

**POST 2005 ASSISTANCE ARRANGEMENTS FOR THE
AUTOMOTIVE MANUFACTURING SECTOR**

**Department of Transport and Regional Services
Submission to the Productivity Commission Inquiry**

May 2002

The views expressed in this submission are those of the Department and do not necessarily reflect those of the Minister for Transport and Regional Services or the Government.

1 The Department's interest in the inquiry

The overriding objective of the Department of Transport and Regional Services (DOTARS) is:

A better transport system for Australia and greater recognition and opportunities for local, regional and territory communities.

A "better" transport system is considered to be one that is safer, more efficient, internationally competitive, sustainable and accessible.

The composition of the Australian vehicle fleet is an important element of the transport system. A more modern vehicle, for example, generally provides higher quality transport services as well as being a safer and more environmentally friendly vehicle.

A better transport system can also be achieved in many other ways such as through improvements in road infrastructure, driver behaviour and traffic management arrangements. In some cases, reforms in these areas can be a more cost-effective means of improving the transport system. For example, even the most fuel-efficient vehicle performs poorly when stuck in congested traffic or when driven badly. Consequently, calls for Government support to improve the transport system through improved vehicles should be assessed against alternative options to achieve this end.

This submission, however, concentrates on the composition of the Australian vehicle fleet as this component of the transport system appears most directly influenced by industry assistance arrangements.

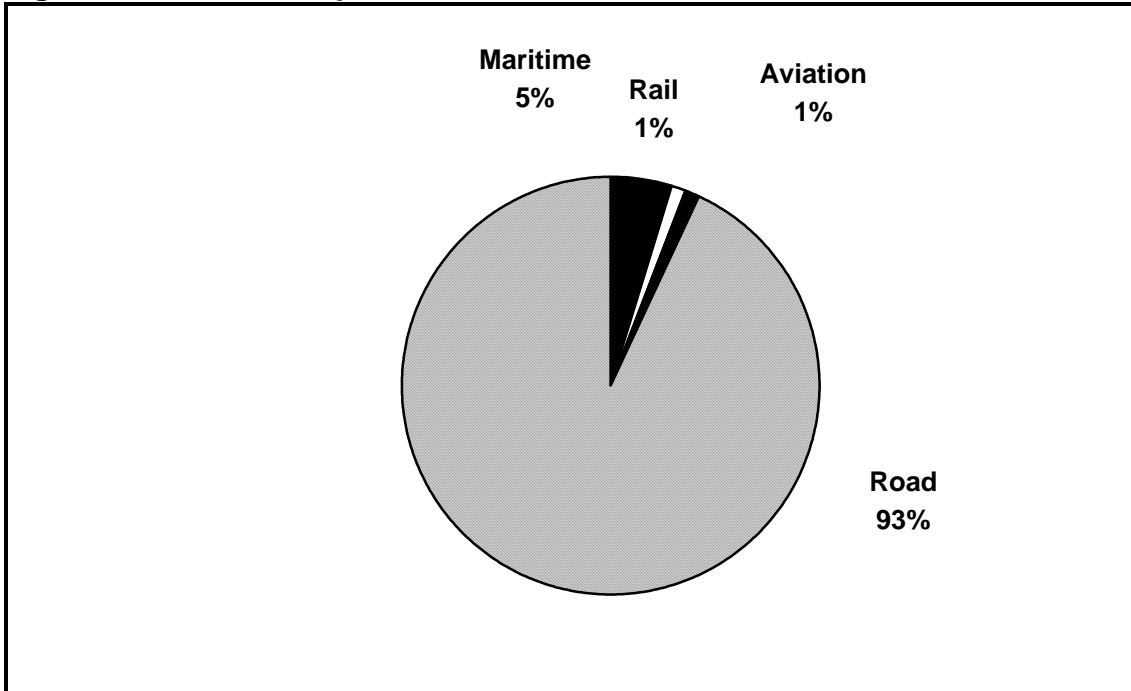
Elements of the Commission's Terms of Reference that are of most relevance to DOTARS appear therefore to be those that require the Commission to:

- analyse the implications of industry assistance arrangements on regional Australia, consumers, resource allocation and growth prospects generally, and
- examine impacts on the automotive sector of changes in road safety and environmental requirements.

Assistance arrangements can reduce the efficiency of the transport system by increasing the cost of new vehicles. The community's understanding of this impact has been greatly improved by the Commission's numerous previous inquiries into this industry. The impact of industry assistance and other regulatory arrangements on the safety and environmental performance of the vehicle fleet is less well understood and is the focus of this submission.

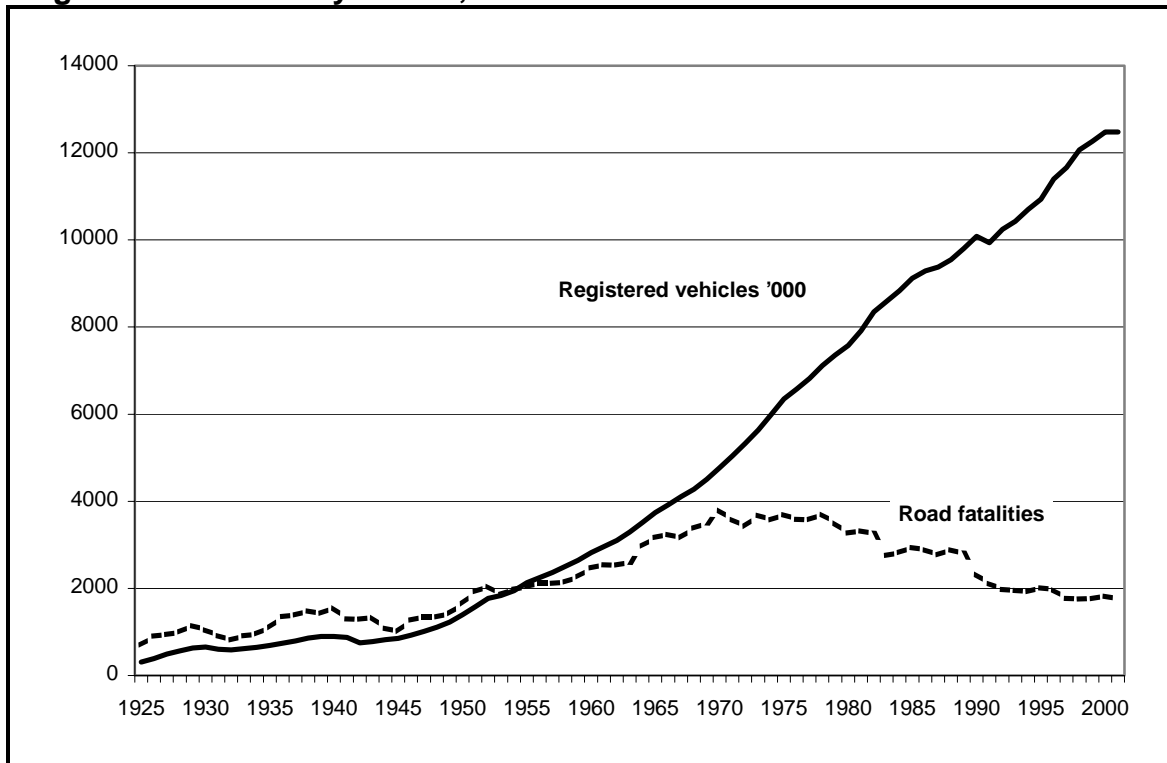
2 Road safety

The high social and economic costs imposed by transport accidents are widely recognised. In addition to the burden of personal suffering, the monetary cost of crashes in 1996 has been estimated to be in the order of \$15 billion. Road accidents account for by far the largest slice of the total cost of transport accidents (Figure 1).

Figure 1 Cost of transport accidents, 1993

Source: Bureau of Transport and Regional Economics

While there are definitely challenges ahead in transport safety, Australia's record to date has been quite good. Road fatalities have fallen from a peak of 3798 in 1970 to 1756 in 2001. This gain has been made against a background of a major increase in vehicle numbers (Figure 2).

Figure 2: Road safety record, 1925-2001

Source: Australian Transport Safety Bureau

Commonwealth and State/Territory Governments are committed to using the most effective means to improve our transport safety record. A range of measures has been employed to improve road user behaviour and the quality of the road network.

Improvements in new vehicle safety standards have also made a significant contribution to this performance. Additional safety features have progressively been introduced, such as improved seat belts, air bags and crumple zones. Further improvements in new vehicle safety standards are one of a range of measures agreed by Commonwealth, State and Territory Governments to improve road safety.

The National Road Safety Strategy aims to dramatically reduce death and injury on Australian roads — see <http://www.dotrs.gov.au/atc-nrss.htm>. The Strategy has an explicit target of reducing the rate of road fatalities per 100,000 population by 40 per cent — from 9.3 in 1999 to 5.6 in 2010. Concerted efforts to improve road safety continue to be made by both Commonwealth and State Governments. However past improvements in road safety have levelled-off and little progress has been made in achieving this target in the past few years.

3 Vehicle emissions

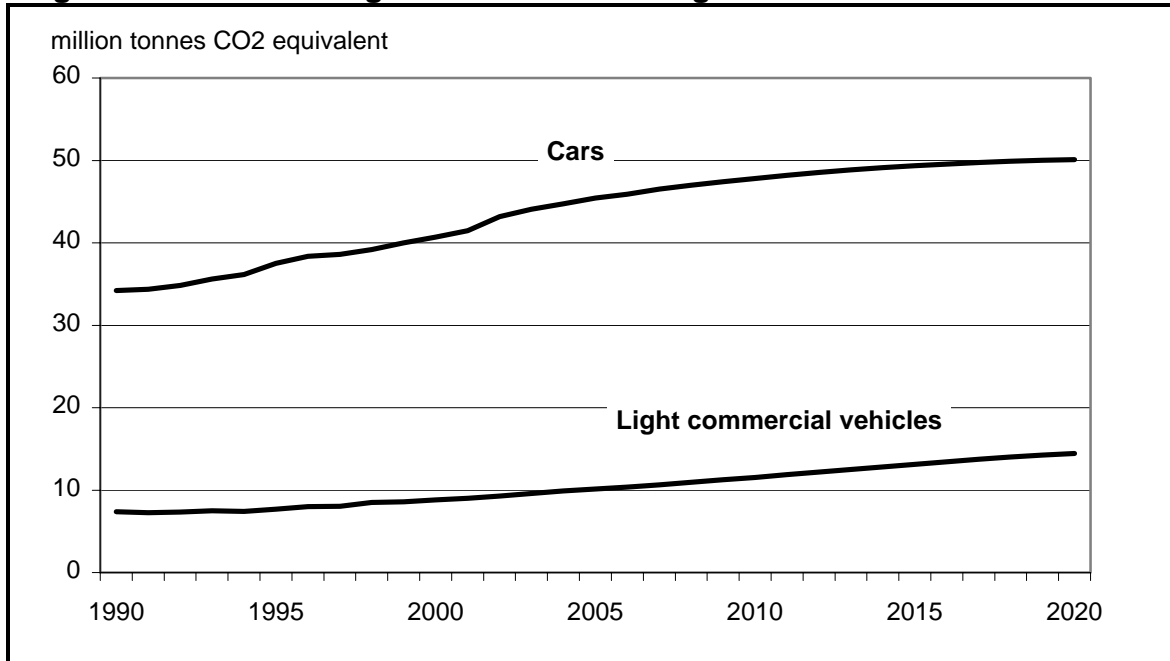
Light vehicles — cars, four wheel drive vehicles (4WDs) and light commercial vehicles (LCVs) — are significant contributors to both greenhouse gas emissions and urban pollution.

- **Greenhouse gas emissions**

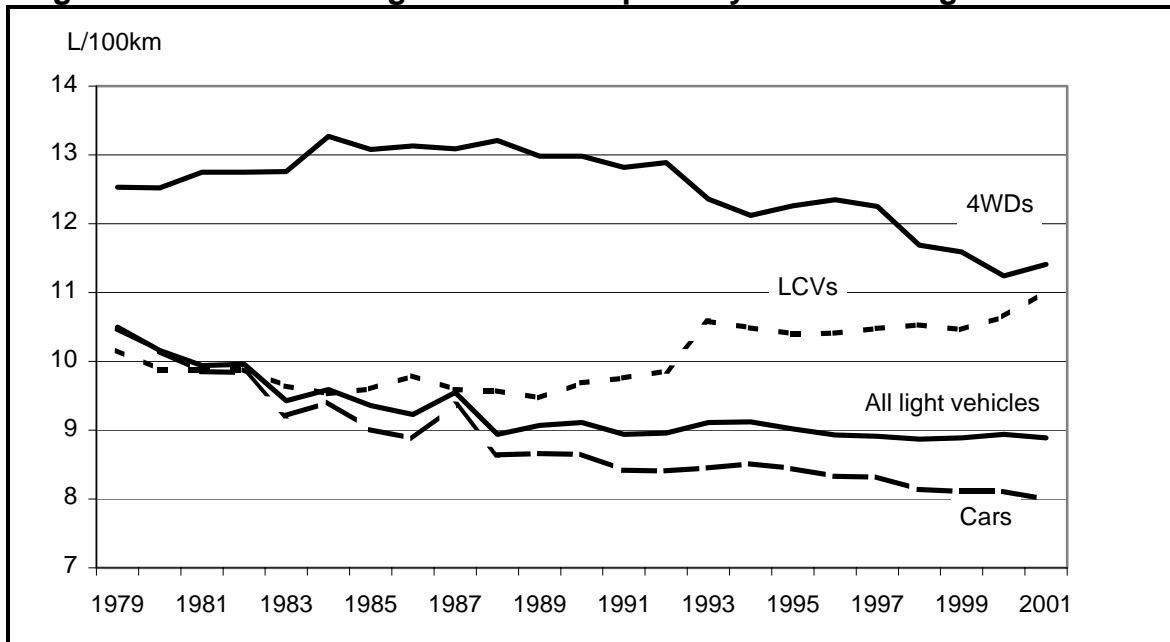
Light vehicles account for 70 per cent of transport's greenhouse gas emissions or about 11 per cent Australia's total greenhouse gas emissions. Latest Bureau of Transport and Regional Economics (BTRE) projections suggest that emissions from light vehicles in 2020 may be about 55 per cent above their 1990 level. Greenhouse gas emissions from cars are expected to level out towards the end of this period as the growth in car ownership rates continues to ease. Greenhouse gas emissions from light commercial vehicles are expected to almost double over the period in line with projected growth in economic activity (Figure 3).

Greenhouse gas emissions are closely linked to the amount of fuel used and its carbon content. Road transport demand is largely dependent on population and economic activity and quite insensitive to road transport costs. Consequently, measures aimed at reducing the amount of fuel used by light vehicles by increasing the cost of transport are typically costly approaches for achieving reductions in greenhouse gas emissions. This leads to considering whether improving in the fuel efficiency of vehicles is a more feasible option for reducing fuel use.

The BTRE has recently undertaken an analysis of trends in fuel efficiency of light vehicles — see <http://www.btre/btre/docs/is18/is18.htm#Top>. The basic story behind fuel efficiency trends over the last 20 years is that the fuel efficiency of engines has improved substantially. But the potential fuel savings have been largely offset by increases in vehicle power and weight, by strong growth in sales of 4WDs and by increases in the average fuel consumption of light commercial vehicles (Figure 4).

Figure 3: Greenhouse gas emissions from light vehicles

Source: Bureau of Transport and Regional Economics

Figure 4: National average fuel consumption by Australian light vehicles

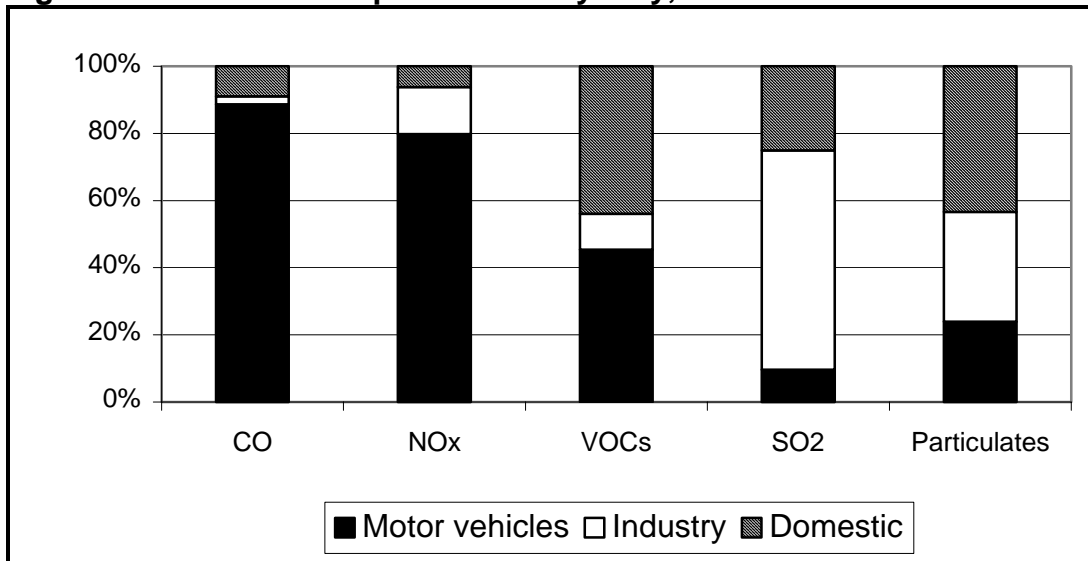
Source: Bureau of Transport and Regional Economics

- **Urban air pollution**

The air pollutants of current concern in Australia are ozone — formed by reaction between volatile organic compounds (VOCs) and oxides of nitrogen (NO_x), particulates, air toxics, and to a lesser extent, carbon monoxide (CO). The nature of air pollution in Australia is quite different to that in some other countries. Sulphur dioxide, for example, accounts for a far lower share of emissions in Australia than in Europe.

Motor vehicles — including heavy vehicles — account for the dominant share of some, but not all, types of air pollution emissions (Figure 5). They are the major source of CO and NO_x and a significant source of VOCs and particulates.

Figure 5: Sources of air pollution in Sydney, 1992



Source: Australian Academy of Technological Sciences and Engineering 1997, *Urban Air Pollution in Australia*.

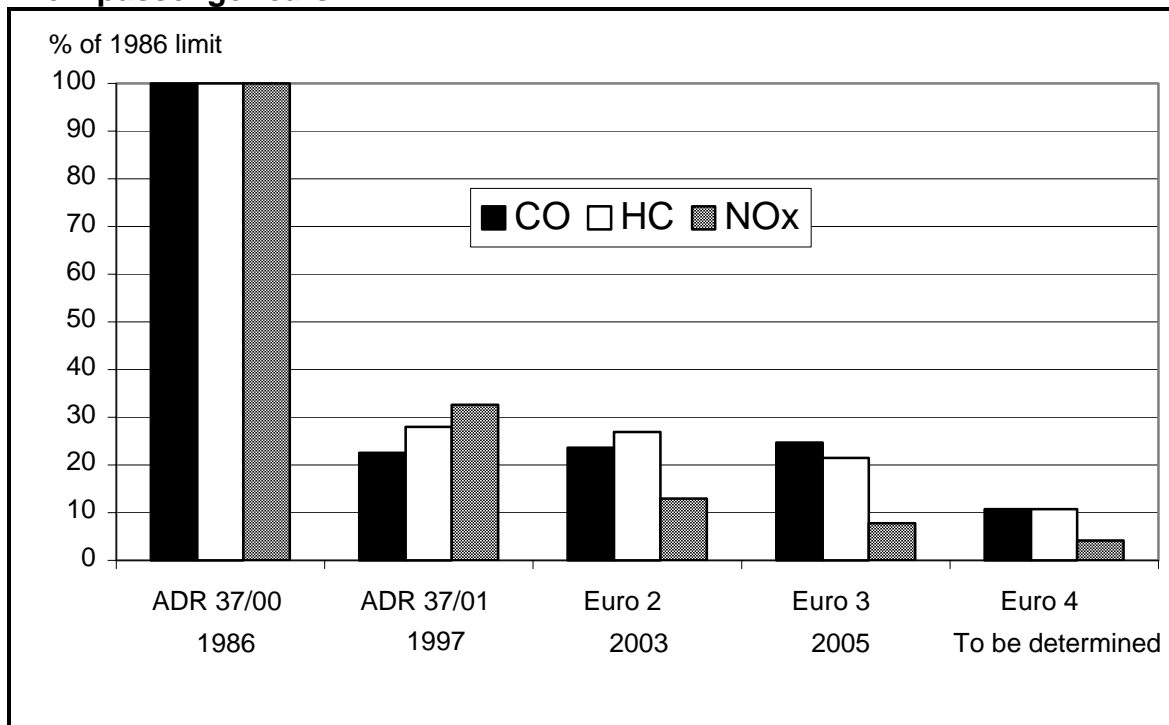
The sheer dominance of cars in urban areas ensures that they are the major contributors to motor vehicle emissions. Even though diesel vehicles emit particulates at a much higher rate than petrol vehicles, cars still account for perhaps half the amount of particulate emissions from transport in urban areas.

Unlike greenhouse gas emissions, a vehicle's contribution to urban air pollution depends critically on the emission performance of the vehicle rather than just the amount of fuel it uses. Indeed, new cars sold in Australia after 2005 will be required to meet emission standards around 75 to 95 per cent less than cars sold before 1986 (Figure 6). Heavy vehicles have also been subject to major reductions in emission standards.

Air quality in Australian cities has generally improved over the past 15 years. Tighter new vehicle emission standards are widely recognised as having made a significant contribution to this improvement.

While a mix of strategies has been used to address air pollution from motor vehicles, it is generally considered that the introduction of tighter new vehicle emission standards has been the most effective means to date in Australia. This view is consistent with the experience in other developed countries. Recent discussions with USA environmental agencies suggests that perhaps as much as 90 per cent of the improvements in urban air quality gained in American cities can be attributed to improved emission standards of new conventionally fuelled vehicles. Other measures, such as those relating to alternatively fuelled vehicles, improving fuel economy and public transport, have generally not had a significant impact on pollution levels.

Figure 6: Timing and magnitude of reductions in emission standards for new passenger cars



4 The Department's role in improving new vehicle standards

The major mechanism used by DOTARS to improve the safety and environmental performance of the vehicle fleet is through new vehicle standards — also known as the Australian Design Rules (ADRs).

Safety regulations relate to quite fundamental safety features such as braking, lighting, seat belts, tyres and occupant protection. They also include a number of other items that contribute to the overall safety performance, such as features to ensure driver visibility in all conditions and systems/components not directly assessed in performance testing via occupant protection crash standards. These include door latches and hinges, seats and seat anchorages and internal sun visors.

Environmental standards regulate noise and emissions levels that are of a health concern. There are no vehicle standards that restrict greenhouse gas emissions. However, vehicle standards have been recently amended to include labelling requirements to indicate a vehicle's fuel economy.

New vehicle standards are developed by DOTARS in consultation with relevant Commonwealth, State and Territory agencies, representatives of the vehicle manufacturing and transport industries and road user groups.

While the Commonwealth is responsible for new vehicle standards, the States and Territories are responsible for regulating the use of vehicles after they are supplied to the market. The States and Territories rely on the new vehicle standards as the basis for regulating the on-going roadworthiness of vehicles within their jurisdictions. This may be done as a requirement for vehicle registration though some States also undertake

random vehicle inspections. It is therefore essential that States and Territories are included in the development of the standards.

Currently, out of 76 ADRs, 48 are either fully or partially harmonised with the international regulations adopted by the United Nations Economic Commission for Europe (UNECE). The UNECE is the forum for development of international technical standards for road vehicles and components. A review of the ADRs that is currently underway should result in even closer harmonisation. Generally, the vehicle and component manufacturing industries are supportive of Australia's current program of harmonisation with the UNECE. The review is well advanced and is targeted for completion by the end of 2002.

Australia also attempts to reduce compliance costs to industry through mutual recognition of UNECE testing and approval systems.

In April 2000 Australia became a signatory to the UNECE 1958 Agreement on Technical Prescriptions for Vehicles and their Components and in time will be in a position to issue UNECE approvals for those UNECE Regulations that we apply.

In assessing conformity with those ADRs that are harmonised with UNECE Regulations, the Australian vehicle certification and approval system accepts approvals issued by any UNECE vehicle certification body without any further examination or testing. However, manufacturers are not compelled to obtain UNECE approvals and can elect to use the Australian certification system. This allows manufacturers to conduct their own testing to confirm compliance with relevant ADRs. They are required to submit evidence to the Australian approval authority (DOTARS) to confirm that all the relevant tests were carried out and that conforming results were obtained, prior to being issued with an approval. The approval authority conducts post approval audits to confirm that production vehicles conform to the type approved.

Different arrangements are being introduced to apply to the importation of specialist and enthusiast models that are not otherwise available as new vehicles through established retail outlets. The arrangements are based on the establishment of registered automotive workshops where the workshop operator conducts the vehicle inspections and therefore carries the responsibility for ensuring compliance.

There are a small number of ADRs for which there are no corresponding UNECE regulations. Most of these ADRs have been earmarked for deletion in the current review of ADRs. However, there would be little community and State/Territory government support for the deletion of three of these unique ADRs, namely child restraint anchorages, occupant protection in buses and full frontal impact occupant protection in passenger cars.

In the case of child restraint anchorages, the Australian system, like the USA and Canadian systems, requires the top tether strap anchor point to secure the child restraint to the vehicle. This is not a feature of the UNECE system. The bus occupant protection standard was brought in to address community concerns over a spate of fatal bus accidents in the late 80s. This standard requires three point lap/sash seatbelts in long distance coaches. Australia is also the only country with both full and offset frontal impact protection standards. Other countries have one or the other. Japan is considering adopting the same approach and there are discussions within the UNECE to develop a full frontal impact protection standard in addition to the existing offset frontal UNECE protection standard.

5 Some policy issues

This section provides some preliminary views and comments on a number of policy questions that DOTARS would like the Commission to consider in its deliberations.

5.1 Assistance arrangements

- **What should be the level of automotive tariffs post 2005?**

Tariffs increase vehicle costs and therefore the cost of transport services for both business and consumers. By increasing the overall cost of replacing older vehicles with more modern models, they also delay the benefits being achieved from the more stringent safety and environmental standards of new vehicles.

The major reductions in automotive tariffs that have been achieved to date have significantly reduced this cost impost on the transport sector. However, DOTARS notes that few other industries now receive tariff assistance above 5 per cent. It considers that continued reductions in automotive tariffs will contribute to a transport system that is safer, more efficient, internationally competitive, sustainable and accessible.

- **Should tariff levels for 4WDs and LCVs continue to remain below those for conventional passenger motor vehicles?**

4WDs are increasingly being used as passenger vehicle substitutes in urban areas, in addition to their traditional role as commercial vehicles. Sales of 4WDs have grown from about 2 per cent of new light vehicle sales in 1980 to nearly 15 per cent in 2001 — though mostly due to very strong growth at the small end of the 4WD market. There are nine 4WD models in the top 30 selling light vehicles on the Australian market.

Tariffs on 4WDs, as well as LCVs, are generally 10 percentage points lower than for passenger cars. Consequently, the tariff arrangements could be expected to have provided at least some encouragement for this trend, though DOTARS would not wish to overstate this effect.

The trend to 4WDs is not unique to Australia. In the USA, there has been massive growth in sales of so called sports utility vehicles while sales of all other light vehicle types have been largely static. This growth has occurred despite policies in the USA to discourage the use of high fuel consuming vehicles. These policies include the Corporate Average Fuel Efficiency standards (CAFE) and a 'Gas Guzzler Tax' of up to \$US7700 per vehicle that is levied on sales of vehicles with fuel economy less than 22.5 mpg.

There are concerns that the increased popularity of 4WDs has adverse effects on both road safety and transport emissions largely due to the structural design of the *larger* 4WDs and their inferior emissions performance.

A recent major study of vehicle crashes undertaken by the Monash University Accident Research Centre examined the safety performance of a wide range of vehicle types, including a range of 4WD vehicles¹.

While results varied considerably within vehicle categories, it did not appear that drivers of larger 4WDs were significantly better protected in a crash than drivers of larger cars. Drivers that were clearly most at risk in crashes were generally those in vehicles within the smallest car category.

The Monash study also examined differences between vehicles in the injury risk vehicles pose to drivers of other vehicles. The results indicated that larger 4WDs generally pose a significantly greater risk to drivers of other vehicles than do larger passenger cars. This is because the larger 4WDs are generally higher off the ground, causing it to strike the other vehicle at a more vulnerable place, instead of at a bumper-bar or door-sill. In addition, the 4WD is likely to be heavier and much stiffer as it is commonly built on the chassis of a light truck designed to carry heavy loads. These factors will cause the 4WD to penetrate further into the other vehicle.

Both Australian and USA data suggest that risk of a car occupant fatality in a collision with a 4WD is several times higher than in a collision with a large passenger car. The Australian Transport Safety Bureau report that 4WD occupants accounted for 18 per cent of fatalities in 4WD crashes in 1998 that involved multiple vehicles <http://www.atsb.gov.au/road/mgraph/mgraph11/mono11.pdf>. Passenger car occupants accounted for the largest proportion of fatalities (64 per cent) and pedestrians, cyclists and motorcyclists accounted for 15 per cent.

In 1998, per kilometre travelled, 4WDs were involved in 20 per cent more fatal accidents than passenger cars and 50 per cent more fatal accidents than trucks under 4.5 tonne gross vehicle mass. However, the extent to which this higher fatality rate might be due to the design of the larger 4WDs is not clear. Almost 70 per cent of 4WD crashes occurred in rural areas where road speeds tend to be higher and road quality lower.

While a more homogenous fleet is generally a safer fleet, vehicle diversity provides substantial economic benefits from better matching vehicle characteristic to the demands of motorists.

With regard to greenhouse gas emissions, the trend to 4WDs is likely to increase greenhouse gas emissions. The average fuel economy of 4WDs sold in 2001 was almost 30 per cent worse than the average for all light vehicles sold. However, there are considerable differences in the fuel economy of vehicles within the 4WD and car categories.

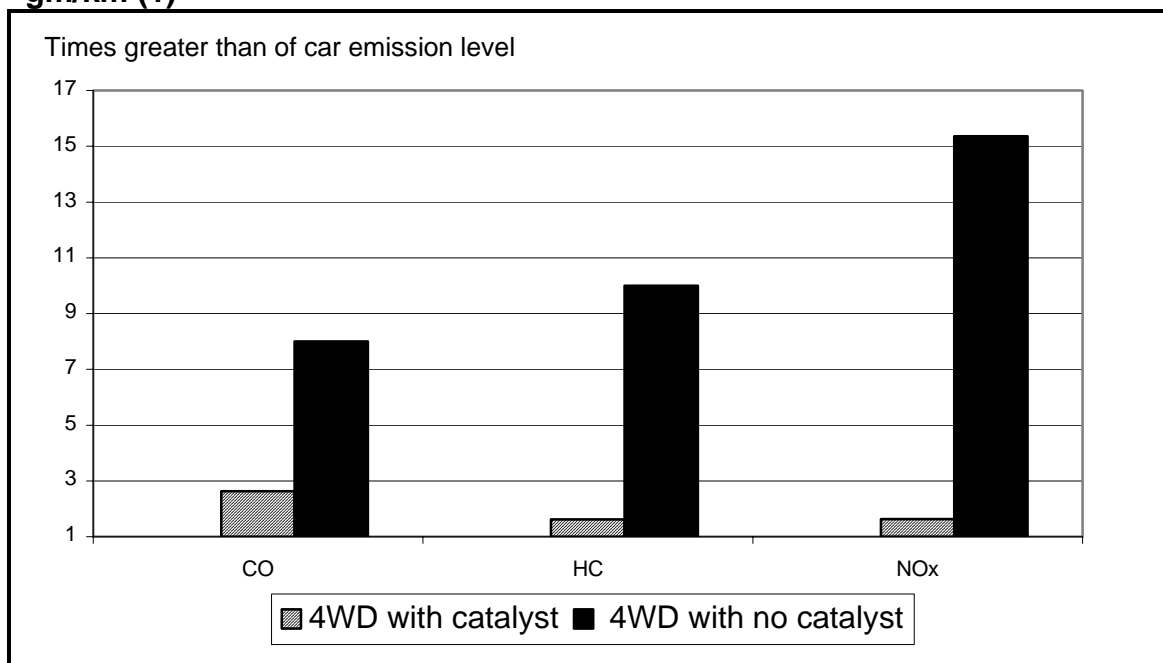
A shift towards the use of 4WDs in urban areas is likely to have adverse impacts on urban air quality. Under current emission standards, 4WDs above 2.7 tonnes are required to meet considerably less stringent emission limits than passenger cars. Only one of the nine top selling 4WDs is required to meet passenger car emission standards. DOTARS understands that broad differences in emission limits between cars, 4WDs and trucks reflects the outcome of an international negotiation process between

¹ Monash University Accident Research Centre, 2000, *Vehicle crashworthiness and aggressivity ratings and crashworthiness by year of manufacture: Victoria and NSW crashes during 1987-98, Queensland crashes during 1991-98*, Report No. 171, July

governments and industry that takes into account the costs of meeting these standards and the potential emission benefits.

Some 4WDs are sold with emissions reduction catalysts that significantly improve their emissions. However, such catalysts are generally not required to meet current 4WD emission standards. Reflecting their less stringent emission limits, recent testing indicates that emissions from 4WDs are significantly higher than emissions from passenger cars — and can be 8 to 15 times higher if catalysts are not used (Figure 7).

Figure 7: Comparison of emission levels from 4WDs and passenger cars, gm/km (1)



(1) Averages of emission test results of a sample of vehicles that met current new vehicle emission standards (ADR37/01 for passenger cars and ADR36/00 for 4WDs).

Source: DOTARS 2001, Comparative Vehicle Emissions Study, March.

Under the ADRs to apply from 2005, the emission limits for 4WDs and LCVs will be considerably strengthened. Nevertheless, 4WDs will still be allowed to meet emission limits typically 30-50 per cent higher than those for a standard passenger car.

DOTARS considers that any assistance regime for the automotive industry should not provide an incentive for consumers to choose one vehicle type over another. It acknowledges that the scheduled reduction in the passenger vehicle tariff to 10 per cent in 2005 will substantially reduce the current incentive provided by the tariff for the purchase of 4WDs.

DOTARS does not favour increasing the tariff on 4WDs to the passenger car level. This would increase transport costs and would be a blunt tool for addressing urban air quality and road safety objectives, particularly given the significant use of 4WDs off-road.

DOTARS favours achieving a common tariff on cars and 4WDs by reducing the tariff on cars.

- **If existing local industry subsidies for production, investment and R&D are to be maintained, should they be linked to other objectives such as reduced emissions and regional development?**

DOTARS considers that as more conditions are placed on local industry subsidies, the greater the subsidy required to provide the same level of industry assistance. The issue that needs to be considered, therefore, is whether the additional subsidy required could be better used in other ways to achieve reduced emissions, regional development or other objectives.

The Government's goals and priorities for developing Australia's regions over the next decade are outlined in its regional policy statement, *Stronger Regions, A Stronger Australia* <http://www.dotars.gov.au/regional/statement/contents.htm>. Central to the Government's approach is a partnership between Government and communities which fosters the development of self-reliant regions, and which takes a planned, cooperative approach to dealing with the social and economic impacts of structural change. In general, the Government looks to communities themselves to identify and work to realise the potential of their regions. For its part, the Government will support them by providing the right environment for economic growth — and the right building blocks. This includes transport and telecommunications infrastructure, education, health and other essential services and quality information. Broad based industry assistance is generally too blunt to be a cost effective regional support tool.

Similarly, proposals to subsidise the development, investment and production of low emission vehicles need to be assessed against other means of reducing transport emissions. Previous BTRE research has found large differences in the cost effectiveness of commonly proposed transport measures to reduce greenhouse gas emissions². This demonstrates the need to consider proposals on their merits and to resist the urge to use all means available to reduce emissions regardless of their cost.

5.2 Road safety and environmental requirements

- **In what circumstances, if any, should ADRs depart from international standards?**

The Government's policy is to harmonise our vehicle standards with international standards — as indicated by the UNECE Regulations — wherever possible. As outlined in section 4, current ADRs are already significantly aligned to international standards and the current ADR review should result in even greater harmonisation.

As automotive manufacturing is typically a high volume business, the costs of developing and producing vehicles to meet unique standards can be prohibitive. While accepting that departures from international standards can make it more difficult for local manufacturers to compete on world markets, the costs of departing from international standards may sometimes be justified by associated safety benefits.

There has been little support in the current review of the ADRs for the removal of Australian specific ADRs relating to child restraint anchorages, occupant protection in buses and full frontal occupant protection in passenger cars.

- **When should emission standards for light vehicles be brought more into line with 'Euro' standards?**

² BTE 1996, *Transport and Greenhouse, Costs and options for reducing emissions*, Report 64.

There has been a long-standing practice in Australia to significantly lag overseas countries in the adoption of emission standards for new vehicles. Frequently this has been on the basis of the local industry's limited capacity to meet the technological demands of more stringent emission standards.

The *Measures for a Better Environment* (MBE) agreement established a timetable designed to bring new vehicle emission standards more into line with international standards — commonly referred to as the *Euro* emission standards.

It was agreed that diesel vehicles — all of which are imported — will be required to meet the *Euro 4* emission standards in 2006, just one year later than in Europe. By contrast, a much slower timetable was agreed for the adoption of *Euro* emission standards for new petrol vehicles. The MBE agreement stated that:

The timetable for the introduction of Euro 2 needs to allow domestic vehicle manufacturers sufficient lead-time to source new engine technology. The Government is satisfied that the timetable set out above can be achieved without disrupting the domestic industry.

The *Euro 2* standards for petrol vehicles were introduced in Europe in 1996, but will not be applied in Australia until 2003. Similarly, the most advanced standards to which Australia has committed for petrol vehicles are the *Euro 3* emission standards. The application date for *Euro 3* is 2005, some 5 years after its adoption in Europe.

A timetable for the *Euro 4* emission standards for petrol vehicles, which will apply in Europe from 2005, has not yet been agreed. A review is soon to commence to consider the possible timing for these standards.

DOTARS acknowledges the significant investment required by the local automotive manufacturing industry to meet more stringent emission standards. However the question arises as to whether it is preferable to provide some form of direct support to the industry to enable it to meet these standards more quickly rather than to delay them and the resultant health benefits for the community.

- **Is there a case to strengthen the current approach to achieving National Average Fuel Consumption (NAFC) targets?**

On average, vehicles in Australia have worse fuel economy than in many other countries. However, this tends to be due to Australian preferences for larger vehicles rather than a significantly worse fuel economy of Australian-made vehicles relative to their imported competitors (Figure 8).

As part of its 1998 National Greenhouse Strategy, the Commonwealth undertook to negotiate with the automotive industry to secure a 15 per cent improvement in the National Average Fuel Consumption (NAFC) for new passenger motor vehicles by 2010. This represents a reduction from about 8 litres per 100 km to about 6.3 litres per 100 km. It was also agreed that the NAFC framework would be extended to include LCVs and 4WDs to 3.5 tonnes.

As the NAFC targets are essentially voluntary, there is little financial motivation for the automotive industry to achieve fuel efficiency levels beyond that which reflects the demands of consumers.

A number of countries have adopted or considered policies aimed at increasing the fuel efficiency of new vehicles through regulation or by providing financial incentives or

penalties. The NSW Government is currently developing more favourable stamp duty rates for lower emission vehicles. Probably the most well known measure is the Corporate Average Fuel Efficiency (CAFE) scheme that was introduced in the USA in 1975. While CAFE was originally aimed at reducing reliance on imported oil, its emphasis has shifted in recent years to environmental objectives relating to vehicle emissions. A detailed description of these policies is provided in a soon to be released BTRE report, *Transport and Greenhouse Options* <http://www.btre/btre/recent.htm#Top>.

Figure 8: Fuel efficiency of Australian-made and roughly comparable imported cars

Imported	L/100km City Cycle	L/100km Hwy Cycle	Australian made	L/100km City Cycle	L/100k m Hwy Cycle
Honda Accord V6, 3.0L	11.5	8.5	Holden VX Commodore Exec 3.8L	11	6.6
Hyundai Sonata EF, 2.5L	9.5	6.4	Ford AUII Falcon Forte 4.0L	11.5	6.8
Mazda 626, 2.0L	9.5	7.4	Mitsubishi Magna Exec, TJ 3.0L	10	6.4
Volkswagon Passat V6, 2.8L	11	6.4	Toyota Camry, 3.0L	11	6.8
Nissan Maxima (Man) 3.0L	11	7.2	Toyota Avalon, 3.0L	11.5	6.8
Kia Optima, 2.5L	11.5	7.2			
Ford HE Mondeo Ghia, 2.0L	11	6.6			

Source: Australian Greenhouse Office, 2001, Fuel Consumption Guide

CAFE standards currently require companies to maintain the average fuel efficiency of new vehicles at 27.5 miles per gallon (8.5 litres per 100km) for cars and 20.5 miles per gallon (11.5 litres per 100km) for light trucks. Light trucks include passenger vans, utilities and sport-utility vehicles — known in Australia as 4WDs. Car manufacturers have not always met the standards and, in 1998, paid over \$US55m in fines for failing to comply for passenger cars.

A recent review of the effectiveness and impact of the CAFE system concluded that it had contributed to the increased fuel economy of the nation's light-duty vehicle fleet during the past 22 years. However, it was unclear about the significance of this contribution compared with other factors, and particularly higher fuel prices.

DOTARS has a number of concerns with policies, such as CAFE, that directly regulate or provide financial incentives or penalties that target fuel-efficient vehicles as a greenhouse measure. Many of these concerns can be illustrated by the experience of the CAFE system.

- Targeting fuel use is a far more direct approach to address greenhouse gas emissions than targeting vehicle standards. Fuel use is also affected by such factors as the distance a vehicle travels, the manner under which it is driven, and the road conditions it encounters. As mentioned earlier, even the most fuel-efficient vehicle performs poorly when it is stuck in congested traffic. While such policies may result in greater sales of more fuel-efficient vehicles, they may not result in less fuel use. For example, motor vehicle ownership may increase because the price of small vehicles is reduced to meet the required fleet average or owners of more fuel efficient vehicles may decide to travel more in response to resultant lower running costs. The risk of policies that do not target objectives directly is further illustrated by the CAFE experience. Because fuel economy for CAFE purposes is calculated

per litre of *petrol*, manufacturers produced large numbers of vehicles able to run an 85% ethanol-petrol blend — even though these vehicles were never expected to have access to this fuel once they were sold and were always expected to run on straight petrol.

- Such policies can impose costs of the economy by distorting the vehicle mix away from the demands of consumers — though these costs are often less transparent than those that result from higher tariffs. These costs need to be assessed against other options for reducing greenhouse gas emissions if least cost greenhouse abatement is to be achieved. The need to compare the cost effectiveness of policies that target vehicle fuel efficiency with other non transport options is particularly important given the inelastic nature of road transport demand and the existing strong additional incentive for motorists to conserve fuel provided by the current fuel excise arrangements.
- Encouraging smaller, more fuel-efficient vehicles can be at the expense of safety. As noted in the BTRE report, one review of the CAFE system concluded that the ‘downweighting’ and downsizing that occurred in the late 1970s and early 1980s in the USA, some of which was due to CAFE, probably resulted in an additional 1,300 to 2,600 traffic fatalities in 1993.