Sofia-TRUE-Report-EN-v4-dec21.pdf>

<sup>14</sup> Kazemi Bakhshmand, S., Mulholland, E., Tietge, U., & Rodríguez, F. (2022). Remote sensing of heavy-duty vehicle emissions in Europe [Publication pending]. International Council on Clean Transportation.

<sup>15</sup> Metcalfe J and Kuschel G (2022). *Estimating the impacts of introducing Euro 6/VI vehicle emission standards for Aotearoa*. Report prepared by Emission Impossible Ltd for NZ Ministry of Transport, 12 April 2022.

26. The gap between regulated emissions and on-road/real-world emissions, especially for emissions from diesel vehicles, has been recognised by law makers in Europe and other jurisdictions. As a result, the Euro 6/VI standard has been amended in stages since it was first introduced in Europe in 2014, in order to increase its effectiveness.
27. The most recent standard, known as Euro 6d, is now the most stringent standard regulated globally. The Euro 6d requirements were mandated for new type approvals in the EU from September 2017, though full implementation was not required until January 2021.
28. Although the harmful gas emission limits are similar throughout Euro 6a to Euro 6d and Euro VI-a to Euro VI-e, the newer iterations change testing procedures to ensure that the intended reductions are actually achieved, both in the laboratory and in real-world driving.
29. The EU continues to advance standards, as do other jurisdictions. The EU is planning to phase in Euro 6e in late 2022 and end approvals for the current Euro 6d standard during 2024. The Euro 6e standard adds further provisions to restrict real-world emissions closer to lab-tested emissions, and, a more accurate (tougher) assessment of plug-in hybrids, which currently are provided generous treatment through assumptions on how frequently they drive on battery-only (zero engine emission) propulsion.
30. Further, Euro 7 is expected to be phased in during the middle of this decade.<sup>16</sup> The United States has also indicated tougher harmful emission standards will be adopted in the middle of the decade.<sup>17</sup>

### Aotearoa's current regulations and their impact

31. The first Rule was introduced in 2004, which has since then been regularly amended to incorporate improved standards as they have become available. The Rule specifies minimum emissions standard requirements for used and new vehicles entering the fleet, further broken down by fuel type and vehicle weight.
32. The table below details Rule amendments and their year of enforcement across new and used vehicle segments. Figure 12 shows the response to the regulations through imports of emissions standards in a given year.

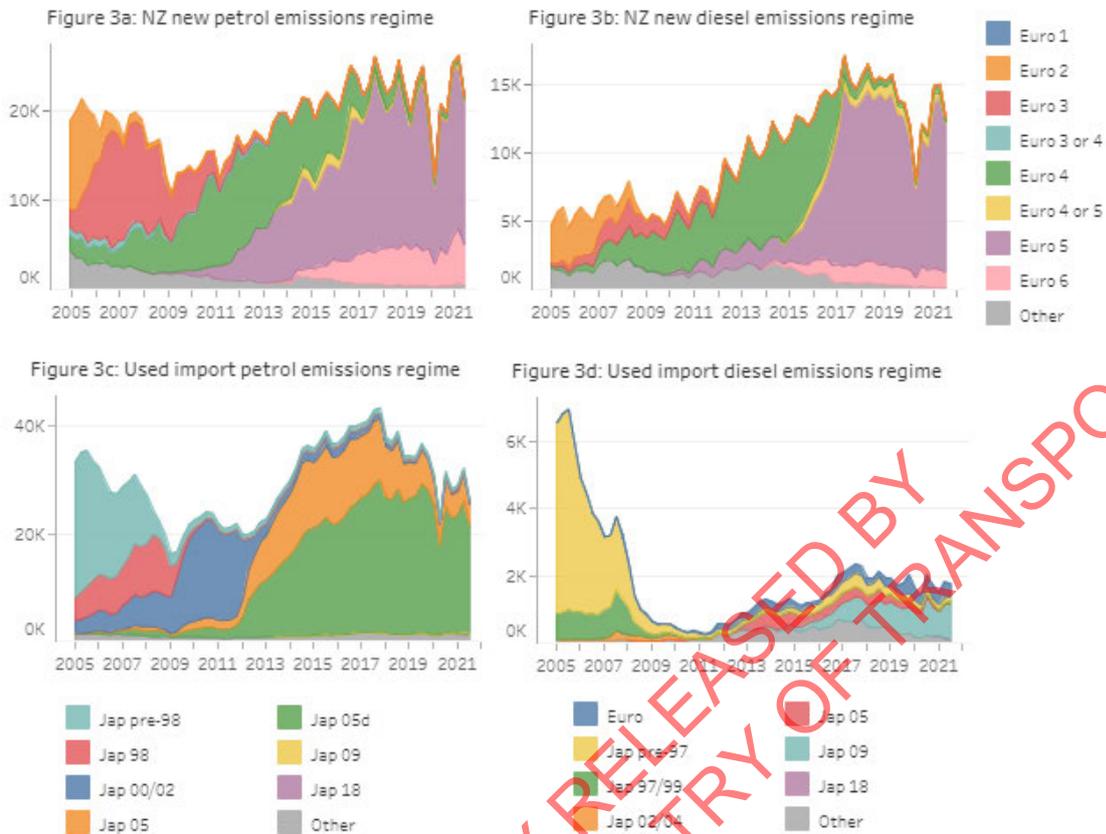
Figure 11 Table of Rule amendments since 2008

Year enforced	New Vehicles	Used Vehicles
2008	Euro 3	Euro 2
2009	Euro 4	Euro 3
2012	Euro 5	Euro 4

<sup>16</sup> [https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12313-European-vehicle-emissions-standards-Euro-7-for-cars-vans-lorries-and-buses\\_en](https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12313-European-vehicle-emissions-standards-Euro-7-for-cars-vans-lorries-and-buses_en)

<sup>17</sup> <https://www.epa.gov/newsreleases/epa-proposes-stronger-standards-heavy-duty-vehicles-promote-clean-air-protect>

**Figure 12 Graphs of new vehicle registration by emission standard shown over time**



33. This graph shows relatively high volumes of new Euro 4 vehicles continuing to be imported into Aotearoa after the requirement of Euro 5 in 2012. This is because the Euro 4/IV standard was not required for existing vehicle models until November 2016.
34. In learning from this, a policy to require Euro 6/VI would have a more stringent timeframe for existing vehicle models or would not allow extra time for existing vehicle models at all.
35. Aside from this, there is a clear increase in vehicles which meet the newly required standards on the year they are introduced, and a clear drop in imports of vehicles meeting the older emission standard.
36. Most of Aotearoa's used imports come from Japan, so these vehicles are referred to with their accepted Japanese emissions code. Japan 2005 is considered an accepted alternative to the Euro 4/IV standard, which has reduced in import numbers in recent years due to updated Japanese emissions standards.
37. Japan 2005d and Japan 09 would be accepted alternatives to Euro 5. As shown in the graph, the volume of imported Japan 00/02 vehicles (accepted alternative to Euro 3) reduces significantly with the requirement of Japan 2005 or above in 2012.

**The Emissions Reduction Plan will contribute to some harmful air pollution reductions**

38. The below table has a list of Emissions Reduction Plan (ERP) initiatives which may help to reduce levels of harmful emissions.

Initiatives underway	Details
<b>Mode-shift</b>	<p>Work underway by the government to shift people to other modes of travel (walking, cycling, public transport) and to reduce vehicle kilometres travelled (VKT) will help to reduce harmful emissions from motor vehicles.</p> <p>The Government’s ERP adopted in 2022 has a target to reduce VKT by 20 percent by 2035.</p>
<b>The Clean Vehicles Programme</b>	<p>The Clean Vehicle Discount and Clean Vehicle Standard continue to incentivise consumers towards low and zero carbon dioxide (CO<sub>2</sub>) emission vehicles and is likely to result in reduced harmful emissions over the long term. Because it uses pricing to bring about change, vehicles with high CO<sub>2</sub> (and harmful) emissions are still permitted but should reduce over time. The ERP has a target for 30 percent of the overall light fleet to be zero emissions by 2035, which if achieved, will reduce harmful emissions in the long term.</p>
<b>Freight decarbonisation</b>	<p>The work on the Green Freight project and current freight decarbonisation strategy is likely to reduce levels of harmful pollution from heavy vehicles. The ERP has a target to reduce freight CO<sub>2</sub> emissions 35 percent by 2035, noting that achieving this is reliant on formulating and adopting new policy, for example, policies that encourage the uptake of battery-electric and hydrogen powered trucks. Freight decarbonisation work should reduce harmful emissions in the medium-long term.</p>
<b>Biofuels mandate</b>	<p>The ERP commits Aotearoa to reduce the emissions intensity of transport fuel by 10 per cent by 2035. Biofuels are expected to reduce harmful emissions to some extent, but this has not been accounted for in the modelling used in this RIS, due to time constraints.</p>
<b>MARPOL Annex VI</b>	<p>Acceding to the Marine International Convention for the Prevention of Pollution from Ships (MARPOL) will reduce harmful emissions from shipping in and around Aotearoa ports and harbours. MARPOL Annex VI requirements will be in force before the end of 2022.</p>
<b>Public transport bus fleet decarbonisation</b>	<p>The public transport bus fleet is progressively being decarbonised. The Government requires all new public transport buses must be electric from 2025 and is targeting decarbonisation of the entire fleet by 2035. Based on existing diesel buses being operated until they reach a maximum of 20 years, we expect that most of our 900 very worst emission (Euro 3 and Euro 4) buses will exit the fleet between 2022 and 2032. From 2032, we would expect to see significant numbers of our existing 1000 Euro 5 buses exiting the fleet, but a full replacement of these vehicles would likely take until 2041.</p> <p>Accelerating the replacement of Euro 3, 4 and 5 buses with zero-emission buses sooner would be reliant on additional funding given the current cost premium for providing services with electric buses. Short term funding has been provided through Budget 2022.</p>

39. Although the above list of actions included in the ERP will contribute to harmful emissions reductions over the long term, we deem requiring Euro 6/VI as necessary for a number of reasons:

- The Clean Vehicles Programme does not currently include heavy diesel vehicles and is not expected in the short term to have a strong effect on light diesel

vehicles, both of which produce most of transport's harmful emissions. Although diesel vehicles are more economical on fuel and emit less CO<sub>2</sub> when measured against a similar sized petrol vehicle (therefore earning them better treatment under the Clean Vehicle Programme), they contribute disproportionately larger levels of harmful emissions than their petrol equivalents.

- Urbanised mode-shift is likely to shift commuters from petrol vehicles to active and public transport modes. This is beneficial for greenhouse gas emissions, but will have less impact on harmful emissions, because diesel vehicles (often utes and vans) will continue to be needed for particular purposes.
  - The freight decarbonisation plan is likely to have the most impact over the long-term, as vehicles we use for freight are predominantly diesel, and contribute a large proportion of harmful emissions. Emissions reduction technology for heavy vehicles is significantly behind that of light vehicles, so requiring Euro VI will enable vehicles entering the fleet to be cleaner than what would otherwise be imported over the short term.
40. Because Euro 6/VI vehicles tend to have newer technologies which enable more efficient engines (which emit less CO<sub>2</sub>), requiring the standard is in line with our goals under the ERP.
41. Although the above actions will have some impact on harmful emissions, targeting new and used imports is an action we can take which is minimal cost, will bring Aotearoa in line with the rest of the developed world, achieve co-benefits, and take place at the same time as other changes we need to make for a net zero emissions transport system.

### What is the policy problem or opportunity?

42. Although our air quality is generally good by world standards, air pollution is still a major health concern in Aotearoa and vehicles are a significant source of air pollution, especially in the Auckland region and beside busy roads.<sup>18</sup> Air pollution can cause significant health impacts ranging from respiratory symptoms and illness (morbidity) to premature death (mortality).
43. Air pollution in this context refers to pollutants that are harmful to human health, emitted from the tailpipe exhaust of vehicles. It does not include carbon dioxide emissions, or other greenhouse gases which are harmful to the climate.
44. Of the common pollutants present in air pollution, the largest and best-known impacts on health (in terms of the burden on the health system and society) arise from the fine particulate matter known as PM<sub>10</sub> (particles with a size less than 10 µm) and PM<sub>2.5</sub> (particles with a size less than 2.5 µm). Ultrafine particles (particles with a size less than 0.1 µm) are of particular concern due to their ability to penetrate deep in the respiratory system and enter the bloodstream.
45. Awareness of the health risks from exposure to oxides of nitrogen (NO and NO<sub>2</sub>, referred to collectively as NO<sub>x</sub>), especially NO<sub>2</sub>, is also growing.<sup>19</sup> This is particularly concerning, as transport is understood to be the only source of these emissions in Aotearoa, and their presence can be significant in cities.
46. The 2022 Health and Air Pollution in Aotearoa (HAPINZ 3.0) report found that air pollution (primarily NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>) from the transport sector contributed \$10.5 billion in social costs per year. By way of comparison, this is approximately double the

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<sup>18</sup> [our-air-2018.pdf \(environment.govt.nz\)](#)

<sup>19</sup> [Mortality and Morbidity Effects of Long-Term Exposure to Low-Level PM2.5, BC, NO2, and O3: An Analysis of European Cohorts in the ELAPSE Project | Health Effects Institute](#)

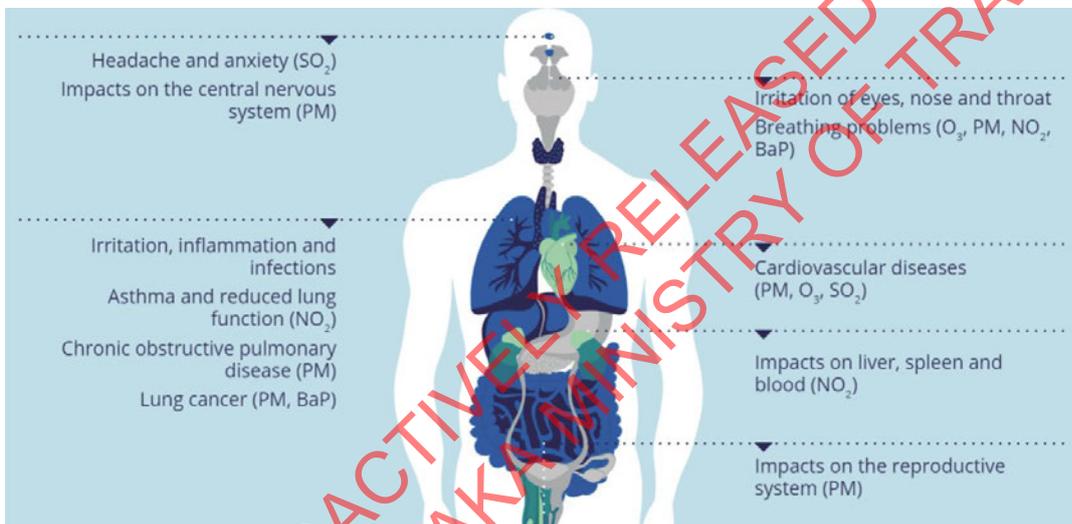
total social cost of motor vehicle fatal and injury crashes. The calculated social costs come from the below list of health impacts:

- 13,000 cases of asthma prevalence in our tamariki, and 900 childhood hospitalisations per year due to asthma/wheeze;
- 2,200 premature deaths;
- 9,000 cardiovascular and respiratory hospital admissions; and
- 300,000 restricted activity days (when air pollution causes symptoms which prevent people being able to go to work, school or undertake their usual activities).

47. Social costs measure the total cost of air pollution to the country, including loss of life, loss of productivity and income, and the costs of medical treatment, including hospital admissions.

48. Figure 13 below has further information on how air pollution impacts the human body.

**Figure 13 The impact of harmful air pollution on the human body<sup>20</sup>**



49. HAPINZ 3.0 also found that motor vehicle emissions contribute 67 percent of the total social cost health burden due to air pollution. This is over twice that of the second highest contributor, domestic fires (29 percent).

50. Due mostly to better measurement, together with some increases in pollution and exposed population, the overall impacts are significantly higher than previously understood. Previous reports did not have sufficient NO<sub>2</sub> data to account for it in social costs and morbidity. Being able to account for NO<sub>2</sub>, together with moderate increases in pollution, shows the overall impacts are significantly higher than previously understood. This is consistent with new international findings on air pollution by the World Health Organisation (WHO).<sup>21</sup>

51. Unlike particulate emissions, where the main sources in Aotearoa are from domestic fires (although transport contributes to particulate matter pollution also), NO<sub>x</sub> emissions are solely a product of combustion of fossil fuels, especially from diesel vehicles.<sup>22</sup>

<sup>20</sup> BaP = benzo(a)pyrene; NO<sub>2</sub> = nitrogen dioxide; O<sub>3</sub> = ozone; PM = particulate matter; SO<sub>2</sub> = sulphur dioxide  
Source: EEA (2020).

<sup>21</sup> New WHO Global Air Quality Guidelines published 2021 provide clear evidence of the damage air pollution inflicts on human health, at even lower concentrations than previously understood.

<sup>22</sup> Paul Nieuwenhuis, *Fact Check: are diesel cars really more polluting than petrol cars?*, Cardiff University, accessed: <https://theconversation.com/fact-check-are-diesel-cars-really-more-polluting-than-petrol-cars-76241>

Domestic and overseas health studies, show that NO<sub>x</sub> emissions have health impacts that are separate from particulates, and these impacts are significant. HAPINZ 3.0 found that particulate matter contributes to 10 percent of the total health burden due to motor vehicles; NO<sub>2</sub> contributes to the remaining 90 percent.<sup>23</sup>

52. In September 2021 the WHO published its first update in 15 years on the recommended maximum annual concentrations, giving a new guideline maximum value of NO<sub>2</sub> of 10 µg/m.<sup>24</sup> The WHO stated this new and much lower limit (the previous was 40 µg/m<sup>3</sup>) was necessary to protect the public from the health effects of NO<sub>x</sub>.
53. Few roadside monitoring locations in Aotearoa would have annual emissions below this new level. The updated WHO guideline is still too new to allow for an assessment of the implications of the new limit for Aotearoa air quality policy and this will need to be monitored.
54. Although PM concentrations have overall reduced by 21 percent since the first HAPINZ study in 2006 (17 percent of PM<sub>2.5</sub> is attributed to motor vehicles), nitrogen dioxide (NO<sub>2</sub>) concentrations have worsened by nearly 13 percent.<sup>25</sup> This has resulted in an increase in social costs of nearly 28 percent from 2006 to 2016. HAPINZ deemed this unsurprising, given the increases in VKT and the number of diesel vehicles (which are the major source of NO<sub>2</sub>) over the last decade.<sup>26</sup>
55. Overall, combining PM<sub>2.5</sub> and NO<sub>2</sub>, the air pollution health burden due to anthropogenic sources increased by 10.2% between 2006 and 2016. This increase is due to increased exposure to NO<sub>2</sub>, but the full impact of worsening NO<sub>2</sub> has been lessened by the improvements in PM<sub>2.5</sub> concentrations.
56. An infographic is attached at **Annex One** which illustrates the HAPINZ 3.0 findings visually

### Air pollution is not felt equally in Aotearoa

57. The young, sick, and elderly are much more likely to be affected. Māori are 3 times and Pacific peoples 3.2 times more likely to be hospitalised for asthma than Europeans or other New Zealanders. Low socio-economic groups are almost 3 times more likely to be hospitalised than those in the least deprived areas.<sup>27</sup> The WHO states that children living close to roads with heavy-duty vehicle traffic have twice the risk of developing respiratory disease as children who do not.<sup>28</sup>
58. Aotearoa has some of the highest rates of childhood asthma in the world, with one in seven children aged 2-14 years taking medication. For respiratory hospital admissions due to motor vehicle pollution (6,900 annually), 13 percent (approximately 900) of the

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<sup>23</sup> Kuschel et al (2022). Health and air pollution in Aotearoa 2016 (HAPINZ 3.0): Volume 1 – Finding and implications. Report prepared by G Kuschel, J Metcalfe, S Sridhar, P Davy, K Hastings, K Mason, T Denne, J Berentson-Shaw, S Bell, S Hales, J Atkinson and A Woodward for Ministry for the Environment, Ministry of Health, The Ministry of Transport and Waka Kotahi NZ Transport Agency, March 2022.

<sup>24</sup> [Ambient \(outdoor\) air pollution \(who.int\)](https://www.who.int/air-quality-guidelines)

<sup>25</sup> [PM<sub>10</sub> is particulate matter 10 micrometres or less in diameter, PM<sub>2.5</sub> is particulate matter 2.5 micrometres or less in diameter. PM<sup>2.5</sup> is more likely to travel into and deposit on the surface of the deeper parts of the lung, while PM<sup>10</sup> is more likely to deposit on the surfaces of the larger airways of the upper region of the lung.](#)

<sup>26</sup> <https://www.transport.govt.nz/statistics-and-insights/road-transport/sheet/vehicle-kms-travelled-vkt>

<sup>27</sup> <https://www.asthmafoundation.org.nz/research/key-statistics>

<sup>28</sup> <https://www.euro.who.int/en/health-topics/environment-and-health/Transport-and-health/data-and-statistics/air-pollution-and-climate-change2>

cases occur in children presenting with asthma/wheezing.<sup>29</sup> Motor vehicle pollution causes 13,200 cases of asthma prevalence in children annually.

59. Poor quality housing may be a factor for asthma prevalence in some groups, particularly the rate at which those living in deprived areas experience prevalence and hospitalisation. However, HAPINZ 3.0 and other international research show there is a clear link between even short-term (minutes or hours) exposure to NO<sub>2</sub> and the severe aggravation of asthma symptoms.<sup>30</sup>

### Current accepted standards in Aotearoa

60. Aotearoa accepts used vehicles where they meet Euro 4/VI and accepted aligned standards from Japan, Australia and the United States. For new vehicles, Euro 5/V and accepted aligned standards are accepted.
61. Aotearoa continues to import new vehicles today that were banned from sale in Europe six years ago for new vehicles, and 11 years ago for used imports. China and India have already implemented Euro 6 standards.
62. The root cause of the air pollution problem is the uncontrolled negative externality of motor vehicle pollution.

### The vehicle industry is a primary stakeholder in this issue

63. Officials have engaged with members of the MIA representing new vehicle distributors, and the Imported Motor Vehicle Industry Association (VIA) representing used vehicle importers. Officials have also engaged with the Motor Trade Association, the Automobile Association, and the Bus and Coach Association, among others.
64. Addressing harmful motor vehicle pollution through an update to the Rule will primarily affect vehicle importers and purchasers of brand new and newly imported used vehicles. An update to the Rule will impact what vehicles are permitted to enter the fleet and will have some impact on the price of vehicles, particularly new vehicles.
65. Although the vehicle industry generally agree motor vehicle pollution needs to be addressed, officials and industry differ around what the best phasing for Euro 6/VI is.
66. Some brands of new vehicle importers can meet fast timeframes of Euro 6/VI adoption. Other brands (particularly Japanese manufacturers) are more closely tied to the Australian market and need more time, or to wait until Australia adopts Euro 6/VI.
67. Officials began engagement with some groups affected by motor vehicle pollution to increase understanding of the problem when the HAPINZ 3.0 report was released in July 2022. These groups include the Aotearoa Asthma Foundation, Age Concern, Ora Taiao and others. Although there was not time to complete the engagement ahead of completion of this RIS, officials will look to proactively engage with these, and other groups affected by motor vehicle pollution, during public consultation on a proposed policy option. This will shape the Rule update, and any other actions that should be taken to address the motor vehicle pollution problem.

### What objectives are sought in relation to the policy problem?

68. To improve the harmful emissions standards of motor vehicles entering the Aotearoa fleet. The Rule has not been updated since 2012; updating the Rule to require Euro 6/VI will bring our standards in line with the rest of the developed world.

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<sup>29</sup> Aged 0 to 18 years.

<sup>30</sup> J. Gillespie-Bennett\*, N. Pierse\*, K. Wickens, J. Crane#, P. Howden-Chapman, and the Housing Heating and Health Study Research Team. *European Respiratory Journal*, vol 38, no 2, 2011

## Section 2: Deciding upon an option to address the policy problem

### What criteria will be used to compare options to the status quo?

69. The overarching objective of any policy solution in this context should be to improve the emissions standards of vehicles entering the fleet. There are additional criteria to consider, particularly considering the impact new requirements will have on Aotearoa consumers.
- **Cost-effectiveness**, which primarily considers the costs borne by the motor vehicle industry to meet new requirements, which will be passed on to consumers.
  - **Air pollution impact**, is considered in terms of achieving reduced social costs from motor vehicle pollution. This criteria is weighted heavier than cost-effectiveness because it is the primary problem, and it is unlikely the costs to consumers or industry would be comparable to the air pollution problem (at \$10.5 billion annually).

### What scope will options be considered within?

70. Cabinet agreed to update the Rule to require Euro 6 for light vehicles (CAB-21-MIN-004) in January 2021, and officials have had direction from the Minister to begin this process.
71. Adopting Euro VI for heavy vehicles is an action included in the Government's 2022 Emission Reduction Plan. Under action 10.3.1: *Support the decarbonisation of freight* it is agreed that the Government shall "Consider the implementation timing of Euro VI standard for heavy vehicles."
72. The scope of options is limited to improving the harmful emissions standards of vehicles entering the New Zealand fleet, by requiring the Euro 6/VI standard through a Rule update.
73. Additional policies, such as reducing VKT and accelerating the uptake of zero-emissions vehicles are covered by the 2022 ERP and are not the subject of this RIS (though these policies will contribute to reductions in harmful emissions). The ERP targets are to reduce VKT by cars and light vehicles by 20 percent by 2035 and to increase zero-emission vehicles to 30 percent of the light fleet by 2035.
74. Policies such as low-emission zones and behaviour change campaigns are being worked through by other policy teams in government.

### What options are being considered?

75. Three options are being considered to address this issue. These include:
- Taking no action
  - Waiting to require Euro 6/VI until Australian adoption of the standard
  - Requiring the most recent Euro standard, Euro 6d/VI-e, for new and used vehicles (with phasing and timing options across three sub options, 3a (fastest), 3b (moderate) and 3c (slowest))

### Option one – take no action

76. This option is to not update the Rule and maintain the status quo. The impact of this option would rely on voluntary efforts by the vehicle industry, together with existing and planned government work in the form of the Clean Vehicles Programme, the public

transport bus fleet decarbonisation, and other actions (such as decarbonising the freight sector) to reduce harmful emissions of vehicles.

### Option two – delay the Euro 6/VI requirement until Australian adoption

77. Like Aotearoa, Australia currently requires their accepted equivalent of Euro 5/V, regulated under the Australian Design Rule (ADR).
78. The current expectation is for Australian adoption of Euro 6/VI is in 2027, based on a published RIS by the Australian Government, but this has not been confirmed in legislation. Australia have also not confirmed they will adopt the most recent Euro 6d/VI-e standards.

### Option three – update the Rule to require more stringent emissions standards for new and used vehicles

79. This option reviews an appropriate new set of minimum requirements on vehicles entering Aotearoa, phased over time to strike a balance between vehicle supply and rapidly reducing air pollution harm. As such, a number of different options around pace, stringency, and splitting of the vehicle market are possible.
80. Aotearoa currently accepts used imports meeting Euro 4/V. Over time this needs to shift to Euro 5/V and then to Euro 6/VI, to make gains in air quality.
81. For used vehicles, the option for analysis is:
  - used vehicles would be required to shift from Euro 4/IV to Euro 5 as soon as possible
  - Euro 6/VI would be required for used petrol vehicles manufactured in 2024 or later, and then for all used petrol imports in 2028
  - Used diesel vehicles, light and heavy, would be required to meet Euro 6/VI on the same dates as new vehicles

#### Options for new vehicles:

82. Aotearoa currently accepts brand new vehicles meeting Euro 5/V. Several options are available to move to Euro 6/VI, with varying planning and disruption impacts on the new motor vehicle industry. These options are shown in the table below:

Option	Requirement for light vehicles	Requirement for heavy vehicles
<b>3a (rapid)</b>	Euro 6d in 2024	Euro VI-e in 2024
<b>Preferred option</b>	Euro 6b in 2024	Euro VI-c in 2025
<b>3b (moderate)</b>	Euro 6d in 2025	Euro VI-e in 2026
<b>3c (MIA preferred option)</b>	Euro 6 for new models in 2025 Euro 6 for existing models in 2026 Euro 6d required after Australian adoption	Euro VI-c for new models in 2025 Euro VI-c for existing models in 2026 Euro VI-e required after Australian adoption

## How do the options compare to the status quo/taking no action?

	Option one	Option two	Option 3a	Option 3b	Option 3c
	Take no action	Adopt Euro 6/VI after Australia	Fastest	Moderate	Slowest
<b>Cost-effectiveness (consumers, industry)</b>	0	0 Adopting Euro 6/VI after Australian adoption would have a very similar impact to taking no action. This is because vehicle importers are likely to import vehicles of the same standard as Australia given its close linkages, whether there is a requirement for Euro 6/VI or not. This means adopting Euro 6/VI after Australia would technically be cost-effective, resulting in minimal purchase cost increases to consumers.	-- Some vehicle brands, such as those in Europe, can achieve this timeline without significantly increasing overheads. Many other vehicle brands, such as those tied to Australia, have stated that this timeframe will be too fast, causing high overheads which will result in high-cost increases passed down to consumers.	- This timeframe would result in some vehicle cost increases and would cause restrictions on some available models. Industry have stated that Euro 6b is more achievable, but Euro 6d/VI-e ahead of Australia still impossible. This will be true for some vehicle brands, but not for all.	0 This timeframe would cause the least vehicle model restrictions/cost increases compared to options 3a and 3b. It is broadly achievable for industry to meet and will result in minimal cost increases to consumers.
<b>Harmful air pollution impact (weighted x2)</b>	0	0 Similar outcomes to harmful air pollution as taking no action due to the reasons outlined above. Australia may not	++ Would abate significant social costs, upward of \$8.3b (accumulated to 2050).	++ Would abate significant social costs, upward of \$6.7b (accumulated to 2050).	+ The less stringent standard of Euro 6b would not apply to all new imports until 2026, and the most stringent

	Option one	Option two	Option 3a	Option 3b	Option 3c
		adopt the most stringent iteration of the Euro 6/VI standard, and timeframes on their adoption are to be confirmed.			standard, Euro 6d/VI-e, does not have an implementation timeframe. We assess the social cost savings would likely align with the 2027 introduction scenario, of \$3.7b (accumulated to 2050).
<b>Overall assessment</b>	0	0	0	+	+
<b>Weighted assessment</b>	0	0	++	+++	++

**Key for qualitative judgements:**

- +++ much better than the taking no action
- ++ better than the taking no action
- 0 about the same as the taking no action
- worse than the taking no action
- much worse than the taking no action
- ... preferred option highlighted

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## What option is likely to best address the problem, meet the policy objectives, and deliver the highest net benefits?

83. The analysis on anticipated saved social costs and consumer-facing costs have been taken from the below table, developed for the Ministry by Emissions Impossible. These figures are based off the HAPINZ 3.0 report referenced earlier in the paper. The scenarios consider Euro 6/VI adoption across four scenarios: in 2024, 2025, 2027 and 2030.

Figure 14 Table of estimated benefits and costs of policy scenarios from 2021 to 2050<sup>31</sup>

Scenario	Benefit Net Present Value \$2019 (in \$million)	Cost** NPV \$2019 (in \$million)
Scenario 1: 2024	\$ 8,342	\$236
Scenario 2: 2025	\$6,662	\$182
Scenario 3: 2027	\$3,749	\$92
Scenario 4: 2030	\$1,076	\$22

\*The benefit is the difference between the base case and the scenario total NPV of air pollution costs from diesel and petrol vehicle emissions from 2021 to 2050  
 \*\*The cost is the estimated total NPV of the additional cost of manufacturing Euro 6/VI vehicles (compared with a Euro 5/V vehicles) for the vehicles affected under each policy scenario between 2021 and 2050. The cost is based on an estimated worst case manufacturing cost premium.

### Option two (wait for Australia) is similar to taking no action

84. This is because if Australia requires Euro 6/VI, Aotearoa importers will likely follow suit whether it is required here or not. It is, as per option one, highly achievable and minimises costs in terms of vehicle purchase prices.
85. Australia have moved slowly to adopt Euro 6/VI because its petrol specifications cannot support Euro 6 vehicles. The specified levels of aromatics and sulphur could damage Euro 6 vehicles or void their warranties, so Australian oil refineries would need to be upgraded to ensure compatibility with Euro 6 engines. Australia has just made sulphur reduction a requirement for the end of 2024. Upgrading oil refineries is a significant exercise, and as such, runs the risk of delay.
86. Australian diesel specifications do support Euro 6/VI engines, so there is potential for earlier adoption for light and heavy diesel vehicles.

s 6(b)

88. Aotearoa no longer has domestic petrol refineries so does not face the same challenge; we already import fuel that, on average, meets Euro 6 compatibility.
89. This option would not improve the emissions standards of motor vehicles entering the fleet fast enough, because Australia may not adopt Euro 6 for their light vehicles until 2027, and while heavy vehicles could transition sooner, this is by no means certain.
90. This option leaves Aotearoa with uncertainty. We would have to wait for Australia to upgrade petrol refineries, and for an updated Australian Design Rule for Australian diesel vehicles. The longer delay ahead of requiring Euro 6/VI will lock in vehicles with

<sup>31</sup> Metcalfe J and Kuschel G (2022). Estimating the impacts of introducing Euro 6/VI vehicle emission standards for Aotearoa. Report prepared by Emission Impossible Ltd for NZ Ministry of Transport, 12 April 2022.

high levels of harmful emissions in the fleet for longer. It would also allow another body that Aotearoa has no direction over influence our domestic decision making.

### Options 3a-3c would regulate stricter emission standards

91. All of these options would include moving used vehicles to stricter emissions standards:
  - used vehicles would be required to shift from Euro 4/IV to Euro 5/V as soon as possible
  - used petrol vehicles manufactured in 2024 or later would be required to meet Euro 6/VI, before the requirement applying to all used petrol imports in 2028
  - used diesel vehicles, light and heavy, would be required to meet Euro 6/VI on the same dates as new vehicles.
92. Requiring Euro 5/V for used vehicles is unlikely to cause vehicle constraints, as 85 percent of used vehicle imports already meet this threshold.
93. The prescribed dates for used vehicles are unlikely to cause constraints, as the majority of these come from Japan, and have had to meet the accepted Japanese version of Euro 6/VI from 2020 onwards.
94. There is not a supply constraint on used diesel vehicles, therefore phasing out to 2028 is not necessary, and would not be desired given diesel engine emissions cause more health harm than petrol engine emissions. On average, under 10 percent of used vehicle imports have diesel engines.
95. However, the latest light diesel standards required in Japan from 2016 remain noticeably weaker than Euro 6. This is a difficult issue to resolve through import standards, as requiring standards more stringent than Japan would effectively mean a ban on used diesel imports manufactured in Japan.
96. **Option 3a (fast)** would result in significantly abated social health costs out to 2050, the most out of all options. However, it has been deemed as unachievable by several leading vehicle brands.
97. Moving too fast to require Euro 6/VI is likely to severely restrict available vehicle models and would increase overheads. The majority of our vehicles are approved for sale (homologated) to the Australian Design Rule, and re-homologating vehicle models to meet the Euro 6/VI standard is likely to increase overheads significantly (by millions of dollars). Allowing sufficient lead time for vehicle importers to decouple from the Australian market would reduce the overheads inevitably passed on to consumers. So, while the likely benefits are high by moving quickly, so would be the likely costs to consumers. This would save an accumulative \$8.342 billion in social costs out to 2050. Accumulative costs (considering difference in manufacturing price) to consumers is \$236 million.
98. **Option 3b (moderate)** has mixed achievability; as there is more Euro 6b model availability but requiring Euro 6d in 2025 is challenging for some brands. This is particularly true for Japanese automakers (especially diesel vans and utes), having organised their business more closely with the Australian market than their European counterparts.
99. Some brands will be unable to move to the more stringent Euro 6d/VI-e standard ahead of Australia, despite it being a legal requirement in the UK and Europe already. We anticipate this would cause some constraints on vehicle models, and moderate increases in vehicle prices, where Australasian supply is split. Industry has also requested a gap between new and existing vehicle models.

100. s 9(2)(b)(ii)

101. Heavy vehicle distributors state they are likely be able to meet the Euro VI-c requirement based on their confidence that Australia is likely to move in similar timeframes. This would however be more challenging to meet if Australia did not adopt Euro VI mid-decade. This risk could be mitigated with a scheduled rule review.
102. This option is outside of the scenarios modelled by Emissions Impossible in figure 14. Based on the scenarios modelled, we assess this option would save over \$6.7 billion in social costs out to 2050, with accumulative costs to consumers of between \$92 and up to \$200 million.
103. **Option 3c (slow)** would result in some abatement of harmful emissions. This option does not specify which iteration of Euro 6/VI should be required for light vehicles. It would affect only newly introduced models to start and give more time to existing models. This is a convention used historically by our Rule amendments, when Aotearoa was more rapidly following international jurisdictions (and hence the supply of vehicles globally meeting such standards was still growing). Because the majority of brand-new vehicles imported to Aotearoa are 'existing' models, this option would essentially defer much of the regulatory impact by a further year, especially if distributors postpone introducing new vehicle models.
104. This option is easier for the industry to achieve but provides a slow improvement to harmful emissions and other benefits. Option 3c is outside of the scenarios modelled by Emissions Impossible in figure 14. It allows less stringent iterations of Euro 6/VI. As illustrated by figures eight and ten, iterations of Euro 6/VI before Euro 6d/VI-e provide less air pollution benefits than the most stringent standard. The less stringent standard of Euro 6b would also not apply to all new imports until 2026. We assess the social cost savings would align with the 2027 introduction scenario, of \$3.749 billion (out to 2050), with accumulative costs to consumers of between \$92-\$182m. Costs are assessed to be between the 2025 (\$182 million) and 2027 (\$92 million) introduction scenarios.
105. Between the moderate and slow options, the trade-off is a couple of years of bigger profits for industry, and for wider model availability for consumers, between several billion dollars in saved social costs out to 2050. It is important that New Zealanders have a fair range of options for the vehicles they need. Our preliminary discussions suggest that the moderate option will deliver adequate supply of Euro 6/VI vehicles for Aotearoa consumers and save more substantial health costs in the long-term than delaying the requirement, or opting for a less stringent version of Euro 6/VI.
106. Our preferred option is 3b. Public consultation would be able to help discern whether this moderate option will reduce the re-homologation costs enough to ensure sufficient supply of vehicles New Zealanders need, at reasonable prices.

### What are the marginal costs and benefits of the option?

Additional costs of the preferred option compared to taking no action	Comment <i>nature of cost or benefit (e.g., ongoing, one-off), evidence and assumption (e.g., compliance rates), risks.</i>	Impact <i>\$million present value where appropriate, for monetised impacts; high, medium, or low for non-monetised impacts.</i>	Evidence <i>Certainty High, medium, or low, and explain reasoning in comment column.</i>
<b>Costs of regulatory change</b>	Low regulatory change cost, can be done	Low	High

<b>Additional costs of the preferred option compared to taking no action</b>	<b>Comment</b> <i>nature of cost or benefit (e.g., ongoing, one-off), evidence and assumption (e.g., compliance rates), risks.</i>	<b>Impact</b> <i>\$million present value where appropriate, for monetised impacts; high, medium, or low for non-monetised impacts.</i>	<b>Evidence</b> <i>Certainty High, medium, or low, and explain reasoning in comment column.</i>
	relatively quickly with existing FTEs.		
<b>Cost to consumers</b>	Moderate overall cost to consumers. Vehicle prices may cost more in the long-term as more features become embedded in vehicle design. Risks are higher than forecasted costs if the preferred option is not achievable by industry and a potential shift to importing more used vehicles that only comply with Euro 5  Costs may be offset by a reduction in travel costs resulting from lower fuel consumption and less frequent need for repairs and servicing.	Moderate cumulative impact of \$92 million and up to \$200 million out to 2050. These costs were based on estimated price premiums of Euro 6 vehicles compared to Euro 5.	Medium – based on modelling report.
<b>Total monetised costs</b>	Monetised costs considered low compared with the social cost benefit.	\$92 million-\$200 million out to 2050.	Medium
<b>Non-monetised costs</b>	Low non-monetised costs of regulatory change. Moderate non-monetised costs should the option not be achievable for industry.	Medium	Medium

<b>Additional benefits of the preferred option compared to taking no action</b>	<b>Comment</b> <i>nature of cost or benefit (e.g., ongoing, one-off), evidence and assumption (e.g., compliance rates), risks.</i>	<b>Impact</b> <i>\$ million present value where appropriate, for monetised impacts; high, medium or low for non-monetised impacts.</i>	<b>Evidence</b> <i>Certainty High, medium, or low, and explain reasoning in comment column.</i>
<b>Reduction in the health impacts of air pollution</b>	The social costs of air pollution reflect the harm pollutants impose on human health. Reducing the quantity of pollutants emitted will realise significant benefits of	Between \$6,662 million-\$7,500 million in social cost savings to 2050.	High. The social cost values were estimated in the HAPINZ 3.0 study. The reduction in pollutants from

Additional benefits of the preferred option compared to taking no action	Comment <i>nature of cost or benefit (e.g., ongoing, one-off), evidence and assumption (e.g., compliance rates), risks.</i>	Impact <i>\$ million present value where appropriate, for monetised impacts; high, medium or low for non-monetised impacts.</i>	Evidence Certainty <i>High, medium, or low, and explain reasoning in comment column.</i>
	fewer health conditions associated.		this policy was estimated based on Waka Kotahi's Vehicle Emissions Prediction Model.
<b>Travel costs</b>	<p>Benefits of lower travel costs due to slight improvements in fuel consumption and maintenance are likely to be small across all scenarios.</p> <p>Increase in travel demand is likely to be minimal- so we can assume VKT will remain same.</p> <p>Euro 6/VI vehicles could also be more expensive to operate than their Euro V/I counterparts. For example, Euro 6/VI requires the use of urea.<sup>32</sup> Urea is not considered to be an unreasonable extra expense for business operators who rely on the use of diesel vehicles.</p>	Low	Medium
<b>Total monetised benefits</b>	High monetised benefits in the reduction of social costs over the next 30 years.	High - between \$6,662 million- \$7,500 million in social cost savings out to 2050.	High
<b>Non-monetised benefits</b>	Low – VKT and lower travel costs are assumed to be minimal.	Low	Medium

<sup>32</sup> Urea is injected in the engine's gas exhaust system resulting in a chemical reaction that converts NOx produced by diesel cars to harmless water vapour as well as nitrogen.

Alignment of the preferred option to other priorities compared to taking no action	Comment <i>nature of cost or benefit (e.g., ongoing, one-off), evidence and assumption (e.g., compliance rates), risks.</i>	Impact <i>\$million present value where appropriate, for monetised impacts; high, medium or low for non-monetised impacts.</i>	Evidence Certainty <i>High, medium, or low, and explain reasoning in comment column.</i>
<b>Alignment with Clean Vehicles Programme</b>	For light vehicles, efficiency improvements are largely driven by separate legislation. Efficiency gains now need to be made by hybrid tech and electrification which can, but not always, reduce both greenhouse gas and harmful emissions. Some pollution reduction technology can actually reduce engine efficiency slightly and cause a minor increase in CO <sub>2</sub> emissions.	Low	Medium
<b>Reduction in CO<sub>2</sub> emissions</b>	Improved fuel consumption may lead to some benefits of reduced CO <sub>2</sub> emissions. However, given the implementation of other policies to address this, and that CO <sub>2</sub> emissions are a small focus of Euro standards, we can expect the reduction in CO <sub>2</sub> to be in the low thousands to low ten-thousands tonnes CO <sub>2</sub> emissions per annum, which will reduce over time.	Low – improvement in CO <sub>2</sub> emissions is largely driven by separate legislation.	Medium – CO <sub>2</sub> emissions are a small focus of Euro standards.
<b>Reduction in road crashes and injuries</b>	The increased uptake of Euro 6d/VI-e vehicles could deliver both environmental and safety benefits. However, just 68 percent of Euro 6 vehicles imported in 2021 have the two key safety features that been proven to offer the greatest safety benefits for Aotearoa's crash	Medium. AEB and LKA alone have the potential to have 496 DIS savings between now and 2030 (representing a social cost reduction of about \$484 million). This is on top of the \$662 billion in social costs prevented by Euro 6/VI adoption out to 2050.	Medium

Alignment of the preferred option to other priorities compared to taking no action	Comment <i>nature of cost or benefit (e.g., ongoing, one-off), evidence and assumption (e.g., compliance rates), risks.</i>	Impact <i>\$million present value where appropriate, for monetised impacts; high, medium or low for non-monetised impacts.</i>	Evidence Certainty <i>High, medium, or low, and explain reasoning in comment column.</i>
	<p>types (Autonomous Emergency Braking (AEB) and Lane Keep Assist (LKA)).</p> <p>However, of all new vehicles that came into Aotearoa last year, just 14 percent met Euro 6/VI, LKA and AEB. Therefore, while there are environmental benefits to Euro 6/VI, there are potential safety disbenefits by excluding those vehicles with these safety features, that are not Euro 6 standard.</p> <p>Exploratory work to support the adoption of AEB and LKA is underway and work to mandate these features could take place in parallel to work to mandate Euro 6/VI.</p>		

### Equity considerations

107. For new vehicles, the worst case increases to cost premiums for manufacturing a Euro 6/VI vehicle compared with a Euro 5/V are below:
  - Petrol light duty: \$300 per vehicle
  - Diesel light duty: \$900 per vehicle
  - Diesel heavy duty: \$4000 per vehicle<sup>33</sup>
108. The above figures do not take into account the industry costs (which could be passed on to consumers) that moving to Euro 6/VI could cause. Public consultation on the proposed option will help to clarify how significant these costs could be.
109. Euro 6/VI diesel vehicles require the use of exhaust reagent (most commonly known as AdBlue). Between 30–60 litres of AdBlue (priced between 0.6–1.50 per litre) is needed per 1000 litres of diesel used. This would be an additional cost to diesel vehicle users but could be offset by gains made in reduced fuel consumption.
110. It is important to ensure used vehicle imports remain affordable for low- to middle-income New Zealanders. As mentioned, requiring Euro 5/V for used vehicles next year

<sup>33</sup> On average. Very heavy trucks cost more to achieve Euro VI however there are far fewer of them.

is unlikely to cause price increases, as 85 percent of used vehicle imports already meet this threshold.

111. It is difficult to project what price increases could occur by phasing the Euro 6/VI requirement out to 2028, and officials may need to monitor this ahead of requirements for petrol vehicles coming into force.
112. There are some specific transport inequities for Māori:
  - Māori are more likely than non-Māori to live in small urban and rural communities;
  - Māori are disproportionately younger and in lower income households;
  - Māori are disproportionately more likely to work in industries that require lengthy travel with limited access to public transport, such as horticulture and forestry.
113. Given the above, it is likely that Māori are more likely to purchase used diesel vehicles and more likely to drive them significant distances, so could be more impacted by any additional costs (such as the purchase of AdBlue). However, very small volumes of used diesel vehicles are imported, so it is likely any impact would only be felt later in the decade, or in the 2030s (after more expensive to buy/run new diesel imports are sold on within the Aotearoa market).
114. Over 70 percent of annual vehicle sales are of vehicles already in the Aotearoa fleet, which will not be subject to the new Rule. This does minimise the likelihood that groups such as lower income households, Māori in the groups listed above, younger workers and students would be negatively affected by a Euro 6/VI requirement.
115. Our analysis would have been strengthened with specific impacts on groups disproportionately affected by air pollution; we know that the young and old, and people living near busy roads are the most affected by air pollution. These groups are likely to feel the benefits of importing cleaner vehicles the most, as well as diesel vehicle users (as air pollution also affects the passengers and drivers of these vehicles).

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## Section 3: Delivering an option

### How will the new arrangements be implemented?

116. Our preferred option to implement is 3b.

Option	Requirement for light vehicles	Requirement for heavy vehicles
<b>3b (moderate)</b>	Euro 6b in 2024	Euro VI-c in 2025
	Euro 6d in 2025	Euro VI-e in 2026

117. Waka Kotahi would be responsible for the implementation and enforcement of option 3b, and would be responsible for updating the Rule to stipulate the Euro 6/VI requirement, and on what dates, with support from the Ministry.
118. Ahead of the Rule being finalised, the Minister of Transport will seek agreement from Cabinet to publicly consult on a draft Rule. Public consultation is expected to take place in September 2022 for six weeks.
119. Waka Kotahi and the Ministry will then consider submissions on the preferred option and may undertake a further two-week targeted consultation with industry. This targeted consultation will be to ensure the technical accuracy of the Rule before providing a final copy to the Minister for signature.
120. An updated Rule will be finalised by the end of the year. Arrangements will come into effect after the 28-day gazetting period.
121. Should substantive changes to the draft Rule be needed after public consultation, the Minister will report back to Cabinet. In this scenario, an updated Rule will be finished in the first quarter of 2023.
122. Key implementation risks are the achievability of the dates by which Euro 6/VI is required by a new Rule. Ongoing engagement and then formal public consultation with industry are informing policy decisions to ensure dates put forward are achievable.

### How will the new arrangements be monitored, evaluated, and reviewed?

123. New arrangements will be monitored through existing statistical forums the Ministry and Waka Kotahi already undertake. This includes the regular monitoring of the emissions standards of new vehicles when they are registered for entry into the fleet. The Ministry also produces a report on fleet statistics annually. Statistics (including of harmful emissions standards) on new vehicle registrations are also updated on a quarterly and monthly basis and are publicly available on the Ministry's website.
124. A Rule review could be scheduled one year into requiring Euro 6/VI to survey its effect on the vehicle market, including model availability and pricing, and its effect on the prevalence of AEB and LKA in newly registered vehicles.
125. The Ministry for the Environment conduct regular assessments of air quality through its environmental reports. The reports are produced jointly with Statistics Aotearoa and are done every three years. These reports should be able to indicate whether stringent exhaust emissions standards are resulting in a decrease of motor vehicle pollution.

# Annex One: HAPINZ 3.0 findings infographic

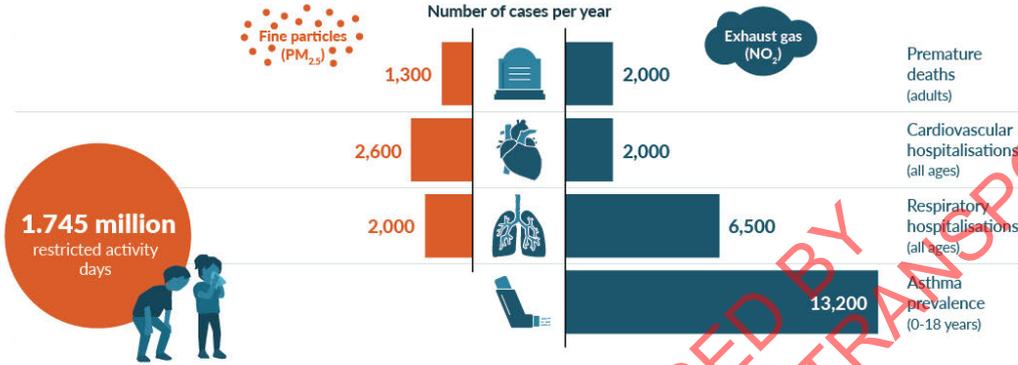
Health and Air Pollution in New Zealand (HAPINZ)

## HAPINZ 3.0 study key findings

Air pollution does significant harm to our people, especially our tamariki.

Clean air matters to Kiwis: making improvements in air quality makes a difference to people's health.

### Health impacts from human-made air pollution (2016)



### Social costs of health impacts from human-made air pollution (2016)

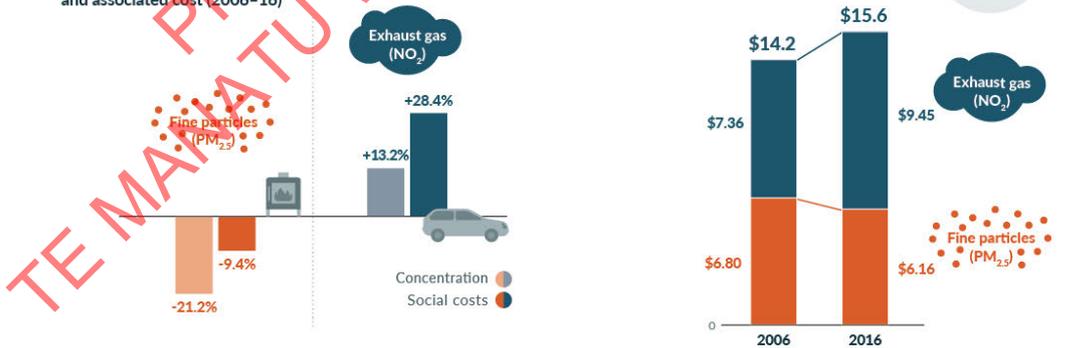


### Trends in air pollution and social costs (2006-16)

Improvements in PM<sub>2.5</sub> were offset by increased exposure to NO<sub>2</sub>.

Change of PM<sub>2.5</sub> and NO<sub>2</sub> population-weighted concentration and associated cost (2006-16)

Social costs per year in billion \$



[environment.govt.nz/publications/health-and-air-pollution-in-new-zealand-2016-findings-and-implications](http://environment.govt.nz/publications/health-and-air-pollution-in-new-zealand-2016-findings-and-implications)  
[www.ehinz.ac.nz/projects/hapinz3](http://www.ehinz.ac.nz/projects/hapinz3)

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