

Coversheet: Moving to a low emissions light vehicle fleet

Advising agencies	Ministry of Transport
Decision sought	Agreement to publicly consult on a vehicle fuel efficiency standard and a feebate scheme.
Proposing Ministers	Associate Minister of Transport

Summary: Problem and Proposed Approach

Problem Definition

What problem or opportunity does this proposal seek to address? Why is Government intervention required?

Transport accounts for 20 percent of domestic greenhouse gas emissions, and is New Zealand’s fastest growing source of emissions. Between 1990 and 2017, gross emissions across the economy grew by 23 percent with transport emissions growing by 82 percent, and road emissions increasing by 93 percent.

The Emissions Trading Scheme (ETS) is New Zealand’s primary tool for providing for the abatement of greenhouse gas (GHG) emissions. The objective of pricing GHG emissions is to allow the market to moderate demand for transport fuel. However, at the current New Zealand Unit price of around \$25 per tonne, the emissions component of fuel prices is just around 7 cents per litre for petrol. The Productivity Commission’s analysis concluded that the ETS currently plays a very limited role in reducing transport emissions as the carbon price is a relatively small component of fuel prices and fuel demand is relatively unresponsive to changes in price.

The Ministry of Transport considers that the ETS will not deliver the most desirable emission abatement solutions for New Zealand transport in the timeframe wanted, and therefore we recognise that there are good reasons to employ a broader range of complementary measures. This view was earlier evidenced by an Infometrics report commissioned by the Ministry to examine the carbon emission abatement potential of the ETS in transport in 2017¹.

Without additional policy intervention, emissions from light vehicles are projected to grow until around 2022 before declining. If no policy changes are made, emissions from light vehicles are projected to be 12 percent above 2005 levels by 2030. However, New Zealand’s 2030 Paris Agreement target is to reduce net emissions by 30 percent below 2005 levels by 2030. This is a significant mismatch.

The Productivity Commission has noted New Zealand is one of a handful of developed countries without a vehicle fuel efficiency standard, and as a result risks becoming a dumping ground for high-emitting vehicles from other countries. Evidence suggests this is already playing out as the most efficient variants of the top selling 17 models in New Zealand have on average 21 percent higher emissions than their comparable variants in the United Kingdom.

Incentivising the light vehicle fleet to be low emissions presents the greatest opportunity to reduce transport emissions. However, the status quo policy settings are not sufficient to

¹ The Impact of the ETS on Lowering Transport Emissions for Ministry of Transport August 2017

encourage the needed uptake of low-emission vehicles. New policies are required to address a number of challenges that are currently limiting the supply and demand of vehicles with lower emissions.

The two proposals covered by this regulatory impact statement: a vehicle fuel efficiency standard and a feebate scheme, are to complement the ETS and other government commitments in transport like investing in public transport and the encouragement of active transport modes. All such policies help New Zealand reduce GHG emissions.

The vehicle fuel efficiency standard and the feebate scheme will apply to the light vehicles only. This is for pragmatic reasons. There are a growing number of low emission light vehicles on the market, meaning a real opportunity to encourage change exists. This is not the case for heavy vehicles - yet. The Government intends to address emissions from the heavy fleet in the future, but this is not practical until low emission technologies for the heavy fleet are available.

Proposed Approach

How will Government intervention work to bring about the desired change? How is this the best option?

Vehicle fuel efficiency standard

A regulated vehicle fuel efficiency standard for vehicles entering the fleet would help New Zealand shift to a low emissions light vehicle fleet. It would do this by changing the composition of vehicle imports in favour of ones having lower average emissions. This includes encouraging the additional supply and uptake of electric vehicles (EVs).

A vehicle fuel efficiency standard would help address the supply and demand challenges that are currently causing New Zealand to lag behind in benefiting from improved vehicle technologies.

On the supply side, a less fuel efficient selection of vehicles is made available to our market compared to other markets. For example, the most fuel efficient variants of top selling 17 vehicle models available in New Zealand have, on average, 21 percent higher CO₂ emissions than the best comparable variant offered in the United Kingdom. A regulated vehicle fuel efficiency standard would also help overcome the vehicle demand issues that:

Vehicle suppliers and consumers have vastly different amounts of information. Vehicle suppliers know how much vehicles with better efficiency enhancing technologies cost. They also know the level of improvement these technologies offer. However, consumers generally only know, and can act on, the trade-offs between vehicle costs and fuel efficiency of the vehicles that are currently on offer to them.

Light vehicle feebate scheme

On the demand side, changing consumers' purchase decisions in favour of low emission vehicles is proposed through a vehicle purchase feebate² scheme. Consumers could receive a rebate, or be required to pay a fee, depending on the CO₂ emissions of the vehicle they are buying.

Feebates address the challenges that:

² Higher emission vehicles would incur a fee, while lower-emission vehicles would receive a rebate, hence the name 'feebate'.

- consumers discount fuel efficiency and carbon emissions in their vehicle purchase decisions
- consumers have been increasingly buying heavier more powerful vehicles that generate higher emissions because they require more fuel to move
- EVs and petrol hybrids are currently more expensive than conventional vehicles.

Section B: Summary Impacts: Benefits and costs

Who are the main expected beneficiaries and what is the nature of the expected benefit?

Monetised and non-monetised benefits

Introducing a vehicle fuel efficiency standard and a feebate scheme would be a significant policy supporting our climate change goals and international commitments to reduce greenhouse gas emissions.

The main direct beneficiaries would be vehicle consumers who would enjoy significant fuel savings from being able to purchase from a broader selection of more fuel efficient vehicles, including EVs. Recent studies indicate the 'total cost of ownership' reduces with EVs compared to fossil fuelled vehicles. Globally, as EVs and other low emission vehicles become main-stream, unit costs will decrease and pricing will move towards the prices for equivalent fossil fuelled variants. The measure is estimated to yield \$3.4 billion in fuel savings over the lifetime of the vehicles affected.

The main non-monetised benefits would be:

- improved security of supply from the importation of lower volumes of fossil fuel and increased use of locally generated electricity;
- road safety improvements from a more modern fleet;
- lower vehicular noise and air pollution; and,
- reduced vehicle maintenance costs (EVs have around 20 moving parts compared with 2,000 to 4,000 for a fossil fuelled vehicle so maintenance requirements are much less).

Combining the supply side increased availability of low emission vehicles from the vehicle fuel efficiency standard together with the demand side incentive for consumers to purchase low emission vehicles coming from the feebate scheme should maximise the change to electric vehicles and other low emission types. The combined affect will be greater than either scheme by itself.

Where do the costs fall?

Monetised and non-monetised costs; for example, to local government, to regulated parties

Vehicle fuel efficiency standard

The main cost with the vehicle fuel efficiency standard would be incurred by vehicle consumers as they pay for the higher technology costs associated with vehicles that have the necessary design and equipment to meet lower emissions levels. Government revenue from GST and fuel excise will also decline proportionally as fuel consumption is reduced.

There could also be a welfare impact borne by consumers who opt to buy a vehicle which is different from their preferred one as a result of changes in vehicle prices, or possibly in availability.

The extent to which any welfare loss occurs will depend on a number of factors, including

consumers' response to vehicle price changes, how importers alter their purchase profiles following changes in consumers' purchasing preferences, and how vehicle manufacturers respond to meet demand for low-emission vehicles.

Fuel suppliers would be expected to incur a fall in sales and revenue as a result of the fuel savings enjoyed by consumers.

There would also be continuing costs associated with EV recharging infrastructure. Infrastructure is developing, but is still of the nature where it is designed to serve only a few vehicles daily. EV recharging infrastructure is not yet mainstream. Infrastructure costs will also include EV owners and corporate owners who choose to put in charging units at their residence/vehicle depots.

The remaining costs are incurred by government to implement, regulate and enforce the standard, and by industry in compliance costs.

Light vehicle feebate scheme

For the feebate scheme, the main cost would be incurred by vehicle consumers through changes in the price due to the fee levied on high-emissions vehicles, if such vehicles remain their preference. This cost imposition is an essential part of the scheme designed to incentivise consumer choice towards low emissions vehicles.

The extent to which any welfare loss occurs will depend on a number of factors, including consumers' response to vehicle price changes, how importers will alter their purchase profiles following changes in consumers' purchasing preferences, and how car manufacturers respond to meet demands for low emission vehicles.

There would also be compliance costs to industry in displaying the fees and rebates, helping to make consumers aware of them, data entry/record keeping costs as well as transaction costs such as collecting the fees on behalf of the regulator. The detail of the scheme's design has yet to be finished but it will likely be reasonably complex and require industry involvement to work. Another potential cost to industry is to profitability as the government intervenes in market pricing.

There will be costs incurred by government for the implementation of the scheme. These costs will include the design and build of the data system and enforcing the scheme.

What are the likely risks and unintended impacts, how significant are they and how will they be minimised or mitigated?

Vehicle fuel efficiency standard

A vehicle fuel efficiency standard could potentially increase the cost of imported vehicles (both new and used-imports) resulting in the risk of extending the lifetime of existing vehicles in the fleet that are high emitters. Vehicles owners could become more diligent at vehicle maintenance of their older vehicles as they resist EV technology, or simply can't afford to buy more modern efficient vehicles. This would lock-in the emissions from older fossil-fuel vehicles for longer. It could also pose a risk to road safety.

To help mitigate this risk, the low emissions vehicle package includes a voluntary vehicle scrappage scheme in Auckland. The scheme would encourage people to retire their older vehicles earlier than they would have otherwise. The incentives offered would encourage EV uptake and a modal shift to e-bikes, public transport, cycling, car-share and ride-share schemes.

The fuel efficiency standard focusses on reducing CO₂ emissions. This could lead to an increased uptake of diesel vehicles and a resultant deterioration in air quality. This is because diesel vehicles tend to be relatively fuel efficient compared with petrol and they emit relatively lower levels of CO₂ emissions. Diesel motors produce higher levels of air pollutants such as nitrates and particulate matter. However, this risk is being mitigated by strengthening the exhaust emission standards to Euro 6 for new vehicles and (at least) Euro 5 for used-imports.

Light vehicle feebate scheme

For the feebate scheme, a key risk is that some low income households could be penalised where a low emissions vehicle is not available at an affordable price. In addition, larger households that require a larger vehicle such as a people mover may not find an affordable low emission model. In this situation, these households would have no choice but to purchase a higher emissions vehicle and may possibly be required to pay a fee.

This risk would arise if the range of low emission vehicles remains limited, and the price differential between conventional vehicles and EVs and petrol hybrids remains high. Tradespeople reliant on affordable utes, vans and light trucks could be similarly affected.

This risk could be mitigated by delaying the introduction of the feebate scheme until after the vehicle fuel efficiency standard had been in effect for at least a year. The fuel efficiency standard is expected to expand the selection of lower emission vehicles offered in New Zealand as importers alter their range selections to comply.

Identify any significant incompatibility with the Government's 'Expectations for the design of regulatory systems'.

Our initial assessment of implementation indicates that a vehicle fuel efficiency standard is able to be implemented in a manner consistent with the Government's 'Expectations for the design of regulatory systems'.

Section C: Evidence certainty and quality assurance

Agency rating of evidence certainty?

How confident are you of the evidence base?

The Ministry is confident of the evidence base it has used in its analysis. Vehicle fuel efficiency and emission results for makes and models of vehicles are specified and widely reported. International exhaust emission standards are known. Vehicle fuel efficiency standards and feebate type schemes have been implemented internationally and their

effects are well-proven. Our analysis has been informed by such information.

To be completed by quality assurers:

Quality Assurance Reviewing Agency:
<p>The Treasury has advised that given this is a consultation regulatory impact assessment, to accompany a discussion document and support in-principle decisions, it does not need to make a formal assessment of whether it meets the quality assurance criteria.</p> <p>The Treasury will do its assessment when public consultation has been completed and this regulatory impact assessment has been updated in light of that consultation. The updated regulatory impact assessment will inform Ministers' final decisions on whether or not to proceed with a vehicle fuel efficiency standard.</p>
Quality Assurance Assessment:
Reviewer Comments and Recommendations:

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Impact Statement: Moving to a low emissions light vehicle fleet

Section 1: General information

Purpose
<p>The Ministry of Transport is solely responsible for the analysis and advice set out in this Regulatory Impact Statement, except as otherwise explicitly indicated. This analysis and advice has been produced for the purpose of informing:</p> <ul style="list-style-type: none">• in-principle policy decisions to be taken by Cabinet• stakeholders who are to be consulted with via a government discussion document.

Key Limitations or Constraints on Analysis

Limitations on the quality of the data used for the impact analysis

The key limitation on the analysis in this regulatory impact statement concerns data limitations. The specific limitations identified in the analysis include the following.

- There is a high level of uncertainty about the rate at which the range of low emission vehicles, including EVs, will expand globally and in New Zealand. It is not known when New Zealand could expect to have low emission alternatives for the range of conventional vehicles currently available. It is also not known how quickly vehicle suppliers will alter their fleet profiles following changes in consumers' purchasing preferences.
- The purchase price of EVs will be a key driver of uptake. However, it is not possible to project EV prices with confidence. In particular, there is a high level of uncertainty around when price parity will be achieved between EVs and their fossil fuelled equivalents. The Ministry of Transport's projections of EV uptake assume purchase price parity will occur in the late 2020s. This assumption is at the optimistic end, with some commentators seeing price parity occurring in the major vehicle markets towards the end of the 2020s³ rather than in a small market like New Zealand. That said, officials are aware of one manufacturer who has notified recommended retail prices in late 2018 that indicate near price parity for one model plug-in EV.
- The analysis has assumed that the charging infrastructure for EVs will match the rate of EV uptake.
- There are a wide range of technologies that have been adopted by vehicle manufacturers to meet fuel efficiency standards in other countries. As a consequence, it is difficult to obtain reliable estimates of the costs consumers will face in being supplied with vehicles with better fuel efficiency. This has been resolved by using the cost estimates that the Australian Department of Infrastructure and Regional Development used in their regulatory impact assessment of a vehicle fuel efficiency standard in Australia⁴. It is assumed that New Zealand consumers will face the same magnitude of costs.
- The modelling for the vehicle fuel efficiency standard has assumed there are no vehicle supply constraints and vehicle distributors and dealers can source the low emission vehicles, including EVs, which they need to meet their fleet emission targets.
- Implementation costs have not yet been fully costed. This will be completed following public consultation when final recommendations are developed. The cost-benefit analyses for the vehicle fuel efficiency standard and the feebate scheme under-report the total benefits of these measures. Due to data limitations they do not include the benefits of:
 - lower air and noise pollution from the increased uptake of EVs
 - road safety impacts associated with changes in vehicle mixes and technologies
 - improved security of supply from lower fuel imports.
- The baseline scenario used in the cost-benefit analysis reflects the slow growth scenario in the Ministry of Transport's Vehicle Fleet Emissions Model. This makes a number of projections on vehicle imports including EVs and hybrids, the ratio of used and new vehicles, the average annual vehicle kilometres travelled (VKT), the rate of VKT decline as a vehicle gets older, the average economic life of a vehicle and the proportion of total

³ For example, Bloomberg New Energy Finance expect that price parity will occur in major markets over 2025–2029. See <https://about.bnef.com/blog/electric-vehicles-accelerate-54-new-car-sales-2040/>

⁴ Improving the efficiency of new light vehicles, Commonwealth of Australia, December 2016.

trips between different travel modes.

- The price of new conventional vehicles is assumed to remain constant and the price of hybrid vehicles is assumed to be the same as EVs. The own price and cross price elasticities are as estimated by Covec – Economic Consultants.
- The cost-benefit analyses assume that consumers only consider one year of fuel costs savings in their vehicle purchase decisions.

Stakeholder perspectives

This regulatory impact assessment has been prepared to inform Ministers' decisions on whether to consult on a vehicle fuel efficiency standard. Final decisions on whether the measure will be progressed will be informed by this consultation.

Nevertheless, some information on stakeholder perspectives is available from the public submissions on the New Zealand Productivity Commission's Low-emissions economy: Draft report. These submissions have informed this regulatory impact assessment.

Responsible Manager (signature and date):

Glen-Marie Burns
Manager, Urban Development and Environment
Ministry of Transport

15 April 2019

Section 2: Problem definition and objectives

2.1 What is the context within which action is proposed?

The Government is committed to taking action on climate change

Climate change poses significant risks to New Zealand’s economic, cultural, social and environmental prosperity. Like other countries New Zealand is highly vulnerable to the impacts of climate change, which include sea-level rise, ocean acidification and the increased frequency and severity of flooding, wildfires and drought⁵.

New Zealand is already beginning to experience significant costs and disruption from previously ‘locked-in’ climate change. More frequent and extreme weather events pose a significant risk to important infrastructure and assets. Climate change also presents a magnified security and economic threat in terms of increasing disaster risk management and migration pressures in the wider Pacific region⁶.

The specific economic costs of climate change impacts are difficult to estimate. However, a report, commissioned by The Treasury, found that climate change-related floods and droughts have cost the New Zealand economy at least \$120 million for privately insured damages from floods and \$720 million for economic losses from droughts over the last 10 years.

As well, the Ministry for the Environment has estimated the economic impact of climate change on New Zealand and Australia, combined, is a one to two percent reduction in gross domestic product levels by 2060⁷.

The only way New Zealand can minimise these impacts and costs is by playing its part to ensure there is collective and effective global action to reduce greenhouse gas (GHG) emissions.

As a party to the Paris Agreement on Climate Change, New Zealand has endorsed the decision that the world reach net zero GHG emissions by the second half of this century. Net zero means that GHG emissions are reduced to a level where the total amount emitted is no greater than the amount that can be removed from the atmosphere.

New Zealand has an interim target to reduce net emissions to 30 percent below 2005 levels by 2030.

To bring New Zealand further in line with the global ambition set out in the Paris Agreement, Cabinet agreed to the Climate Change Bill [CAB-17-MIN-0547 refers] this year. The Bill will set a new 2050 reduction target in law that is consistent with New Zealand becoming a net zero emissions economy.

Lowering emissions from transport is critical to meeting the net-zero challenge

Transitioning to a net-zero emissions economy will require significant economic change. The transport sector is expected to play a large part in this change. It accounts for 20 percent of New Zealand’s domestic emissions and it has been New Zealand’s fastest growing source of emissions (see Figure 1).

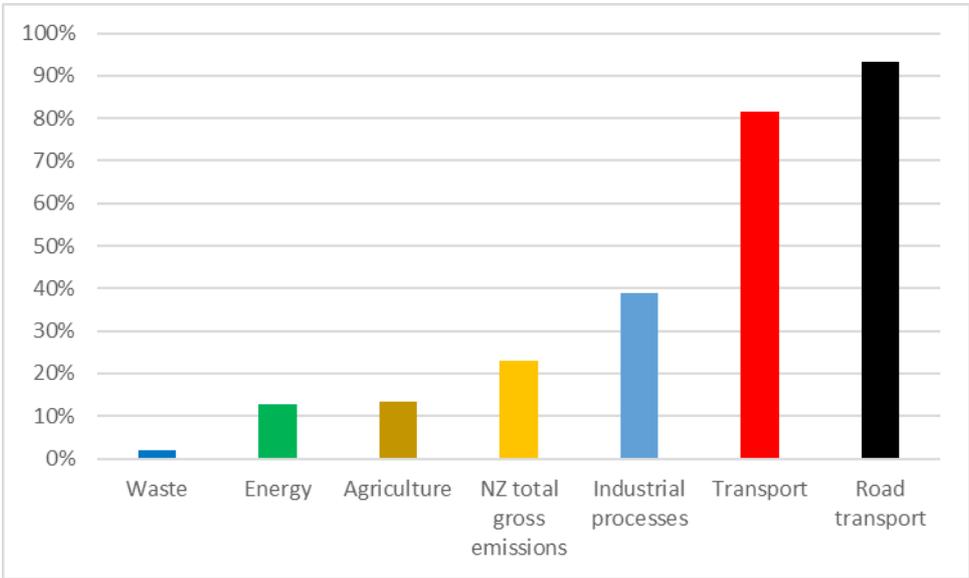
⁵ Reisinger et al, Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge and New York: Cambridge University Press. pp 1371-1438. 2014

⁶ Ministry for the Environment, Regulatory Impact Statement, Zero Carbon Bill

⁷ Ministry for the Environment. 2018a. Zero Carbon Bill Economic Analysis: A Synthesis of Economic Impacts. Wellington: Ministry for the Environment.

Between 1990 and 2017, overall transport emissions grew by 82 percent, with emissions from road transport growing by 93 percent. This compares with 23 percent for gross emissions across the total economy.

Figure 1 – Percent increase in gross emissions 1990–2017



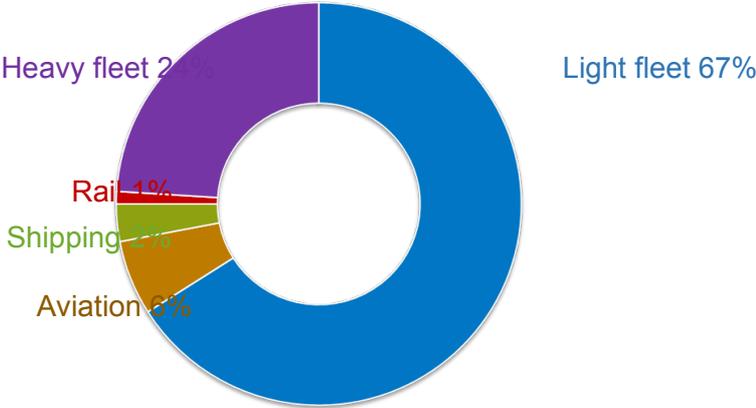
Also, compared internationally New Zealand’s use of transport is very emissions intensive. New Zealand’s per capita transport emissions are the fourth highest in the OECD and the ninth highest of all countries with a population over a million.

The transport emissions problem is predominately a road one

New Zealand’s high per capita transport emissions largely reflects the fact that our transport system is dominated by private road transport for moving people and freight.

Road vehicles are the primary cause of transport emissions growth, contributing 91 percent of transport emissions. The travel done in light vehicles accounts for 67 percent of transport emissions. This is 12 percent of New Zealand’s total gross emissions.

Figure 2 – GHG emissions by transport mode



Light vehicles are cars, SUVs, commercial vans, utes and small trucks all under 3.5 tonnes.

To illustrate the significance of light vehicles, over the next 5 years over 1.2 million light vehicles are likely to enter New Zealand's fleet. If powered by fossil fuels, these vehicles will lock-in up to 50 megatonnes of CO₂ emissions over the next two decades⁸. This is the equivalent of over half of New Zealand's annual gross emissions.

What is expected to happen to transport emissions if no further action is taken?

The Ministry of Transport's projections suggest that if no further action is taken, emissions from light vehicles will continue to rise until around 2022 with growth in travel and in the vehicle fleet. Emissions are then projected to gradually decline with an assumed favourable uptake of EVs and an increased in vehicle fuel efficiency.

However, the magnitude of decline will be insufficient to make a material contribution to meeting New Zealand's 2030 target under the Paris Agreement. This target is to reduce net emissions to 30 percent below 2005 levels by 2030. If no policy changes are made, emissions from light vehicles are projected to be about 12 percent above 2005 levels by 2030.

Moreover, the projected decline is substantially below that required to support New Zealand's transition to a have a low emissions transport system.

2.2 What regulatory system, or systems, are already in place?

The following measures are in place that facilitate or promote the uptake of low emission vehicles.

The New Zealand Emissions Trading Scheme

The Emissions Trading Scheme (ETS) establishes a price on GHG emissions that flows through to the cost of petrol and diesel. The objective of pricing GHG emissions is to moderate demand for transport fuel. This includes encouraging individuals and businesses to opt for more fuel-efficient vehicles.

The point of obligation for transport emissions sits with fuel importers and producers, however, the majority of the ETS cost is passed through to consumers. At the current New Zealand Unit price of around \$25 per tonne, the emissions component of fuel prices is around 7 cents per litre for petrol and around 7.5 cents per litre for diesel⁹.

The vehicle fuel economy labelling scheme

Motor vehicle traders are required to display fuel economy labels on all vehicles they are selling. The objective of the labels is to encourage vehicle buyers to consider fuel efficiency in their vehicle purchase decisions.

The labels use a star rating system and provide indicative fuel costs per year to help buyers easily compare the fuel efficiency of one vehicle to another. There is a star rating scale for all vehicles, with six stars for vehicles that are the most fuel efficient, and the least number of stars for the most fuel heavy vehicles.

⁸ New Zealand Productivity Commission (2018). Low-emissions economy: Draft report.

⁹ New Zealand Productivity Commission, Low-emissions economy: Draft report, April 2018.

Fuel efficiency information also has to be displayed on trading websites if the vehicle is being sold on-line.

The EVs Programme

The EVs Programme was put in place in May 2016 to help address the barriers to the uptake of electric vehicles. Its key components are:

- exempting EVs from road user charges until December 2021 for light vehicles and December 2025 for heavy, or until they make up 2 percent of their respective vehicle fleets
- piloting aggregated EV procurement that combines EV demand from the public and private sectors
- supporting the development and roll-out of public charging infrastructure, including providing information and guidance
- providing \$1 million annually for a nationwide electric vehicle information and promotion campaign over five years
- the Low Emission Vehicles Contestable Fund that provides up to \$6 million per year until 2021/22 to encourage and support innovative low emission vehicle projects
- enabling road controlling authorities to allow EVs into special vehicle lanes on the state highway network and local roads.

2.3 What is the policy problem or opportunity?

Transport's contribution to domestic gross emissions is substantial and transport emissions are continuing to rise with population and economic growth. Without policy changes, emissions are not expected to start declining until 2022. This will be too late, and the rate of decline too modest for the transport sector to meaningfully contribute to New Zealand achieving its emission targets.

At the same time, there are significant opportunities to reduce transport emissions and support New Zealand's transition to being a net zero emissions economy. Separate investigations by the Ministry of Transport and the Productivity Commission have concluded that the greatest reductions could be achieved through moving to a low emissions light vehicle fleet.

The Productivity Commission in its report, *Low-emissions economy*, August 2018, concluded that current policy settings will be inadequate to support a transition to a low emissions light vehicle fleet. It recommended that additional measures be put in place to realise the benefits from low emission vehicles sooner rather than later.

By itself the ETS is likely to be insufficient to drive the uptake of low emissions vehicles

The Productivity Commission's analysis concluded that the ETS currently plays a very limited role in reducing transport emissions. This is because the current emissions price of around \$25 per tonne is a relatively small component of fuel prices, and fuel demand is relatively unresponsive to changes in price. Even with a significant increase to the emissions price, additional measures will be needed to achieve large emission reductions.

Modelling by *Infometrics*¹⁰, commissioned by the Ministry of Transport, estimated that with a

¹⁰ Infometrics (2017) The impact of the ETS on lowering transport emissions. Report for the Ministry of Transport. Wellington: Infometrics

carbon price of \$25 per tonne, the ETS has the potential to reduce transport emissions by about 3 percent. A higher carbon price of \$100 could be expected to reduce transport emissions by around 11 percent. Even this level of reduction is insufficient compared to the level consistent with a low-emissions economy.

The uptake of EVs is likely to be too slow relative to the pace and scale of the change required

Current policy settings are unlikely to affect a fast enough uptake of EVs given the pace and scale of the change required. The Productivity Commission, in its report *Low-emissions economy*, August 2018 states that to electrify the bulk of the light fleet by 2050, nearly all newly registered vehicles would need to be electric by the early 2030s.

However, currently the Ministry of Transport's projection is that only around 40 percent of vehicles entering New Zealand will be electric in 2030. This projection is consistent with 68 percent of the light vehicle fleet being electric by 2050. This projection assumes EVs achieve purchase price parity with conventional vehicles around 2025. We are aware that some commentators consider this projection optimistic.

Current challenges to the uptake of EVs

At present the following challenges are limiting the uptake of EVs.

- The higher upfront cost of purchasing EVs – new EVs are currently more expensive to make and buy than equivalent conventional vehicles. The cheapest new EV retails for around \$48,500 compared with \$36,500 for its petrol equivalent¹¹. Another comparison is the e-Golf at \$65,990 compared to the TSI Highline Golf at \$41,990. These examples show a 32%, 38% and 57% market premium respectively. Some used EVs entering the fleet are sold at a similar price to petrol or diesel equivalents because they attracted subsidies when first sold in Japan.
- Travel range anxiety – The current models of pure EVs can typically travel between 100–300 kilometres before they need recharging. As a result, many people tend to only consider EVs when they are urban or suburban based, or looking for a second vehicle. This range also poses challenges for commercial drivers whose typical daily travel exceeds the range of mid-priced EVs.
- Availability of public charging infrastructure – to date there has been a relatively strong response to the provision of public charging infrastructure. However, there are gaps in the provision of fast public charging in the South Island, specifically on the West Coast as well as in many other rural areas and still in certain urban areas. Furthermore, we commonly see one or two EV charging units tucked away in the corner of a forecourt or carpark, hardly the numbers or locations to be considered a mainstream network, yet.
- A limited variety of EVs is available in New Zealand - this range has to compete with a much wider choice of conventional vehicles. Although more models will eventually become available, our market is very small it is not viewed as a priority market. Manufacturers are focusing on large markets that provide government subsidies that can absorb the technology premium.

Of all these challenges, the cost of new EVs is understood to be the most important reason for deciding not to buy an electric vehicle.

Currently, the price challenge is reduced to a small extent through the road user charges exemption. The exemption is worth around \$600 each year for each vehicle. The exemption is due to be removed for light vehicles on 31 December 2021, or when EVs make up 2

¹¹ This is the Toyota PHEV Prius Prime compared with a Toyota Corolla with similar specifications.

percent of the light vehicle fleet.

For businesses, co-funding is potentially available for fleet purchases from the Low Emission Vehicles Contestable Fund. Projects considered for assistance are those not commercially viable without funding assistance. The Fund will be available until 2021/22.

There are also a number of fledgling schemes around the shared use of EVs. Examples are the Mevo service in Wellington and Yoogo share operating in Auckland and Christchurch. All vehicles are PHEVs and clients book the use of these. Most client's are inner-city residents and businesses.

Price support is justified until EVs achieve purchase price parity with conventional vehicles

Eventually the travel range of EV batteries will improve, purchase price parity will be achieved with conventional vehicles, and the range of models and functionality will grow. Once this happens, EVs will increasingly become mainstream as consumers respond to their lower running costs. These lower costs should increase the rate of obsolescence and scrapping of conventional vehicles.

However, it is highly uncertain when the majority of EVs will achieve purchase price parity with similar conventional vehicles in New Zealand. The Ministry of Transport's projections assume this will occur towards the end of the 2020s. This assumption might be at the optimistic end, with some commentators seeing price parity occurring in the major vehicle markets towards the end of the 2020s¹² rather than in a very small market like New Zealand.

At the time of preparing this Regulatory Impact Assessment, Mitsubishi New Zealand announced new prices for its Outlander range. For the 4WD VRX models the diesel was priced at \$56,990, the PHEV at \$55,990 and the petrol version at \$54,490. The Ministry observes that the pricing for this one make and model is very different from all other EVs available in New Zealand at this time.

Providing price support to encourage uptake is justified until the price gap between EVs and conventional vehicles disappears. This is because people who opt to buy EVs over conventional vehicles do not fully benefit from the reduction in social costs as the current ETS price is too low to reflect the full social cost of GHG emissions and air quality pollutants are not priced.

Under current policy settings, price support (through the RUC exemption for EVs) is likely to end before the price parity tipping point of EVs with conventional vehicles occurs. If this occurs it will probably result in less people opting to buy an EV over a fossil fuelled vehicle.

Internationally, the uptake of EVs is still largely driven by the policy environment set by individual governments. An uptake of EVs is rare in jurisdictions that do not have significant fiscal incentives to encourage the purchase of EVs¹³. An international review of EV uptake shows that financial incentives, and particularly reductions in up-front purchase costs, are the incentives that impact most strongly on EV purchase decisions. Non-financial incentives play a supporting rather than a leading role¹⁴.

Examples of non-financial incentives include free parking, having a network of public charging stations and access to bus lanes.

¹² For example, Bloomberg New Energy Finance expect that price parity will occur in major markets over 2025–2029. See <https://about.bnef.com/blog/electric-vehicles-accelerate-54-new-car-sales-2040/>

¹³ Barry Barton and Peter Schütte, Electric Vehicle Policy: New Zealand in a Comparative Context, Research Report, University of Waikato, November 2015

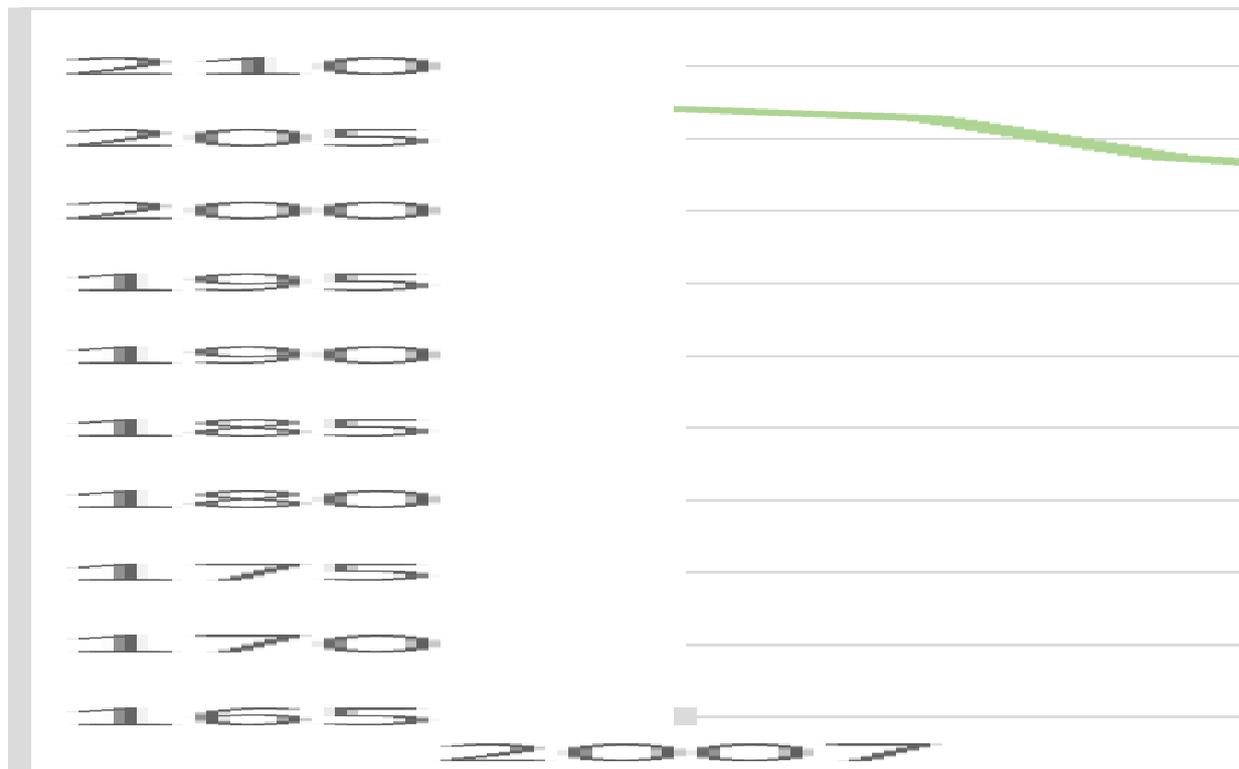
¹⁴ Australian Electric Vehicle Market Study, Australian Government, May 2018.

New Zealand lags behind in benefiting from improved vehicle fuel efficiency

The second opportunity is to increase the fuel efficiency of conventional vehicles imported into New Zealand as a transitional measure. Fuel efficiency is an important climate change mitigation because the CO₂ emissions of a vehicle are directly proportional to the quantity of fuel consumed by its engine. Despite this, New Zealand lags behind most other developed countries in benefiting from improved vehicle technologies.

Rates of improvement in vehicle fuel efficiency and resultant emissions performance have stalled

Since 2005, the average manufacturer-reported emissions intensity of vehicles entering the fleet improved from 211 grams of CO₂ per kilometre, to about 180 grams CO₂ per kilometre in 2018. However, from about 2013 improvements have stalled (see Figure 4).



At the same time, the gap has widened between manufacturer-reported vehicle fuel efficiency, established in laboratory conditions, and real on-road vehicle fuel performance¹⁵. A New Zealand study suggests that this gap increased from about 14 percent in 2010 to 25 percent in 2014¹⁶.

¹⁵ 2016 Annual Vehicle Fleet Statistics, Ministry of Transport p 47

¹⁶ "Real-world fuel efficiency of light vehicles in New Zealand", Wang, McGlinchy, Badger, Wheaton, Ministry of Transport. This paper was presented at the Australasian Transport Research Forum (ATRF) in October 2015.

The implication of a widening gap is that emissions calculations based on the manufacturers' performance figures for vehicles does not give regulators confidence about real emission trends. Since 2012/13, despite the slight downward trend in average CO₂ emissions graphed, the on-road fuel efficiency of light vehicles entering the fleet is actually likely to have worsened and their emissions increased.

Other countries have continued to improve fuel efficiency since 2013, though at a slower rate than in preceding years¹⁷.

The average vehicle entering our fleet is less fuel efficient than in most other developed countries

The light vehicles entering our fleet are more emissions-intensive than in most other developed countries. In 2018, the average vehicle entering our light fleet had an emissions intensity of about 180 grams of CO₂ per kilometre driven. This is the same level as the average vehicle entering Australia, but the average light vehicle entering the European fleets in 2016 had an emissions intensity of 118 grams of CO₂ per kilometre for cars and SUVs, and 164 grams of CO₂ per kilometre for light commercial vehicles. In Japan, where most vehicles entering the New Zealand fleet come from, the average vehicle entering its fleet had an emissions intensity of approximately 105 grams of CO₂ per kilometre.

With current policy settings, the Ministry projects that the current (2018) average emissions of vehicles entering the fleet of 180 grams CO₂/km, will only decline to 155 grams CO₂/km by 2025 and reach 68 grams CO₂ per kilometre by 2050^{18 19}.

The lack of a regulated vehicle fuel efficiency standard is affecting the vehicles supplied to our market

Part of the reason why the light vehicles entering our fleet have a higher emissions intensity is the absence of a regulated vehicle fuel efficiency standard.

New Zealand and Australia are two of the three developed countries²⁰ without regulated vehicle fuel efficiency standards. These standards aim to drive improvements in vehicle efficiency at a faster rate than could otherwise be expected from market forces. They effectively require manufacturers to deploy fuel-efficient technologies across more of the vehicles they supply.

The standards address the market failure that vehicle suppliers and consumers have vastly different amounts of information.

Vehicle suppliers know how much vehicles with better efficiency enhancing technologies cost. They also know the level of improvement these technologies offer. However, consumers generally only know, and can act on, the trade-offs between vehicle costs and fuel efficiency of the vehicles that are currently on offer to them.

Unconstrained by a standard, manufacturers select vehicles from their global portfolio that they believe will sell well and will maximise their profits in New Zealand. They will not necessarily opt to select the most fuel efficient variants of vehicle models as these variants

¹⁷ New Zealand Productivity Commission, April 2018

¹⁸ Vehicle Fuel Efficiency Standard Preliminary Cost- Benefit Analysis, Ministry of Transport, June 2018

¹⁹ This reflects the base-case projection in the Ministry of Transport's Vehicle Fleet Emissions Model. If the slow EV growth projection is used average vehicle emissions would only decline to be 146 grams CO₂ per kilometre by 2050.

²⁰ The other country is Russia.

cost more to produce.

Appendix 1 shows that manufacturers are opting to provide less fuel efficient variants to New Zealand. The appendix compares the emissions performance of the most efficient variants of top selling vehicle models in New Zealand, with the best comparable variant available in the United Kingdom²¹.

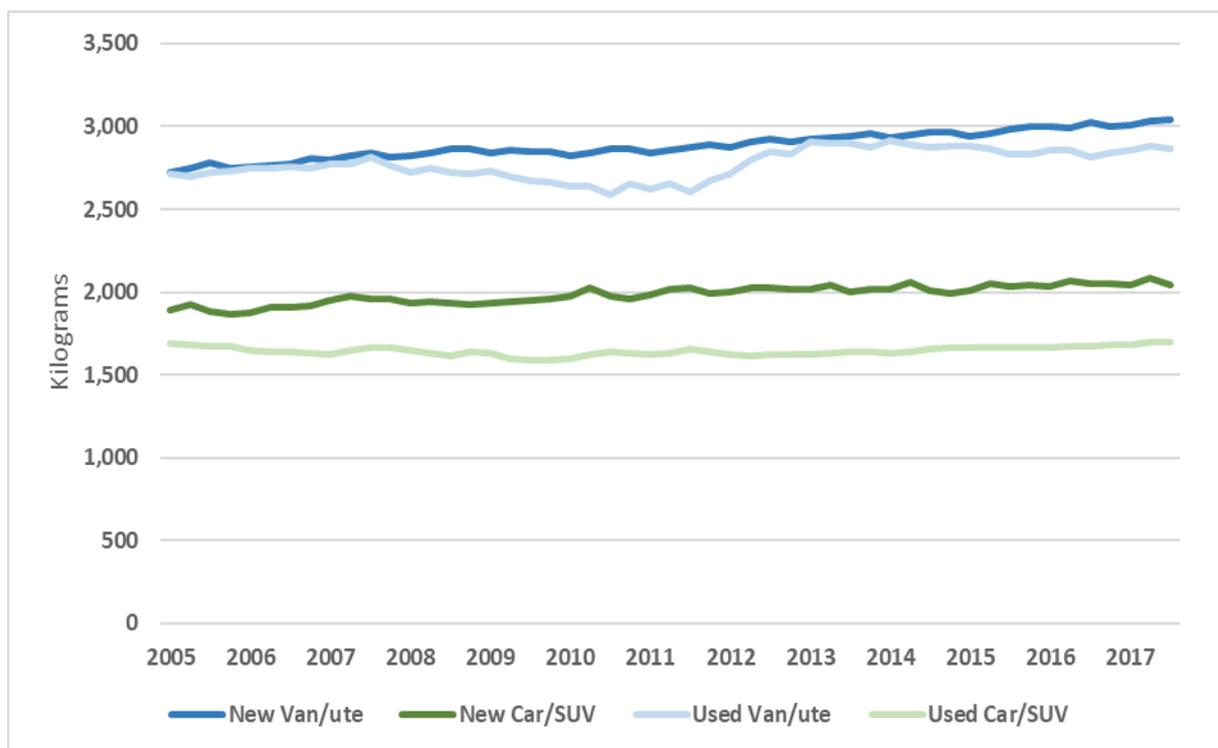
This comparison shows that the most fuel efficient variants available in New Zealand have, on average, 21 percent higher CO₂ emissions than the best comparable variant offered in the United Kingdom.

New Zealanders are increasingly choosing larger, heavier vehicles

The other factor that is contributing to our vehicles having a relatively higher emissions intensity, is our increasing preference for heavier vehicles. Heavier vehicles require more fuel to move and emit more CO₂.

The gross vehicle mass of light vehicles entering our fleet is increasing (see Figure 5). This trend is more pronounced for new vehicles. In 2005, the average new car entering our fleet had a gross mass of 1,891 kilograms and the average new van/ute had a gross mass of 2,720 kilograms. By 2017, the gross mass of the average new car had increased to 2,042 kilograms and the average new van/ute to 3,012 kilograms.

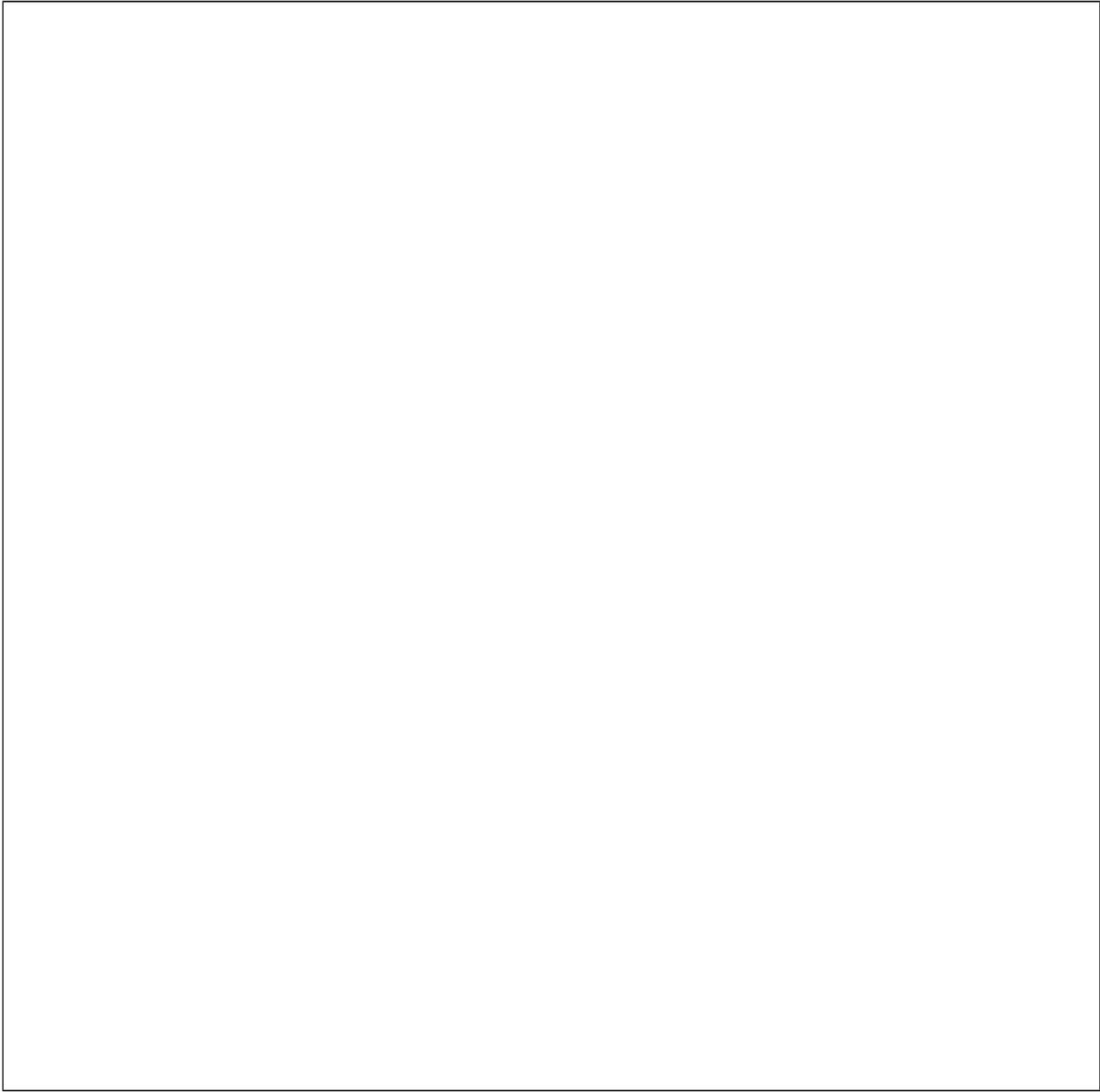
Figure 5 - Average gross mass of light vehicles entering the fleet (kg)



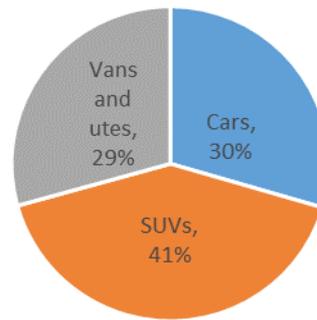
The trend to heavier vehicles can also be seen in the changing vehicle mix. In 2015, cars were 39 percent of new light vehicles sold. In 2017, their share reduced to 30 percent with the shares for vans and utes and for SUVs increasing to 29 percent and 41 percent respectively (see Figure 6).

²¹ Ibid, p 24

Figure 6 – Composition of new vehicle sales



2017



This trend makes it more difficult for New Zealand to achieve emission reductions. In 2017, the average new car sold in New Zealand had an emissions intensity of 152 grams of CO₂ per kilometre. This compared with an emissions intensity of 182 grams of CO₂ per kilometre for new SUVs and 215 grams of CO₂ per kilometre for new vans and utes.

A range of factors contribute to our preference for larger vehicles. Analysis of vehicle purchasing decisions shows that while fuel efficiency is valued by consumers, its benefits are less immediate and tangible than other considerations such as vehicle price, size, functionality, performance, and safety.

Where consumers do consider fuel efficiency in making purchase decisions, international evidence suggests they heavily discount future savings from reduced fuel use compared to upfront costs²². Fuel savings that are years in the future may be too uncertain, or too distant, to have an impact on today's purchase decisions.

As well, people find it hard to assess the benefits of fuel efficiency relative to other vehicle attributes like price, size and performance²³.

Without additional measures we risk the high cost of locked-in emissions

The final reason why additional measures are needed is to avoid the high cost of locked-in emissions that result from the slow rate of turnover of the vehicle fleet. A vehicle entering the

²² Green, D (2010) Why the Market for new passenger cars generally undervalues fuel economy, Joint Transport Research Centre Discussion Paper No. 2010-6, Oak Ridge, United States.

²³ *ibid*

light fleet is driven until it is, on average, over 19 years old. This means that the emissions from new vehicles that are imported today will be locked-in for around two decades. The less fuel efficient the vehicles, the higher the future emissions burden imposed.

Over the next 5 years, over 1.2 million light vehicles are likely to enter New Zealand's fleet. If powered by fossil fuels, these vehicles will lock in up to 50 megatonnes of CO₂ emissions over the next two decades. This is the equivalent of over half of New Zealand's gross emissions²⁴.

2.4 Are there any constraints on the scope for decision making?

What is out of scope?

An approach of influencing the demand for low emission vehicles through variable annual vehicle licensing fees based on CO₂ emissions has been ruled out as instructed by the Associate Minister of Transport. This is because it could be seen as conflicting with the decision the Government took in December 2018 to end the ACC Vehicle Risk Rating programme. This programme applied different levy rates in the annual vehicle licensing fees to different makes and models of vehicles based on their safety ratings. This is analogous to varying licensing fees on the basis of their CO₂ emissions.

The vehicle risk rating will no longer apply from 1 July 2019.

Moreover, variable annual licencing fees would unfairly penalise vehicle owners for past purchase decisions. Also importantly, low-income households would be impacted more by the increase in motoring costs as a greater share of their income is spent on transport.

Interdependencies or connections to other existing issues

In terms of interdependencies, as far as possible the Associate Minister of Transport is seeking vehicle emission policies that have the co-benefit of increasing vehicle safety and vice-versa. This is because New Zealand's vehicle fleet is currently not consistent with a transport system that is free of death and serious injury.

Forty-five percentage of the vehicle fleet has an ANCAP²⁵ safety rating of 1- or 2-stars on a 5-

²⁴ New Zealand Productivity Commission, April 2018

²⁵ The Australasian New Car Assessment Program provides independent vehicle safety ratings. These ratings take into account the level of occupant and pedestrian protection provided by new vehicles through the conduct of physical crash tests and the assessment of collision avoidance technologies.

star scale. These vehicles do a markedly poorer job in helping to avoid crashes and in protecting their occupants in the event of a crash, than vehicles with higher ratings. Therefore there is much to gain from policy settings that have a dual focus on improving the safety and emissions performance of the vehicle fleet.

2.5 What do stakeholders think?

This regulatory impact assessment has been prepared to inform Ministers' decisions on the measure, or measures, to progress to public consultation. Final decisions on whether the measure(s) will be advanced further will be informed by this consultation.

The stakeholders directly affected by the proposals are vehicle suppliers, energy companies, motorists and businesses. Although consultation has yet to occur, some information on their perspectives is available from the public submissions on the New Zealand Productivity Commission's *Low-emissions economy: Draft report*. Their views as stated in these submissions are as follows.

Vehicle fuel efficiency standard

The majority of submitters who commented on the recommendation to have a vehicle fuel efficiency standard supported its introduction.

The Major Energy Users Group opposes a vehicle fuel efficiency standard as they are of the view that the market is already moving to adopt more efficient vehicles. The Motor Industry Association and Toyota also oppose a standard. They prefer a fee-bate scheme over a vehicle fuel efficiency standard. Their concern is that a fuel efficiency standard should apply to all vehicles entering the fleet but this would be problematic for the used vehicle sector.

We note that a fuel efficiency standard could be designed to apply with coverage of both new and new-used vehicles entering the New Zealand fleet. There is no intention to apply it to vehicles already licensed in New Zealand.

We also note that some stakeholders have suggested that another supply-side change that could be made is to ensure suppliers only bring in vehicles that meet newer standards by setting an age limit for imported used vehicles.

Vehicle feebate scheme

The proposal to introduce a vehicle feebate scheme received the greatest number of responses. The vast majority supported the concept although opinion varied as to the

attributes the scheme should have.

In general, the submitters supported a scheme that applied to vehicles entering the fleet, both new and used. Comments included that the scheme should be simple to implement and cost effective to run. Indeed with matching rebates to fees over time, a feebate scheme could be managed to be self funding.

The Motor Industry Association and Toyota stated there was considerable merit in a feebate scheme and preferred this option over a fuel efficiency standard. This is because the feebate scheme focuses on consumer demand and then it is assumed that vehicle suppliers will supply the vehicles consumers want to buy. We note that the feebate scheme is a demand-side incentive scheme and the fuel efficiency standard is a supply-side incentive: both have merit and are potentially supportive of each other.

Some submitters commented on possible equity issues arising from a feebate scheme. Their concern was that it would drive up the cost of vehicles for those less able to afford to replace their existing vehicles. It also subsidises the purchase of EVs for those already able to afford them without a rebate.

Tax incentives

Alongside support for a feebate scheme, tax exemptions were seen as a way to support EV uptake. These ranged from reduced fringe benefit tax, to targeted tax credits, a GST exemption, and accelerated depreciation rates for EVs.

We consider tax incentives could offer businesses encouragement to select EVs and to better utilise them. Tax incentives would need to be considered within the budget cycle.

Investment in infrastructure

The need for more charging stations and support from government to build them was also a common theme. Other policy options included requirements to provide charging stations at car parks and work premises and extending the road user charges exemption for EVs beyond the current threshold.

The Motor Industry Association is of the view that interventions are needed that incentivise low emissions while de-incentivising high emissions. These interventions should capture the whole vehicle fleet, rather than just vehicles entering the fleet. Electronic road user charges need to be applied to all motorists regardless of the vehicle size or fuel type of the vehicle. This would incentivise low emission road use and penalise high emission use.

Section 3: Options identification

3.1 What options are available to address the problem?

The options considered are aimed at:

- achieving a rapid uptake of EVs and other low emission vehicles. The Ministry of Transport estimates that if EVs are half of the vehicle fleet in 2040, then road emissions would be reduced by over 40 percent. EVs also contribute to reduced air and noise pollution and have lower fuel and maintenance costs
- increasing the fuel efficiency of conventional vehicles coming into New Zealand as a transitional measure. Fuel efficiency is an important climate change mitigation because the CO₂ emissions of a vehicle are directly proportional to the quantity of fuel consumed by its engine. It is also important as achieving a largely electric fleet will take decades. The Ministry estimates that if the carbon intensity of the average light vehicle entering the fleet was reduced from the current (2017) level of 182 grams of CO₂ per kilometre to 105 grams/km by 2025, then CO₂ emissions would reduce by over 5 million tonnes.

There are a range of options to transition to a low emissions light vehicle fleet. These range from non-regulatory, such as providing information to influence vehicle purchase decisions, to regulatory measures requiring an improvement in vehicle fuel efficiency.

Option 1: CO₂-based first registration fees (when vehicle is registered for the first time in NZ)

This option seeks to encourage the demand for low emissions vehicles by charging registration fees based on a vehicle's CO₂ emissions.

Registration fees are paid to get a vehicle on the road for the first time. With this option the cost of a vehicle's first registration fee would include a component reflecting the vehicle's CO₂ emissions. The registration fee would be higher for more emissions-intensive vehicles and would scale down for low emission vehicles. Pure EVs would not attract any CO₂ charge within the vehicle registration fee.

Internationally, fiscal measures like variable registration fees are seen as an effective way to encourage a shift towards less emissions-intensive vehicles²⁶. Many countries, including the United Kingdom, Ireland, Japan, Sweden, the Netherlands and France have vehicle registration fees that include an element based on CO₂ emissions.

Option 2: Introduce a vehicle purchase feebate scheme

This option would seek to shift consumer demand towards less emissions-intensive vehicles. Consumers would either receive a rebate, or pay a fee, depending on the CO₂ emissions of the vehicle they are buying. Low emission vehicles, like EVs, would attract rebates, while high emission vehicles would attract fees.

The rebate/fee would be visible to the consumer at the point of purchase. Feebates would apply only to new and used vehicles sold for the first time in New Zealand. The scheme would not cover vehicles that have already been used in New Zealand.

The scheme would be managed to be self-financing with the rebates paid from the fees

²⁶ International Energy Agency (2012) Improving the Fuel Economy of Road Vehicles: A policy package. OECD/IEA, Paris. <https://www.iea.org/publications/freepublications/publication/policy-pathways-improving-the-fuel-economy-of-road-vehicles---a-policy-package.html>

collected. People buying low emission vehicles would receive a rebate paid for by the people buying high emission vehicles.

Based on international experience, feebates are likely to be effective in shifting consumer demand to low emission vehicles. This experience shows that financial incentives, particularly up-front reductions in purchase costs, are the incentives that impact most strongly on EV purchase decisions²⁷.

As well, France has had a feebate scheme for new passenger vehicles since January 2008. The scheme is one of the key tools the French government has used to bring down carbon emissions from light vehicles. Research shows that feebates have been successful in shifting consumer preferences toward low-emitting vehicles²⁸. In 2008, vehicle sales in the 101–120 grams of CO₂ per kilometre band rose by 80 percent and sales volumes fell in all bands with higher emissions.

Overall, in France, the passenger fleet-average CO₂ has fallen steadily from 141 grams in 2008 to 110 grams in 2016. This compares with the EU average of 118 grams. In 2016, the market share of hybrid vehicles and EVs was 3.9 percent compared with 2.9 percent across the EU²⁹.

Option 3: Regulate a vehicle fuel efficiency standard

This option would reduce the average CO₂ emissions of new and used vehicles coming into New Zealand by regulating a national CO₂ emissions target. Vehicle suppliers would have to meet this target on average across the fleet of vehicles they sell in New Zealand in a given year. Suppliers would meet the target largely by selecting vehicles with better technology. In this way, this option would seek to increase the supply of low emission vehicles.

As the target works on a fleet-average basis, individual vehicles would not have to meet the CO₂ emissions target. This allows a broad range of vehicles to remain on sale, with vehicle suppliers deciding where they will make improvements across their fleets to ensure compliance with the national CO₂ emissions target.

In other words, high emission vehicles, like some models of commercial vans and utes that are not yet available in electric or hybrid variants, could still be offered to consumers. However, to achieve the average target, suppliers would have to balance these high emission vehicles with a sufficient number of low-emission vehicles.

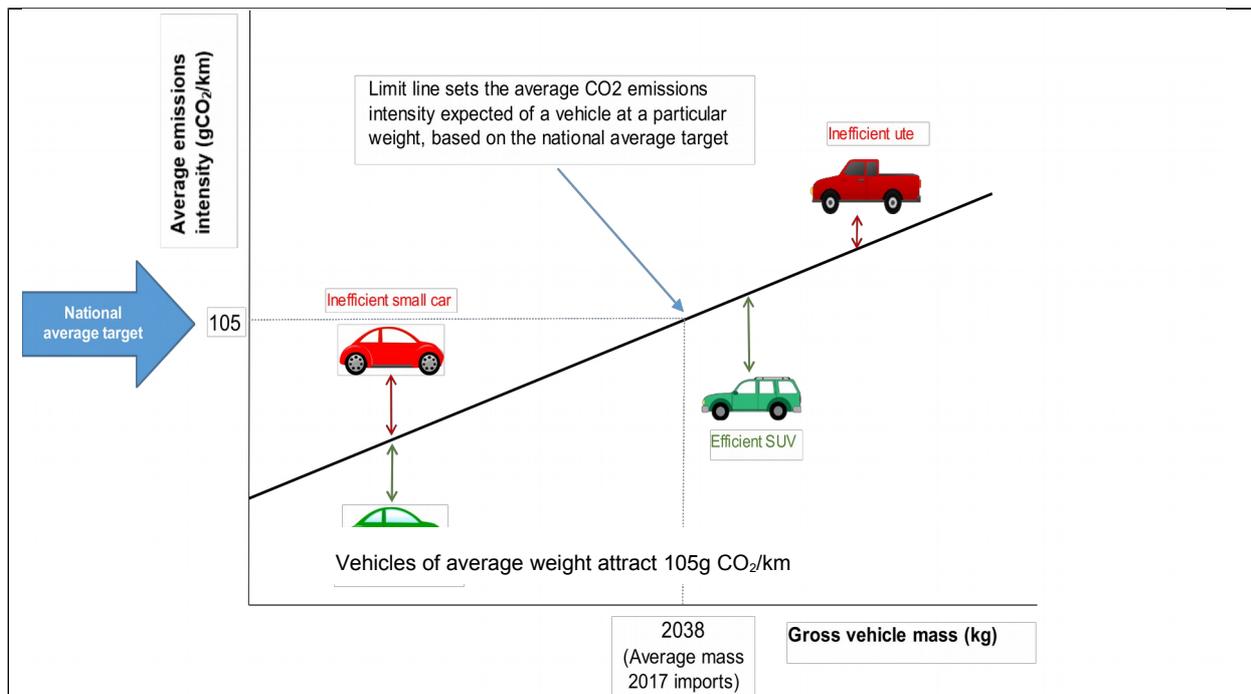
The proposed average emissions target would be 105 grams of CO₂ per kilometre in 2025. This target would be phased in from 2021 giving vehicle suppliers five years to reach the target.

In line with international best practice, the national CO₂ emissions target would be adjusted by vehicle weight. This recognises that heavier vehicles require more fuel to move and have more emissions. A weighted adjusted target allows the wide range of vehicles in the light fleet, from micro cars to large utes, to all attract an appropriate average emissions target. This is illustrated in the diagram.

²⁷ Australian Electric Vehicle Market Study, Australian Government, May 2018.

²⁸ D'Haultfoeuille, X (2016) et al, Disentangling Sources of Vehicle Emissions Reduction in France, CREST

²⁹ http://eupocketbook.org/wp-content/uploads/2017/11/ICCT_Pocketbook_2017.pdf



The effect of a weight-adjusted target, is that vehicle suppliers will have different average targets to meet depending on the make-up of their fleets. Vehicle suppliers that sell predominantly heavier vehicles would have a higher grams of CO₂/km target. Vehicle suppliers that sell predominantly lighter vehicles would have a lower grams of CO₂/km target.

Internationally, vehicle fuel efficiency standards have been effective in mobilising the large, low-cost carbon mitigation opportunity available in vehicle efficiency technologies³⁰. A 2015 evaluation of the vehicle fuel efficiency standard that regulates new light vehicles sold in the European Union, found that it is likely to have accounted for between 65–85 percent of the reductions seen in tailpipe emissions over the period 2009–2014³¹.

Option 4: Introduce an age limit on used vehicle imports

Currently the average age of used imported vehicles is 10.4 years. This option would seek to increase the supply of low emission vehicles by placing an age restriction of 7 years on the used vehicles able to be imported into New Zealand. A ban of 7 years is based on the restriction Hong Kong has in place.

In general, newer models of a vehicle tend to be more fuel efficient, emit less air pollutant emissions and are safer than earlier models. This reflects improvements in engine and fuel technology, materials and aerodynamics. Although we do note that there has been a reduction in efficiency and emission improvements from fossil fuelled vehicles entering the fleet around 2012/13 onwards. Results of air pollutant monitoring in Auckland shows that increased vehicle age and mileage are associated with a higher level of harmful emissions³².

New Zealand is unlike other developed countries in having around half of vehicles entering the fleet being used vehicle imports. Nevertheless, there are examples of countries that

³⁰ International Energy Agency 2012, Technology Roadmap, Fuel Economy of Road Vehicles, OECD/IEA, Paris

³¹ European Commission (EC) 2015, Evaluation of Regulations 443/2009 and 510/2011 on CO₂ emissions from light duty vehicles, Final Report, 8 April 2015
https://ec.europa.eu/clima/sites/clima/files/transport/vehicles/docs/evaluation_ldv_co2_regs_en.pdf

³² *Understanding trends in roadside air quality*, NZ Transport Agency, Research Report 596, September 2016,
<https://www.nzta.govt.nz/assets/resources/research/reports/596/596.pdf>

import used vehicles where age restrictions apply. To register an imported used vehicle in Hong Kong it must be less than 7-years old³³.

3.2 What criteria, in addition to monetary costs and benefits, have been used to assess the likely impacts of the options under consideration?

In analysing the options we are seeking to ensure that they will achieve the objectives for climate change policy development and decision-making in the framework that Cabinet agreed in May 2018 [CAB 18 M0218 refers]. This framework is centred on the following three pillars.

1. Leadership at home and internationally. This includes placing primary reliance on domestic measures to reduce our emissions out to 2050 and beyond, and to meet our commitments under the Paris Agreement.
2. A productive, sustainable and climate-resilient economy. This includes encouraging innovation, diversification and the uptake of new technologies and identifying the best-value opportunities to reduce emissions.
3. An equitable and inclusive society. This includes considering the optimal speed and pathways for transition. As well as supporting the transitional shift to lower emissions and resilient sectors, and recognising and mitigating impacts on workers, regions, iwi/Māori rights and interests and wider communities.

This framework is reflected in the criteria used to assess the options.

Leadership at home and internationally

1. **Extent to which the initiative reduces emissions.** The initiative must achieve a significant reduction in carbon emissions from light vehicles and contribute to a reduction in air pollutant emissions.
2. **Extent to which the initiative supports a transition to a low emissions light vehicle fleet.** The primary objective of the Low Emission Vehicles Package is to help transition the light fleet to being low emissions. Any initiative must facilitate long-term change in the vehicle market by improving New Zealand's access to vehicle technology that reduces emissions. This includes increasing the supply of low emission vehicles and/or encouraging demand for those vehicles.

A productive, sustainable and climate-resilient economy

3. **Is the initiative a relatively efficient way to reduce emissions.** The initiative offers a cost-effective way of reducing transport emissions and provides co-benefits that are important to economic productivity, such as increased fuel efficiency and diversified fuel use.
4. **Extent to which the initiative provides predictability and certainty to the vehicle market and energy suppliers.** The initiative improves business planning and facilitates investment in the vehicle and energy markets through predictable and certain regulation.
5. **The extent to which the initiative speeds the adoption of low emission vehicle technologies and responds to consumer demand.** The initiative increases the pace at which low emission technologies are adopted in the fleet. It is also consistent with a vehicle market that responds to the diverse vehicle demands of consumers and businesses. This includes by offering a range of vehicles that are affordable to consumers.

³³ <https://info.japanesecartrade.com/content-item/80-hong-kong-import-regulation-for-japan-used-cars>

6. **Extent to which the initiative contributes to increasing the safety of the vehicle fleet.** The initiative must be consistent with transport safety policy and contribute to an improvement in the safety of the light vehicle fleet.
7. **Extent to which the initiative has low implementation, compliance and administration costs.** The initiative must be as simple and low cost as possible to implement, comply with and to administer.

An equitable and inclusive society

8. **The extent to which the initiative's costs and benefits impact across society.** Consistent with an equitable and inclusive transition, the initiative's costs and benefits do not disproportionately impact, or focus, on any one group. If they do have disproportionate impacts that are unavoidable, there is a way that their impact can be managed or minimised.

3.3 What other options have been ruled out of scope, or not considered, and why?

Additional information for consumers

Providing more information to consumers to influence their demand for low emission vehicles was discarded. This type of enhancement would be low cost. However, by itself more information is unlikely to address the problem of a relatively less fuel efficient selection of vehicles being supplied to the New Zealand market.

As well, more information would not overcome the behaviour barrier that consumers' vehicle choices are influenced by a range of factors, other than the desire to reduce emissions. These include vehicle size, purchase price, safety features, vehicle brand loyalty and lifestyle factors³⁴. Consumers also significantly discount the value of future fuel savings from buying a more fuel efficient vehicle.

Have the vehicle industry operate a voluntary fuel efficiency standard

The Ministry of Transport ruled out a voluntary industry vehicle fuel efficiency standard because Australian (1978–2010) and European Union (1999–2008) experience shows voluntary standards are not effective. Manufacturers tend not to comply with voluntary standards.

In both jurisdictions the agreements failed to deliver the expected emission reductions. There were improvements in fuel efficiency but there is no evidence that the improvements were greater than business-as-usual trends. Consequently, the European Union regulated a vehicle fuel efficiency standard in 2009. The Australians are in the process of regulating a standard.

Minimum vehicle fuel efficiency standards

Minimum fuel efficiency standards would apply to individual vehicles and would require that every vehicle entering the fleet must meet the minimum standard. This option was discarded as internationally it is not considered a desirable way to regulate fuel efficiency in motor vehicles³⁵. It removes flexibility for motor vehicle suppliers and unduly restricts consumer choice. It would result in a number of high profile brands and a number of vehicle types being excluded from the market.

Continue the road user charges exemption beyond 2021

A continuation of the road user charges exemption beyond 31 December 2021 was discarded. This is because road user charges form a significant part of the transport

³⁴ OECD International Transport Forum, Examining Fuel Economy and Carbon Standards for Light Vehicles, Discussion Paper No 2007-1, December 2007.

³⁵ Policy pathway, Improving the fuel economy of road vehicles, OECD/IEA 2012

revenues that are used to pay for the roading network and other transport infrastructure and services. These costs arise because of motor vehicle use, irrespective of whether the vehicle is powered by fossil fuels or alternative fuels.

Grants for the purchase of EVs

Many European countries provide grants, or subsidies, for the purchase of new ultra low emissions vehicles, like EVs and plug-in hybrids³⁶. However, this option has been discarded in the New Zealand context as a subsidy from government revenue involves a wealth transfer from low income New Zealanders to middle and high income groups.

GST exemption for the purchase of EVs

The option to encourage consumer demand for EVs through a GST exemption has been discarded. This is because there are many goods and services that have a societal benefit that are not exempt, for example, healthcare, fruit, vegetables and housing. It is difficult to exempt one type of good or service without setting a precedence for exempting others.

Mandating that a certain proportion of vehicle sales have to be low emissions

This option would require that a certain percentage of the vehicles sold in New Zealand would have to be low emissions, such as EVs or very fuel efficient conventional vehicles. This option was discarded as it would reduce the ability of vehicle suppliers to respond to consumer demand.

Smart electronic road user charges

A possible future option that is not currently available is a smart electronic road user charges system that sets different charges based on the emissions performance of the vehicle used. With this option, consumer demand for low emission vehicles would be encouraged through drivers of less fuel efficient vehicles paying more to use the road network.

If a future Government wanted to proceed with this approach, implementation would be some time away. The cost of the technology to vehicle owners would have to fall from current levels.

³⁶ For example, in the United Kingdom grants of up to £4,500 off the price of a new pure EV car and up to £8,000 off the price of a new electric van are available. Lower grants apply to plug-in hybrids. See www.goultralow.com

Section 4: Impact Analysis

Marginal impact: How does each of the options identified at section 3.1 compare with the counterfactual, under each of the criteria set out in section 3.2? *Add, or subtract, columns and rows as necessary.*

	No action	CO ₂ based registration fees (Option 1)	Feebate scheme (Option 2)	Vehicle fuel efficiency standard (Option 3)	Age limit on used imports (Option 4)
Reduces emissions	0	+	++	+++	+
Supports a transition to a low emissions light vehicle fleet	0	++	+++	+++	+
Is an efficient way to reduce emissions	0	+	+++	+++	0
Predictability and certainty to the vehicle market and energy markets	0	+	+	++	+
Speeds adoption of low emission technologies and is responsive to consumer demand	0	+	++	+++	++
Improves the safety of the light vehicle fleet	0	Unclear – risk of slowing improvement	Unclear – risk of slowing improvement	+	+++
Implementation, compliance and administration costs	0	-	--	--	0
Costs and benefits are neutral in their distributional impact	0	-	-	-	-
Overall assessment	0	+	++	+++	+

Key:

- +++ has the greatest impact compared with the status quo
- ++ much better than doing nothing/the status quo
- + better than doing nothing/the status quo
- 0 about the same as doing nothing/the status quo
- worse than doing nothing/the status quo
- much worse than doing nothing/the status quo

	Reduces emissions	Supports a transition to a low emissions light vehicle fleet	Is an efficient way to reduce emissions	Predictability and certainty to the vehicle and energy markets	Speeds adoption of low emission technologies and is responsive to consumer demand	Improves the safety of the light vehicle fleet	Implementation, compliance and administration costs	Costs and benefits are neutral in their distributional impact
No action	New Zealand's 2030 target is for emissions to be 30 percent below 2005 levels by 2030. If no policy action is taken, then road emissions are projected to be 10 percent above 2005 levels by 2030. The status quo does not see a reversal of climbing emission rates by 2030.	Pace and scale of change is too slow. The average emissions of vehicles entering the fleet of 182g CO ₂ /km are projected to decline to 155 grams CO ₂ /km by 2025 and to reach 68g CO ₂ /km by 2050. To achieve a fully electric light fleet, nearly all the vehicles entering in around 2030 need to be EVs. The Ministry projection is that around 40 percent of vehicles entering New Zealand will be electric in 2030.	The status quo is not achieving cost-efficient reductions in emissions.	There would be no change to the regulatory environment. However, as time progresses without effective emissions reductions the uncertainty of markets will increase as stakeholders and consumers would likely have growing expectations that the Government must eventually act to reduce GHG emissions.	NZ would continue to lag most other developed countries in accessing improved low emission vehicle technologies.	There will be no additional impact on the safety of the vehicle fleet. In a no action scenario, supply of acceptably priced EVs is likely to continue to lag demand.	There will be no additional implementation, compliance and administration costs.	There will be no additional distributional effects.
CO₂ based registration (when vehicle is registered for the first time in NZ) fees (Option 1)	If set high enough on high emitting vehicles: <ul style="list-style-type: none"> GHG emissions would be expected to fall. Internationally these taxes have been effective in reducing emissions³⁷ would contribute to a reduction in air pollutant emissions through an increase in the uptake of EVs. 	Would encourage a shift toward less carbon intensive vehicles. There is European evidence that where the fees/taxes have been sufficiently large, consumers have adopted lower CO ₂ emitting vehicles ³⁸ .	Would be a cost-effective way to reduce CO ₂ emissions. However, there is a risk that the tax could encourage an increase in diesel vehicles as they have lower CO ₂ emissions resulting in higher levels of air pollutant emissions. This risk could be minimised by an additional fee on diesel vehicles.	There is a risk of a decrease in predictability and certainty if the level of the taxes were increased too frequently or increased without adequate notice to industry. Could help increase market certainty for vehicle suppliers with a business goal of diversifying their fleets towards more low emission vehicles.	The increase in the speed of adoption of low emission vehicle technologies would depend on the extent to which consumer demand influences suppliers' decisions about the vehicles to provide to New Zealand.	As it applies only to vehicles entering the fleet, it could disincentivise the purchase of new and new-used vehicles. This would extend the lives of existing vehicles in the fleet and slow the improvement in the safety of the fleet.	Would utilise the existing processes for the vehicle registration fee. It would result in a modest increase in government administration costs to impose, collect and enforce the fee.	If this were the sole initiative, the fee would need to be set very high to have the required impact. A high fee could have a disproportionate impact on low income households where their preferred vehicle does not have a low emissions alternative at a price they can afford. It could also penalise businesses reliant on vehicles without a low emission alternative eg tradespeople reliant on utes.
Feebate scheme (Option 2)	Estimated to have lifetime emissions reductions of 1,553 kilotonnes. This is the equivalent of scrapping 94,000 to 213,000 (mid-range 142,000) vehicles. Would contribute to a reduction in air pollutant emissions through an increase in the uptake of EVs. This contribution would be greater than for	Would accelerate the shift toward less carbon intensive vehicles at a faster rate than the registration fee because of the dual rebate/fee components. The rebate element would speed EV uptake by helping to reduce the purchase price difference between EVs and an equivalent conventional	Estimated to have a marginal abatement cost of -\$90 to -\$423 per tCO ₂ (mid-range -\$266/tCO ₂). This means that society would gain \$90-\$423 in benefits for every tonne of carbon avoided. It has an estimated cost-benefit ratio of 1.4 to 4.2 (mid-range 2.6) and an estimated net present value of \$111m to \$821m (mid-range \$413 million).	The feebate scheme would be designed to be self-financing. It would be difficult to strike the fees and rebates at the necessary levels to avoid over- or under- fee collection, but allowing adjustments over time should ensure reasonable balance is achieved over the life of the scheme. To avoid reducing predictability and certainty for the market from too frequent adjustments to the fees and rebates, the government would	Would speed the adoption of vehicles with better low emission technologies. The rebate element would help offset the increase in vehicle prices and lower the market risk to vehicle suppliers. Vehicle suppliers are likely to be more responsive to consumer demand for less emissions intensive vehicles as the rebate	If the variety of low emission vehicles, like EVs and petrol hybrids remains restricted, then the fee element could see buyers choosing to stay with existing vehicles, resulting in an aging fleet and slowing the improvement in the safety of the fleet.	Would have significant costs to implement, administer. Estimated capital costs and operating costs of \$31 million to \$44 million (mid-range \$37 million) (discounted value). Compliance costs to businesses would be significant. Business would have to clearly display the fees and	There is a risk that low income households could be penalised where a low emissions vehicle is not available at an affordable price. In this situation, these households would have to purchase a high emissions vehicle and pay a fee under the scheme. This risk would arise if the range of low emission vehicles remains limited, and the price differential

³⁷ Vehicle Emissions and Impacts of Taxes and Incentives in the Evolution of Past Emissions, Report to the European Environment Agency. ETC/ACM 2018/1

³⁸ ibid

	<p>the registration fee.</p>	<p>vehicle, which is a key barrier to EV uptake.</p> <p>The feebate scheme as a demand-side scheme would complement a supply-side scheme such as the vehicle fuel efficiency standard.</p>	<p>The main benefit is in fuel savings. The measure is estimated to yield \$328 million to \$1,050 million (mid-range \$627 million) in fuel savings over the lifetime of the vehicles affected.</p> <p>There is a risk that feebates could encourage an increase in diesel vehicles resulting in higher levels of air pollutant emissions. This risk would need to be mitigated. The early adoption of latest fuel efficiency standards (e.g. Euro 6) for diesel vehicles would help mitigate the environmental impacts of diesels.</p>	<p>have to operate a fund – a “fee bank” – that would enable smoothing out the effect of under and over revenue collection over the life of the scheme.</p> <p>Changes in the fees and rebates would have to be clearly communicated to vehicle suppliers and consumers some time in advance.</p> <p>Could help increase market certainty for vehicle suppliers with a business goal of diversifying their fleets towards more low emission vehicles.</p>	<p>element lowers the effective retail price. This lowers the risks vehicle suppliers face in bringing new variants to the market in terms of whether they will sell well.</p>		<p>rebates and play a role in collecting fees and passing these onto the regulator. They would also have to ensure consumers are aware of how they can claim their rebates.</p>	<p>between conventional vehicles and EVs and petrol hybrids remains high.</p> <p>Businesses reliant on affordable utes, vans and light trucks could be similarly affected.</p> <p>However, this risk would be mitigated to an extent for low income households by the fact that 75 percent of vehicles sales are of vehicles already in the fleet. These vehicles would <u>not</u> be subject to the feebate scheme. Nevertheless the risk to businesses, which generally buy new vehicles, would remain.</p>
<p>Vehicle fuel efficiency standard – vehicle suppliers required to lower the average emissions of the vehicles they import to 105g CO₂/km by 2025 (Option 3)</p>	<p>Estimated to have lifetime emissions reductions of over 5,000 kilotonnes. This is the equivalent of scrapping 359,000 to 616,000 (mid-range 476,000) vehicles.</p> <p>Would contribute to a reduction in air pollutant emissions through an increase in the availability of low-emission vehicles and the follow-on uptake of EVs.</p> <p>Note: This contribution is assessed as being greater than for the feebate scheme.</p>	<p>Encourages the greatest level of shift toward less carbon intensive vehicles. This is because it requires vehicle suppliers to reduce the average emissions of the vehicles they are importing from 182 gCO₂/km now (2017) to 105g CO₂/km by 2025.</p> <p>To reach this target vehicle suppliers are likely to increase the supply of EVs and petrol hybrids.</p>	<p>Estimated to have a marginal abatement cost of -\$260 to -\$851 per tCO₂ (mid-range -\$468/tCO₂). This means that society would gain \$260-\$851 in benefits for every tonne of carbon avoided. It has an estimated cost-benefit ratio of 2.1 to 6.5 (mid-range 3.16) and an estimated net present value of \$1.21 billion to \$4.75 billion (mid-range \$2.4 billion).</p> <p>The main benefit is in fuel savings. The measure is estimated to yield \$2,162 million to \$5,618 million (mid-range \$3,405 million) in fuel savings over the lifetime of the vehicles affected.</p> <p>There is a risk that the standard could encourage an increase in diesel vehicles resulting in higher levels of air pollutant emissions. This risk would need to be mitigated. The early adoption of latest fuel efficiency standards (e.g. Euro 6) for diesel vehicles would help mitigate the environmental impacts of diesels.</p>	<p>If the emissions target in the standard is communicated with sufficient lead time, the measure will contribute to a predictable and certain regulatory environment.</p> <p>For suppliers with a business goal of diversifying their fleets towards more low emission vehicles the standard will lower market risk and costs. This is because all suppliers will have to change the composition of their vehicle fleets. This more easily enables the increased vehicle costs to be incurred and passed on to consumers.</p>	<p>The scheme is a supply-side scheme. Requires suppliers to select vehicles with better technology in order to meet the emissions target.</p> <p>For it to achieve an increase in uptake of EVs and other low emission vehicles, the scheme depends on consumers' willingness to buy the low-emission vehicles.</p> <p>Greater certainty of achieving policy outcomes is achieved if the vehicle fuel efficiency standard is mated with a demand-side incentive such as the feebate scheme or other form of rebate.</p>	<p>Could contribute to an improvement in vehicle safety if importers of used vehicle have to source younger vehicles to meet the emissions target.</p> <p>At the same time there is a risk that the increase in vehicle prices could cause some people to hold onto their vehicles for longer. This would be negative for safety if they have a low safety rating.</p>	<p>Would have significant costs to implement, administer and comply with. The costs to government are estimated to be \$20-\$30 million (mid-range \$25 million) in capital and operational costs.</p> <p>Compliance costs to vehicle suppliers would be significant. For example in adjusting the selection of vehicles in their fleets, and monitoring and reporting their vehicle sales, vehicle weights and CO₂ emissions to the regulator.</p> <p>Suppliers unable to meet the required standard would be penalised. The penalty costs would be passed onto consumers.</p>	<p>Would increase vehicle prices as suppliers would expect consumers to pay more for vehicles with better technology. This could reduce access to newer vehicles for low income households.</p> <p>However, over time the substantial fuel savings from the vehicle fuel efficiency standard are likely to benefit low income households, particularly as more efficient vehicles are resold into the second hand market.</p> <p>There are over 400 traders importing between 4 and 20 vehicles each year. The costs of compliance for these importers could be prohibitive. It is likely that many of these operators would either leave or amalgamate with others.</p>

<p>Age limit on used imports (Option 4)</p>	<p>Depends on the choices of consumers. If consumers choose to replace like with like, for example replacing a conventional car with a car of the same weight and power then it could reduce GHG emissions.</p> <p>Would contribute to a reduction in air pollutant emissions through an increase in the uptake of younger vehicles. Emissions from older vehicles are generally higher than newer vehicles of equivalent fuel type and servicing³⁹. However, if the initiative extends the lives of vehicles already in the fleet harmful emissions could increase.</p>	<p>Generally, the more recent the year of manufacture of a vehicle the more fuel efficient the vehicle. This is achieved through technology advancements in engine design and transmissions. If consumers replace an older vehicle with a newer vehicle than they otherwise would, then an age limit on used imports could help reduce overall emissions. In addition, to modernisation, any measure that shifts consumer demand to smaller, less powerful vehicles would contribute to a low emissions fleet.</p>	<p>Is too indirect a mechanism to be an efficient way to reduce emissions. It has to be assumed that consumers will maintain their vehicle preferences, or ideally move away from the current trend of preferring heavier more powerful vehicles.</p>	<p>Would not diminish predictability and certainty as a rolling 7-year age ban is simple to understand and give effect to.</p>	<p>Would help to speed the adoption of vehicles with better low emissions technologies.</p>	<p>Would improve the safety of vehicles entering the fleet by removing a large number of the lower safety rated (1-3 stars) vehicles. Currently there is a higher proportion of 1-3 star vehicles in the older imported vehicles. These pre 2008 vehicles lack the basics of ESC and side curtain airbags.</p> <p>A rolling age bag would result in continuous improvements in the used imported fleet.</p> <p>However, there is a risk that the initiative could extend the lives of vehicles already in the fleet. This would occur if there is a reduction in the number of imported used-vehicles.</p>	<p>Would result in a trivial increase in government implementation and administration costs as it would utilise the existing processes for vehicles to gain customs clearance. It would have low compliance costs.</p>	<p>Would increase the average price of used vehicle imports. This increase would be significant as a 7-year age ban would remove around 75%-80% of the current used vehicles imported.</p> <p>The resultant increase in vehicle prices could reduce access to used vehicles for low income households.</p> <p>Could lead to a level of rationalisation in the used segment of the vehicle market. Dealers specialising in cheaper older vehicles would be most at risk.</p>
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³⁹ Policies to Reduce Harmful Emissions from Vehicles: Costs and Benefits, Report prepared for the Ministry of Transport, Covec May 2015

Section 5: Conclusions

5.1 What option, or combination of options, is likely best to address the problem, meet the policy objectives and deliver the highest net benefits?

The Ministry of Transport’s preferred options to transition the light vehicle fleet to be low emissions are:

- regulating a vehicle fuel efficiency standard (Option 3)
- introducing a vehicle purchase feebate scheme (Option 2)

Vehicle fuel efficiency standard

The preferred option to help transition the light vehicle fleet to be low emissions is to regulate a vehicle fuel efficiency standard (Option 3). Its benefits are greater than the other options. It is also likely to have less of an impact on low income New Zealanders. This is because the associated fuel savings from vehicles with better technologies are likely to offset any increase in vehicle prices. Competition in the vehicle market will also help to mute rises in vehicle prices.

A vehicle fuel efficiency standard would address the challenge that a less fuel efficient selection of vehicles is made available to our market compared to other markets. It would also increase the supply of low emission vehicles, including EVs and petrol hybrids.

Benefits

If implemented in 2021, a vehicle fuel efficiency standard with an emissions target of 105 grams CO₂/km in 2025 is estimated to have lifetime emissions reductions of between 3.9 million and 6.7 million (mid-range 5 million) tonnes of CO₂.

This level of emissions reduction is the equivalent to preventing the emissions from 359,000 to 616,000 (mid-range 476,000) vehicles. Alternatively, it is the equivalent to preventing nearly all the emissions that occur from electricity generation in a single year.

A vehicle fuel efficiency standard would have associated fuel savings estimated at \$2.2 million to \$5.6 billion (mid-range \$3.4 billion) over the period 2020–2041. It would also contribute to a reduction in air pollutant emissions through facilitating an increase in the uptake of EVs.

Costs

Against these benefits, a vehicle fuel efficiency standard would have significant government implementation and administration costs. The compliance costs to vehicle suppliers would also be significant. These costs are mainly those in adjusting their fleets, and monitoring and reporting their vehicle sales, vehicle weights and CO₂ emissions to the regulator.

Fuel suppliers would be expected to incur a fall in sales and revenue as a result of the fuel savings enjoyed by consumers. However, this cost is likely to be addressed by the industry as it looks to future proof itself in the face of a move to low-carbon fuels. For example, Z-Energy is positioning itself as a transport energy company rather than an oil company. It has partnered with companies such as ChargeNet, to provide fast-charging facilities at some of its service-stations. It has also invested in Mevo the EV car-share company.

Results

However, our analysis estimates that the value of the benefits would well outweigh these costs. Our analysis suggests that a vehicle fuel efficiency standard would have a cost-benefit ratio of between 2.1 and 6.5 (mid-range 3.2), with an estimated net present value of between \$1.21 billion and \$4.75 billion (mid-range \$2.41 billion).

Further gains would be achieved if progressively stronger emissions targets are set beyond 2025.

Risks

The key risk with a vehicle fuel efficiency standard is that it could increase vehicle prices as suppliers would expect consumers to pay more for vehicles with better technology. This could reduce access to newer vehicles for low income households. It could also pose a risk to road safety if people hold onto their older vehicles for longer. This will be a concern if they are 1- or 2-star vehicles.

It would also be expected to lead to a level of rationalisation in the used-vehicle industry. There are over 400 traders importing between 4–20 vehicles each year. The costs of compliance with the standard for these traders could be prohibitive. It is likely that many of these operators would either leave the industry or amalgamate with others.

Feebate Scheme (Option 2)

The feebate scheme imposes fees on high emission vehicles and pays a rebate on low emission vehicles. It would apply to all light vehicles entering the New Zealand fleet whether new or new-used. The intention is that the scheme be set up to be self-financing over its life. Some fine tuning of fees and rebates over the scheme life would be likely as no one can predict with confidence the consumer response to fees and rebates before they are in effect. Initial design suggests the scheme would generate a surplus of revenue initially enabling the scheme to be managed with little inherent fiscal risk to government.

In the Ministry of Transport's view, it would be desirable to have the vehicle fuel efficiency standard working together with a vehicle purchase feebate scheme. This is because a feebate scheme would quicken the transition to a low emission fleet, over and above the vehicle fuel efficiency standard, by addressing the challenges that:

- EVs and petrol hybrids are currently more expensive than conventional vehicles. Internationally, subsidies and taxes have complemented vehicle fuel efficiency standards in shifting the composition of vehicle fleets towards low emission vehicles
- consumers discount fuel efficiency and carbon emissions in their vehicle purchase decisions. This is evident in the trend for consumers to increasingly buy heavier, less fuel efficient vehicles.

The results of the Ministry's analysis is provided below.

Benefits

If implemented, a feebate scheme is estimated to have lifetime emissions reductions of 1 million to 2.3 million (mid-range 1.55 million) tonnes of CO₂.

This level of emissions reduction is the equivalent to preventing the emissions from 94,000 to 213,000 (mid-range 142,000) vehicles. Alternatively, it is the equivalent to preventing 5 and a half months of emissions from a large (750MW) coal fired power station.

It would have associated fuel savings estimated at between 328 million and \$1,050 million (mid-range \$627 million) (discounted value) over the lifetime of the vehicles affected. It would also contribute to a reduction in air pollutant emissions through an increase in the uptake of EVs.

All these estimates assume that the feebate scheme is in effect from 2020–2025.

Costs

Against these benefits, a feebate scheme would have significant costs to government to implement and administer. Compliance costs to businesses would also be significant.

Results

Our analysis estimates that the value of the benefits would well outweigh these costs. Feebates would have an estimated cost-benefit ratio of between 1.4 and 4.2 (mid-range 2.6) with a net present value of between \$111 million and \$821 million (mid-range \$413 million).

Risks

The key risk with a feebate scheme is that low income households could be penalised where a low emissions vehicle is not available for purchase at an affordable price (either new or used). The essence of this risk is that the scheme is a demand side incentive and simply there may be insufficient affordable EVs to choose from. In time supply will expand and the market will mature and EVs will become a mainstream product. But in the initial stages of EV market growth, demand could well exceed supply. A respond could be to hold off purchasing a low-emissions vehicle and keep older vehicles or to buy a replacement vehicle that is higher emitting than desired.

Tradespeople reliant on affordable utes, vans and light trucks could be similarly affected. This risk could be mitigated by delaying the introduction of the feebate scheme until after the vehicle fuel efficiency standard had been in effect for at least a year and so there would be a better selection of low emission vehicles.

A risk could be posed to road safety if the fee element causes people to hold onto their older vehicles for longer. This will be a concern if they are 1- or 2-star vehicles. These vehicles do a markedly poorer job in helping to avoid crashes, or in protecting their occupants in the event of a crash, than vehicles with higher ratings. The vehicle scrappage scheme proposed would reduce this risk. Nevertheless, other initiatives would need to be develop as part of the new road safety strategy to further increase the rate at which these less safe vehicles leave the fleet.

The other risk with a feebate scheme comes from the need for it to be self-financing. In practice it would be difficult to strike the fees and rebates at the right levels to avoid over- or under- fee collection. If the fees and rebates are adjusted too frequently this would reduce predictability and certainty in the vehicle market. This risk could be mitigated by the government operating a fund that would smooth out the effects of under and over fee collection.

5.2 Summary tables of costs and benefits of the preferred approach

Vehicle fuel efficiency standard

Affected parties	Comment:	Impact	Evidence certainty
Additional costs of proposed approach, compared to taking no action			
Vehicle suppliers consumers (it is uncertain to what extent the costs will be fully passed onto consumers)	Higher incremental 'technology' cost of vehicles that have the necessary equipment to meet lower emissions levels.	\$1,088 million (range: \$683 million to \$1,252 million)	Medium
Regulator	Initial capital costs and annual costs to implement, regulate and enforce this policy.	\$25 million (range: \$20 million to \$30 million)	Medium
Vehicle consumers	Welfare loss borne by consumers who opt to buy a vehicle which is different from their preferred one.	\$18 million (range: \$5.5 million to \$34 million)	Low
Total Monetised Cost		\$1,131 million (range: \$708 million to \$1,316 million)	
Non-monetised costs	Industry compliance costs Possible reduction in range of vehicles available to consumers, if overseas suppliers choose not to make fuel efficient variants available to New Zealand. Possible negative impact of increasing air pollutant emissions if there is an increase in the supply of diesel vehicles and the Euro 6 exhaust emission standard has not been regulated (Euro 5 for used-imports).	Medium Low Low	Medium Medium High
Expected benefits of proposed approach, compared to taking no action			
Vehicle consumers	Fuel savings from improvements in fuel efficiency	\$3,405 million (range: \$2,162 million to \$5,618 million)	Medium
New Zealand	Reduced GHG emissions of 3.9 to 6.7 (range: 5.19) million tonnes Marginal abatement cost of carbon per tonne is -\$260 to -\$851 (mid-range = -\$468)	\$125 million (range: \$62 million to \$156 million)	Medium
Total Monetised Benefit		\$3,530 million (range: \$2,224 million to \$5,774 million)	
Non-monetised benefits	Lower air and noise pollution Improved security of supply from the importation of lower volumes of fuel	High Medium	High Medium

Feebates (this analysis assumes the feebate scheme is in effect over 2020–2025)

Affected parties	Comment	Impact	Evidence certainty (High, medium or low)
Additional costs of proposed approach, compared to taking no action			
Vehicle consumers	Welfare loss borne by consumers as a result of the fee levied on high-emissions vehicles.	\$221 million (range: \$154 million to \$292 million)	Low
Regulator	Initial capital costs to implement and ongoing costs to administer the scheme. This includes the costs of fee collection and rebate payment and to monitor the balance of the feebates fund.	\$37 million (range: \$31 million to \$44 million)	Medium
Total Monetised Cost		\$258 million (range: \$185 million to \$336 million)	Medium
Non-monetised costs	Industry compliance costs	Medium	Medium
	Risk that the lifetime of existing vehicles in the fleet that are high emitters and have a low level of safety would be extended.	Medium	Medium

Expected benefits of proposed approach, compared to taking no action			
Vehicle consumers	Fuel savings from purchasing a more fuel efficient vehicle.	\$627 million (range: \$328 million to \$1,050 million)	Medium
New Zealand	Reduction in GHG emissions of 1,021 to 2,324 (mid-range 1,554) million tonnes Marginal abatement cost of carbon per tonne is -\$90 to -\$423 (mid-range -\$266)	\$44 million (range: \$18 million to \$60 million)	Medium
Total Monetised Benefit		\$671 Million (range: \$346 million to \$1,110 million)	
Non-monetised benefits	Lower air and noise pollution from the increased uptake of EVs.	High	High
	Increased security of supply from importing lower volumes of fuel.	Medium	Medium

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5.3 What other impacts is this approach likely to have?

The vehicle fuel efficiency standard and the feebate scheme will increase the supply of low-emission vehicles and stimulate the demand for EV uptake. This brings a number of co-ordination risks that will need to be managed across the public and private sectors.

Ensuring there is adequate EV charging infrastructure

To date the provision of public charging infrastructure is largely staying ahead of EV uptake, however there are some regions with inadequate infrastructure. Ideally, the charging network will continue to expand as the number of EVs increase. Where it does not, there is a risk that the lack of infrastructure will neutralise the effectiveness of the proposed reforms.

It is also possible that the variety of charging formats and plugs creates a concern for EV motorists. While more and more public charging stations are appearing in NZ, courtesy of companies like Juicepoint, Charge Net and power providers like Vector, any particular fast-charge unit may not offer the right plug for all EVs.

To mitigate this risk, additional government investment is likely to be required to address gaps in the public charging network that are not commercially attractive for the private sector to fill.

As well, if the goal is to achieve a mass adoption of EVs over time, then central and local government with the private sector will need to consider how we can future proof New Zealand for the uptake of EVs. This includes ensuring:

- there is sufficient charging infrastructure in residential streets with on-street parking
- all new residential homes, non-residential buildings and carparks are built to be EV ready
- workplaces have adequate access to charge-points.

Measures will be needed to encourage off-peak charging

The Productivity Commission has highlighted that a large EV fleet would add significant load to the electricity grid and depending on the time at which vehicles are charged, could lead to much higher emissions from electricity generation. As well, high uptake combined with greater use of fast chargers could put substantial pressure on electricity networks.

Smart metering and more cost-reflective pricing of electricity will be needed to address these issues.

A market needs to develop to provide for EV servicing

Consumers need to have confidence that their EVs can be serviced by skilled technicians. In particular the transmission complexities of plug-in-hybrids and extended range EVs may require vehicle technicians to receive significant training. Franchise dealers offering EVs will meet the demand for service provision. For many smaller New Zealand towns there are only the traditional mechanic at the local service station. It is unclear to what extent EVs will be able to be serviced by the generalist mechanics or even auto-electricians.

An extension of EV servicing could be the potential for businesses to develop in New Zealand that are able to convert fossil fuelled vehicles to electric power. If a person was looking at a fossil fuelled motor reconditioning or replacement, the option of converting to an electric power train might appeal.

EV damage repair servicing also needs to adjust. It is reported that EVs present a risk of electrocution and fire for panel beaters. EVs contain lithium in batteries which is highly flammable meaning that they can not be put into paint spray booths. We understand the

Collision Repair Association of New Zealand is bringing in new international, service quality standards which will see repairers commit to ongoing training, equipment upgrades, annual inspections and audits including particular requirements for repairing EVs.

Some countries have developed first-response vehicles with a tent-like device to encompass an EV and starve any fire of oxygen.

A market needs to develop to provide and recycle batteries

As half of all vehicles entering the fleet are used-imports, it will be important that a market for replacement batteries develop. Currently, it is difficult to source a replacement battery. Nissan New Zealand does not offer them because imported Nissan Leafs are not “their cars”. However, importers of used-EVs will eventually have to support the vehicles they sell by developing a market for replacement batteries and other specialised parts.

As well, the increase in EVs will result in an increase in used lithium batteries. The Ministry for the Environment has begun working with industry stakeholders to develop a proposal for a mandatory product stewardship scheme for lithium batteries, to ensure that spent batteries are recycled or reused instead of becoming potentially hazardous waste.

5.4 Is the preferred option compatible with the Government’s ‘Expectations for the design of regulatory systems’?

The preferred options are consistent with the Government’s ‘Expectations for the design of regulatory systems’.

Section 6: Implementation and operation

6.1 How will the new arrangements work in practice?

How could the preferred option be given effect?

The option to have a vehicle fuel efficiency standard and a feebate scheme would be implemented through legislative changes. New legislation is proposed: the 'Climate Change Response (Transport Emissions) Bill. These schemes would likely involve both regulations and rules made under the new Act.

If Ministers agree to progress this option stakeholder consultation will occur. If Ministers subsequently agree to implement the proposal, the necessary legislative changes would be sought, however they are already being planned.

The consultation will include consideration of the transition arrangements that would apply. For the vehicle fuel efficiency standard, the standard would be phased in with sufficient lead time to allow vehicle suppliers to:

- develop the necessary IT systems to collate, monitor and assess their sales and emissions data and to submit reports to the regulator
- adjust their product plans to ensure the fleet of vehicles they supply is compliant.

It could apply the type of transition that was successful in the European Union, and is proposed in Australia, which is to phase-in the average target on an increasing proportion of sales. For example a possible transition could be:

Year	Requirement applying
2021	Annual reporting of sales and emissions levels commences
2022	65% of vehicle sales to comply (on sales weighted average basis)
2023	75% of vehicle sales to comply (on sales weighted average basis)
2024	80% of vehicle sales to comply (on sales weighted average basis)
2025	100% of vehicle sales to comply (on sales weighted average basis) and penalties commence

Once implemented, who will be responsible for ongoing operation and enforcement of the new arrangements?

It is likely that the New Zealand Transport Agency would be responsible for the ongoing operation and enforcement of both options.

When will the arrangements come into effect? Does this allow sufficient preparation time for regulated parties?

Decisions on when the arrangements would come into effect would be considered following stakeholder consultation. However, at the earliest the vehicle fuel efficiency standard could be phased in from 2021. As mentioned it could be preferable to phase in the feebate scheme after the vehicle fuel efficiency standard has been in place for about a year.

How will other agencies with a substantive interest in the relevant regulatory system or stakeholders be involved in the implementation and/or operation?

Given their role, it is likely that the Energy Efficiency and Conservation Authority would work with the New Zealand Transport Agency to raise industry awareness of the vehicle fuel efficiency standard.

6.2 What are the implementation risks?

The vehicle fuel efficiency standard and feebate scheme would be a significant regulatory change that would be new in the New Zealand context. This brings several implementation risks.

Global or New Zealand economic performance

There is always a risk that a global or New Zealand centric economic downturn could cause the Government to reconsider the emissions objectives in light of the need to change macro-economic policy settings to stimulate growth. For example the recent increases in petrol prices has resulted in the Government stopping any extension of regional fuel taxes beyond Auckland. Such exogenous factors are a significant risk but very hard to foresee and measure in terms of the domestic policy response.

Regulator risks if not adequately resourced

From the perspective of the regulator, the New Zealand Transport Agency would have to regulate new parts of the transport sector that it currently does not regulate. Significant investment would be needed in its people capability, information technology systems, and business processes to ensure that it could fulfil the regulatory role.

Unless the implementation detail of the initiatives is well-understood there is a risk that the level of systems development and skills capability needed is not be adequately scoped and planned for. If this occurs the New Zealand Transport Agency could be either under- or over- resourced to fulfil the new functions.

This risk would be mitigated by the New Zealand Transport Agency having discussions with regulators in other jurisdictions. These discussions would focus on understanding how they administer their policies and the system and people resources involved.

Industry not compliant (don't understand their obligations)

The vehicle fuel efficiency standard and the feebate scheme would rely on a high level of compliance from the vehicle industry. Vehicle suppliers would have to accurately report their vehicle sales, along with the tare weights and tailpipe CO₂ emissions of the vehicles they sold. They would also have to adjust the fleet of vehicles they are selling on the market to ensure that the average level of emissions across their fleet compiles.

For the feebate scheme vehicle retailers would have to accurately show the fees and rebates that apply to each vehicle. They would also have to play a role in collecting fees and passing these onto the regulator. As well as ensuring consumers are aware of how they can claim rebates.

To ensure a high level of compliance adequate information and guidance will need to be available to the industry. A campaign to inform the public about the feebate scheme would also be needed to ensure consumers are well aware of their rights and obligations.

Feebates – risks of under and over revenue collection

The feebate scheme is intended to be self-financing, with the fees and rebates set so that the rebates can be paid for out of the fees. To achieve this they require the 'pivot point' that divides vehicles into those that receive rebates and those that attract fees to be regularly reviewed. This point is defined in grams CO₂/kilometre.

However, to provide a sufficient level of predictability for consumers and vehicle suppliers the pivot point can not be reviewed too frequently. This means that in practice feebate schemes have a risk of trending to over- or under-revenue collection. For example, if demand for low emission vehicles is too low, more fees will be collected than rebates are paid. Similarly, if demand is higher than expected more rebates will be paid and the

scheme could be under-funded. To mitigate this risk, the incomings and outgoings will need to be monitored in the context of what is known about the present and future vehicle offerings and market prices, and the regulator would have to operate a cash reserve as a buffer funded.

Social Impacts

For both proposals, a key risk is where people require a larger vehicle such as a people mover for a large family, or a ute or van for a small business, and there is no affordable low emission model with the functionality they need on the market. In this situation, these people would have no choice but to purchase a higher emissions vehicle and may possibly be required to pay a fee. These risks would be reduced/mitigated when the range of low emission vehicles expands from where it is today and the price differential between conventional vehicles and EVs and petrol hybrids is gone.

There is also a perception risk that the feebate scheme is seen as support for the relative wealthy as only these ones can afford new cars (new or imported-used) anyway.

Consultation will identify other implementation risks

Consultation with stakeholders on the preferred option has yet to occur. Once it does it is likely that stakeholders will identify implementation risks that will need to be mitigated. These additional risks will be discussed in the regulatory impact statement that is done to inform Ministers' decisions on whether the proposals will proceed to implementation.

Section 7: Monitoring, evaluation and review

7.1 How will the impact of the new arrangements be monitored?

Vehicle Fuel Efficiency Standard

The NZ Transport Agency's monitoring would focus on ensuring individual vehicle suppliers comply with their required fleet average emissions targets.

The Ministry's monitoring will focus on the extent to which the vehicle industry as a whole is on track to achieve the national fleet target of 105 grams of CO₂ per kilometre in 2025.

This monitoring will inform the setting of subsequent national fleet targets that would be set in the early 2020s out to 2035, to ultimately achieve a low emissions vehicle fleet.

The data used to administer and enforce the vehicle fuel efficiency scheme would be used to monitor its impact.

The feebate scheme

The very design of this scheme and the need to alter some metrics through time means that regular ongoing monitoring is a vital part of its administration.

NZ Transport Agency would monitor the level of fees received versus rebates paid out. This would be used to inform:

- whether the 'pivot point' requires review to ensure the scheme is self-financing. This point divides vehicles into those that receive rebates and those that attract fees
- an assessment of the degree to which the scheme is being effective in influencing consumer demand for lower emission vehicles.

The Ministry of Transport would formally evaluate the effectiveness of the scheme. This could be three years after it has been in operation. The data used to administer and enforce the feebate scheme would be used to monitor its impact.

7.2 When and how will the new arrangements be reviewed?

- *How will the arrangements be reviewed? How often will this happen and by whom will it be done? If there are no plans for review, state so and explain why.*
- *What sort of results (that may become apparent from the monitoring or feedback) might prompt an earlier review of this legislation?*
- *What opportunities will stakeholders have to raise concerns?*

Vehicle Fuel Efficiency Standard

The effectiveness of the vehicle fuel efficiency standard in increasing the supply of low emission vehicles would be formerly evaluated by the Ministry of Transport at the end of 2025. This would be in line with when the national fleet target of 105 grams of CO₂ per kilometre is to be achieved.

Prior to this, a review of the level and ease of industry compliance would be completed. Ideally this would be done after the standard had been in operation for a year.

The review would be done by the Ministry of Transport working with the NZ Transport Agency and the Motor Industry Association and the Imported Motor Vehicles Industry Association. The review would look at whether industry participants are well aware of their obligations and are using cost-effective systems to monitor their fleets and report to the regulator. It would give stakeholders an opportunity to raise any concerns with the operation and administration of the standard.

The feebate scheme

The operation of the feebate scheme would be reviewed after it has been in effect for one year. The review would seek to ensure the system has integrity in terms of:

- vehicle suppliers accurately displaying the fees and rebates that apply to each vehicle
- consumers having confidence in the system
- it being easy for consumers to claim rebates from the regulator and for businesses to collect fees from consumers on behalf of the regulator.

The review could be done via a survey of vehicle suppliers and consumers who had purchased a vehicle under the feebate scheme. The Ministry of Transport would be responsible for the review.

In addition, the ongoing need for the feebate scheme would be reviewed by the Ministry of Transport in 2025, or earlier, if the purchase price difference between EVs and conventional vehicles has significantly narrowed.

Appendix 1

Comparison of the best performing variants of top selling passenger vehicles in New Zealand with the best performing comparable variant sold in the UK (August 2017)⁴⁰

Model	Best NZ variant	Tailpipe CO ₂ (g/km)	Best UK variant	Tailpipe CO ₂ (g/km)	Difference %
Toyota Corolla (sold as Auris in UK)	1.8L Petrol Hybrid	96	1.8L Petrol Hybrid	79	18
Toyota Rav4	GX 2.2D/4WD/6AT/SV/5DR/5S	176	Petrol Hybrid AWD 2.5 VVT-i Auto	118	33
Toyota Yaris	GX 1.3P/5MT/HA/5DR/5S	134	1.5 VVT-i hybrid Auto with 15 inch alloy wheels	75	44
Kia Sportage	Urban EX 2.0P/6AT/SV/5DR/5S	182	'1' 1.7 CRDi 114bhp ISG	119	35
Mazda CX-5	GSX DSL 2.2D/4WD/6AT/SV/5DR/5S	158	2.2 SKYACTIV-D (150PS) 4WD A6	144	9
Mazda 3	GLX 2.0P/6AT/HA/5DR/5S	136	1.5L Turbo Diesel, 6 Spd Manual	99	27
Mitsubishi Outlander	XLS 88KW/PHEV/4WD/AT/SV/5DR/5S	39	GX5h 2.0 PHEV	44	-13
Suzuki Swift	GL 1.2P/5MT/HA/5DR/5S	106	1.2 2WD	116	-9
Suzuki Vitara	SPORT 1.4P/6AT/SV/5DR/5S	138	1.6 2WD	106	23
Hyundai Tucson	2.0 CRDi LIMITED 2.0D/4WD/6AT/SV/5DR/5S	178	2.0l CRDi 4WD, 100kW Diesel A6	160	10
Hyundai	GD CRDi 1.6D/7AM/HA/5DR/5S	136	1.6L Turbo	94	31

⁴⁰ This comparison has been derived from data sourced from the UK Vehicle Certification Agency <http://www.dft.gov.uk/vca/> and from data routinely provided by distributors through the New Zealand Motor Industry Association's Model Information system.

i30			Diesel, 6 Spd Manual		
Hyundai Santa Fe	DM 2.2D/4WD/6AT/SV/5DR/5S	205	2.2l CRDi 4WD 18" or 19" wheels	159	22
Nissan Qashqai	N-TEC 2.0P/CVT/HA/5DR/5S	159	dCi 110 16/17 inch wheel	99	38
Nissan X-Trail	ST-L 2.5P/6CVT/SV/5DR/5S	188	dCi 130 2WD 17" wheel	129	31
Ford Focus	Trend Diesel 2.0D/6AT/HA/5DR/5S	115	1.5 Duratorq TDCi (105PS) with stop/start – 5 Door	88	23
Subaru Outback	2.0D SLT Premium 2.0D/4WD/6CVT/SV/5DR/5S	165	2.0D SE Lineartronic AWD CVT	159	4
HONDA HR-V	L 1.8P/CVT/SV/5DR/5S	160	1.6 i-DTEC S	104	35