

# *Review of a Star Rating Scheme for Japanese Used Vehicles in New Zealand*

*Prepared for  
NZ Ministry of Transport*

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## *Executive Summary*

In New Zealand there is keen government support to publish fuel consumption rates of vehicles to enable New Zealanders to make better informed vehicle purchase decisions. In her recent State Opening of Parliament the Prime Minister reiterated the need to reduce energy consumption.

The New Zealand vehicle market is heavily dominated by passenger cars from Japan, both new and used. New Zealand registered 228,797 cars in 2004, including new cars and ex-overseas or used imports. In 2004, 67% of all new registered cars were previously registered overseas, and of the used-imports, some 95% were previously registered in Japan.

The Vehicle Fuel Consumption Information programme is an information disclosure programme that aims to allow consumers to compare fuel consumption when making purchase decisions. To enable such comparisons, fuel efficiency of the vehicle is measured under specific drive cycle tests to produce a Fuel Consumption Rate (FCR), usually expressed in litres/100 km. However, it is not currently possible to publish comparable FCR information for all new vehicles and used Japanese imports due to the incompatibility of results derived from differing fuel consumption test methods.

Consequently, the Ministry of Transport has been directed by the Government to consider representing the FCR information to consumers in a different format for Japanese used vehicles. A star rating – based on information from the Japanese domestic test – will be used to represent the FCR of used Japanese imports, while the FCR figure, based on results of the European test will be used for new vehicles. The scheme for Japanese used vehicles would be modelled on the widely recognised and successful six star rating scheme used for appliances.

It is proposed to present to consumer the star rating of the used vehicles on a scale of 1 – 6 Stars in ½ star increments, effectively making 12 star rating categories. The star rating for the used vehicles will be placed on a web site which can be accessed by potential buyers of new cars. The star ratings will be developed so they relate to vehicle FCR in a consistent manner, as shown in the following table:

### FCR bands (litres per 100km) and Stars

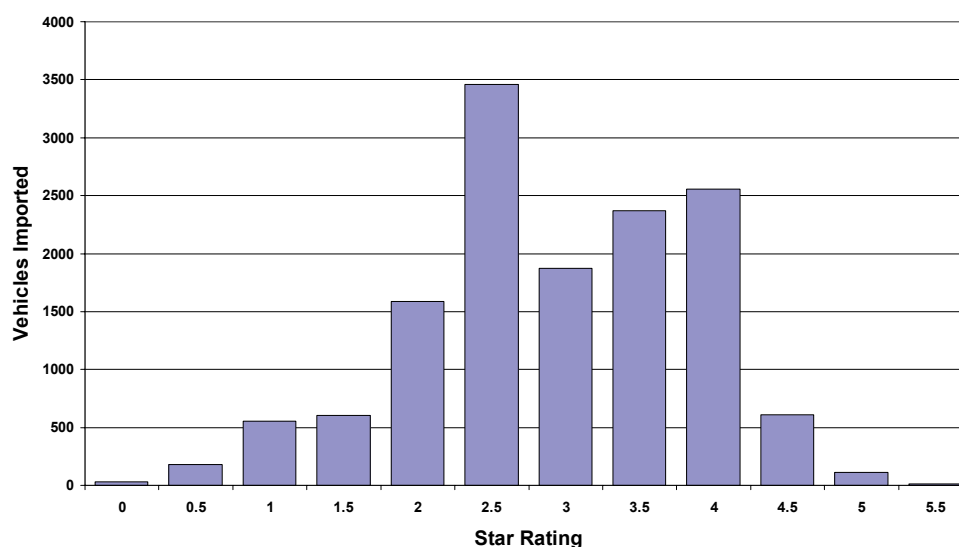
FCR Greater Than	is FCR Than	is Less	Stars
0	2		6
2	3		5.5
3	4		5
4	5		4.5
5	6		4
6	7		3.5
7	8		3
8	9		2.5
9	10		2
10	11		1.5
11	12		1
12	13		0.5
13	50		0

The purpose of this report is to review the proposed Star Rating Scheme for Japanese Used Vehicles. The report also provides a summary the Ministry of Transport proposal for a Star Rating Scheme.

This review has found that the use of FCR data based on new Japanese vehicle specifications is regarded as appropriate for the Scheme. FCR data is only available for post 1999 vehicles, which presently cover approximately 20% of existing imports. This report is based on data from the database containing vehicles (including number of imports) and their FCR, weight, engine size and fuel type. The analysis of this data has indicated there is sufficient variation in the type of vehicles being imported and star ratings by different vehicle characteristics. In relation to the potential improvement in FCR over time, there appears to be no apparent relationship between FCR and vehicle year within the data provided by the Ministry. The review considers that should the average FCR of vehicles improve over the next few years, there is sufficient reach within the system to allow for increases in star ratings.

The figure following demonstrates the range of star ratings for the 14000 used Japanese vehicles imported between March and September 2005, that were manufactured after 1999.

### Used Japanese Imports by Star Rating



A summary of issues that may need further investigation were identified. Considering the above issues respectively, the following recommendations are made:

1. Consider modifying the fuel cost calculation on the website to incorporate a normalisation factor that accounts for the different tests methods used to derive FCR for new and used vehicles. The Pew Center report may provide the appropriate conversion factors for this exercise, however further investigation of this study and the relevance of this methodology is required. It is not within the scope of this current study to undertake this investigation as it will apply to the later display of fuel running costs for both new and used vehicles.
2. The display - or relative rating - of greenhouse emissions based on FCR, fuel type and emission factors relevant to the test cycle (i.e., Japan, EU etc) should be incorporated into the consumer information on the web site.
3. Analysis of the potential improvements in predicting actual FCR based on an age related deterioration factor for used Japanese vehicles would be advised. As the majority of vehicles imported with FCR data were from the year 2000, the age based deterioration could increase the FCR by as much as 15%, however this is more likely to be under 10% for these used Japanese imports. Due to the small improvement to the representativeness of the scheme, the use of a deterioration factor for the current fleet coverage is not considered worthwhile.
4. Ideally, information should also be displayed on the other emissions; however this may not be possible if the data is not collected. If this is the case, the Ministry should investigate options to collect this information as soon a practical. At a minimum, the rating or display of information relating to the relevant emission

standard that is required for registration should be provided. In this way, air quality performance can be assessed along with greenhouse emissions to allow for greater consumer choice and assist with promoting air quality policy goals.

## *Introduction & Scope*

### *Background*

Internationally, governments are encouraging consumers to move towards using more fuel efficient vehicles. This reflects the increasing concern of the international community in the environmental, especially greenhouse emission, impacts of transport and in some cases also reflect the local economic concerns of importing increasingly expensive fuels.

In New Zealand there is keen government support to publish fuel consumption rates of vehicles to enable New Zealanders compare rates prior to making their purchases. In her State Opening of Parliament the Prime Minister reiterated the need to reduce energy consumption.<sup>1</sup> Government cooperation agreements include energy efficiency as part of a broader programme on sustainable energy and climate change and an important step to reducing New Zealand's energy use and preparing for the end of cheap oil.<sup>2</sup>

Both the National Energy Efficiency & Conservation Strategy of 2001 and New Zealand Transport Strategy 2002 seek reductions to fuel consumption through giving New Zealanders information to so that they can purchase more fuel efficient vehicles. This information is to be provided via the Vehicle Fuel Consumption Information programme, administered by the Ministry of Transport (the Ministry).

### *Vehicle Fuel Consumption Information programme*

The programme is an information disclosure initiative that aims to allow consumers to compare fuel consumption when making purchase decisions. To enable such comparisons, fuel efficiency of the vehicle is measured under specific drive cycle tests to produce a Fuel Consumption Rate (FCR), usually expressed in litres/100 km. Rates are typically recorded through government requirements, and made available through websites and labelling schemes.

The goals of the programme are to:

- Measure and benchmark the fuel efficiency of the present New Zealand vehicle fleet in order to enable comparisons with the efficiency of fleets internationally and to measure changes over time.
- To produce fuel efficiency targets, and to suggest mechanisms for achieving those targets

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<sup>1</sup> Speech from the Throne, State Opening of Government, Rt. Hon Helen Clarke, November 2005

<sup>2</sup> Labour-led Government Co-operation Agreement with Greens, Jeanette Fitzsimons & Rod Donald, Green Party Co-Leaders, 17th October 2005

- To inform consumer choice and reduce the FCRs of vehicles being purchased through consumer demand
- To inform government's policy instruments which may increase consumer demand for more fuel efficient vehicles. Instruments may include: rebates, fees, and grants; labelling; and procurement policies.
- To reduce CO2 emissions. This is a goal which is met as a consequence of reducing fuel consumption as, assuming vehicle numbers remain constant, increasing the fuel efficiency of the fleet will lead to a decrease in fossil fuel burning and hence in greenhouse emissions from this source.

### ***Purpose and Scope of Report***

The purpose of this report is to summarise and review the proposed Star Rating Scheme for Japanese Used Vehicles.

This review aims to assess the appropriateness and effectiveness of:

- the objectives and goals of the scheme;
- the test method for determining fuel consumption
- the scope of vehicles included;
- the assumptions and data availability;
- information delivery methods;

In addition, EnergyConsult have reviewed the technical criteria and algorithms for the Scheme, including:

- the spread of vehicles, by fuel consumption, category and sales or registrations and fuel type, ;
- the assumptions and calculations; and
- the potential for future efficiency improvements within the rating criteria

Any issues found in the review have been highlighted and recommendations made as required.

### ***New Zealand Car Market Composition***

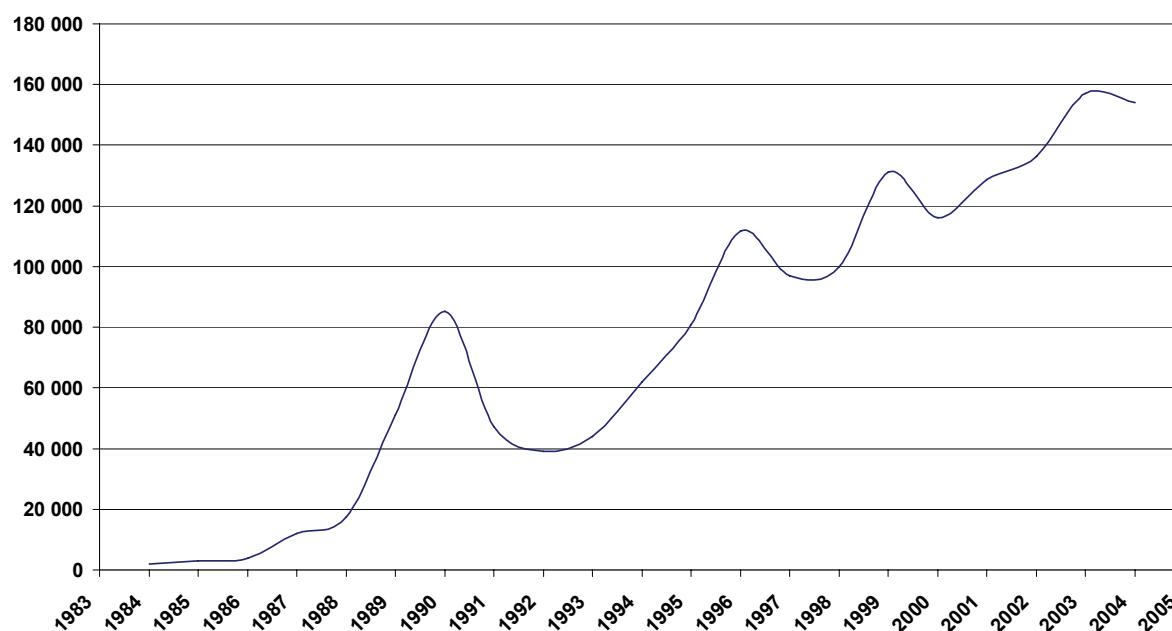
The New Zealand car market is heavily dominated by vehicles from Japan, both new and used. New Zealand registered 228,797 cars in 2004, including new cars and ex-overseas or used imports. Table 1 shows 67% of all new registered cars were previously registered overseas, and of the used-imports, some 95% were previously registered in Japan. It is known that a small percentage of the cars that were previously registered in Japan are not manufactured in Japan (i.e., some European cars like BMW or Mercedes-Benz). In 2004, the Japanese car manufacturers made up over 70% of all new car registrations (including ex-overseas).

**Table 1: Main Countries of Origin of New Cars and Previous Registration of Ex-overseas Cars**

Countries of origin		New cars (including ex-overseas)	Previous registration of ex-overseas (used-imports) cars
Australia	Total Registered	19,036	782
	<i>% of Grand Total</i>	<i>8.32</i>	<i>0.51</i>
Japan	Total Registered	167,932	147,769
	<i>% of Grand Total</i>	<i>73.4</i>	<i>95.93</i>
United Kingdom	Total Registered	5,449	466
	<i>% of Grand Total</i>	<i>2.38</i>	<i>0.3</i>
All others	Total Registered	36,380	5,025
	<i>% of Grand Total</i>	<i>15.9</i>	<i>3.26</i>
Grand total		228,797	154,042

Source: Land Transport New Zealand motor vehicle registration statistics 2004

The number of registrations of “ex-overseas” cars has also increased greatly over the period 1984 – 2004, as shown in Figure 1. The proportion of this type of vehicle within the NZ fleet is expected to increase if the current trends continue and hence their impact on the national average fuel consumption will also increase.

**Figure 1: Annual registration of ex-overseas cars**

Source: Land transport New Zealand motor vehicle registration statistics 2004

The government has agreed that the Ministry lead assessments of labelling, monitoring, and tracking of fuel consumption figures. It has agreed to a broad approach to include

Japanese used vehicles in such a labelling program, and to the development of a website to display fuel consumption information.

The inclusion of Japanese used vehicles in the scheme is important as a category. Japanese used vehicle imports dominate the registrations of new entrants into the New Zealand fleet. There is increasing concern within New Zealand of the environmental effects of vehicle use and the increasing contribution of these imported Japanese vehicles on the make up of the national passenger fleet. The Ministry is investigating how to provide information to consumers on the fuel based running costs of all vehicles being imported into New Zealand, and hence influence consumers to purchase vehicles with lower greenhouse emissions and greater fuel efficiency.

However FCRs for vehicles imported from the Japanese domestic market are not compatible with FCRs derived from tests required in Europe and Australia. Furthermore, no method has yet been found which reconciles, on a model by model basis, the figures derived from each test method with sufficient accuracy for labelling purposes. The reason for the incompatibility is that the European Union fuel efficiency test methods differ from the Japanese methods (see the Appendix II), and are conducted to different conditions, such as; hot versus cold starts, different distances, speeds, and numbers of stops. Comparisons of results of test methods have been achieved statistically on a fleet wide basis. Such comparisons have been made by the PEW Center on Global Climate Change<sup>3</sup>.

Consequently, for Japanese used vehicles the Ministry has been directed by the Government to consider representing the FCR information to consumers in different formats. A star rating based on information from the Japanese domestic test will be used to represent the FCR of Japanese used imports, while the FCR figure, based on results of the European test will be used for new vehicles. The scheme for Japanese used vehicles would be based on the widely recognised and successful six star rating scheme used for appliances.

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<sup>3</sup> [http://www.pewclimate.org/global-warming-in-depth/all\\_reports/fuel\\_economy/index.cfm](http://www.pewclimate.org/global-warming-in-depth/all_reports/fuel_economy/index.cfm)

## *Summary of Scheme*

### *Rationale and Objective*

The goal of the Vehicle Fuel Consumption Information programme (the “programme”) is to reduce two key statistics around the New Zealand vehicle fleet. One statistic, the National Average Fuel Consumption (NAFC) is the measure of the fuel efficiency of the national fleet which provides a snapshot of the average fuel consumption of all new passenger vehicles registered in any one year. The units are usually in litres/100 km. The second key statistic involves the average fuel consumption for the entire fleet, and is known as the Fleet Average Fuel Consumption, or (FAFC).

One mechanism to reduce these statistics, is by recording and publishing fuel consumption information to enable purchasers to compare efficiencies of the vehicles they buy. The proposed star rating scheme (the “scheme”) forms a part of the overall programme which is aimed at Japanese used vehicle imports and will provide relative star ratings of passenger vehicle fuel efficiency of these imports. Consumers may be targeted by government later with other promotional tools, such as labels and point of sale information (such as posters). It is assumed that some consumers when presented with information on vehicle FCR will purchase more fuel efficient vehicles, reduce the average fuel consumption rate of some vehicles entering the fleet, and hence reduce the national average fuel consumption rate (NAFC). Over time with incremental entrants of more efficient vehicles this is expected to reduce the fleet average fuel consumption (FAFC).

The reason for introducing a star system for Japanese used vehicle imports is twofold:

1. The FCRs for new vehicles differ from that of used vehicles due to vehicle deterioration. The FCR is applicable for the vehicle when it was manufactured, but would not allow direct comparison with new vehicles hence vehicle to vehicle comparisons are not possible.
2. The test cycle used to measure the FCR for vehicles imported from Japan is different from that used in Europe (see the Appendix II) and the USA, and again direct vehicle to vehicle comparisons are not possible.

The use of a six star rating scheme will enable model by model comparisons within the range of Japanese tested vehicle imports. The scheme is already well known to the public through the mandatory appliance energy rating label.

### *Description of the Proposed Star Rating Scheme*

The goal of the star rating is to provide consumers with comparative fuel consumption information for Japanese used vehicles, in a distinct way from FCR figures for new vehicles, in order to divorce results of incompatible tests. The Ministry proposes to present to consumers the star rating of the used vehicles on a scale of 1 – 6 stars in ½ star increments, effectively making 12 star rating categories.

The star rating for the used vehicles will be placed on a web site which can be accessed by potential vehicle buyers. The star ratings will be developed so they relate to vehicle FCR in a consistent manner. The proposed approach is shown in Table 2. No differentiation is considered for fuel type.

**Table 2: FCR bands (litres per 100km) and stars**

<b>FCR Greater Than</b>	<b>is FCR Than</b>	<b>is Less</b>	<b>Stars</b>
0	2		6
2	3		5.5
3	4		5
4	5		4.5
5	6		4
6	7		3.5
7	8		3
8	9		2.5
9	10		2
10	11		1.5
11	12		1
12	13		0.5
13	50		0

### *Data Processes*

The process for importing used Japanese vehicles into New Zealand is outlined at on the Land Transport New Zealand (LTNZ) website<sup>4</sup>. In summary, when a Japanese used vehicle enters New Zealand it undergoes a customs and bio-security check. At this point an identifier (usually a vehicle identification number or VIN) is allocated, and entered onto a database, together with other characteristics.

At the same time, the Ministry has acquired fuel consumption information for Japanese used vehicles from the Society of Automotive Engineers of Japan, Inc<sup>5</sup>(JSAE), so that FCRs can be allocated to the make, model, and variant of vehicles entering New Zealand. Using the database of VINs, Land Transport New Zealand translate the Japanese JSAE data into English and supply the FCRs for the specific makes, models, and variants.

The FCRs are made available to importers via a portal at LTNZ<sup>6</sup>. Requests for Fuel Consumption Statements are submitted and resulting statements are printed. Importers may then make the vehicle available to an entry certifier with required documentation (Fuel Consumption Statement and De-registration certificate). The vehicle is then

<sup>4</sup> <http://www.landtransport.govt.nz/publications/infosheets/infosheet-2-09.html>

<sup>5</sup> [http://www.jsae.or.jp/index\\_e.php](http://www.jsae.or.jp/index_e.php)

<sup>6</sup> <http://www.landtransport.govt.nz/importing/fuel-consumption/search.html>

processed according to standards compliance, roadworthiness, title, and entitlement to register. The importer then registers and licenses the vehicle before being lawful for New Zealand roads.

## *Appropriateness and Effectiveness*

### *Objectives and Goals of Scheme*

The proposed star rating scheme forms a part of the overall programme, but is specifically aimed at Japanese used vehicle imports. It will provide relative star ratings of passenger vehicle fuel efficiency, and intends to reduce the FCR of the Japanese used imports entering the New Zealand fleet.

The objective of the scheme is to provide consumers with a star rating which will inform them of the fuel efficiency of vehicle models as compared to other models. The star ratings will also fulfil the objective of providing a FCR which can be used in promotions concerning fuel efficiency. Consumers may be targeted by government later with other promotional tools, such as labels and point of sale info (such as posters).

### *Appropriateness of FCR Data Collection*

The appropriateness of the FCR data was evaluated having regard to:

- The nature of the FCR data
- The data collection processes and its integrity
- The coverage of vehicle imports by the FCR data.

#### **Nature of FCR Data**

The source of the FCR data is the Japanese “10-15 Light Duty Test Cycle” test method (see Appendix III). This test data is based on the Japanese manufacturer supplied data at the time of manufacture. A limitation on this data is it applies to new vehicles but not to used vehicles. As the fuel efficiency of vehicles deteriorates with use and age, the FCR of a used vehicle imported into NZ will not be the same as the FCR measured when the vehicle was originally produced.

The issue of deterioration is analysed in more detail on page 20. The main implication of that analysis is that though deteriorating fuel efficiency in used vehicles does lead to significant changes in FCR, they may not significantly affect the star rating of a vehicle. For example, a large deterioration in efficiency of up to say 10% would mean less than a ½ star difference to the vehicle ratings. Consequently the use of FCR data based on new Japanese vehicle specifications is regarded as appropriate for the scheme.

#### **Data Collection Processes and Integrity**

Various controls and procedures are in place to ensure the integrity of the FCR data, however it is not within the scope of this project to review all these processes. Land Transport New Zealand’s InfoSheet 2.15, Process 2.2 (Appendix III), state that applicants must obtain the fuel consumption information by contacting the Land Transport New Zealand Helpdesk to find out more about the correct procedures. Most of the FCR data

is preloaded by LTNZ and the Ministry have reported that systems are in place to ensure that errant data is not inadvertently entered when a model/variant is not found in the FCR database.

The Independent Motor Vehicle Dealers' Association, Inc (IMVDA) and the Motor Trade Association (MTA) are offering assistance to vehicle importers, for a fee, and may be able to assist in supplying this data, but ultimately the data come from the same source, the translated Japanese tables made available through the Land Transport NZ importer website<sup>7</sup>.

The process for collection of data from Japanese manufacturers appears to be appropriate for the star rating scheme, however detailed analysis of the process administered by Land Transport NZ has not been included in this report.

### **Coverage of Vehicle Imports by the FCR Data**

The scheme is confined to Japanese used passenger vehicles imported into New Zealand. It is intended that only passenger vehicles that were previously registered in Japan and manufactured after 1999 are included as data is only currently available on the FCR of these types of vehicles (see Land Transport NZ Info sheet 2.15 in Appendix III). The types of vehicles included are as follows:

- Vehicle type:
  - Japanese used imports;
  - Passenger vehicles subject to NZ vehicle classes MA (passenger cars), MB (forward control passenger vehicles) and MC (off road passenger vehicles), MD1 and MD2 (omnibuses), and NA (light goods vehicles);
  - Japanese vehicles manufactured after 1999
  - Vehicles with a gross mass of up to 3.5 tonnes
- Fuel type
  - Petrol, hybrid (petrol or diesel) and diesel vehicles
  - Factory fitted LPG are excluded

At this time no consideration has been made to include FCR on vehicles fuelled by non-traditional fuels, such as LPG, CNG, or ethanol/biodiesel blends. However as currently the proportion of imported vehicles using non-traditional fuels seems to be a fraction of a percent, their exclusion will not reduce the coverage or effectiveness of the scheme, though this may need to be reviewed in the future.

Fuel quality is excluded from consideration as any potential impact of fuel quality between Japanese fuels and New Zealand would apply equally to all Japanese used vehicle imports,

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<sup>7</sup> <http://www.landtransport.govt.nz/importing/fuel-consumption/search.html>

hence the star ratings of the scheme should maintain their relative comparisons. Again this limitation will not affect the effectiveness of the scheme.

As FCR data is only available for post 1999 vehicles, which presently cover approximately 20% of existing imports<sup>8</sup>, the coverage of the Star Rating scheme will initially be confined to a minority of Japanese vehicles. However, with time the coverage of the scheme will rapidly grow as the proportion of imports that are post 1999 vehicles increases.

This current limitation in the scope of vehicles covered means the scheme will accordingly be limited in achieving its goal of reducing the FCR of Japanese used vehicle imports in the short term. However as the scope of vehicles covered by the scheme will increase over time, the scheme will become progressively more relevant to the majority of used vehicle imports.

### *Information Delivery Methods*

The star rating will be provided to consumers initially via a web based database that provides search facilities based on certain vehicle information. At this stage primary search criteria will include; the manufacturer, model, body style, fuel type, and engine size.

The search engine should provide a facility to search selected vehicle types, fuel type and some indication of vehicle size to assist consumers with selecting a more efficient vehicle that meets their decision making criteria. In this way, the user can select particular criteria and see what star rating various models achieve.

The site would also advise consumers that the star rating is based on the performance of the vehicle as it was when new, and that the age of the vehicle and other service conditions will affect the rating of the vehicle.

Whether the use of a web-based data base is an appropriate information delivery mechanism for the scheme will be depended on:

- The design, user-friendliness and execution of the web-based service
- The extent that the site is linked and promoted on other websites
- The promotion and advertising of the site through non-web based media and marketing channels
- The extent the site is supported by non-web based information dissemination media such as brochures, posters, pamphlets etc.

As the website is still under development, no conclusion could be made on the overall effectiveness of the web-based database as an appropriate information delivery mechanism.

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<sup>8</sup> Based on analysis of seven months of data on Japanese used vehicle imports for 2005.

The Ministry also gave consideration to providing the Star Rating on the Supplier Information Notice (SIN). Information on the SIN must be meaningful, accurate, and verifiable. Further investigations would be needed before determining whether these criteria are met sufficiently in order that fuel consumption rates could be published on SINS.

## Technical Criteria and Algorithms

### Distribution of Vehicles and Star Rating Variations

The distribution of FCR (and hence star ratings) of Japanese used vehicles varies widely. A database listing models (including number of imports), their FCR, weight, engine size, and fuel type was supplied by the Ministry in order to assess range of star ratings by different vehicle characteristics. Overall, the star rating shows a good spread of vehicles across star rating bands. Approximately 14000 Japanese used vehicle imports over the period March to September 2005 are displayed in the following charts and tables.

The number of used passenger vehicles imported from Japan that meet the star rating scheme criteria is shown in Figure 2 on page 12. Overall the spread of vehicles vs. star rating shows the majority of models currently imported are in the 2 to 4 star range, with a small percentage in the higher range of 4.5 to 6. This indicates that at the present time there will be sufficient spread of ratings to enable consumers to select from a range of higher rating vehicles if they wish. The vehicle ratings show a normal distribution toward the centre of the rating range. Bunching toward either end of the range would reduce the star rating's value as an information source to encourage the selection of low fuel consumption vehicles.

**Figure 2: Used Japanese Imports by Star Rating**

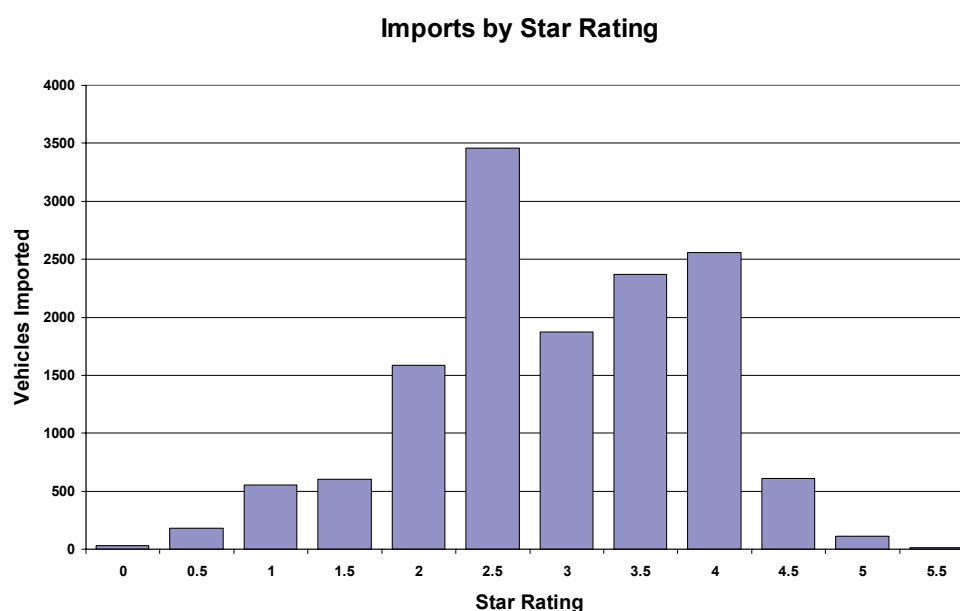
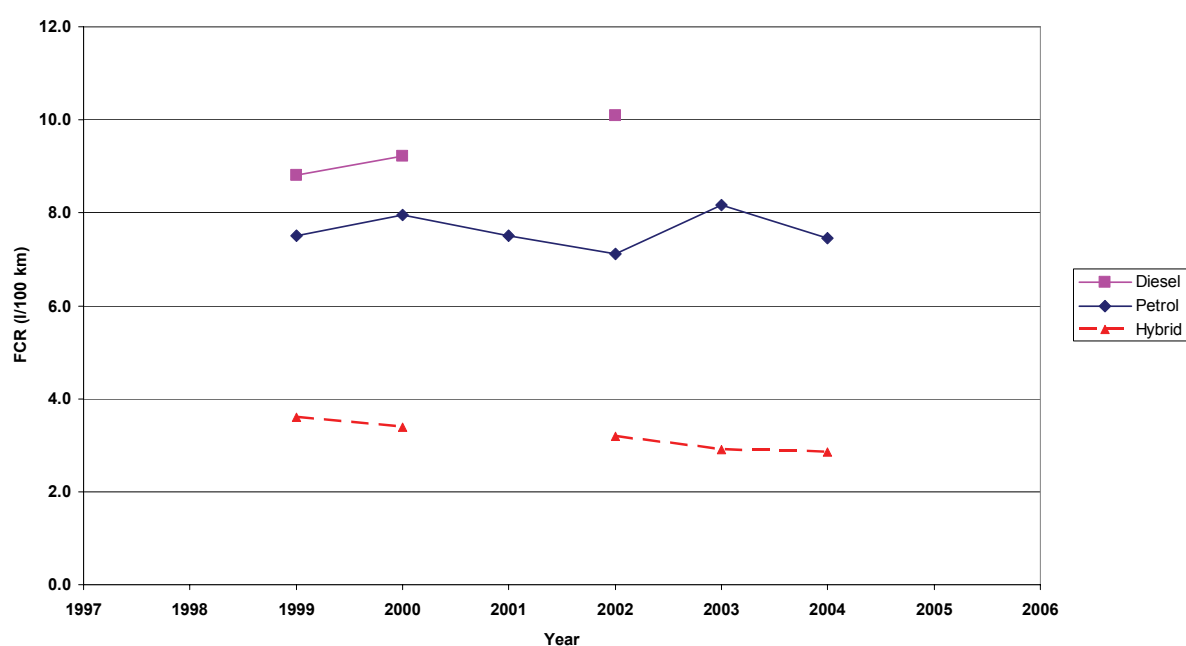


Figure 3 shows the weighted average FCR by vehicle year for the used Japanese vehicles imported over the period March to September 2005. The value ranges from 8.16 l/100km to 7.11 l/100km for vehicles dated from 1999 to 2004. There appears to be

no obvious trend towards improving FCR by vehicle year based on the fleet wide average of approx 14,000 of Japanese imports over the above period. The 2005 JAMA<sup>9</sup> *Motor Industry of Japan* reports that the national average FCR for new Japanese cars (the NAFC) has improved from 7.2 l/100km in 2000 to 6.6 l/100km in 2003, an improvement of approximately 9% over 3 years. There could be several factors that explain the difference between no apparent trend in the Japanese vehicles imported to NZ and an improving efficiency trend for those entering the fleet in Japan. However the most likely explanation is that the composition of the new vehicle fleet in Japan is different from that imported to NZ. Engine size, weight and other characteristics also significantly affect the NAFC, and these factors may obscure any intrinsic improvement in the Japanese domestic fleet being transferred to the Japanese used vehicle fleet in New Zealand.

Based on the data shown in Figure 3, no relationship between FCR and vehicle year is apparent, hence we can not make projections relating to the average FCR over the next 5 years. However, if the improvement in the Japanese new vehicle NAFC is eventually reflected in the NZ imports, the NAFC for these vehicles could move towards 6 l/100km, over the next 5 year period. If this was to occur, the average star rating would improve to 4 stars, from the current 3 star average. This would not significantly affect the effectiveness of the stars rating system in representing the available Japanese imports, as another 2 stars would be available for more efficient vehicles above the average. This suggests it is unlikely that the rating algorithm would need to be altered in the next 5 years.

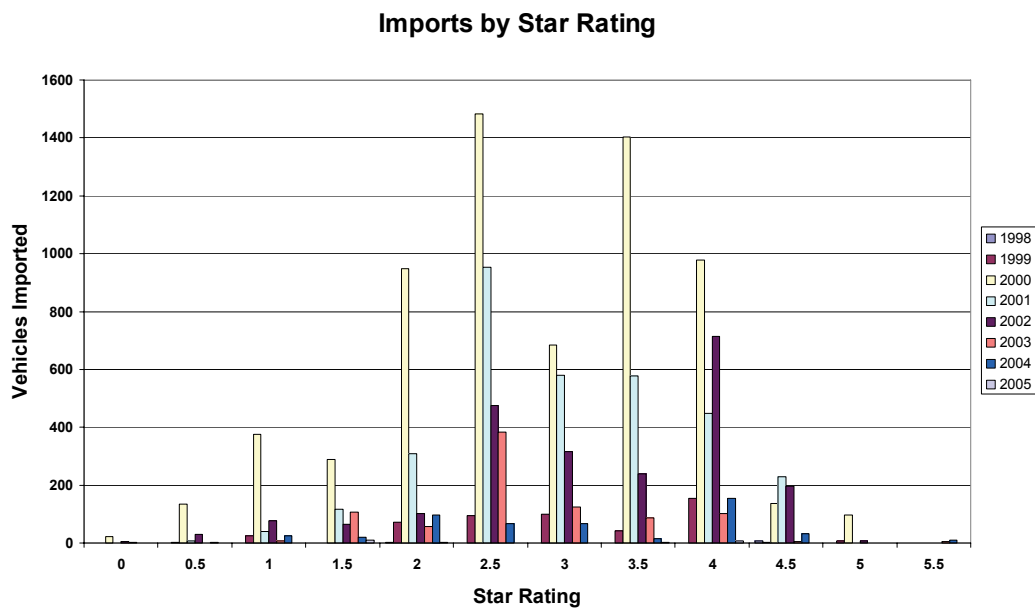
**Figure 3: Used Japanese Import Average FCR by Fuel Type and Year of Manufacture**



<sup>9</sup> JAMA. The Motor Industry of Japan 2005, May 2005, Japanese Automobile Manufacturers Association, Inc

The spread of used Japanese passenger vehicle imports, which could be assigned a star rating by vehicle year is shown in Figure 4. This shows a spread across star ratings for each vehicle year with most displaying a vehicle year of 2000. This is re-affirmed in Figure 5 which shows that the majority of the recorded vehicles with vehicle year of 2000. As is expected, with the average vehicle year for all Japanese imports being year 2000 and 10 months. The scheme provides a wide range of ratings across all years.

**Figure 4: Used Japanese Imports by Star Rating and Vehicle Year**



**Figure 5: Number of Used Japanese Imports by Vehicle Year**

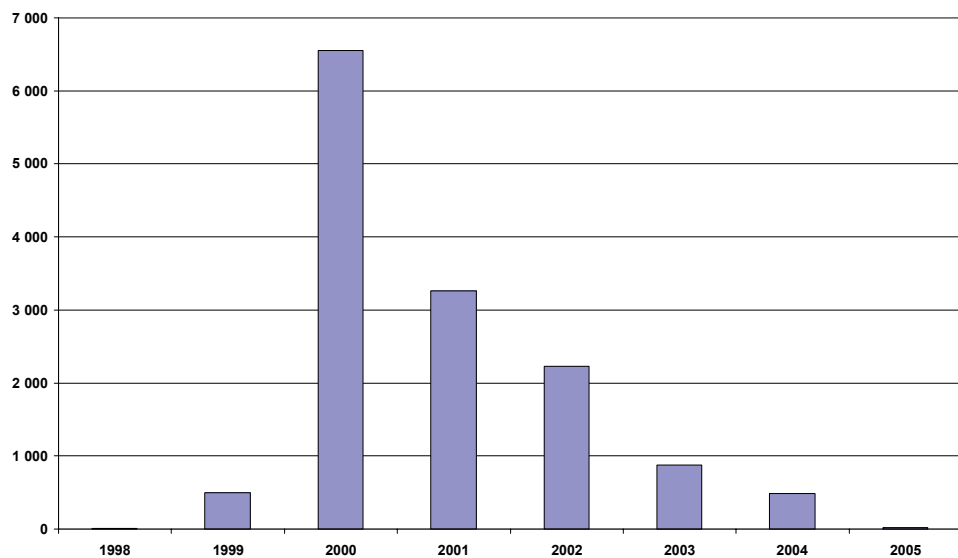
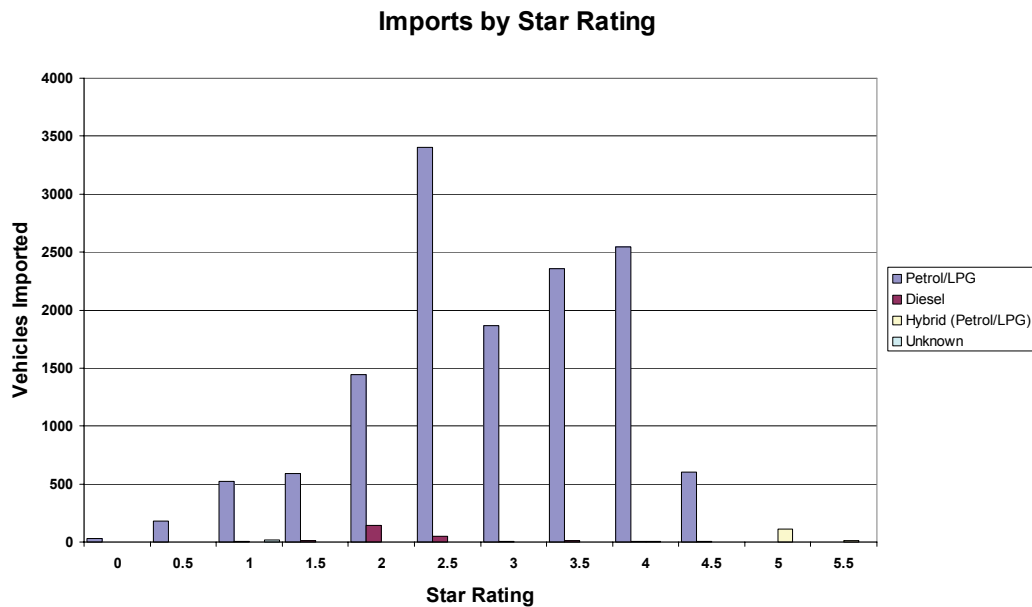


Figure 6 shows the number of star rated imports by fuel type, with petrol vehicles making up over 97% of the total imports. This figure also indicates the high star rating of the small number of hybrid imports.

**Figure 6: Used Japanese Imports by Star Rating and Fuel Type**



A total of 246 out of 14,000 vehicles imported over the 7 month period were powered by diesel. Interestingly, Figure 3 on page 13 suggests that diesel vehicles are generally of higher FCR compared to petrol vehicles. This is primarily due to the greater weight of diesel vehicles (most are larger 4WD of less than 3.5 tonnes) being imported compared to smaller petrol vehicles. The Japanese database supplied by the Ministry combines the Petrol/LPG fuel type as one identifier. However, it is also unlikely that any of these used vehicle imports are supplied were factory fitted LPG or CNG, as only 73 LPG and 2 CNG fuelled vehicles (new or used) were registered in 2004.

Figure 7 show the relationship between star rating and engine size, by fuel type. The overall inverse relationship between engine size and star rating is to be expected, with larger engines generally having higher fuel consumption. The diesel vehicles are generally larger engine size and the hybrids are small vehicles. There is sufficient spread of star rating by engine size to allow consumers to choose higher rating vehicles.

Figure 7: Used Japanese Imports Star Rating by Fuel Type and Engine Size

