

**SAE – A Submission to
Australian Transport Council / Environment Protection and Heritage Council –
Vehicle Fuel Efficiency Working Group –**

**Vehicle Fuel Efficiency –
Potential measures to encourage the uptake of more fuel efficient, low carbon
emission vehicles.**

Name: David Ryan (Primary Contact) Authors: A Hynson, Prof H Watson, F Wills, B Malkoutzis

Company/Organisation: Society of Automotive Engineers - Australasia

Position: Executive Director

Postal Address: Suite B/Level 2
70 Dorcas Street
SOUTHBANK VIC 3006

Phone number: PH: (03) 9696 5190

Fax number: Fax: (03) 9696 5865

Email address: david@saea.com.au

Comment on the discussion paper is invited from interested stakeholders and members of the public. While comments are welcome on any aspect of the paper, readers are particularly asked to respond to the questions raised in Section 4 regarding the potential measures and in Section 7.

All submissions will be treated as public unless confidentiality is requested for all or part of the submissions. The Working Group requests, however, that the scope of any material requested to be kept confidential are limited to the minimum necessary.

Readers are encouraged to use this submission template as a basis for submissions. The Working Group has posed a series of targeted questions in order to provide a degree of consistency across submissions and to simplify the consideration of submissions. Readers are not required to complete the entire submission template. Comments on individual measures are welcome. Submissions in alternative formats will be accepted.

Electronic and handwritten submissions are welcome. A separate template for handwritten submissions is available from the Vehicle Fuel Efficiency Secretariat.

Contact details have been requested in case the Working Group needs to contact you to discuss aspects of your submission at a later date.

Please attach this coversheet to your submission and submit it to the Working Group via:

Email: vfedpaper@environment.gov.au

Fax: (02) 6274 1478

Phone: (02) 6274 1774

Post: Vehicle Fuel Efficiency Secretariat
Department of the Environment, Water, Heritage and the Arts
Renewables and Energy Efficiency Division (REED)
Energy Futures Branch
Technology and Transport Section
GPO Box 787
CANBERRA ACT 2601

Preamble to response

The natural chemical reaction of burning hydrocarbon based fuels (including fossil fuels) results in a number of gases and other by-product being released - CO₂ is but one. There is little to no opportunity to lower the level of CO₂ released in the combustion process based on current engine emission legislation.

The enormous reductions in exhaust emissions achieved by the automotive industry (to less than 2 % of the levels when emission regulations were introduced first) were only possible because the regulated emissions are only a fraction of the total emissions from an internal combustion engine. These great improvements were facilitated mainly through the introduction of the catalyst converter in combination with fuel injection. On the downside the reduction of the regulated exhaust emissions resulted in an increase in CO₂ emissions:

1. CO is converted into CO₂,
2. HC is converted into CO₂ and H₂O
3. NOx are converted into N₂ and CO₂
4. The engines became less efficient as they had to operate stoichiometric rather than lean
5. The additional after treatment systems made the vehicles heavier

The reduction of CO₂ unfortunately has physical limits set through the laws of thermodynamics and CO₂ is one of the main end products of the combustion process.

The only known new but immature technology to CO₂ control is its capture and storage of it in a benign state, forever (i.e. isolate it from the atmosphere- CO₂ sequestration). Consequently the only real opportunity at this time to reduce CO₂ is to reduce the total amount of fuel consumed over all.

Reduction in consumption can be achieved by a number of possibilities either in isolation or combinations of the following:

Vehicle Design

- Increase the thermal efficiency of engines – better utilise the available energy with in the fuel.
- Optimise engine design to energy reduce losses- add variability to optimise efficiency i.e. Variable compression ratio.
- Decrease the mass of the vehicle, so lowering the energy required to accelerate and move it.
- Recover energy used in slowing the vehicle and re use it within the vehicle– (regenerative braking).
- Lower carbon content fuels compared to fossil fuels. (Higher hydrogen to carbon content or lower net carbon cycle carbon content)

Vehicle Operation

- Improve driver-operating behaviour (I.e. subdued acceleration, coasting to lower speed in lieu of using brakes etc).
- Allow the vehicle to maintain a constant speed, as much as is possible i.e. reduce the need to accelerate and decelerate, as much as is possible.

Total Carbon footprint of private transportation.

A holistic approach should be applied to the decision-making processes in the control of CO₂ emissions. The various factors interact with one another and if not suitably considered may even mitigate or negate one another.

- The design, test, manufacture, and end of life disposal or recycling of a vehicle all require process energy. Hence there is a great deal of CO₂ generated in creating a vehicle, the creation proportion of the lifetime total depends on the amount used which is a function of the emission rate in g/km, the kilometres of travel per year and the number of years of use. Although requested to be excluded from this discussion paper, decisions that will be made in regard to this paper should consider the impact this will have on the total CO₂ effect of road transport.

(Example: Increasing the replacement cycle time of vehicles reduces the time to totally amortize the CO₂ generated to produce them in the first place. Or a lighter vehicle which uses less fuel may have a bigger CO₂ footprint overall due to its higher levels of energy used to create the lightweight parts to achieve the lower fuel consumption.)

Refer Attachment Appendix B1

- The fuel / energy source used to power the vehicle requires it to be accessed, refined / converted, transported and dispensed to it, to bring it to use. So again depending on the energy source, it will generate a level of CO₂ discharge or “footprint” to make it available for use, and so should be considered.

(Example: Operating an Electric car in Melbourne based on brown coal generated electric power will create more CO₂ than a similar sized vehicle operating on petroleum based fuels. However the CO₂ generated when producing, refining and delivering petroleum-based fuels may be higher or lower than for Ethanol or gaseous fuels depending upon the feedstock for these and the process paths.

Note: More in-depth research and analysis is required to better understand the interplay involved.

Other Points

- The Australian public and private transport environment has its own unique requirements compared to many other countries. Such as

- A higher level of towed appliances (trailers) per capita resulting in a higher Gross Combination Mass (GCM) levels when compared to other nations.
- A higher operational Gross Vehicle Mass (GVM) due to passenger numbers and /or load carried in private motor vehicle
- To achieve the level of emission reduction will most likely require significant weight reduction in vehicle total mass, which will increase the weight disparity between vehicles on the roads. It is known that there is a significant statistical increase in trauma, injury and death for occupants of the smaller of the two vehicles involved in major impact. Any rapid and significant weight reduction in the vehicle population, should be tempered in light of these this facts.

The Australian Automotive Vehicle Manufacturing Industry

SAE-A believes that the Australian automotive manufacturing industry needs to be supported and nurtured as it offers direct, but as importantly indirect benefit, to the local industry and community by being one of the major breeding grounds for our broader professional engineering, technicians, and trade personnel that our country's economic system requires. Additionally new and emerging manufacturing techniques are often adopted first in local automotive field either developed within Australia or imported from other parts of the parent company. To support growth and maintain the technology progression that is forever changing, SAE-A believes that the Australian automotive industry needs to experience metered change to ensure it is not inappropriately penalised, but at the same time, challenged to keep pace with international improvements and trends, and so achieve the community's expectation in all matters relating to automotive transport. I.e. maintain its efficiency, relevance and effectiveness.

Unfortunately due to the structure and ownership of the Australian Automotive industry, in general Australian Automotive Manufacturers generally tend to be "technology takers" in contrast to "technology creators". This is mainly due to the expenditure limitations of the parent companies, and the relatively small size of local manufacture. The only real drivers to the local manufacturers, other than parent company targets, is the need to better tailor the locally made vehicle to the market place, based on it being the largest single volume segment of the market, and so maximise sales numbers, for the least number of models or variants (i.e. large car segment). However, because of its modest size, change for any one-model requiring body structure or engine /driveline changes can take longer than at larger overseas OEM operations. Hence the model cycle time may lag that of others, and only once technologies have matured can they be "easily" adopted and integrated into the local designs.

Without an Australian Automotive Industry that has both design and manufacturing capability, the ability for Australia to have an impact on reducing CO₂ in the Australian environment will be significantly reduced.

Finally the Australian Automotive Industry exists with in a population of only 22 million, and has evolved into a market niche segment that allows a balance of

volumes produced versus the profit margins generated within that segment, allowing the local manufacturers to maintain their commercial viability. Any major changes to this fine balance will undoubtedly result in a reduction in the size of the locally produced product and at worst the closure of local manufacture of vehicles.

Note: Documented supporting SAE-A and other Engineering Papers or reference documents validating the above comments above can be supplied as required.

Discussion

There are many methods that can be adopted to achieve a total or overall reduction in CO₂ generated or fuel consumed for road transport. The items discussed in this paper are important ones.

As has been demonstrated in the discussion paper, nations have taken the unique aspects of their country's needs regarding road transport and have tailored their CO₂ / fuel consumption reduction plans measured according to internationally recognised standards to best suit their goals.

Similarly the SAE-A is advocating the same for our nation as it too has its own unique road transport requirements. SAE-A believes that the best approach during the early phase of the introduction of such fuel reduction strategies, is to apply a simple standard, which accepts the current consumption level of all vehicles that are in our market. These are known across the new car market, and published in the Green Guide database, with a year on year reduction in vehicle model fuel consumption of about 2.5% per annum being applied. The agreed value should be fixed to provide certainty to manufacturers and importers to meet the national reduction targets.

Based on this principle, market forces would be allowed to continue as they are in determining the composition of the market mix, but an ongoing reduction in consumption result to known target can be assured, without major disruption or distortion of the automotive market place. This would allow the manufacturers that have just released new models and cannot respond quickly to seek out reductions through shorter lead-time means, (Low rolling resistance tyres, engine management system changes etc). For those manufacturers that are in the process of introducing new models they can adopt higher levels of technology, with maximum benefit, and then seek additional changes later. Hence this allows manufacturers the flexibility to respond in a way that suits best their planning and resources at any point in time.

This would

- Reduce the need to shift to smaller cars and the associated issues that come with that.
- Allow vehicle sizing and weight of Australian Manufactured vehicles to shift in a timely and economically viable manner.
- Facilitate ongoing reduction being managed and tailored to achieve the nationally desired outcome while maintaining a level playing field for all participants in the Australian Automotive market place.

A potential issue with the above approach may be that it does not adequately challenge manufacturers or importer which to date have not offered vehicles of a lower or optimised level of fuel consumption. A solution to this may be to apply a slightly higher percentage rate of reduction in fuel consumption on specific vehicle models for a specific period, which in time would ensure that a final absolute target or goal is achieved. However this will require a higher level of administration to achieve.

A more complex alternative to this was canvassed and that was to apply a “correction factor” into the evaluation of a vehicle’s CO₂ emission and to adjust targets to allow for different payloads compared to the kerb weight (Tare weight). This would be a fair adjustment to help larger cars that can carry not only more load, but also more load in relation to their weight (and consequently also related to their CO₂ emissions). Vehicles that are exceeding that target should be charged for these excessive emissions and vehicles with lower CO₂ emissions should receive carbon credits, similar as through the environmental offset program that generates carbon credits by for example replacing light globes in household with energy saving ones.

A standard payload/kerb ratio can be introduced, e.g. at 40%. Cars with a better ratio receive a credit and cars with a lower ratio are to be penalized. The formula would be the following:

$$\text{CO}_2 \text{ adjusted} = \text{CO}_2 \text{ published} \times 40\% / \text{actual payload/kerb ratio}$$

An example is shown in the following table:

The numbers for the calculation are based on sales brochures, the Road Vehicle Certification Scheme database, and the Green Vehicle Guide. Because most Australian brochures for passenger cars don't have information on payload or gross vehicle weight (GVW) for some vehicles sales brochures from overseas were used.		Hyundai Getz Auto	Ford Focus Petrol	Ford Focus diesel	Ford Fiesta manual	Ford fiesta Auto	Ford Falcon Ute Petrol Auto	Ford Falcon Ute LPG Auto
CO ₂ Published	Grams/km	165	189	154	153	176	265	244
CO ₂ Adjusted	Grams/km	187	171	164	157	177	211	213
Tare Weight	Kgs	1131	1320	1418	1098	1123	1668	1718
GVM	Kgs	1530	1905	1950	1525	1570	2505	2505
Payload	Kgs	399	585	532	427	447	837	787
payload/ Tare	%	35	44	38	39	40	50	46

Conclusion

SAE-A is recommending that a reduction strategy that applies a year on year percentage reduction in CO₂ / fuel consumption be applied to all vehicles sold on the Australian market, based on their current Green Guide stated CO₂/ fuel consumption levels as a baseline.

Also that the other major factors not covered by this paper, such as traffic management, fuel types etc, should also be applied in conjunction with this proposal.

References

There are a large number of SAE / SAE-A engineering and broader papers that were used as background or reference regarding this submission. Please advise if copies

of these papers are required together with an indication of the question it refers to and a copy will be made available on request on request.

Discussion Paper Template response.

Hence based on the above SAE-A offer the following comments based on the Discussion paper template.

General comments on a package of measures

1. Do you consider the actions of the type outlined in this paper are required, or are current arrangements sufficient?

Current market pressures may or may not achieve lower fuel consumption and so CO₂ reduction. The level of change will be dependent on market forces at play at any time, which cannot accurately be planned or foreseen. Consequently a guided change is required if specific reduction targets, with set timeframes, are to be achieved.

Hence these actions are required if controlled and metered lowering of CO₂ emissions is to be achieved within a short time.

2. If you consider further actions may be required, which measures, or package of measures, offer the greatest potential to cost-effectively reduce greenhouse emissions from the road transport sector?

- The most dramatic and quantifiable change that can be achieved, in the shortest timeframe, across the total national road transport fleet, for both private and commercial, is to better control the movement (or lack of) of vehicles in traffic. The minimisation of stop start traffic could achieve a significant and effective reduction of CO₂ generated by traffic.
- An excise (tax) on ALL fuels (energy) that accounts for their real CO₂ emissions through use and their production and process emissions.
- To a lesser degree driver education and training can help reduce CO₂ emissions through better instruction on how to generally maintain their vehicle, or best drive a particular type of vehicle to achieve lower fuel consumption. For example
 - Reinforce the importance of correctly vehicle maintenance and its effect on fuel economy i.e. tyre pressure, engine servicing

bearing condition etc.

- In Germany a new driver is exposed to both a small manual transmission vehicle and a larger automatic transmission vehicle as part of their, on road training to sit for a license for the first time, to demonstrate appropriate driving technics.

3. In your view, are there particular combinations of measures that would enhance the potential benefits of the measures?

The most natural combination would be the changes suggested by this paper, in conjunction with sophisticated automated traffic control systems which minimises “inner city” congestion and maximises vehicle movement as much as is possible.

Add to this the change to lower CO₂ producing energy sources, as well as reduced turnover of vehicles with in the national population of vehicles, only then will a long term holistic and significant reduction in CO₂ emissions result.

4. Are there barriers or challenges to the uptake of low emission transport technologies in Australia, which have not been identified in this paper?

The level of optional features in Australian vehicles in general is quite high by comparison to the majority of the rest of the world. The addition of these added or optional features to any one vehicle generates CO₂ in their manufacture, and fitment as well as the level of CO₂ emitted by the vehicles that has them fitted, due to either their weight and / or any parasitic load that may be placed on the engine of the vehicle to power the feature. Generally the buying public is not fully aware or informed on the effect of these accessories on fuel consumption, good or bad. The absence of these facts distorting their understanding when deciding which vehicle to purchase.

As discussed later in question 3.2.1 a system of information dissemination, be it of a general or, detailed and specific nature is required to better inform the buying public of the environment affects of the options and accessories they may select.

5. Are there opportunities to improve vehicle fuel efficiency within the Australian road transport sector, which have not been identified in this paper?

- Improved traffic flow through a highly automated, high technology traffic management system that maximises vehicle movement, and reduces the need to slow or stop in getting to any one destination, for the majority of vehicles.

- Reductions in vehicle replacement, so reducing the CO₂ emitted to create them in the first place.
- Change to lower emitting energy source to power vehicles i.e. different or non-hydrocarbon based, or lower carbon content.
- If smaller lighter cars are be used to tow heavier loads the chance of load related accidents will increase and vehicle wear and tear will increase so resulting in either high vehicle replacement, or higher levels of maintenance and retained carbon impact.
- Driver training (as in Europe) that includes elements on how to reduce fuel consumption in a range of vehicles (i.e. smallest manual to larger Automatic etc).
- Addition of vehicle indicators that encourages and/or informs of lower fuel consumption. (I.e. fuel consumption displays or shift advice indicator lamps in manual transmission vehicles.
- Labelling of the CO₂ effect of parts and materials used in the ongoing maintenance / servicing or modification of a vehicle. I.e. multi step colour coding – green through to black indicating the better CO₂ product.
- Financial incentives for the scrapping of vehicles at the optimal points to ensure the CO₂ impact are minimised.

6. Do you have views on possible social or economic impacts arising from measures outlined in this paper? How could these impacts best be managed?

- The use of economic penalties that push for change to newer vehicles will result in lower socio-economic members of the community being disproportionately burdened with the cost of such corrective action. Some sort of reimbursement or discount to either account for the price of registration, or the purchase of a newer vehicle, or similar maybe required.
- As newer vehicle weights reduce compared to the existing vehicle demographic, the weight difference within the national fleet will grow (initially). It is known that with an increase in weight difference between vehicles involved in a major collision the occupant trauma dramatically rises for occupants of the lighter vehicle, so resulting in more significant levels of injury or death count. This will impact the members of the community their families, as well as the health, police, emergency services etc. A more managed, balanced and measured, longer-term approach to ongoing change may temper this effect.
- If fuel pricing is used as a strategy, a similar incentive, or a similar type of dispensation may also be required for lower socio economic members of the community.
- The strategies implemented could dramatically affect the viability of local automotive manufacturing, so resulting in the contraction of the size of the industry or its total elimination leaving only importation and local sales operations only. Caution is advised on this point as the

evidence is that 'taking' markets have less control on their destiny.

7. General Comments

A holistic approach is required on the issue of CO₂ reduction; the items raised in this paper are but only one part of a total solution. If these changes are introduced in isolation then a distorted control of the local industry will result. This in turn will most likely result in only a small reduction in CO₂ emissions, and place unnecessary and unfair burden on different parts of the community and various local industries. If however a holistic approach is taken where all facets of the problem are addressed, in a co-ordinated manner then the changes with in any one, can be slowed, and the burden shared. This would allow careful monitoring observation of change, and a higher degree of control without over reaction. Thus delivering ordered change across the community and its industries, while still achieving overall CO₂ targets.

Category 1 Measures to Increase the Supply of Low Emission Vehicles

1.1 CO₂ Emission Targets for New Light Vehicles

1. Do you consider there is a case for tightened CO₂ standards for the light vehicle fleet in Australia?

If it is necessary for all sectors of the community activity to participate in reducing Greenhouse gases, then the answer is yes. However, any lowering of CO₂ emission target must be balanced, metered and considered to allow the local manufacturers of vehicles sufficient time to make appropriate changes, in design and manufacturing process to meet the elected targets. As discussed in the above.

2. If you consider tightened standards are required, should they be voluntary or mandatory?

An effective standard should be voluntary with regular reporting as there is ample evidence that mandatory standards are costly to monitor and can lead to market distortions.

3. Do you have a view about the design of any system – for example do you agree that the standard should be a sales-weighted average? Do you agree with the European Union proposal to link the standard to vehicle weight, or should it be based on different parameters?

Our considered opinion is that the standard should not be sales weighted but applied uniformly across all model types that warrant inclusion in the green guide.

This would specify a percentage improvement over time. It avoids pressure for sales shifts to smaller vehicles (which elsewhere we have argued has significant community cost implications as well as affecting the viability of the local industry) or from automatic to manuals (in many cases) etc but would encourage across the range up take of relevant, market ready technology such as mild hybrids in the smallest vehicles to cylinder deactivation in engines with a large number of cylinders as just two examples. An agreed percentage reduction has the advantages of

1. Simplicity
2. No after-the-fact calculation such as sales weighting is needed. The achievement or otherwise of the standard is known when the vehicle enters the market.
3. It does not discriminate against technology or design
4. It embodies the realism that the L/100km reductions over time will be less in the long term (asymptotic to zero at infinity) consistent with the long-term reduction mechanisms becomes more and more difficult to find and apply.
5. The amount of fuel saved will be larger for larger (high fuel usage) vehicles
6. Under or over performers could be penalized or credited.
7. Vehicles not included in the Green Guide would not be required to meet the target.
8. Model cycles could be accommodated (not necessarily %/year) but this would lose the benefit of simplicity.

The table 1 illustrates outcomes for new models

Table 1 CO₂ emissions from a typical car

Year	2010	2030
2%/y	186	124
3%/y	186	101

Note: New model introductions not currently covered by Green Guide would have to meet a minimum standard for the type and category it falls into.

As an example

Project CO2 Reduction based on 2.5% reduction year on year				
Projected CO2 Discharge	Hyundai Getz Auto		Ford Falcon Ute Petrol Auto	
Note :Compounding effect on % reduction	CO2 gm/km	Overall % improvement from 2008	CO2 gm/km	Overall % improvement from 2008
2008	165	0	265	0
2010	157	4.8	252	4.8
2020	122	26	196	26
2030	95	42.5	152	42.5

4. Do you consider that CO₂ standards can effectively operate independently of other measures, or are other measures critical to their success?

No. As the objective is to reduce CO₂ emissions from the transport sector, the whole of the real world life emissions should be reduced. This means that frequent turnover of the vehicle fleet is not consistent with this objective. Refer to Appendix SAE-2? Moreover measures which reduce fuel production energy, in service energy (not measured by the NEDC Euro test cycle) which reduce the stopping frequency in traffic (smoother driving) and manage speeds on highways (amongst several other options) are critical to achieving parts of this objective and metrics for achieving these benefits should be developed and included as part of vehicle performance with respect to CO₂emissions.

The above proposal recognizes that inherently larger vehicles consume more fuel and that there are unique Australian market needs and wants for larger vehicles. Moreover historical data shows that the reduction in fuel consumption for large cars has been greater than for small cars and the proposal here will continue this delivering greater reductions (in L/100km).

5. Do you consider that market pressures, such as rising fuel prices, will be sufficient to deliver significant CO₂ reductions from the light vehicle fleet, without the need for CO₂ standards?

There is significant historical evidence that increasing oil prices suppress the demand for its consumption. The oil price shocks of '73 and '79 demonstrate this clearly along with more findings with lesser price swings. As fuel is a marginal cost item representing about 8 to 15% of vehicle operational cost for light duty vehicles but up to 25% for heavy-duty vehicles, large price swings are needed to influence the former particularly amongst first vehicle purchasers. Moreover the likely significant fuel price swings current and almost certainly pervading in the future send mixed messages to vehicle owners and drivers.

Further, those at the lower end of the socio-economic who are often the last owners of vehicles will likely be much more influenced by fuel costs yet attracted by the longer durability and reliability of the larger light duty vehicles. Thus fuel-pricing policy as a CO₂ reduction mechanism is often talked up by economists but talked down by politicians. Thus nominating a performance standard and by having this information in the public domain, identifying those that are low fuel consumption through to those that are high, will be a significant incentive in a voluntary scheme.

As an example: Though introduced as a fuel consumption reducing technology there is no irrefutable evidence that low sulphur fuel (10 ppm) brings CO₂ benefits, directly or enabling, to all vehicle technologies. But there is ample evidence that sulphur removal costs energy in fuel production.

6. General Comments

Category 2 Measures to Increase Demand for Low Emission Vehicles

2.1 Restructure State registration and stamp duty charges for light vehicles

1. Would a stamp duty differential charging scheme be an effective means of encouraging consumers to purchase more fuel-efficient vehicles?

Any scheme, which imposes, whole of life costs on vehicle ownership will raise questions of equity. At the point of first sale or at the time of resale a case may be made for differential taxation such as stamp duty related to fuel usage/CO₂ emission. But any actions, which prematurely terminate the life of a vehicle, can lead to undesirable outcomes, such as not fully amortizing the capital (manufacturing and materials embedded) energy and CO₂ as demonstrated in Appendix A

2. Would a registration differential charging scheme be an effective means of encouraging consumers to purchase more fuel-efficient vehicles?

If the charges offered were significant enough yes. But as above it would have to be significant enough and balanced to account for the higher initial purchase price, and any early removal of older vehicles.

3. Of the range of basic system models outlined in Measure 2.1 of the discussion paper, which would be the most effective at improving vehicle fuel efficiency and most understandable to the average motorist?

Refer above

4. What other considerations should be made in the design of any system?

Apart from the moral obligation, whatever the benefit a potential purchaser will seriously look at the payback period for the higher on road purchase of a more fuel-efficient (read lower CO₂ emitting) vehicle. The longer the payback of the price difference between any two comparable vehicles, the less attractive a low fuel consumption vehicle becomes. If the difference cannot be recovered in 18 to 24 months, or there is an absence of attractive features (heavier with more power) the harder the justification becomes. It has to make financial sense and the benefit must be realised in the shortest period possible for new vehicle purchases.

5. General Comments

The price difference, and operational cost difference between comparable cars must be amortised within the shortest, practical time possible. Any government based related cost break must be carefully considered if it is to have an influence on a buyer decision.

The moral responsibility and its reinforcement to potential buyers cannot be understated. Buyers that are in position to afford the price difference may be influenced by any promotion on this point.

Category 2 Measures to Increase Demand for low emission vehicles

2.2 Provision of direct financial incentives/disincentives based on vehicle CO₂ emissions.

1. Do you consider that direct rebate for low emission vehicles are an effective measure in reducing CO₂ emissions?

It can be, there is very strong evidence that the motor vehicle market is very price sensitive especially at the lower end of the market including most commercial fleets including those of government. A direct rebate will influence the buying patterns in a given market.

However there is also evidence that there is strong resistance to 'price control' or taxes that interfere with a free market. To date voluntary schemes have had significant impact, although only infrequently have overall targets been met.

It is for the above uncertainties that a flat percentage based proposal is recommended to avoid these and other issues which would arise from a rebate scheme. Hence a voluntary scheme would be recommended.

2. If so, do you consider that the cost of rebates should be offset with higher fees on high emitting vehicles (i.e. a feebate scheme)?

Refer above

3. Do you agree that any scheme should be based on CO₂ emissions and not linked to particular technologies?

Yes, technology will be one of the tools in achieving the target. So allowing manufacturers to use any technology they can adopt to achieve the desired outcome. The outcome must be based on quantifiable measures with undisputable results.

4. If a scheme was to be introduced, would you support it being based on a single threshold, or do you support a range of “class” based thresholds? What do you consider are the advantages and disadvantages of such approaches?

Refer above to Preamble recommendation dialogue.

5. General Comments

Category 2 Measures to Increase Demand for Low Emission Vehicles

2.3 Develop fleet purchasing frameworks that incorporate greenhouse reduction objectives

1. Do you consider fleet operators would be motivated to participate in a national fleet accreditation process to improve the fuel efficiency of their fleet?

The 1996 National LDV Fuel Consumption Survey undertaken by SAE-A with ERDC funding involved the interrogation of ten fleet operator's practices. Several used the recorded odometer and fuel use data to direct their subsequent vehicle purchases for leasing, with preferences for low consumption (and operating cost vehicles). Although their data correlated with the published AS-2877 fuel consumption the correlation was often weak, and this led the manufacturers supplying these fleets revising the calibration of their vehicles for good in-service performance as well as calibrating for the test cycle for mandatory data reporting. It is likely that this practice continues today at a time of higher fuel costs. It would appear that good practice already exists but perhaps is not so well coordinated in government fleets because of their disparate nature.

2. If you do, what benefits do you consider fleet operators would expect to result from participation in such a scheme?

The availability of more credible information will result in better-informed business decisions while still allowing more choices in how they can more efficiently operate their business. So lowering operating costs and so maximising profits.

3. Do you think that an accreditation scheme should have the sole goal of reducing CO₂ emissions? Should additional goals be considered (such as air quality)?

Yes, more goals could be included if decided. However without constant review and administration it may dilute the focus of the strategy and so loose effectiveness in one or more of the goals.

4. Are you aware of fleet fuel efficiency schemes operating within Australia or overseas? Has there been an analysis of the effectiveness of these schemes?

No comment

5. General Comments

Category 3 Measures to Improve Consumer Awareness

3.1 Including Fuel Consumption Data in Vehicle Advertisements

1. Do you consider there is a case for including fuel consumption and CO₂ emissions data in vehicle advertising?

Yes, education is the best way of getting participation in environmental matters. Therefore all potential buyers must have this information if they are to make an informed decision based on this issue.

2. If so, what do you think would be the best way to implement it?

Must be a standard that is common across all forms, and applicable to all new car retailers in the market. A nominated, pre nominated level of information that is included with all printed, audio, and visual media.

3. Are there any matters not identified which would facilitate or impede the introduction of this measure? We are particularly interested in any published material you can point to.

It may be time to repeat the In-Service Fuel Consumption program conducted by SAE-A (1986 and 1996) that established the relativity of the city and highway cycle tests to real world conditions as reported in the fuel consumption guide. Particularly in view of the changed drive cycle to the NEDC. As part of this, customer perceptions about how environmental and energy matters could be best conveyed could be conducted thus avoiding the cost and risks associated with a specific short-term survey. There is a dearth of publicly available quantitative data around the world and moreover Australians have a special take on advertising.

4. What do you consider are the costs and benefits of the measure, and their likely magnitude? What is the basis of your views on this question?

This response is based on it being a prescriptive measure on how to present the information about an individual vehicle. It also assumes that the intention is to make fuel consumption performance data readily available to all potential buyers in a consistent and easily accessible format in a high proportion of vehicle advertising.

Manufacturers of best in class vehicles would promote heavily, those not so good, would tend to hide or minimise the information. The answer to this question is dependent on just how prevalent you would wish to make the information available to potential buyers. So long as it meets a minimum repeatable standard in terms of proportion of advertisements it would be sufficient.

Cost would be nominal in its most basic form, higher if it is strongly promoted as a strong selling point. Hence a company would only be required to present a minimum of information, so making it equal to all involved. But, still allow the freedom to promote the information more predominantly if so desired.

5. Are you aware of any other countries implementing similar measures, and whether there has been any analysis of their effectiveness?

No Comment

6. General Comments

Category 3 Measures to Improve Consumer Awareness

3.2 Standards / Labelling Requirements for Non-engine Components Which Impact on Fuel Consumption

1. Do you consider that measures in relation to non-engine components are worth pursuing?

Most definitely. Regenerative braking is one example (like ABS was in the past) of a technology that will influence CO₂ emissions that needs to be single out and be promoted as a future CO₂ saving technology. Also devices that aggravate CO₂ emissions should also be nominated to again, make potential buyers aware of the effect of the features they are adding to their future vehicle and the effect they having on CO₂ emitted; either through manufacturing energy, weight gain, or parasitic losses on the engine consumption. This information must be credible, so it can be conveyed without confusion to individuals, groups, the media etc. (RACV, RACQ, NRMA etc)

In all cases suppliers of the products will have to formally demonstrate that the fitment of their aftermarket product to a vehicle does not affect the ADR compliance of the vehicle, and continues to meet the registration requirements of the jurisdiction it is registered in.

2. Do you agree with the Working Group's assessment that Australia should move quickly to assess/establish within Australia any measures agreed to internationally?

Yes, so long as the international standard has been implemented and stands up to considered scrutiny before it is adopted, and there is opportunity to tailor the standard by applying a correction factor that appropriately adjusts it to meet any unique aspects of Australian community requirements. Note remarks in section 2.3 above.

3. General Comments

3.3 Heavy Vehicle Environmental Rating Scheme

1. Do you consider there are gaps/inadequacies in the provision of heavy vehicle fuel efficiency data to business purchasers? Can you identify those deficiencies?

Yes. As stated in the paper it can be extremely difficult to access consistent and comparable data on commercial vehicles. There are no common test procedures or standards used, nor are there results published that can be relied on that are impartial and empirical.

Fuel economy is already a major factor in truck operations (up to 25% of operating cost). Incentives for good practice should be mindful that much of truck freight is volume limited e.g. transporting cars and foodstuffs. So any system that uses fuel/tonne.km is going to be biased towards mass. Moreover there are some services that are not so amenable to improvement e.g. carting milk where the load factor is dictated by the route and customers supply variations.

2. If deficiencies exist, what do you consider is the most effective way to address these? Do you consider there is a case for web-based fleet management tools, and how should they be funded?

Though not ideal in the world of commercial vehicles, a uniform test standard that results in comparable test data that is generated at unladen and GVM weights as per ADR 81/00 or across a range of vehicle weights. This would demonstrate the extremes of operation and so provide some indicator as to potential range of consumption. This is particularly important as many LCV's operate at a low load factor that would provide information to encourage an alternate vehicle to be selected that is more appropriate to the task.

One possibility may be to amend ADR80/03 (emission certification requirements) so that the measurement of fuel efficiency would be included. The fuel efficiency can be calculated by the same carbon balance method as used in ADR81/02 for passenger cars and light duty trucks. The ADR80/03 test procedure defines several engine operating points with different speeds and loads to be tested. The emissions are reported in mass per energy delivered (g/kWh), therefore the fuel efficiency can also report in g/kWh. These values allow an owner operator to carry out direct comparison when considering the purchase of a new vehicle as

to its suitability for the application.

3. What do you think would be the most important areas for any tools to address?

No comment

4. Are you aware of any other countries implementing similar measures and whether there has been any analysis of their effectiveness?

No Comment

5. Are there any additional matters that would facilitate or impede the introduction of fleet management tools? We are particularly interested in any published material you can point to.

In the past SAE-A developed a software protocol for vehicle selection to assist the trucking industry tailor their range or model selection to individual owner operators. Unfortunately it was strongly opposed by truck manufacturers at the time. However, the software was made available to members and interested parties, the industry capitulated and made available to customers their in-house software for developing component (transmission, axle ratios, tyre configurations as well as engines) selection by owner-drivers to “tune” their trucks specification to better suit their application. Owner-driver at the comprised a large proportion of the market (Fleet operators are usually well informed). This protocol could be updated and re-introduced.

6. Do you think the development of fuel efficiency guides for fleets would be a cost effective means to reduce fuel use of heavy vehicles?

Yes, most fleet purchases are based on establishing the best vehicle for the application, lowest cost of purchase, lowest cost to maintain, and lowest cost to operate. Any information that affects any of these key points will be closely studied and considered before purchasing a vehicle.

7. Do you consider there is a case for development of a heavy vehicle environmental rating scheme similar to the light vehicle-rating scheme? Do you agree with the assessment that any scheme should wait for the finalisation of international emission measurement standards?

Yes as mentioned earlier buyers of commercial vehicle will use this type of information in their decision-making process. The nature of commercial transport is relatively universal; an international standard would be expected to cater for a majority of Australian applications, but may need tailoring if glaring differences are identified.

8. What do you think would be the most important areas for any scheme to address?

CO₂ emission per tonne per kilometre travelled for heavy goods and per cubic metre for bulk goods transport (Both have to be rig applicable and not just to the prime-mover). The lowest emission per maximum quantity that can be transported over a fixed distance. This then is a good starting point, as this can provide the basis for knowing what happens at fractional loads and will ensure that the true carbon cost of freighting materials is understood, and is basic enough that an operator will tend to optimise the operation of their vehicles (i.e. Minimum load before shipping etc).

9. General Comments

Category 3 Measures to Improve Consumer Awareness

3.4 Establish a technology demonstration scheme for Australian road transport fleets linked to achievement of greenhouse outcomes

1. Do you consider a subsidy scheme to support the development and trial of emerging low emission technologies is necessary to encourage innovation within the light commercial and heavy vehicle market segments? If so, is it an effective approach?

Australian operations may be different from those elsewhere in the world, thus providing support for innovation is likely to lead to beneficial outcomes if there is appropriate support for wide scale implementation. It is often this area that has been difficult to deliver in Australia. Australian investors are often "risk averse" in this area because of a significant number of mismanaged attempts that do not have the right technical (knowledge) base and the right delivery structure.

2. Are there additional (non-financial) barriers to the adoption of proven and emerging low emission technologies within the light commercial and heavy vehicle segments?

As above

3. Are you aware of any other countries implementing similar measures and whether there has been an analysis of its effectiveness?