

Document purpose:

This document is the result of the programme reviews EECA and MBIE conducted across EECA's programme portfolio in 2016. The reviews were in response to a requirement to reprioritise the EECA's portfolio in the context of the new NZEECS, the new EV programme, and expanded levy. The framework for the review is available [here](#).

The reviews were based on existing documentation and workshops with MBIE, PwC and EECA staff.

About Vehicle Fuel Economy Labelling (VFEL)

Vehicle buyers are not factoring fuel economy into their vehicle purchasing decisions, as there is no reliable fuel efficiency information available to allow them to compare different vehicles and choose the most fuel efficient models.

In 2002, the Ministers of Transport and Energy approached Cabinet with a proposal to improve the average fuel economy of light passenger vehicles imported into New Zealand. As a first step, it was recommended to Cabinet that the Government fast-track a fuel efficiency labelling regime for new and used light vehicles under the 2001 National Energy Efficiency and Conservation Strategy (NEECS).

Key components of the programme are:

- Reporting of fuel economy performance of vehicles imported into New Zealand.
- Regulations requiring display of the mandatory fuel economy label on new and used vehicles for sale (except for private sellers).
- Compliance activities that ensure car dealers are displaying the label.

Conclusions

There is a clear role for government based on the identified problem, market failure, and barriers, and the potential benefits of the programme. However, it is difficult to attribute public benefits to the programme (i.e. a reduction in greenhouse gas emissions).

Further, this programme demonstrates that there is a role for government simply in the collection and publication of information by a trusted and authoritative source and absent any promotion for consumer action. Such information collection and publication:

- assists the market to function more effectively
- provides an analytical base to support discussions, policy-making, decision-making, and strategy

There is clear value in having quality data and the infrastructure to collect it. "Infrastructure" includes the relationships developed with industry.

There is an ongoing role for the provision of information in this area; however, as the majority of this data infrastructure work has been done (i.e. the programme has been established to a steady state), there is the question of what level of investment is warranted for the future and for what purpose.

Recommendations

In considering the question of what level of investment is warranted for the future, and for what purpose, this could involve:

- the programme being a “tool” for other programmes (e.g. the Electric Vehicles Programme)
- maintaining consistent and credible market information to support any potential vehicle fuel efficiency standards and technologies

It is recommended that EECA:

- review the Vehicle Fuel Economy Labelling Programme in light of other light transport initiatives (e.g. electric vehicles)
- consider investigating fuel efficiency standards with the Ministry of Transport
- investigate more broadly the role for government in, and value of, addressing behaviour change in car purchasing (e.g. consider other options besides labelling) with the Ministry of Transport

EECA should consider these in the context of the proposed New Zealand Energy Efficiency and Conservation Strategy priorities. EECA will also have to continue to work within the existing regulatory framework.

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1 The problem

Vehicle buyers are not factoring fuel economy into their vehicle purchasing decisions, as there is no reliable fuel efficiency information available to allow them to compare different vehicles.

1.1 Why is it a problem?

Light vehicle fuel consumption is high and contributes to significant greenhouse gas emissions. EECA estimates light vehicles contribute to 54%¹ of all vehicle emissions or 9.3% of New Zealand's total emissions². Reducing average fuel economy will help towards reducing our carbon emissions and decrease fuel costs.

There are a number of reasons why vehicle energy use and greenhouse gas emissions are so high, including:

- New Zealand has one of the highest rates of car ownership in the world³, which has grown rapidly since the introduction of used Japanese imports.
- New Zealand's vehicle fleet is one of the oldest in the developed world. Older vehicles tend to deliver poorer fuel economy than newer vehicles. At the end of 2005, the average age of the vehicle fleet was about 12 years. By the end of 2014 this had increased to 14 years.
- New Zealanders have historically tended to favour larger cars. The increase of lower cost imports has seen growth in the number of larger engine sports utility vehicles (SUVs) in the light vehicle fleet⁴. The reduction in oil prices has increased demand for higher powered new vehicles (particularly in the light commercial and SUV market).
- New Zealand's geography and population spread make us highly reliant on private transport, and public transport systems do not offer a viable alternative or economic option for many trips.

1.2 The programme

1.2.1 Origins

In 2002 the Ministers of Transport and Energy approached Cabinet with a proposal to improve the average fuel economy of light passenger vehicles imported into New Zealand⁵. Their proposal stemmed from an earlier report on the potential to introduce national fuel economy standards.

As a first step, it was recommended to Cabinet that the Government fast track a fuel efficiency labelling regime for new and used light vehicles under the 2001 National Energy Efficiency and Conservation Strategy (NEECS). The regime would be enabled by regulation under section 36 of the *Energy Efficiency and Conservation Act 2000* (the Act).

¹ Total light vehicle emissions are 7.5 million tonnes CO₂ per annum. For every litre of fuel consumed in an average petrol passenger vehicle, around 2.34 kg of carbon dioxide is released into the atmosphere.

² Total greenhouse gas emissions are 81 million tonnes, according to the Ministry for the Environment's Greenhouse Gas Inventory 2016.

³ [IEA-Advance Motor Fuels Annual Report \(2012\)](#)

⁴ SUVs currently account for 38% of all new light vehicles registrations compared to 31.5% for sedans and hatchbacks.

⁵ [Cabinet Paper - Report back on vehicle efficiency Standards and The Introduction of Fuel Consumption Reporting and Fuel Economy Labelling for Light Duty Vehicles. Proposals for the Design of Schemes for New Zealand 2002.](#)

1.2.2 Purpose

The initial purpose of the vehicle fuel economy labelling scheme (VFEL) was to improve the fuel efficiency of light vehicle models imported into New Zealand by providing consumers with comparative fuel economy information at point of sale. This enabled more informed purchase decisions, and increased demand for more fuel efficient vehicles. Improved light fleet fuel economy also offered important co-benefits by reducing the volume of imported fuel, and improving New Zealand's greenhouse gas emissions profile under the Kyoto Protocol.

1.2.3 Key components

Since it began in 2008, the VFEL programme has cost about \$500,000 per year and reduced vehicle fuel emissions by approximately 66 ktCO₂e to 2013⁶. Key components of the programme are:

- Reporting of fuel economy performance of vehicles imported into New Zealand.
- Regulations requiring mandatory new and used vehicle labelling (except for private sellers).
- Compliance activities that ensure car dealers are displaying the label.

1.3 Market characteristics

1.3.1 Light vehicle buyers/owners

Light vehicle buyers are either purchasing privately or for a commercial fleet.

Private buyers

IPSOS market research in 2013⁷ suggests that vehicle buyers use a mix of personal contacts, car dealers and online information sources when searching for cars. About 33% of them then go on to purchase their cars from a used car dealer and 29% from a new car dealer. In terms of priorities, over a quarter of those surveyed rated fuel consumption in the top three factors for their final decision, usually behind price and reliability.

New Zealanders are reluctant to scrap older cars and as a result the average age of a car is now 14 years, with 20% of them more than 20 years old.

Fleet buyers

Fuel consumption is an important consideration for 62% of commercial fleet purchasers, but this falls well below reliability, price, size, safety, and experience⁸.

Most people hunt out information online or via the dealership, where the majority of purchases are made.

1.3.2 Light vehicle sellers

Private buyers typically purchase their new vehicle from a franchise dealer. A franchise dealer purchases inventory from the manufacturer. As a franchise holder, the dealer must meet a stringent set of manufacturer's criteria including dealership appearance, parts and service operations and customer service systems. They offer the consumer peace of mind through key areas such as brand

⁶ [2013 evaluation conducted](#) internally by EECA

⁷ [Online survey \(n=261\)](#)

⁸ [EECA-commissioned Synovate market research in 2011](#) (n=50)

reputation, factory warranty, factory trained technicians, brand specific diagnostic knowledge and repair tools.

Franchise dealers also sell used cars that may be from any brand but are usually dominated by the vehicle brand(s) the franchise represents. Certified used car programmes which were once popular with manufacturers are limited now to just one brand covering both Japanese imports and New Zealand vehicles.

Independent dealers are not affiliated to a particular manufacturer or brand(s). These are typically used car dealers that operate as a standalone business and don't usually have a parts or service facility. Vehicle stock age is typically older than at a franchise dealer with many specialising in used Japanese imports which are either purchased directly from auction houses in Japan or from local wholesalers who import used vehicles in bulk. Other popular source countries for used vehicles include the United Kingdom, Australia and the United States.

Any person carrying on the business of motor vehicle trading must legally be registered as a Motor Vehicle Trader (MVT).

Online platforms have become popular resources for consumers to both find information about vehicles and complete the purchase. Private sellers, franchise dealers and independent dealers advertise vehicles for sale online. Online sales advertisements are dominated by used vehicles, however new vehicles are also available. Traditional vehicle auction houses allow for vehicles to be purchased in person for a fixed price, but are also increasingly developing online sales opportunities.

2 Strategic fit

The VFEL programme was mandated by Cabinet through the 2001 NEECS and the Act. The programme is part of EECA's regulatory responsibilities administered via the *Energy Efficiency (Vehicle Fuel Economy Labelling) Regulations 2007*.

VFEL is also consistent with government initiatives such as the energy and climate area in the [Business Growth Agenda \(BGA\)](#) Natural Resources chapter. The BGA signals that New Zealand should "ensure well-functioning markets, and identify and remove regulatory barriers to support renewable energy and reduce carbon emissions."

It also fits clearly into the [New Zealand Energy Efficiency and Conservation Strategy 2011-16 \(NZECS\)](#) which aims for "a more energy efficient transport system, with a greater diversity of fuels and alternative energy technologies."

The VFEL programme contributes to a more energy efficient transport system by aiming to improve the fuel efficiency of light vehicles entering the fleet. The programme does this by providing information to consumers to help them choose wisely and understand the benefits of doing so.

[EECA's strategy](#) prioritises "influencing consumer behaviour in vehicle choice, efficient driving and using alternative fuels." VFEL influences light vehicle choice amongst consumers.

3 Role for government

3.1 Market failures and barriers

3.1.1 Market failure

In 2001/02 an [investigation into New Zealand's light vehicle fuel efficiency](#) identified that there was no reliable fuel efficiency information available to vehicle buyers. For many vehicles entering the New Zealand fleet there was simply no fuel economy information available, and where it was available, it was often not made visible. This meant that vehicle buyers did not take into account the running costs over the vehicle's life. As a result, the overall fuel economy of the light vehicle fleet was higher than an efficient market would provide.

If the market was functioning appropriately, vehicle buyers would be able to factor fuel efficiency into their purchase decisions. A lack of information has been identified as the primary market failure preventing this from occurring.

Lack of information/understanding

There is lack of information on fuel efficiency in the vehicle market which results in high search costs. Search costs are the transaction costs faced by consumers (largely the value of their time) in finding the 'best' model to purchase. Prior to VFEL, search costs for fuel efficiency information were high because fuel efficiency information either did not exist or was not made readily available. This means vehicle buyers were unable to minimise the total cost of ownership by taking fuel efficiency into consideration when purchasing a vehicle.

3.1.2 Market barriers

Present bias

Vehicle buyers prioritise the upfront cost of a vehicle over the whole-of-life costs.

Priorities

Fuel consumption is a secondary priority to price and sometimes reliability and safety (see Figure 1)⁹.

⁹ From [IPSOS research 2014 page 22 \(n=202\)](#)

Figure 1: Stated average importance ranking for vehicle buyers (1 = most important)⁹



3.2 Potential benefits

Table 1: Summary of types of expected benefits

PUBLIC BENEFITS	PRIVATE BENEFITS
<ul style="list-style-type: none"> • Avoided greenhouse gas emissions • Improved energy security through reduced oil imports (unquantified) • Improved air quality (unquantified) 	<ul style="list-style-type: none"> • Decreased fuel costs

3.2.1 Primary public good benefits

Avoided greenhouse gas emissions: Greater fuel efficiency in the light vehicle fleet will reduce greenhouse gas emissions.

3.2.2 Other public good benefits

Improved air quality: Emissions from vehicles can have significant detrimental effects on local air quality, leading to health problems and environmental degradation. Regional councils monitor local air quality, and in several regions, levels of harmful contaminants exceed the ambient air quality standards. Vehicle exhaust emissions are a significant contributor to air pollution in urban areas near busy roads in Auckland and Canterbury (currently estimated at up to 17% of PM₁₀ contaminants in the Canterbury air shed)¹⁰.

¹⁰ See Draft Canterbury Air Regional Plan for First Schedule Consultation 2014 X:\Research Monitoring & Technical Info (RT)\01 Monitoring\03 Ex Post\Draft Canterbury Air Regional Plan for First Schedule Consultation.pdf 20 Oct.pdf

Improved energy security through reduced oil imports: In the long term, the price of oil is likely to become increasingly volatile as worldwide energy demand grows. This is compounded by ongoing political instability in major oil producing regions. While there may be some short term decreases or increases in the price of oil, these factors point to an ongoing increase in the price of oil in the medium to long term. As a net importer of oil, New Zealand is particularly vulnerable to the adverse effects of rising oil prices. Reduced fuel use in New Zealand's light vehicle fleet will reduce the quantity of oil imported.

3.2.3 Private good benefits

Decreased fuel costs for light vehicle drivers: The immediate benefit of improved fuel economy is reduced fuel costs for the consumer.

3.3 Potential costs

To date, there has been limited evidence of the market looking to play a role in providing fuel efficiency information to help reduce carbon emissions and fuel costs.

Fuel economy labelling is a policy that has been implemented in several large economies across the globe including the US, UK, and China. International experience shows that there are unlikely to be negative externalities from this type of intervention.

A key aspect of resolving the information failure is ensuring that any information that is provided is independent and authoritative. The government fulfils this role.

4 Intervention

4.1 Intervention logic

There is no intervention logic for the programme currently¹¹.

4.2 Options

A [Cabinet paper](#) in 2001 reported on different policy options for improving the fuel efficiency of light passenger vehicles including labelling, fuel economy targets and fiscal incentives. It recommended that labelling and fuel economy reporting were the best options given that New Zealand was expected to benefit from interventions in other jurisdictions.

The [Regulatory Impact Statement](#) for the programme outlined four options for information intervention, including a preferred option.

4.2.1 Option 1: Status quo

Maintaining the status quo would have meant that:

¹¹ An intervention logic will be developed if required when implementing the review findings.

- the Fuelsaver website (introduced in 2006 to promote fuel economy awareness in New Zealand) would remain the primary reference for fuel economy information
- the Government and other organisations would continue general awareness campaigns
- vehicle fuel economy labelling would have remained at the discretion of the vehicle manufacturer. Uptake had been low and the information provided varied for each manufacturer.

This option was not preferred because it did not solve the problem and meet the policy objective – to address the lack of information available to consumers about the fuel economy of a vehicle, and the long term fuel costs of operating it, when making a purchase decision.

4.2.2 Option 2: Generic labelling

This would involve the establishment of a mandatory labelling scheme, but the label would simply refer the consumer to the Fuelsaver website for fuel economy information. This would be quick to implement and easy to operate as a generic label would be applied to all vehicles and would not require specific fuel economy information. It was not preferred as a generic label does not provide sufficient information to influence the consumer and therefore does not meet the policy objective. A generic label does not offer any major benefits over and above status quo, and would create an additional cost for placing the label.

4.2.3 Option 3: Mandatory Labelling for New Vehicles Only

This involves a mandatory fuel economy labelling for new vehicles only. The label would apply to new vehicles and there would be a high degree of certainty that the tested performance reflects actual performance. This was not preferred as a scheme that only applies to new vehicles would only cover a third of all new fleet entrants and would not fulfil the policy objective.

4.2.4 Option 4: Mandatory Labelling at point of sale for new and used vehicles (Preferred Option)

The preferred option will:

- be mandatory at the point of sale for new and used vehicles (excluding motorcycles) weighing less than 3.5 tonnes sold by registered motor vehicle traders
- use a dedicated label that displays fuel economy information by a star-rating
- display additional information to help the consumer, including an indicative annual cost of fuel
- be based on the fuel economy information on the Fuelsaver website
- apply to vehicles sold through vehicle trading websites

A motor vehicle trader is a person registered under the *Motor Vehicle Sales Act 2003* who sells more than six vehicles, or imports more than three vehicles, per year. Labelling would become part of the requirements for the commercial sale of vehicles and would not apply to private sales or imports, except where vehicles are sold through vehicle trading websites.

The label will include a comparative star rating that indicates the vehicle's fuel economy relative to other vehicles in the fleet, along with an annualised cost of fuel for that vehicle. The label will include a disclaimer to state that the information on the label is indicative only, and that actual fuel

economy depends on a range of factors. It will also explain how the annualised fuel cost is determined. There will also be a link to the Fuelsaver website, where there will be an in-depth explanation of all the information contained on the label.

The following adjustments have been made to the preferred option as it has been put into practice:

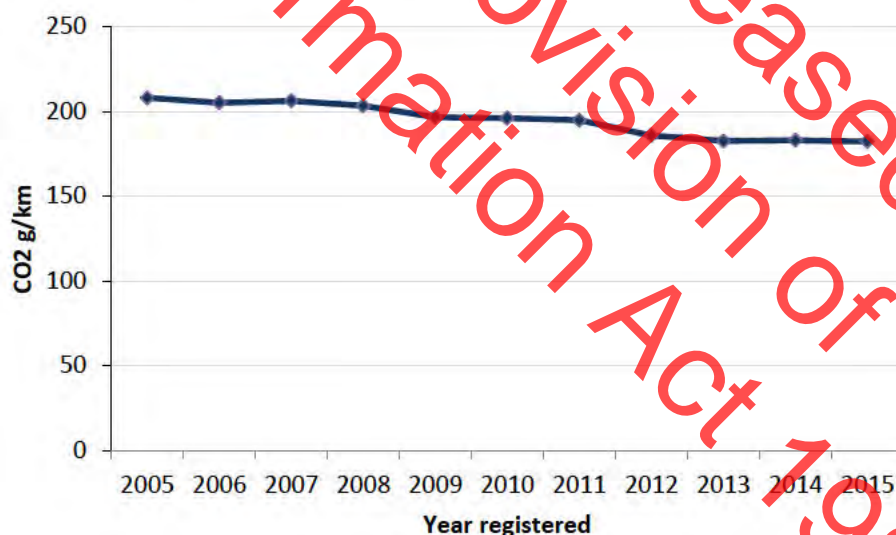
- The regulations state that motor vehicle traders must display fuel economy labels for vehicles when a trader “offers the vehicle for sale by displaying it at any location” (provided Fuelsaver information is available when the trader first displays the vehicle).
- The correct interpretation of the regulations is that “motor vehicles with a gross laden weight of more than 3500kg” are excluded. This is different from what a vehicle weighs (which is the tare or kerb weight).

4.3 Investment objectives

The most recent Statement of Performance Expectations (2016/17) contains the objective to maintain a compliance rate for VFEL display that is no less than 90% (95% for new vehicles and 90% for used).

EECA’s most recent Business Plan describes an objective to reduce average CO₂ per kilometre for vehicles entering the fleet to 178g CO₂ per km. The Ministry of Transport’s (MoT) most recent data (2015) has the value at 182.3g. Figure 2 shows that the average CO₂ per kilometre has been steady over the last several years, after decreasing slightly.

Figure 2: Average CO₂ emissions of newly registered vehicles in New Zealand



4.4 Potential impact

A cost-benefit analysis was conducted by CRL Energy Ltd in October 2007 that discussed the inclusion of both new and used vehicles in the VFEL programme¹². It concluded that “the

¹² X:\Research Monitoring & Technical Info (RT)\01 Monitoring\03 Ex Post\VFEL Report 8 October 07.pdf

combination of web-based and label display of fuel economy information for new and used entrant vehicles is expected to provide a 25-year, 5% discount rate NPV of \$343 million, and avoid the emission of 985 ktCO₂ over 25 years. By the end of year 5 the fuel saved is expected to be to the order of 6.2 million litres per year (i.e., around 15,000 tCO₂ avoided per year). By year 10 the fuel saved is expected to be to the order of 14 million litres per year (i.e., around 35,000 tCO₂ avoided per year)". This year 10 figure equates to about 0.5% of emissions annually, assuming total light vehicle emissions remain at around 7.5 Mt CO₂ per year as in 2014.

4.5 Market readiness

EECA is not aware of any incentives for car dealers to encourage the sale of less efficient vehicles. They are also more than capable of using fuel economy as a sales tool. EECA market research in 2012 found that the majority (96%) feel they have a self-reported 'good' or 'full' understanding of the VFEL¹³.

There are incentives for manufacturers to 'game' the fuel economy testing standards in order to make their vehicles seem more fuel efficient and therefore more attractive to buyers. This suggests that the market is placing more importance on fuel efficiency. In 2016, there were several car manufacturers who were found to be manipulating the fuel efficiency tests that VFEL and other international labelling schemes rely on¹⁴. This issue is an international one and EECA relies on an international response to restore the credibility of fuel economy labelling.

4.6 Risks

Table 2 outlines the main risks to the programme's success.

¹³ n=69

¹⁴ For example - <http://www.theverge.com/2016/4/20/11466320/mitsubishi-cheated-fuel-efficiency-tests>

Table 2: Risks to the programme's success

Risk	Description	Mitigation
Lack of public confidence in international testing of vehicles undermines EECA's Vehicle Fuel Economy Label programme	Consumer confidence in vehicle emissions and fuel consumption testing has been put under stress in recent times with international and national reports showing the growing difference between tested and on road fuel consumption results, and recent testing issues for VW, Mitsubishi and other vehicle manufacturers.	<ol style="list-style-type: none"> 1. International governments and regulatory agencies have increased compliance operations and improved testing procedures to strengthen the international regulatory framework for fuel consumption testing and restore consumer confidence. 2. We are working with the Ministry of Transport, NZTA, our international partners, and local motor industry representatives to be kept informed on any developments 3. Motor vehicle dealers have been advised that fuel economy data is provided as a basis for comparison and not a guarantee of performance. 4. Disclaimers have been added to the EECA website addressing the fact that real-world fuel economy may differ from that under test conditions.
Inaccurate or inconsistent information is published (e.g. Fuelsaver, or EECA websites), which undermines public confidence in EECA as an authoritative source of information.	<p>To effect change (improving energy efficiency and renewables use in New Zealand), EECA depends on its trusted brand status. EECA's reputation would be damaged by errors.</p> <p>The EEC Act requires EECA to be the Authority; we must provide authoritative data to meet our obligations under the Act.</p>	<ol style="list-style-type: none"> 1. Externally published figures are subject to quality assurance processes. 2. Investigations are commenced when any claim of Fuelsaver misinformation is received and data is compared with international available data. 3. Strong working relationship maintained with NZTA who collect VFEL data. 4. Any material challenges are investigated in light of new information and corrective action taken.

4.7 Interdependencies

This programme is not dependent on any other EECA programme but it is heavily dependent on data from international fuel economy testing standards and labelling programmes, especially in large economies. This is because VFEL utilises the results of fuel economy testing in other countries in order to provide the information to vehicle buyers (i.e. New Zealand does not do its own testing). Because most New Zealand vehicles are imported from Japan we are most dependent on their data.

The Electric Vehicles Programme will be partially reliant on VFEL for labelling and market segmentation data intelligence to show the regional impact of EVs and their success in the market.

4.8 Resource allocation

A nominal 1.7 FTE is allocated to VFEL as part of the Products team's overall MEPS and MEPL regulatory and compliance requirements. The budget for 2016/17 is \$375,000 for business-as-usual operations and \$200,000 for one-off activities associated with research and testing protocols.

5 Performance

5.1 Effectiveness

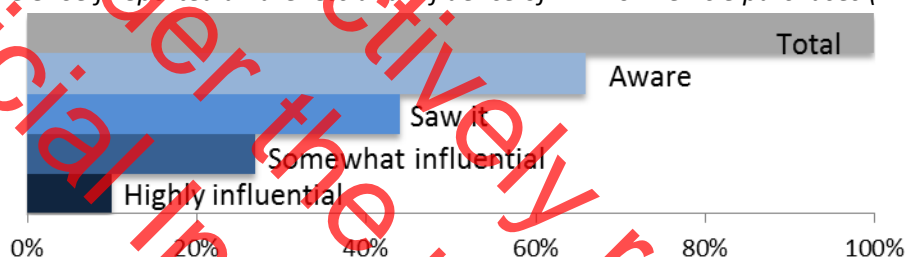
5.1.1 Use of EECA tools

The number of unique views¹⁵ of EECA's [VFEL web tool](#)¹⁶ equates to about 30% of the total number of Trade Me vehicle listings. For example, total vehicles listed on Trade Me in June 2016 was 74,637 and unique views of the web tool were 23,131. This gives an impression of how much the car buying public is using fuel economy information to research their vehicle purchase.

5.1.2 Influence of label

EECA conducted [market research](#) on the level of awareness and value of the VFEL label. When shown the label, 133 (66%) of 201 recent vehicle buyer respondents stated that they were aware of it and 89 (44%) said they saw it when they were vehicle shopping. Of those 89, 21 (24%) stated it was 'highly influential' in their purchase decision and 55 (62%) said it was 'somewhat influential'.

Figure 3: Self-reported awareness and influence of VFEL on vehicle purchases (n=201)



[Stakeholder research](#) conducted by EECA showed that vehicle retailers think that "VFEL has made fuel efficiency easier to understand and more tangible for customers". They also said its independence is important given the lack of trust many customers have in salespeople.

5.1.3 Compliance

Every year, EECA completes surveys on a sample of car yards to assess the level of compliance with VFEL label display. For the 2014/15 year 93% of vehicles at sampled car yards were displaying the VFEL label (91% for used vehicles and 95% for new)¹⁷.

5.1.4 Accuracy of testing standards

There will always be a discrepancy between tested and real world fuel economy due to variations in driving conditions. However, the Ministry of Transport's [2014 Annual Fleet Statistics](#) report acknowledged that there is "good evidence that the gap between laboratory results and real world fuel economy has been widening." This is a global phenomenon. There is a worldwide response underway to harmonise light vehicle testing procedures¹⁸ which EECA will be involved in.

¹⁵ Unique views can be understood as user sessions per page, with each session potentially representing multiple views of the page but a minimum of one view per session.

¹⁶ The VFEL web tool helps users work out the running costs of vehicles based on the label and their own estimated travel distances.

¹⁷ Sourced from a draft of EECA's 2014/15 Annual Report.

¹⁸ The Worldwide Harmonized Light Vehicles Test Procedures.

5.1.5 Fuel savings

Attributing fuel savings to VFEL is tricky because several other interventions may have had an indirect or direct impact on fuel economy in the same time period: for example, establishing the Right Car website, the raising of frontal impact standards and enabling of Euro 5 diesel vehicles to enter the fleet. There was also an underlying improvement in vehicle efficiency driven by consumer and government requirements.

In 2013 there was an [internal evaluation](#) that attempted to account for these factors and attribute fuel savings to the VFEL programme. The evaluation found that the overall trend in average fuel economy of vehicles joining the fleet steadily increased from 2005 (three years prior to when the VFEL Programme began) until 2009 (Figure 4)¹⁹. The average fuel economy for both petrol and diesel vehicles showed no improvement between 2009 and 2010.

To estimate savings data on engine size bands, the numbers of vehicles imported in a year within this band and the calculated average fuel economy for the actual vehicles imported in each band was used to work out fuel economy performance of vehicles entering the fleet.

A 'business as usual' (BAU) projection was made, against which the actual fleet fuel economy performance was compared. The BAU projection was derived from the historic average fuel economy data prior to the introduction of the VFEL programme and a natural log regression expression. It is important to note that, due to limited data availability, the BAU was built on only five data points so is vulnerable to data noise.

The gross savings were then estimated from the difference between the actual fleet fuel economy performance and the BAU case, multiplied by the number of vehicles imported, and a standard distance driven in a year of 14,000km (as noted on the vehicle fuel efficiency label).

An attribution factor was used to estimate the savings that can be attributed to the influence of the VFEL programme on consumer purchase behaviour. This factor was determined to be 12.6% from market research undertaken for EECA to test brand recognition and the programme's claimed level of influence on purchasing decisions²⁰. This was applied to the gross observed savings, which result from all interventions and technology improvement. The result was the net savings attributable to VFEL. The savings calculated in this manner will include any movement in consumer choice between large and small engine size vehicles as this will be reflected in the average fuel economy of the fleet. The margin of error in this attribution factor was impossible to determine and it is likely that the estimation of this factor represented the largest error in the analysis. The outcome is shown in Table 3.

Table 3: Estimated benefits from the VFEL programme

Year	Estimated cumulative fuel savings achieved by the programme	Estimated cumulative greenhouse gas savings achieved by
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¹⁹ Prior to 2005 manufacturers did not consistently supply fuel economy information on vehicles imported into NZ. As a result, the data for diesel fuelled vehicles prior to 2005 was based on low numbers of vehicles and subject to large margins of error, which made determining a trend for that period impossible.

²⁰ This figure is based on consumer recognition of the label, their claims about which part of the label's information was most useful and their claims as to whether the label helped them with their decision.

	(million litres)	the programme (ktCO ₂ e) ²¹
2008	1	3
2009	4	10
2010	8	19
2011	13	32
2012	20	47
2013	28	66

Figure 4: Fuel economy trends of petrol and diesel vehicles entering the New Zealand fleet 2000-2013

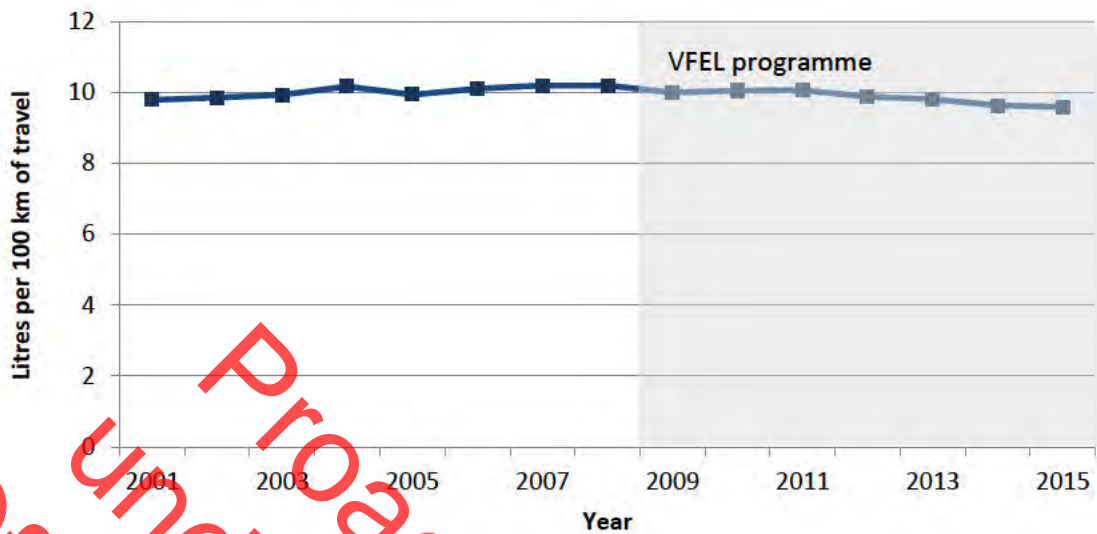


As mentioned in Section 5.1.4, the 'real world' fuel economy can be quite different than what was analysed above. Figure 5 is from MoT and shows the real world economy of the entire New Zealand light petrol fleet. This shows that the fuel economy of the light vehicle fleet has remained static during the last 15 years.

This was calculated by taking Ministry of Business, Innovation and Employment's (MBIE) 'delivered fuel' values²² (less estimated non-road use) and dividing it by the national fleet kilometres travelled²³.

²¹ Using petrol default emissions factor of 2.36 kg/litre from MfE.

Figure 5: NZ light petrol fleet 'real world' fuel economy



5.2 Achieved benefits

Using the figures from the internal evaluation (see section 5.1.5), the benefits to 2013 are detailed in Table 4. The total cumulative benefits over six years equate to an overall reduction of 0.15% in light vehicle greenhouse gas emissions per year²⁴.

Table 4: Public and private benefits arising from the programme to 2013

Benefit	Beneficiary	Public or private	Value
Avoided greenhouse gas emissions (primary)	New Zealanders	Public	66 ktCO ₂ e (cumulative)
Improved energy security through reduced oil imports	New Zealanders	Public	Unquantified
Improved air quality	New Zealanders	Public	Unquantified
Decreased fuel costs	Individuals/households	Private	\$56m (28 million litres of petrol at an average price of \$2/litre)

²² MBIE's "observed" values are from fuel company reporting.

²³ Derived from the odometer readings recorded when vehicles undergo inspection (warrant of fitness and certificate of fitness). MoT states that although the current method of collecting data generally provides accurate data, changes to the WoF cycles have impacted on this and the figure is considered to be an estimate that may be revised in subsequent years in light of more complete data. The level of change is expected to be less than one percent.

²⁴ Assuming total light vehicle emissions are 7.5 Mt CO₂e per year as per [EECA's analysis](#).

5.3 Value-for-money

The principal benefit from the programme is reduced fuel consumption through the purchase of more efficient vehicles. This analysis utilised the total fuel savings estimated in previous VFEL programme reviews (most recently in 2013).

Because of the uncertainty implicit in the determination of the fuel savings from the VFEL programme and the marginal costs of more efficient vehicles, the results of the economic analysis are presented in a sensitivity format. A full summary of the analysis can be found in Appendix 1.

Table 5: Results of cost-benefit analysis for VFEL since its inception in 2008

Fuel savings attribution	100%	100%	75%	75%
Marginal vehicle costs (efficiency premium)	100%	75%	100%	75%
Net Present Value	-\$13.9M	\$25.4M	-\$11.4M	\$18.1M
All benefits/All costs	0.91	1.21	0.91	1.20
Public benefits/Public costs	1.60	1.60	1.20	1.20

5.4 Programme future

Near the end of the 2015/16 financial year, a project to review VFEL labels was approved by the EECA Governance Group to ensure they are fit for purpose in the changing light vehicle market – especially with respect to electric and hybrid vehicles and new vehicle testing standards.

Since the introduction of the VFEL programme in 2008, a number of changes in the market and environment have occurred that may affect the VFEL labels and fuel economy information currently provided to consumers:

- The introduction and acceleration of sales of electric and plugin hybrid vehicles in New Zealand.
- An increase awareness of carbon since the COP21 climate summit.
- The future introduction of new testing requirements for light vehicles.

The current VFEL label was designed prior to electric and plugin hybrid vehicles being available in New Zealand. Voluntary Electric and Plugin Hybrid VFEL labels were subsequently developed in consultation with industry and within the constraints of the current petrol and diesel labels. These labels have not yet been tested on consumers to determine the level of understanding and influence on purchase decisions. EECA plans to review the existing VFEL labels and make changes that ensure they remain fit for purpose in a changing transport context.

In the next few years, the *Energy Efficiency (Vehicle Fuel Economy Labelling) Regulations 2007* and Fuel Consumption and Emissions Rules will require amendments to ensure New Zealand regulations are ready for a new vehicle fuel economy test method that will be adopted in Japan and Europe.

APEC produced a [best practice report](#) on vehicle fuel economy labelling in 2015. The key things missing from New Zealand's programme are data from real world fuel consumption and testing. Testing has already been established as too expensive for New Zealand to do.

6 Lead organisation

EECA was recognised as the lead agency in the initial Cabinet paper in 2002. The VFEL programme clearly fits within EECA's mandate under the *Energy Efficiency and Conservation Act* to promote "practices and technologies to further energy efficiency".

EECA has proven its capability to run the VFEL programme over nearly a decade of continuous improvement to the data infrastructure, systems and processes that are used to collate, share and run the programme. Perhaps the best example is EECA's influence to facilitate an intervention in 2015 at Ministerial level with the Japanese Government to secure used import data going forward. This data is a fundamental input to the VFEL programme, but also more broadly for New Zealand's data needs in the light vehicle space across both MoT and NZTA.

7 Conclusions

There is a clear role for government based on the identified problem, market failure, and barriers, and the potential benefits of the programme. However, it is difficult to attribute public benefits to the programme (i.e. a reduction in greenhouse gas emissions).

Further, this programme demonstrates that there is a role for government simply in the collection and publication of information by a trusted and authoritative source and absent any promotion for consumer action. Such information collection and publication:

- assists the market to function more effectively
- provides an analytical base to support discussions, policy-making, decision-making, and strategy

There is clear value in having quality data and the infrastructure to collect it. "Infrastructure" includes the relationships developed with industry.

There is an ongoing role for the provision of information in this area; however, as the majority of this data infrastructure work has been done (i.e. the programme has been established to a steady state), there is the question of what level of investment is warranted for the future and for what purpose.

8 Recommendations

In considering the question of what level of investment is warranted for the future, and for what purpose, this could involve:

- the programme being a “tool” for other programmes (e.g. the Electric Vehicles Programme)
- maintaining consistent and credible market information to support any potential vehicle fuel efficiency standards and technologies

It is recommended that EECA:

- review the Vehicle Fuel Economy Labelling Programme in light of other light transport initiatives (e.g. electric vehicles)
- consider investigating fuel efficiency standards with the Ministry of Transport
- investigate more broadly the role for government in, and value of, addressing behaviour change in car purchasing (e.g. consider other options besides labelling) with the Ministry of Transport

EECA should consider these in the context of the proposed NZEECS priorities. EECA will also have to continue to work within the existing regulatory framework.

9 Appendices

9.1 Appendix One – Cost-benefit analysis summary

1 Scope

This analysis assesses the quantifiable outcomes of EECA's VFEL programme since its start in 2008. General assumptions applied in the analytical framework used in this review:

- EECA costs include all direct internal costs but not the general EECA overheads allocated to the programme.
- All third party costs are included. These primarily consist of the marginal cost of purchasing more efficient vehicles.
- Future benefits accruing beyond 2015/16 for all vehicles purchased up to the end of that year are included.
- Cash flows are expressed in NZ\$2016 discounted at the default Treasury rate of 7%.

2 Costs

- EECA direct costs are taken from internal accounts and include employment, operating costs and marketing expenses.
- Additional costs of more efficient vehicles have been drawn from several sources:
 - The difference in retail price between a conventional Toyota Corolla petrol vehicle and an analogous Corolla hybrid vehicle²⁵.
 - US data showing the trade-off between fuel economy and vehicle cost²⁶.
- These show reasonably consistent additional vehicle costs of \$1,000 to \$1,500 for each one litre per 100 kilometre improvement, although it should be noted that retail prices are not necessarily a reliable indicator of true economic cost. The original VFEL programme used an equivalent cost of \$500 per vehicle.
- Other third party costs such as dealer compliance were insignificant compared to the marginal vehicle costs.

3 Benefits

- The principal benefit from the programme is reduced fuel consumption through the purchase of more efficient vehicles. This analysis utilised the total fuel savings estimated in previous VFEL programme reviews (most recently in 2013). The methodology used in these reviews followed three steps:
 - A BAU trend in average incoming vehicle fuel consumption was established.
 - The difference between the actual average fuel economy and the trend was determined for each year.

²⁵ EECA Vehicle total cost of ownership tool.

²⁶ "Reducing Greenhouse Gas Emissions from Transportation", Oak Ridge National Laboratory, April 2006

- 12.6% of the difference was attributed to the VFEL programme, based on earlier market research carried out for EECA²⁷.
- Each of the three steps contributes significant uncertainty to the determination of actual fuel savings. These energy savings are private benefits and represent a reduction in average fuel consumption of vehicles coming into the national fleet of less than 0.5%.
- Reduced carbon dioxide emissions can be directly associated with the fuel savings. This is a public benefit.
- MBIE's price monitors have been used for deriving economic prices for fuels and all future prices are maintained at the 2016 level. Carbon dioxide prices are set at the average value of an NZU in each year of the programme and valued at \$25 per tonne thereafter.

Costs and benefits are summarised in the table below for the programme base case.

Financial Year ending June	2008	2009	2010	2011	2012	2013	2014	2015	2016
Saved Litres Annual million	0.00	1.17	2.90	4.12	5.14	6.64	7.96	9.29	10.61
CO2 Reduction tonnes	0	2,761	6,844	9,723	12,130	15,670	18,786	21,917	25,047
Benefits and Costs \$ million nominal									
Fuel Savings	0.00	1.16	3.25	5.89	7.19	8.93	9.64	9.25	9.01
CO2 Reduction	0.00	0.00	0.00	0.00	0.00	0.08	0.09	0.22	0.38
EECA Expenditure	0.25	0.25	0.25	0.25	0.25	0.25	0.23	0.51	0.68
Third Party Expenditure	10.84	16.14	11.46	9.65	14.28	12.65	12.80	12.89	12.98

4 Outputs

Because of the uncertainty implicit in the determination of the fuel savings from the VFEL programme and the marginal costs of more efficient vehicles, the results of the economic analysis are presented in a sensitivity format:

Relative to Base Case:				
VFEL Fuel Savings Attribution	100%	100%	75%	75%
Marginal Vehicle Costs	100%	75%	100%	75%
Net Present Value	-13.9	25.4	-11.4	18.1
All Benefits/All Costs	0.91	1.21	0.91	1.20
Public Benefits/Public Costs	1.60	1.60	1.20	1.20

These results indicate the VFEL programme provides net benefits but are highly sensitive to the key inputs of fuel savings and additional vehicle costs. The overall national benefits are not as conclusive as those for the public benefits to public costs. However, this is consistent with the original cost benefit analysis undertaken at the inception of the programme.

²⁷ See "2013 Review of the VFEL Programme", EECA October 2013.