

ATTACHMENT A - COMPARATIVE ASSESSMENT OF CURRENT AND PROPOSED STANDARDS

Light Duty Vehicles

Comparison of Current Standards with *Euro 2* and *Euro 3* Requirements

The attached Tables summarise the differences in emission limits, test procedures and other requirements of the *Euro 2* and *Euro 3* standards, with the current ADR provisions for "light duty vehicles".

Currently the relevant ADRs dealing with emissions from light duty vehicles (includes cars, 4WDs and light commercials) are:

- **ADR37/01** (petrol engined vehicles \leq 2.7 tonnes gross vehicle mass [GVM])
- **ADR36/00** (petrol engined vehicles $>$ 2.7 t GVM, includes some vehicles treated by UN ECE system as light duty *ie* £3.5t)
- **ADR70/00** (all diesel engined vehicles).

Table A1 - Emissions Requirements for Cars

Standard & Date of Application at Source	Absolute Emission Limits (g/km)					Emissions Test		Other Requirements
	CO	HC	NOx	PM ²	Evap			
	Cars < 2.5t ¹					Exhaust	Evaporative	
<i>ADR37/01</i> (1997-9)	2.1	0.26	0.63	NA	2	US EPA Federal Test Procedure (FTP) from 1975	US EPA 2 hr "SHED" ³ Test from 1975	80,000km durability requirement.
<i>Euro 2</i> ⁴ (1996)	2.2	0.28	0.22	0.08	2	Comparative testing on FTP & Euro cycles indicates mixed results on CO, E2 tougher on HC for most vehicles, and E2 much tougher on NOx for locally produced US based engines.	Equivalent to ADR37/01	80,000km durability requirement.
<i>Euro 3</i> (2000)	2.3	0.2	0.15	0.05	2	E3 test more stringent than E2 as sampling starts from ignition (40s delay in E2). Comparative testing on E2 and E3 cycles indicates it makes CO and HC emission limits harder to meet, variable impact on NOx. ACEA ⁵ claim E3 leads to effective reduction in CO, HC and NOx emission limits of 30%, 40% & 40% respectively.	Significantly more stringent test with canister loading and conducted over 24 hrs. ACEA estimates equate to an 80% increase in stringency on the E2 limits.	80,000km durability requirement. OBD ⁶ requirement (initially for petrol vehicles only, phased in for diesels over 2003-2006) Separate -7°C emissions test for HC & CO emissions (from 2002)

¹ More relaxed limits apply for vehicles greater than 2.5t and less than 3.5t, see separate table.

² Diesel vehicles only

³ Sealed Housing Evaporative Determination.

⁴ For *Euro 2* there is a combined limit for HC+NOx, split figures assume a ratio of 55:45 (HC:NOx)

⁵ European Automobile Manufacturers Association (ACEA)

⁶ On Board Diagnostics.

Table A2 - Emissions Requirements for 4WDs and Light Commercial Vehicles (LCVs)

Standard	Emission Limits (g/km - unless otherwise specified)
	Cars > 2.5t & LCVs - up to max 3.5t (Euro & ADR70/00) 4WDs and LCVs ≤ 2.7t (ADR37/01) 4WDs & LCVs > 2.7t (ADR36/00)

	CO	HC + NOx	HC	NOx	PM	Evap
ADR37/01	6.2	NA	0.5	1.4	NA	2
ADR36/00	1% by vol	NA	180ppm	NA	NA	NA
ADR70/00*	58-110g/test**	19-28g/test**	NA	NA	NA	2
<i>Euro 2</i> **						
Petrol	2.2 or 4.0 or 5.0	0.5 or 0.6 or 0.7	NA	NA	NA	2
Diesel	1.0 or 1.25 or 1.5	0.7 or 1.0 or 1.2	NA	NA	0.08 or 0.12 or 0.17	NA
<i>Euro 3</i> **						
Petrol	2.3 or 4.17 or 5.2	NA	0.2 or 0.25 or 0.29	0.15 or 0.18 or 0.21	NA	2
Diesel	0.64 or 0.8 or 0.95	0.56 or 0.72 or 0.86	NA	0.5 or 0.65 or 0.78	0.05 or 0.07 or 0.1	NA

* Diesel vehicles only, *Euro 1* requirements.

** Limits depend on the mass of the vehicle.

*** For *Euro 1* and *Euro 2* there is a combined regulated limit for HC+NOx, EU assume a ratio of 55:45 (HC: NOx)

Key conclusion on Petrol Engine 4WDs and LCVs

While the above picture is complex, *Euro 2* provides significant improvements over current standards for 4WDs and LCVs because:

- All vehicles ≤ 3.5 t GVM subject to same emissions test as cars (currently vehicles > 2.7 t are only required to be tested under ADR36/00, which is a much simpler test than ADR37/01)
- E2 Emission limits (particularly NOx) are tighter than ADR37/01 and ADR70/00, even the most lenient ones
- E2 sets limits on NOx for those vehicles currently exempt from any NOx requirement under ADR36/00
- E2 sets limits on PM for those vehicles currently exempt from any PM requirement under ADR70/00

Heavy Duty Vehicles

Comparison of Current Standards with *Euro 2* and *Euro 3* Requirements

The attached Table summarises the differences in emission limits, test procedures and other requirements of the *Euro 2* and *Euro 3* standards, with the current ADR provisions for “heavy duty vehicles”. The comparability of the US EPA’s heavy duty standards is also covered.

Currently the relevant ADRs dealing with emissions from heavy duty vehicles (includes trucks and buses) are:

- **ADR36/00** (petrol engined vehicles > 2.7 tonnes gross vehicle mass [GVM])
- **ADR70/00** (all diesel engined vehicles).

Table A3 – Emission Requirements for Heavy Duty Vehicles

Standard & Date of Application at Source	Absolute Emission Limits (g/kWh) (unless otherwise specified)				Emissions Test	Other Comments
	CO	HC	NOx	PM		
<i>ADR36/00 (petrol)</i> (1979) <i>ADR70/00 (diesel)</i> ⁷ (1995-6)	1% by vol 4.5	180ppm 1.1	NA 8.0	NA 0.36	9 mode steady state engine dynamometer test 13 mode steady state engine dynamometer test	ADR36 reflects 1974 US EPA standards for heavy duty petrol engines. US EPA 91 diesel limits at least as stringent as <i>Euro 1</i> , although US uses transient test, so not directly comparable
<i>Euro 2</i> (1996-1998)	4.0	1.1	7.0	0.15 ⁸	13 mode steady state engine dynamometer test	ECE/EU has no standards for heavy duty petrol engines (>3.5t). US EPA 94 diesel limits at least as stringent as <i>Euro 2</i> , but derived from US transient test so not directly comparable.
<i>Euro 3</i> (2000) <i>ESC Limit</i> <i>ETC Limit</i>	2.1 5.45	0.66 0.78 ⁹	5.0 5.0	0.10 ¹⁰ 0.16 ¹¹	Manufacturers have choice of 2 new test cycles ¹² : Euro Stationary Cycle (ESC); or Euro Transient Cycle (ETC)	US EPA 98 diesel limits similar to <i>Euro 3</i> but derived from US transient test, so not directly comparable. US expected to adopt Euro Stationary Cycle as additional requirement to the transient test sometime in 1999.

⁷ ADR70/00 allows compliance with ECE/EU standards, US EPA and Japanese Standards, the ECE (*Euro 1*) limits are used here as the basis for comparison.

⁸ Original *Euro 2* limit for PM was 0.25, which was reduced to 0.15 in 1998.

⁹ non-methane hydrocarbons

¹⁰ smaller engines are subject to more relaxed PM limits of 0.13 (ESC)

¹¹ Smaller engines are subject to more relaxed PM limits of 0.21 (ETC).

¹² *Euro 4* will require both tests to be met.

ATTACHMENT B - DESCRIPTION OF OPTIONS

Option 2A - Adopt *Euro 2* in 2002

Vehicles

- Amend ADR37/01 as soon as possible to incorporate UN ECE R83/03 (*Euro 2* and *Euro 3* levels) as an alternative standard
- *Euro 2* by 2002 for new models, 2003 for all models
- *US94* HDV standards accepted as an alternative for HDVs (petrol and diesel above 3.5 tonnes)
- Smoke standards in ECE 24/03 apply to diesels, with *US 94* smoke standards accepted as alternative for HDVs over 3.5 tonnes
- Emissions standards apply to all vehicles operating on all fuels nominated – currently petrol, diesel, LPG and NG
- Acceptance of later versions of the nominated standards, provided they are demonstrated to be no less stringent than the version specified in the ADR

Fuel

- Reduction of the sulfur content of fuel to 0.05%

Option 2B - Adopt *Euro 2* in 2002, followed by *Euro 3* in 2006

Vehicles

- Amend ADR37/01 as soon as possible to incorporate UN ECE R83/03 (*Euro 2* and *Euro 3* levels) as an alternative standard

From 2002

- *Euro 2* by 2002 for new models, 2003 for all models
- *US 94* HDV standards accepted as an alternative for HDVs (petrol and diesel above 3.5 tonnes)
- Smoke standards in *ECE 24/03* apply to diesels, with *US 94* smoke standards accepted as alternative for HDVs over 3.5 tonnes
- Emissions standards apply to all vehicles operating on all fuels nominated – currently petrol, diesel, LPG and NG
- Acceptance of later versions of the nominated standards, provided they are demonstrated to be no less stringent than the version specified in the ADR.

From 2005

- *Euro 3* by 2005 for new models, 2006 for all models
- *US 98* HDV standards accepted as an alternative for HDVs (petrol and diesel above 3.5 tonnes)
- Smoke standards in ECE 24/03 apply to diesels, with *US 98* smoke standards accepted as alternative for HDVs over 3.5 tonnes
- Emissions standards apply to all vehicles operating on all fuels nominated – currently petrol, diesel, LPG and NG
- Acceptance of later versions of the nominated standards, provided they are demonstrated to be no less stringent than the version specified in the ADR.

Fuel

From 2002

- Reduction of the sulfur content of diesel fuel to 0.05%

From 2005

- Changes to fuel parameters based on the outcomes of the Fuel Quality Review and discussions with industry

Option 2C - Adopt Euro 3 in 2002

Vehicles

- Amend ADR37/01 as soon as possible to incorporate UN ECE R83/03 (*Euro 2* and *Euro 3* levels) as an alternative standard
- *Euro 3* by 2002 for new models, 2003 for all models
- *US 98* HDV standards accepted as an alternative for HDVs (petrol and diesel above 3.5 tonnes)
- Smoke standards in ECE 24/03 apply to diesels, with *US 98* smoke standards accepted as alternative for HDVs over 3.5 tonnes
- Emissions standards apply to all vehicles operating on all fuels nominated – currently petrol, diesel, LPG and NG
- Acceptance of later versions of the nominated standards, provided they are demonstrated to be no less stringent than the version specified in the ADR.

Fuel

- Reduction of the sulfur content of diesel fuel at least to 0.05%, possibly lower
- Other changes to fuel parameters may also be required (need to base on the outcomes of the Fuel Quality Review (2000))

ATTACHMENT E - SUMMARY OF PUBLIC COMMENT

The attached is a summary of the key points raised in each submission received on the MVEC Review of Australia's Vehicle Emissions Standards.

Respondent	Comment
1. School of Chemistry Macquarie University	<ul style="list-style-type: none"> • Support the adoption of Euro 3 standards in lieu of Euro 2. • Concern that Euro 3 and Euro 4 standards may lead to many vehicle manufacturers importing only PULP vehicles, which has some greenhouse implications. • Sulfur content needs to be reduced to allow use of catalytic converters on diesel vehicles.
2. Australian Automobile Association (AAA)	<ul style="list-style-type: none"> • No option but to adopt Euro 3 standards under GATT/WTO obligations and APEC. • Adopt Euro 3 in lieu of Euro 2 as manufacturers would not wish to have two (delayed) standards – only phase with the rest of the world.
3. Department of Environmental Protection, WA	<ul style="list-style-type: none"> • Support the adoption of Euro 3 standards by 2005/6 in lieu of Euro 2. • Recommendations are incompatible with Government policy commitments to implement an Automotive Industry Environmental Strategy. One element of which is “harmonised noxious emissions standards with International standards by 2006”. • Global climate change and air toxics issues ignored. No consideration of the role of motor vehicles in the emissions of greenhouse gases (carbon dioxide, methane and nitrous oxide) and of air toxics, in particular benzene, toluene, 1,3-butadiene and polycyclic aromatic hydrocarbons. • Review is deficient in not assessing the costs and benefits of complying with Euro 3. This should be undertaken as soon as possible and published as an addendum to the Review. • Adoption of Euro 2 will not meet the Federal Government commitment of harmonisation with UN ECE standards by 2006. Application of Euro 2 standards to new models in 2002 will be six years after Europe and all models in 2003 would be 7 years after Europe. This would allow for the potential for dumping vehicles meeting lesser performance standards on the Australian market. • Strongly support the proposal to include all petrol vehicles up to 3.5 tonnes in the revised design rule. • The issue of test fuel specification is not included. The quite significant differences between test fuel and commercially available and commonly used fuel should be addressed, with a view to ensuring a test fuel that resembles as closely as possible commonly used fuel.
4. Ferrari	<ul style="list-style-type: none"> • Strongly support International harmonisation of regulations. • Support the adoption of Euro 3 standards. Would also be useful for low volume operators to adopt an alternative like the USA Tier 1.
5. A J Smith	<ul style="list-style-type: none"> • If any change to the RON is envisaged then a review of the capabilities of Australian Refineries to meet the proposed RON should be conducted. • Need to focus on inspection and maintenance, in particular catalyst deterioration which is one of the contributors to emissions. • Rather than harmonise with Europe, should attack the obvious sources of the problems, ie evaporative emissions and in particular volatility and catalyst deterioration. • MVEC should canvass the option of requiring all light duty city trucks and buses to use gaseous fuels. • MVEC on the basis of the report, has not justified the move to new standards, this is especially so as the air quality data does not support the change. • Until the comparison data between the relevant standards has been produced and evaluated it does no credit to MVEC to present recommendations for passenger cars.

Respondent	Comment
6. Nissan Motor Company	<ul style="list-style-type: none"> • Agree to the introduction of more stringent emission requirements if such a decision has been made as a result of sufficient study including the consideration of other methods (developing inspection and maintenance system for in-use vehicles, or any political methods for encouraging the scrapping of old vehicles), evaluation of costs and benefits, and if it would be proceeded with enough lead time and appropriate change on fuel properties. • Strongly believe Australia should increase the octane number (harmonise its level to Europe – 95RON) in commercial fuel in order to maintain the vehicle performance which meet the Euro 2 requirement. • Cannot decide the necessity of adopting Euro 3 standards without considering the result of air quality improvement based on the introduction of Euro 2.
7. Denso Manufacturing Australia Pty Ltd	<ul style="list-style-type: none"> • Suggest that the benefit derived from the replacement of charcoal canisters would be substantially less than projected. The working capacity deterioration of charcoals used in canisters should typically be less than 20% during the vehicle life. • The performance of the charcoal canister can be adversely effected by some other service affects. Vehicle producers are aware of field service deterioration and make some provision for this in deciding the canister requirements. • Although regular replacement of charcoal canisters is an appealing concept, the environmental benefits are not expected to be substantial when applied to later model vehicles.
8. International Trucks Australia Limited	<ul style="list-style-type: none"> • Support Euro 3 and required fuel quality only if study demonstrated that it was technically and economically viable (given Australia’s high sulfur fuel) compared/balanced against a reduction in health costs.

Respondent	Comment
<p>9. Bus Industry Confederation</p>	<ul style="list-style-type: none"> • Euro 2 engines will be introduced into the Australian market before they are legally required to be introduced. (around 75% of new buses sold in Australia in 1999 will be equipped with Euro 2 engines). From the year 2000, Euro 3 engines will become the industry norm and advocates the mandatory introduction of Euro 3 engine standards in line with the proposed MVEC timetable • Supports the introduction of Euro 2 standards. However, the key parameter that influences whether in-service emissions from Euro 2 engines conform is the sulphur content of the diesel fuel. • Appropriate assistance should be provided to help the refineries met the cost of investing in desulphurisation units – by tax expenditure mechanisms such as accelerated depreciation or extension if the Infrastructure Borrowing’s Tax Offset Scheme to include this form of investment. Another possible incentive is to lower excise on low sulphur fuel. • CNG is not the only option for reduced emissions and might not be the best option when greenhouse gas emissions are taken into account. • At present a Euro 2 engine cost from \$2,000 to \$3,000 more than an Euro 1 engine. During the course of 1999, based on the fact that Euro 2 engines will be produced in higher numbers, it is envisaged that the cost difference between Euro 1 and Euro 2 engines will fall to zero. • Tentative estimates are that Euro 3 engines will cost between \$2,500 and \$3,500 more than Euro 2 engines. The cost is likely to decline over time as volumes increase through increased market penetration of Euro 3 engines. • Considerable debate regarding the cost of installing necessary desulphurisation facilities at Australian refineries. Refinery estimates put the figure in excess of \$1 billion. Based on overseas evidence the costs of installing desulphurisation units was \$15 million per refinery in Canada with increased operating costs of around \$1.8 million per year. MVEC paper estimates the cost at around \$30 million per refinery with increased operating costs of around \$2 million per year. Assuming that six of the eight Australian refineries need to upgrade their facilities this would imply an investment cost at around \$180 million. • CNG engines are about 20% less fuel efficient than their diesel counterparts. A CNG bus would be approximately 15% more expensive than the equivalent diesel bus, and maintenance costs can be up to 5% higher for CNG buses. There are insufficient outlet to fuel CNG vehicles. • Although the emissions of some gases from diesel buses are higher than from CNG busses, clean diesel engines (Euro 2 engines) also have low emission when operating on low sulphur fuels. With regard to green house emissions, diesel appears to be superior to CNG in terms of carbon dioxide emissions for the same transport task, and when assessed on a life cycle basis.
<p>10. Australian Automotive Aftermarket Association Ltd</p>	<ul style="list-style-type: none"> • Agree to Euro 2 from 2002/3; do not support Euro 3. • Agree with tighter vehicle emissions, not fuel parameters. • The existing fleet should be tested annually for compliance with their relevant emission ADRs.

Respondent	Comment
11. Queensland Conservation Council	<ul style="list-style-type: none"> • There is little point in passing new exhaust emission standards for petrol and diesel engines if there is no credible level of in-service testing to ensure those standards are adhered to. • MVEC should revisit the option of following the US EPA's lead. Heavy diesels could readily comply with Euro3/EPA1999 or 2002. Australia could be in line with the US EPA standards by the time EPA 2004 is in place. • Supportive of options linking fuel and registration costs to improvements in emissions. • Supportive of measures to increase the proportion of the vehicle fleet, especially the heavy or freight vehicle component, utilising CNG and LPG. • Australian emission standards should incorporate fuel specifications as is the case in European and US emission standards • Need to accelerate the lowering of diesel fuel sulphur content to .05 or lower urgently. • Document fails to propose full adoption and implementation of EPA98 immediately, implementation of Euro 2 immediately and short term transition to Euro 3 standards as options. • Process of ongoing review of Australia's standards to keep us in line with international standards is crucial.
12. Department of Transport – Queensland	<ul style="list-style-type: none"> • Euro 2 emission standards are the logical next step in harmonising Australia standards with the international market. • Fuel with volatility greater than ADR test fuel has been shown to significantly lower the in-service performance of vehicle evaporative control systems. • Review has not provided sufficient information regarding fuel quality on which to confidently support the introduction of Euro 3 standards. • Given the time taken to conduct reviews, reach agreement and allow manufacturers time to comply, it would seem logical to not only review Euro 3 standards but Euro 4 as well. • If review Euro 4 now, it should be possible to introduce Euro 4 in Australia at the same time as overseas, by-passing Euro 3 altogether. This would achieve true international harmonisation of introduction dates as well as standards.
13. Department of Transport WA	<ul style="list-style-type: none"> • Euro 2 should be adopted immediately. Euro 3 should be adopted as soon as possible ie 2002/3. • The introduction of Euro 2 engines into Australia will provide added leverage to seek the full specifications that these engines require.
14. Australian Institute of Petroleum	<ul style="list-style-type: none"> • The implementation date for new emission standards should be based on the requirements of future air quality, and the practical investment schedules of both the auto and oil industries. • Review should incorporate the results of airshed modelling out to 2020. • Premature to make decisions on vehicle emission standards which have fuel quality impacts, before the fuel quality impacts have been fully assessed. Formally incorporate the review of Fuel Quality Requirements into the Review as the source of fuel related cost and impact data. • Set the date of introduction of the proposed standards on the basis of demonstrated need in the most critical airshed. Work backwards from that date to set timetables for auto and oil industry activities. • Consider all likely changes to petrol properties, not just RON, and in a timeframe out to 2020. Utilise the review of Fuel Quality Requirements for this purpose. • Implement a test program to determine whether 95 RON is really needed for maintaining the emissions performance of Euro 2 vehicles • Carry out scenario planning, airshed modelling and refinery investment analysis in connection with Euro 3 and Euro 4 before making any decisions on Euro 2, especially on the timing of implementation of Euro 2. • Do not introduce petrol volatility reduction as an alternative to the proper maintenance and performance of a component of existing and future vehicle emission control systems. Petrol volatility reduction should be considered on a stand-alone basis.

Respondent	Comment
15. Caltex Australia Limited	<ul style="list-style-type: none"> • Agree to adopt Euro 2 standards, however timing should be determined following consultation with stakeholders. Do not support Euro 3 at this time. • It will not be possible to make any recommendations on future fuel quality requirements until after the findings of the Transport Fuels Study are available. • UN ECE standards could pose problems if these standards are designed to solve European air quality problems, which are different to the problems encountered in Australia, either for climatic or geographic reasons. • Need clarification of what is meant by harmonising with UN ECE standards. If it means that Australia would adopt European standards as soon as they are implemented in Europe, this could see Australia industry forced into investments, which yield little local environmental benefits.
16. Royal Automobile Club of Victoria (RACV)	<ul style="list-style-type: none"> • Supports harmonisation with UN ECE • Supports the reduction of the volatility of petrol provided that the reduced volatility does not have a detrimental effect on the driveability of existing vehicles in certain climate regions and that any associated impacts on petrol prices are minimised. • Commercial grade petrol should have the same octane specification as test fuel. • Introduction of lower sulfur content diesel fuel should be timed to minimise the impact on the local refinery industry in order to ensure that there are minimal impacts on petrol prices. • Do not support Euro 3, as further work is needed to assess the benefits and costs of such a proposal. The initial objective should be to ensure that the adoption of UN ECE Euro 2 delivers the anticipated emission benefits.
17. Col Potts Engineering	<ul style="list-style-type: none"> • Agree with summary of recommendations 6.2 of report • Projected diesel emissions can only be reached if higher standard diesel fuel is available. • For optimum performance and to minimise emissions, oils should meet engine manufactures specifications
18. Toyota Motor Corporation Australia Ltd	<ul style="list-style-type: none"> • Supports the thrust of response provided by the FCAI, particularly in regard to the vital importance of fuel quality and pricing on the success of future emissions standards. • Endorse Euro 2 subject to supporting conditions identified by the FCAI.
19. The Royal Automobile Club of Queensland Ltd	<ul style="list-style-type: none"> • Supports the introduction of Euro 2 standards from 2002/3 and Euro 3 some time thereafter, say five years. • Tightening of emissions standards should be carried out according to a widely published plan in respect of the emission levels, the timings and fuel parameters • Support alignment with UN/ECE standards • Ensure fuel standards move in line with emission standards. Commercial fuels should meet the specifications of the standard test fuel. • Support on-board diagnostic system (that is guaranteed for the life of the vehicle) to warn of the failure of any part of the emission control system.
20. Detroit Diesel-Allison Australia	<ul style="list-style-type: none"> • Disagree with the adoption of Euro 2 standards, support adoption of alternative US EPA 1994 standards. • Do not support the adoption of Euro 3 standards without full cost and benefit assessment.

Respondent	Comment
<p>21. Federal Chamber of Automotive Industries</p>	<ul style="list-style-type: none"> • Supports progressive tightening of emission standards and harmonisation with ECE standards. Proposes the Euro 2 standards become effective from 2003 for new models, and 2005 for existing models, subject to: <ul style="list-style-type: none"> • Ensuring that suitable fuel qualities are widely available at a competitive price • Assuring a minimum of 2 years leadtime from rule gazettal for new models • US94 and Japan 98 standards be allowable alternative standards for heavy duty diesel vehicles • EEC certificates be accepted for compliance, as the test procedure is the same as UN ECE. • Acceptance of certification of vehicles on 95RON test fuel. • Support adoption of Euro 3 standards after an appropriate lead time to develop supporting infrastructure for both OBD systems service and provision of a high quality fuel supply to the market. (market place fuel quality to be the same as specified by the emission regulation ie World Fuel Charter, category 3, the same as regulated in Europe). • Adoption of Euro 3 following a comprehensive evaluation which demonstrates the need for such a standard • Essential to modify fuel specification and improve fuel quality not only in terms of reducing fuel volatility and diesel sulfur content, but also ULP octane increase and ULP reduced sulfur levels.
<p>22. Dr Sue Graham-Taylor, on behalf of the National Environmental Consultative Forum</p>	<ul style="list-style-type: none"> • Adopt UN ECE vehicle emission regulations as soon as possible. Adopt Euro 3 standards. • Review should also consider the problem of air toxics from motor vehicles and their fuels such as benzene, 1,3-butadiene, acetaldehyde and formaldehyde • Review should elaborate on the health effects of fine particles less than PM 2.5 in the summaries • Review fails to consider carbon dioxide emissions. Improving fuel consumption can reduce such emissions. Should consider tax incentives for low emission vehicles. • Support adopting Euro 3 standards (skip Euro 2) • If emission standards are to be met, fuel parameters need to be considered. • Should not be considering a 0.05% (500 ppm) standard for sulphur in diesel as it will be out of date by the time it is implemented. • Urge the establishment of emission standards for vehicles running on alternative fuels, in particular for LPG and natural gas, due to methane emissions.
<p>23. Department of Transport, WA</p>	<ul style="list-style-type: none"> • Support adoption of Euro 2, followed by Euro 3, depending on the outcomes of a detailed Australian costs benefit analysis • Develop and implement a policy offering incentives for the adoption of low polluting alternative fuels to encourage new Australian technologies, industries and innovations.

Respondent	Comment
24. Environment Protection Agency, SA	<ul style="list-style-type: none"> • Adopt Euro 2 for the commercial (diesel fuelled) portion of the fleet. Euro 2 for passenger vehicles is considered premature, insufficient information to determine if Euro 2 is the most cost-effective solution. • Main concern for the adoption of Euro 3 (as well as Euro 2) is the risk that 95 RON fuel may need to be introduced, and the associated risk of introducing more air toxics into urban airsheds. • Request that further analysis be undertaken on the impact on fuel consumption from the introduction of the proposed ECE/US standards – full assessment of the impact of proposed options on greenhouse gas. • Subject to the findings of the national fuel study, the move to reduce lower petrol volatility and lower sulphur content in diesel (to 0.05%) is considered beneficial • Strongly support the need to include a smoke emission requirement in the relevant ADR, as it supports in-service programs. • Concern that the proposed PM mass based emission standards for diesel vehicles may lead to an increase in the number of (very) fine particles. The health impacts should be assessed. • Support that the ADR should apply to all types of (alternative) fuels, and that the mass limit in ADR 37/01 should be increased to 3.5t.
25. Environment Victoria	<ul style="list-style-type: none"> • As Australia has signed an International treaty that requires us to adopt International standards by 2006, the paper should be largely about the process and timing of adopting the standards. • No point in adopting standards that have already been superseded in Europe and the USA • Would only support adoption of Euro2 and Euro 3 if they were part of a process to reach international standards by 2006. Such a process should involve stakeholder consultation. • Need in service monitoring. • National Environment Consultative Forum should be involved in the process of developing the formal response to the public comments.
26. Clean Air Society of Australia and New Zealand	<ul style="list-style-type: none"> • Basic agreement with the recommendations of the report, however, recommendations are not sufficiently far reaching. • Report lacked discussion of the role of diesel fine particulate emissions. In service diesel vehicles emit large numbers of particulates in submicron range, Euro standards will not address these emissions as the Euro standards are based on PM10 mass measurements.
27. Cummins	<ul style="list-style-type: none"> • Agree to the introduction of Euro 2 standards from 2002/3, with the stipulation of US EPA 1994 as an alternative. • Unable to agree to Euro 3 until a cost benefit assessment is undertaken.
28. Robert Bosch (Australia) Pty Ltd	<ul style="list-style-type: none"> • Agree to the adoption of Euro 2 standards in the quickest possible timeframe. • Euro 3 standards cost and benefits should be further investigated as any change in fuel specifications will have obvious wide-ranging economic benefits
29. Royal Automobile Club of WA (Inc)	<ul style="list-style-type: none"> • Agree to the adoption of Euro 2 standards from 2002/3. • Would support the adoption of Euro 3 standards provided that it shows a positive net benefit. Consideration needs to be given to the effect on new car prices. If there is an increase it will reduce the number of new cars purchased and prolong the life of older cars.

Respondent	Comment
30. Road Transport Forum	<ul style="list-style-type: none"> • Changes to vehicle emission and fuel parameters should be done in such a way not to impose significant costs or impediments upon the industry. • Degree of policy symmetry should be established linking vehicle emission standards and fuel parameters with other government policy instruments to provide incentives for industry to purchase new or upgrade equipment to meet government environmental objectives. • Adopt Euro 2 and USEPA94 standards introduced once fuel parameters have been resolved (from 2002/3) with Euro 3 standards then being considered in the context of a staged approach five years later. • Lowering sulphur content is likely to impose an extra fuel cost on industry as a result of extra refining processes. This should be considered when changing fuel parameters. • Standards for alternative fuels such as LPG and CNG should be aligned with UN/ECE and American standards • Introduce positive policy incentives to encourage industry to upgrade engines or purchase new vehicles in order to meet the new standards • Taxation strategies should be an integral part of broader environment and industry policy.
31. Department of Transport and Works, NT	<ul style="list-style-type: none"> • Support the adoption of Euro 2 , followed by Euro 3 if supported by cost benefit analysis • Document does not quantify the net costs for remote and rural areas, which are likely to come from increased fuel and vehicle costs <ul style="list-style-type: none"> • Vehicle equipment – additional equipment is likely to be required on each vehicle (\$300-650 per light vehicle and \$1000-1300 per light diesel vehicle. • Impact on fuel prices of the additional refinery capital costs or the possible need for refineries to use more crude oil and increase energy consumption in order to achieve higher quality fuels. • Remote and rural areas should be compensated for these increased costs as the tighter emission standards are primarily directed at solving problems associated with urban areas. • Decisions about future fuel standards should be delayed until the results of the Fuel Study are available. • Paper ignores the financial impact of the phase out of leaded super petrol on the owners of vehicles, which require this petrol. There are significant conversion / modification costs
32. People for Ecologically Sustainable Transport	<ul style="list-style-type: none"> • Support adoption of Euro 3 in 2002/3.
33. Land Transport Safety Authority, New Zealand	<ul style="list-style-type: none"> • Support the move towards UN-ECE as part of the move towards global harmonisation. • Would not impose any restrictions on vehicles coming from Australia and built to Euro 2 levels.
34. Pedal Power	<ul style="list-style-type: none"> • Concerned about the double standards between vehicles powered by petrol and vehicles powered by diesel. Standards for diesel should be the same as those for petrol. • Would like to see particulate emissions reduced.

Respondent	Comment
<p>35. Caterpillar of Australia Ltd</p>	<ul style="list-style-type: none"> • All Caterpillar engines supplied to Australia meet current US 98 standards. • Support the introduction of Euro 3/EPA 99 standards for the 300+ HP vehicles in 2002/3 and for vehicles with lower HP in 2005/6. • Euro 3 and US 99 test procedures for heavy vehicles are the closest match between US and EU heavy duty standards to date. • Adoption of latest standards will not necessarily increase costs, and will enable full advantage to be taken from progressive improvements in fuel quality. • Have been using engines designed for low sulphur on Australia's high sulfur fuels with no identifiable problems. • However, if Australia continues to use high sulphur fuels there is concern that modern oils (designed for use with low sulfur fuel) will not be able to provide the same level of protection.
<p>36. Australian Greenhouse Office</p>	<ul style="list-style-type: none"> • Supports the introduction of a new ADR for 'light duty' vehicles that adopts UN ECE R83/03 (Euro 2 level). • Need to ensure that this is implemented in a manner that will ensure that the following Commonwealth objectives are met: <ul style="list-style-type: none"> • Harmonising with international UN ECE vehicle emission standards by 2006 • Minimising the impact on the NAFC framework and system of targets; • Facilitating the introduction of a model specific labelling scheme as soon as possible ; • Minimising the need for motor vehicle industry to conduct more than one test procedure to meet vehicle emissions and greenhouse/fuel consumption data requirements. • The above objectives can be met provided that: <ul style="list-style-type: none"> • ADR37/01 is <u>not</u> amended to incorporate Euro 2 and Euro3 as alternatives standards as soon a possible (unless the comparative emissions test program being undertaken by FORS shows minimal or no difference in the fuel consumption results achieved using the AS 2877 and UN ECE test procedures); and • There is a single date for the Introduction of the proposed new ADR for all 'light duty' vehicles (rather than the two step introduction arrangement. • New passenger cars will achieve different fuel consumption figures when tested using the AS 2877 and UN ECE test procedures. Euro 2 should be implemented in such a way as to minimise the impact to a single discontinuity in the NAFC data set at an identified point in time. This will also be an issue for fuel consumption labelling. • The move to UN ECE Regulation 83 will encompass vehicles up to 3.5 tonnes which will facilitate the inclusion of LCVs and 4WDs between 2.7 and 3.5 tonnes in the NAFC framework. • Agrees that all vehicles within the scope of the ADRs should be required to meet the same emission standards, regardless of the fuel they are designed to operate on. • The test procedure remains an issue for the implementation of model specific labelling unless the comparative emissions test program being undertaken by FORS shows minimal or no difference in the fuel consumption results achieved using the AS 2877 and the UN ECE test procedures.
<p>37. Institute of Automotive Mechanical Engineers</p>	<ul style="list-style-type: none"> • Support adoption of Euro 2 standards from 2002/3.

Respondent	Comment
38. Department of Infrastructure, Energy and Resource, Tasmania	<ul style="list-style-type: none"> • Euro 2 standards are the most sensible option available and from 2002/3 will provide sufficient lead –time to allow industry to comply. • Unable to support Euro 3 without detailed cost benefit analysis
39. VicRoads	<ul style="list-style-type: none"> • Support in principle the adoption of Euro 2 standards for new model vehicles from 2002 and all new vehicles from 2003 and to lower the volatility of petrol and the sulphur content of diesel. However, prior to the promulgation of a revised ADR 37/01 based on Euro 2 the fuel octane issue should be clarified. • Octane rating of ULP in Australia is 91.6, Euro 2 test fuel minimum 95 RON <ul style="list-style-type: none"> • There may be a compromise in emissions, such that operation on 91.6 RON leads to increase in emissions, negating the impact of introducing Euro2 • There will be a reduction in vehicle performance and increase in fuel consumption • Owners of Euro 2 certified vehicles may be forced to use PULP at an extra cost • If a higher octane fuel is required, then there will be a cost for the petroleum industry • Decisions on the introduction of Euro 3 (and Euro 4) should be deferred until the full costs and benefits of Euro 2 standards has been established and an analysis of the impacts of Euro 3 standards has been undertaken.
40. Total Environment Centre	<ul style="list-style-type: none"> • Support the adoption of Euro 3 in lieu of Euro 2. Agree with the proposal to lower fuel volatility and reduce diesel sulphur content.
41. ACT Department of Urban Services	<ul style="list-style-type: none"> • Adoption of Euro 2 a minimum requirement. Support the adoption of Euro 3 in lieu of Euro 2. • Support moves to lower the volatility of petrol and to reduce the sulphur content in diesel fuel. However, the pace of change needs to be such that it can be accommodated by the Australian fuel industry.
42. Environment Australia	<ul style="list-style-type: none"> • Supports the adoption of internationally harmonised vehicle emission standards based on UN ECE regulations for light and heavy vehicles, and for these standards to include alternative fuel vehicles. • Euro 3 should be considered subject to the outcome of further analysis. • Support acceptance of US EPA 1994 standards as alternatives to the principle standards. Given that vehicles of US origin certified under US EPA procedures dominate the heavy vehicle market in Australia, it appears logical to accept US certification for those vehicles. The concession should not apply to vehicles of other than US origin or to vehicles of US origin that have been certified under UN ECE procedures. The concession should not apply to light vehicles regardless of country of origin.

Respondent	Comment
43. Australian Liquefied Petroleum Gas Association Ltd	<ul style="list-style-type: none"> • Considerable scope for gaseous fuels to replace diesel fuel for both freight and bus operations. • Significant emission reductions to be achieved from in-service vehicles • Light Duty standards – progressive tightening of emission limits may not be cost effective when there is scope to achieve significant short and medium term fleet wide emission reductions by other complementary means – in-service, alternative fuels • Medium/Heavy Commercial Vehicles – adopt a rapid, phased uptake of Euro 3 standards for all medium and heavy –duty vehicles • Support the adoption of Euro 2 standards for light duty spark-ignition engines. All spark ignition OEM and factory-converted vehicle should be included in the scope of upgraded emission standards, subject to appropriate lead times.
44. Department of Environment and Heritage Qld	<ul style="list-style-type: none"> • Agree to tighter standards and harmonisation • There should be no technical impediment for Australian manufacturers to comply with Euro 2 and 2002/3 appears reasonable for this purpose • Support Euro 3 in principle, subject to a cost benefit analysis of the incremental change from Euro2. Undecided as to the timing of Euro 3. Nevertheless going straight to Euro3 may be attractive to Australian Manufacturers, as there would only be one change to production lines instead of two.
45. Volvo Truck Australia Pty Ltd	<ul style="list-style-type: none"> • Support harmonisation with ECE regulations. Definition of harmonisation includes identical system of certification, identical testing methods, uniform sets of standards (limit values) and identical production of conformity routines. • Strongly recommend ECE regulation 49 • Recommend that only the US99 heavy duty standards be accepted as an alternative in Australia.
46. BP Australia Limited	<ul style="list-style-type: none"> • BP's introduction timetable and proposed fuel quality parameters are aligned with the following recommendation of the review <ul style="list-style-type: none"> • Introduce all 3 new ADRs to take effect from 2002 for new models, and 2003 for all models • Reduce the sulphur content of commercial diesel fuel to 0.05% and the volatility of petrol by 5-10 kPa to coincide with the introduction of the revised standards. • Regulating the introduction of Euro3/4, and complementary fuel quality parameters should be revisited when the implications of introducing Euro2 are better understood. • While understanding the benefits of harmonising vehicle emission standards, does not necessarily support the need to harmonise implementation timetables. There is a significant local vehicle and fuel manufacturing sector where the cost may significantly outweigh the benefits of an internationally harmonised implementation timetable. Population, urban exposure levels etc in Australia are significantly different to those in Europe and the USA. • Do not yet understand the total lifecycle benefits and costs, especially for regional air quality parameters of moving the unleaded petrol pool from 91 to 95 octane • In relation to 0.05% sulphur diesel, there may not be a significant health and environment benefit from moving country and off-road use to a lower level of sulphur.

Respondent	Comment
47. European Automobile Manufacturers Association (ACEA)	<ul style="list-style-type: none"> • Supports the adoption of Euro 3 standards by 2002/3, which will impose improvements in catalyst formulation, fuel injection systems and their calibrations. It also implies specifications for the environmental properties of both fuels. • As these standards will be applied in 2001 in the EU, the technical solutions would be available for Australian manufactures shortly after this date. The costs should not be an obstacle due to the fact that the standards would provide a harmonised framework for the development and the industrialisation of the technology. • The EU has retained for Euro 3 an important measure, which consists in the introduction of On-Board Diagnostic systems on both gasoline and Diesel vehicles. With these systems, the operation of the components of the emission control device remain under a permanent control during the life of the vehicle.
48. Bob Murphy	<ul style="list-style-type: none"> • US diesel companies who dominate the heavy truck market in Australia already meet higher standards than those proposed in the MVEC paper. • Caterpillar is already on US EPA 98, Cummins has nearly finished implementing EPA94 and expects to adopt EPA98 in Australia this year, Volvo has named Cummins as its new engine partner so expect to see the new Cummins engine in Volvo trucks in Australia this year; some Detroit's are being imported at EPA98 levels, locally supplied Detroit's are still complying with EPA91 but they are moving to EPA94 this year. • The requirement to introduce EPA94 would be 9 years behind the US requirement and US engine builders supply more than 70% of Australia's heavy vehicle engines.
49. Armidale Air Quality Group	<ul style="list-style-type: none"> • If Europe can adopt Euro3 by the year 2000, and Euro 4 by 2005, the onus will be to justify why Australia can't do the same, or at least introduce Euro 3 for diesel engines by 2002 and the Euro 4 diesel standards at the same time as Europe. • Australia should adopt the European standards that will be current at that time – Euro 3. Harmonisation of international emission standards by 2005/6 will surely require the adoption of Euro 4 or its US equivalent. • Most manufacturers will be planning to meet these standards for the vehicles they sell in Europe and the US, so compliance should not be an issue. • If Australia has less stringent emission standards than US or Europe it might become a dumping ground for manufacturers older, more polluting models. • The adoption of Euro 3 in Europe in 2000 presumably means that it has been assessed as cost effective there. Given recent research into adverse effects of air pollution there can be little doubt that Euro 3 would be found to be cost effective in Australia. Move to meet international emission standards as soon as possible will ensure Australia is not at a competitive disadvantage. • To allow industry the longest possible lead-time to adjust, the decision should be taken as soon as possible to adopt Euro 3 by 2002/3, followed by the agreed harmonisation to international standards including Euro 4 by 2005/6. MVEC should also consider what standards should be adopted beyond that timeframe and its lead in investigating what further standards and strategies are to be adopted including alternative fuels and emissions testing or retro-fitting of existing vehicles.

Respondent	Comment
50. Smogbusters Nature Conservation Council of NSW	<ul style="list-style-type: none"> • MVEC should not make a decision about emission standards until they have investigated the ability of current technologies to meet strict air quality standards at the earliest possible date • MVEC should publish economic simulations, such as how the new standard would exert an influence on jobs in the automotive industry, freight costs, and cost of running private cars. • MVEC should set a target to have all private petrol vehicles 10% more fuel efficient by 2004 and adopt measure to ensure this is achieved. • Petrol vehicles - The European Euro standard is tighter than the US Tier system, as such Australia should not adopt the US Tier system • Euro 3 standards for petrol should be adopted in 2002 and Euro 4 in 2005. • Euro 3 standards for diesel should be adopted in 2004 • Support for CNG infrastructure • Reductions in the level of sulphur in fuel need to occur as a matter of urgency. Technology to reduce PM must be considered in the light of the development of motor vehicles emission standards. • Economic incentives should be adopted to make the attractive purchase of small, fuel efficient cars with low emissions.
51. Australian Automobile Association (AAA) (2)	<ul style="list-style-type: none"> • Support harmonisation with UN ECE • Support the points raised in the MVEC document • Support the introduction of alternative fuels • Fuels necessary to obtain the best emissions performance and at the same time reduce fuel consumption. may not be readily available from the National refineries and will have a higher cost implication.