
FCAI Interim Response to Draft Regulatory Impact Statement for Review of Euro 5/6 Light Vehicle Emission Standards

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Table of Contents

1. INTRODUCTION	1
2. THE PREFERRED OPTION IN THE RIS	2
3. SHORTCOMINGS IN THE RIS	3
4. CO2 EMISSION TARGETS.....	4
5. FUEL QUALITY STANDARDS.....	5
6. IMPACT ON AUSTRALIAN ECONOMY	7
7. ASSUMPTIONS IN THE DRAFT RIS.....	9
8. CONCLUSION	12
APPENDIX 1 – OVERVIEW OF THE AUTOMOTIVE INDUSTRY.....	14
APPENDIX 2 - PRODUCT DEVELOPMENT IN THE AUTOMOTIVE INDUSTRY.....	16

1. INTRODUCTION

The Federal Chamber of Automotive Industries (FCAI) is the peak industry organisation representing manufacturers and importers of passenger vehicles, light commercial vehicles and motorcycles in Australia.

This submission provides an interim response to the Australian Government's Draft Regulatory Impact Statement (RIS), *"Review of Euro 5/6 Light Vehicle Emission Standards."*

The FCAI is not able to support the recommendations in the RIS as additional work is required to fully evaluate the impact of the introduction of Euro 5/6 into Australia. The FCAI considers that the draft RIS has significant limitations because it considers vehicle emissions in isolation and that, at least, the following should be considered in the RIS:

- The current review of CO₂ targets will impact on the benefit cost analysis conducted in the draft RIS and all vehicle emissions, i.e. CO₂, CO, HC, NO_x and particulates must be considered together. The strategies and corresponding investment decisions made by automotive manufacturers to meet any CO₂ targets and/or new emission standards are considerable. The strategies introduced by car brands to meet CO₂ targets has the potential to substantially impact on the benefit cost analysis conducted in the draft RIS. For example, while the draft RIS calculates the potential benefit out to 2040 it assumes a continuation of diesel and petrol engine light vehicles and ignores the impact of the uptake of alternative drive train technologies such as hybrid and electric vehicles that is expected to occur during this timeframe.
- The draft RIS does not adequately address the fuel quality required for compliance with Euro 5/6 and the fuel currently available in Australia. In-service fuel standards are crucial for continued in-service delivery of the improved vehicle emissions from the vehicle technology introduced to meet Euro 5/6 limits, CO₂ targets and OBD requirements. Without fuel meeting the necessary fuel quality standards available in the market the anticipated benefits from Euro 5/6, i.e. reduced vehicle emissions, will not be delivered.
- The benefit cost analysis needs to include the broader impact on the Australian economy. The draft RIS evaluates the health benefits from the introduction of Euro 5/6 emission standards but does not consider any costs to the Australian economy from the impact on domestic automotive manufacturing or the oil industry delivering higher specification in-service fuels. Ultimately any increase in costs will be passed along to Australian motorists.

The FCAI and member companies consider that the public comment period is inadequate with the RIS released on 8 January 2010 and comments due by 15 March 2010 (with the

2 week extension). The FCAI and member companies will continue to research the issues outlined in this interim response and provide a more detailed response within a further 3 months. The FCAI will aim to have a more complete response prepared by 1 June 2010.

Due to the significant impact on the vehicle industry, the FCAI considers that the government needs to provide the industry with sufficient time to fully consider the implications of the introduction of Euro 5/6. This should include a more comprehensive analysis, undertaken in full consultation with the automotive industry (and other stakeholders), before options for the introduction of Euro 5/6 emissions standards can be developed and submitted to government for a decision.

2. THE PREFERRED OPTION IN THE RIS

The draft RIS recommends that;

- Euro 5 vehicle emission standards be adopted in Australia through adopting of UN ECE R83/06 as per Table 2.1 below;

Table 2.1 – Implementation Timetable for Proposed ADR 79/03¹

ADR 79/03 Implementation Stage	Minimum Requirements	Applicable Vehicle Categories	Date of Effect (1 January...)	
			New Models	All Models
Stage 1	“Base Euro 5” (including concessions regarding OBD PM threshold for M and N category vehicles as specified in 3.3.2 of Annex 11 ECE R83/06 and NOx emissions monitoring as specified in 3.3.3.1 of Annex 11 of ECE R83/06)	Petrol, LPG & NG vehicles	2013	2014
		Diesel vehicles	2012	2013
Stage 2	Stage 1 (with OBD PM threshold concession removed) <i>plus</i> PM and Particle Number limits based on new test procedure	Diesel & direct injection petrol vehicles	2013	2014
Stage 3	Full compliance with ECE R83/06, including all OBD requirements of Annex 11 of ECE R83/06	Petrol, LPG & NG vehicles	2015	2015

- Euro 6 vehicle emission standards be adopted in Australia, once ECE R83 is amended to adopt the Euro 6 emission limits from;

¹ Draft RIS for Review of Euro 5/6 Light Vehicle Emission Standards, Table 17, p. 57

- 1 Jan 2016 for new model light vehicles and
- 1 Jan 2017 for all model light vehicles.

The FCAI is not able to support the recommendation in the draft RIS.

3. SHORTCOMINGS IN THE RIS

The FCAI considers that the draft RIS has significant shortcomings;

- The *COAG RIS on CO₂ Standards for Light Vehicles* will impact on the benefit cost analysis conducted in the draft RIS. While the introduction of Euro 5/6 emission standards may not impact on CO₂ targets, the introduction of CO₂ targets and associated strategies has the potential to substantially impact on the benefit cost analysis conducted in the draft RIS.
- The draft RIS does not adequately address the fuel quality required for compliance with Euro 5/6 and the fuel currently available in Australia. In-service fuel standards are crucial for continued in-service delivery of the improved vehicle emissions from the vehicle technology introduced to meet Euro 5/6 limits, CO₂ targets and OBD requirements. Without fuel meeting the necessary fuel quality standards available in the market the anticipated benefits from Euro 5/6, i.e. reduced vehicle emissions, will not be delivered.
- The draft RIS is very narrow in its benefit cost analysis and needs to include the broader impact on the Australian economy. While the draft RIS evaluates the health benefits from the introduction of Euro 5/6 emission standards, it does not consider any costs to the Australian economy. Introduction of Euro 5/6 will impact on the automotive industry, especially Australian manufactured engines or other emissions components that are used for both domestic product and export. The draft RIS also does not consider the implications for the domestic oil industry from delivering a higher fuel specification. Ultimately any increase in costs that will be passed along to Australian vehicle owners.

This interim response will briefly outline the FCAI position on the above main points.

The FCAI will continue to research, through member companies contacting overseas colleagues, the fuel standards required to meet the Euro 5/6 standards to enable the FCAI to provide a more detailed response.

4. CO₂ EMISSION TARGETS

The Australian Government is examining the case for mandatory or voluntary regulation of CO₂ emission from motor vehicles in the *COAG RIS on CO₂ Standards for Light Vehicles*. The FCAI member companies consider that achieving a CO₂ emissions target depends on both vehicle technologies and fuel standards. Vehicle technologies introduced to meet any CO₂ targets will have a significant impact on the modeling undertaken in the draft RIS. The FCAI considers that proceeding with a review of the introduction of Euro 5/6 without consideration of the *COAG RIS on CO₂ Standards for Light Vehicles* may produce regulations or standards that are incompatible, leading to a less than optimal outcome or imposing additional cost to the economy (and ultimately vehicle owners) without benefit.

Many car companies already have ambitious targets to reduce CO₂ emissions of their vehicles by up to 50% by 2020. The strategies in place to meet these targets include shifts to new propulsion technology such as electric vehicles, hybrids and compatibility with biofuels. To accompany the CO₂ targets companies have targets for worldwide production of electric vehicles or hybrids in the order of 20% production by 2020.

The draft RIS does not test for scenarios where electric vehicles or hybrid vehicles are sold in these quantities. It appears that the modeling conducted by BITRE and used in the draft RIS is based on current technology, i.e. internal combustion engines in passenger vehicles.²

There have been a number of studies conducted into the potential uptake of electric vehicles. For example, a report prepared by the University of South Australia for the South Australian government³, concluded that replacing only 5% of daily travel in Sydney with electric vehicles would result in a reduction of 3.26 million km of conventionally fuelled car travel.

In a report on the Economic Viability of Electric Vehicles⁴, prepared for the NSW government, AECOM Australia modeled various scenarios on the uptake of hybrid electric vehicles, plug-in hybrid electric vehicles and pure electric vehicles to estimate the economic viability of electric vehicles and consequently estimate when this new technology is likely to be cost competitive with internal combustion engine vehicles in Australia.

The report also modeled the expected health benefits from the introduction of hybrid electric vehicles, plug-in hybrid electric vehicles and pure electric vehicles into the Sydney metropolitan area. While the base case was modeled against Euro 3 petrol and Euro 4

² Draft RIS for Review of Euro 5/6 Light Vehicle Emission Standards, Appendix C, BAU case, page 81

³ University of South Australia, "Uptake and Use of Electric Vehicles in Australia," Prepared for SA Department of Trade and Economic Development.

⁴ AECOM Australia Pty Ltd, Economic Viability of Electric Vehicles, Prepared for NSW Department of Environment and Climate Change, 4 Sep 2009

diesel emission standards, each of the three scenarios modeled showed significant health benefits in Sydney of;

- Scenario 1; \$261 million saved by 2040.
- Scenario 2; \$710 million saved by 2040.
- Scenario 3; \$1,256 million saved by 2040.

While the FCAI does not contend that any of these particular scenarios is the likely outcome from the current review into CO₂ emission targets, the FCAI does consider that the sensitivity analysis of the Cost-Benefit ratio in the draft RIS needs to consider the implications of the introduction of such new vehicle technology that are increasingly likely to be introduced in the timeframe considered in the draft RIS to accrue health benefits, i.e. the evaluation period extends out to 2040.

5. FUEL QUALITY STANDARDS

Vehicles are developed with an expectation of fuel quality in a particular market. During the design and durability phases of development, the local market fuel parameters are specifically considered to ensure the vehicle operates to the expectations of both the owner and manufacturer.

As the Australian Design Rules are harmonised with the UN-ECE Regulations, and more than 80% of vehicles sold in Australia are imported (see Appendix 1), the FCAI considers that harmonisation of Australian fuel quality standards with the World Wide Fuel Charter (WWFC) and European fuel standards is necessary to achieve the emission and fuel consumption outcomes that the Australian government aims to achieve with the introduction of Euro 5 and Euro 6 emission standards.

The FCAI considers that Australia is a Category 4 country under the WWFC⁵, i.e. *“Markets with further advanced requirements for emission control to enable sophisticated NO_x and particulate matter after-treatment technologies. For example, markets requiring... EURO 4, EURO 5 Heavy Duty, or equivalent emission standards.”*

The main differences between the current Australian fuel quality standard, the WWFC Category 4 fuels and EU fuels for petrol and diesel are outlined in Tables 5.1 and 5.2 below.

⁵ World Wide Fuel Charter, Fourth Edition, September 2006

Table 5.1 – Differences in Petrol Parameters

Parameter	WWFC – Cat 4	EU Fuel Standard	Australian Fuel Standard
Sulphur content	10 ppm (max) all grades	10.0 ppm (from 1 Jan 09)	150 ppm (max) ULP 50 ppm (max) PULP
Olefins	10.0% (max) v/v	18% (max) by volume	18% (max) by volume
Aromatics	35.0% (max) v/v	35.0% (max) v/v	42% pool average over 6 months with a cap of 45%
Research Octane Number		95.0 (min)	91.0 (min) ULP 95.0 (min) PULP
Motor Octane Number	82.5 (min) '91 RON'	85.0 (min) '95 RON'	81.0 (min) ULP 85.0 (min) PULP

Table 5.2 – Differences in Diesel Parameters

Parameter	WWFC – Cat 4	EU Fuel Standard	Australian Fuel Standard
Cetane Index	55.0 (min) (52.0 min when cetane improvers are used)		46 (min)
Cetane Number	55.0 (min)	51 (min)	
Derived Cetane Number (of diesel containing biodiesel)	Meet the relevant WWFC limit.		51.0 (min)
Density	820 kg/m ³ (min)	820 (min) to 845 (max) kg/m ³	820 (min) to 850 (max) kg/m ³
Distillation T95	340°C (max) (or 320°C at T90)	360°C (max)	360°C (max)
Polyaromatic hydrocarbons (PAHs)	2.0% (max) m/m	11% (max) m/m	11% (max) m/m
Flash point	55°C (min)		61.5°C (min)

The petrol fuel quality standard is important to achieve the desired emission outcomes. With the growing inclusion of direct injection gasoline technology to deliver improved fuel consumption, 10 ppm sulphur enables and promotes the use of lean NOx traps. Sulphur will store on the lean NOx trap and high temperature regeneration is required to remove the sulphur. The higher the sulphur level in the fuel, more frequent regeneration is required with a higher CO₂ penalty, higher emissions and lower life of the NOx trap.

Some FCAI member companies are marketing diesel light vehicles that are European specification vehicles. Not providing a fuel quality standard for in-service fuels may not deliver the expected reduced emissions and result in operability problems (i.e. the vehicle may not operate as designed/expected) leading to owner dissatisfaction and impacting on brand reputation.

The FCAI and member companies are very aware of our responsibility to make a contribution to the reduction in CO₂ emissions and lack of appropriate fuel standards could result in fuel consumption targets not being achieved in-service.

Accordingly, to achieve the in-service outcomes from the introduction of Euro 5/6 Australia should have national fuel quality standards harmonised with the World Wide Fuel Charter and/or European fuel quality standards.

The FCAI member companies are undertaking research within their companies in relation to the important fuel parameters for vehicles to meet the durability and emission standards in-service of Euro 5/6. The FCAI will include the results of this research in a more detailed submission.

6. IMPACT ON AUSTRALIAN ECONOMY

The introduction of Euro 5/6 has the potential to impact on the Australian economy in the areas of;

- Vehicle and automotive parts manufacturing
- Oil refining
- Retail price of fuel

6.1 Australian vehicle and automotive parts manufacturing

The automotive industry is a valuable Australian export commodity, worth more than \$4 billion in 2007-08 and more than \$3 billion in 2008-09⁶. Until the recent global downturn, up to 40% of vehicles produced in Australia were exported to more than 21 markets in Europe, Asia, the Middle East and United States.

⁶ Australian Government Department of Foreign Affairs and Trade, "Composition of Trade Australian 2008-09, November 2009.

The automotive industry is the largest manufacturing industry in Australia and directly employs more than 60,000 people. The industry is also the largest investor in R&D of any manufacturing sector, exceeding \$700 million per annum⁷.

Australia is one of only 12 countries which have the capability to design, engineer and manufacture a motor vehicle and has developed expertise in designing and engineering vehicles for the global market.

The draft RIS must consider the impact of the introduction of Euro 5/6 on the local vehicle and automotive parts manufacturing. Significant investments would be required to upgrade local manufacturing to enable locally produced vehicles to meet Euro 5/6. The alternative is closure of local manufacturing with accompanying loss of jobs.

6.2 Australian refining

The Australian refining industry is a small player in a highly competitive global oil market. The Australian Institute of Petroleum (AIP) estimates that the Australian refining industry has already invested more than \$2 billion to upgrade refineries to meet the improved fuel quality standards as Australia has progressed to Euro 4 fuel standards including 10 ppm sulphur diesel and 50 ppm sulphur PULP⁸.

The AIP's *Downstream Petroleum 2007* report highlights the challenges to continuing competitiveness of Australian refineries compared to the larger and new refineries in Asia to such an extent that the AIP considers that *"Australian refineries suffer from substantial disadvantages ... that virtually preclude Australia from consideration for new refinery investment."*

Accordingly, any improved fuel quality standards required to implement Euro 5/6 will have a significant impact on the ongoing viability of the Australian refining industry.

6.3 Retail price of fuel

Along with the impact on the Australian refining industry there is a potential increase in the retail price of fuel, especially, with any improved fuel quality standard.

The draft RIS does not consider the implications of new vehicle owners needing to purchase a higher specification fuel, e.g. PULP, at an increased price. For example, PULP is often sold in the range of 10 to 15 cents per litre higher than ULP.

⁷ Federal Chamber of Automotive Industries, "Submission to the Review of Australia's Automotive Industry May 2008."

⁸ Australian Institute of Petroleum, "Downstream Petroleum 2007."

7. ASSUMPTIONS IN THE DRAFT RIS

In addition to the limitations of the draft RIS, outlined above, the FCAI would like to highlight a number of assumptions in the draft RIS that require reconsideration.

7.1 Implementation Timing

The FCAI members are still considering the implementation timing outlined in the draft RIS, however, a review of the timing has identified different timing to that in Europe.

The recommended option in the draft RIS has implementation timing for “base” Euro 5, Stage 1 Euro 5 and Euro 6 (Table 17, page 57) which does not appear to line up with all of the stages of the implementation of Euro 5/6 in the European Union, i.e. Euro 5a, Euro 5b, OBD stage 5+ and Euro 6 in the following areas;

- 1 Sep 2011; Euro 5b and OBD stage 5+ for new models.
- 1 Jan 2013; Euro 5b for all new vehicles.
- 1 Jan 2014; Euro 5b and OBD stage 5+ for all new vehicles.
- 1 Sep 2015; Euro 6 for all new M1 and N1 Class 1 vehicles.
- 1 Sep 2016 for all new N1 Class 11, 111 and M2 vehicles.

Implementation of any of the Euro 5/6 requirements prior to their introduction in Europe will require that manufacturers will either face increased development costs through bringing forward product development cycles, or will temporarily remove models from sale in Australia.

7.2 Fuel Standards

The draft RIS, “*Section 1.5.4 Fuels and Technology Content*” assumes no change in the current Australian fuel quality standards is required and notes on page 12 that “*the sulfur content of petrol and LPG is considered to be the only relevant parameter*” and on page 13 that the “*decision to adopt 10ppm standards was made primarily to support carbon dioxide emissions ... not to support air pollution standards such as Euro 5/6.*”

While the draft RIS (page 14) recognises that “*sulfur levels in fuel can accelerate degradation of catalytic converters*” it was “*not able to access any definitive information to assess the impact of this particular level of sulfur on technologies likely to be used for Euro 5 standards.*”

The FCAI does not agree with the assumption that 50ppm sulfur fuel is adequate to ensure continued in-service compliance with Euro 5 standards, especially the 160,000km durability requirement.

With the growing inclusion of direct injection gasoline technology to deliver improved fuel consumption, 10 ppm sulphur enables and promotes the use of lean NO_x traps. Sulphur will store on the lean NO_x trap and high temperature regeneration is required to remove the sulphur. The higher the sulphur level in the fuel, more frequent regeneration is required with a higher CO₂ penalty, higher emissions and shorter life of the NO_x trap.

Also, Euro 5/6 introduces additional on-board diagnostics (OBD) requirements. Currently, many brands offer desensitized Euro 5 OBD systems due to the high (i.e. >10 ppm) sulphur levels in Australian petrol. Introduction of Euro 5 and 6 would imply the need for the full OBD requirements which will require 10 ppm sulphur petrol to operate the full range of European OBD requirements.

As noted above in Section 4, the FCAI considers that a review of the Fuel Quality Standards is necessary.

7.3 Technologies to meet Euro 6

The draft RIS is incorrect when stating on page 15 that “... the technology and manufacturing steps required to comply with the Euro 5/6 emission standards are well known ...” The Euro 6 standards have not been finalised (at time of preparing the draft RIS) and the full suite of technology to meet Euro 6 are still under development.

While some of the technology is known and is being trialed, the full suite of technology for both diesel and petrol technologies that are aiming for significant CO₂ gains (e.g. direct injection gasoline) are still under development.

7.4 Cost Assumptions

The draft RIS includes assumptions of various costs for the cost benefit analysis.

The FCAI considers that the costs does not include the full cost of introducing Euro 5/6 into Australia in the areas of development costs (people, time, facilities and upfront investment by suppliers), manufacturing costs (production capability and investment), increased complexity and components required in each vehicle, vehicle design changes to accommodate new components, upgrading of local test facilities and increased development lead times due to increased complexity.

The cost assumptions in the draft RIS were based on those used in the EU. It must be noted that the European market is very different to the Australian market with less than 15% of sales of light vehicles sourced from Europe (see Appendix 2). Accordingly, it cannot be assumed that technology available in Europe can be simply transferred and applied to Australia.

The FCAI understands that the European industry also refuted the cost assumptions contained in the European analysis and referred to in *Section 4.2 Costs* in the draft RIS. The industry considers that the reports referred to in the draft RIS, including “*the Dutch*

*report*⁹” do not adequately consider these costs and also does not consider that there has been a stable 10 years (the “full implementation” period assumed) to amortize the development costs.

The FCAI considers there is a need to review the assumptions in the BAU case, with significant numbers of alternatively fuelled vehicles expected to enter the Australian new car market in the time period considered in the cost benefit analysis, i.e. out to 2040.

There are a number of external factors that could influence the uptake of alternatively fuelled vehicles that have not been considered in any modeling in the draft RIS. As noted in Section 5, any mandatory CO₂ targets would have an influence on the uptake of alternatively fuelled vehicles, as would the retail price of petrol and diesel.

The draft RIS assumes that the oil price would remain around \$60 to \$70. Even if the oil price remains within this range, there is no guarantee that the retail fuel price would remain at this level. For example, the average monthly petrol price (for both ULP¹⁰ and PULP¹¹) increased by more than 50% in the ten year period from 1999 to 2009.

It would seem logical to include an increase in the retail price of fuel in line with historical rates in the cost benefit modeling.

An increase in the retail price of petrol to be paid by new vehicle owners is very likely as a higher specification fuel (e.g. 10 ppm sulphur PULP) will be required for a Euro 5/6 compliant vehicle.

7.5 Australian Market

The draft RIS does not recognise the significant difference in the Australian new light vehicle market from the European market and therefore assumes relatively short implementation timing would be able to be met.

Less than 15% of new light vehicles sold in Australia during 2009 (see Appendix 1) were sourced from Europe while more than 65% were sourced from Asia¹². The sourcing influences the current level of technology in the vehicles and consequently the cost and lead times required to upgrade to meet Euro 5/6.

While some European brands sell diesel engine passenger cars in Australia, these are very small numbers and the majority of diesel light vehicles, including light commercial vehicles, are sourced from Asia. Accordingly, these vehicles may require a longer lead time for the development of Euro 5/6 compliant systems. Further analysis is required.

⁹ Draft RIS for Review of Euro 5/6 Light Vehicle Emission Standards, Section 4.2, page 40

¹⁰ Australian Automobile Association, www.aaa.asn.au, “Average monthly capital city unleaded petrol prices (cpl)”

¹¹ Australian Automobile Association, www.aaa.asn.au, “Average monthly capital city premium unleaded petrol prices (cpl)”

¹² Vfact, The Federal Chamber of Automotive Industries, December 2009

8. CONCLUSION

The FCAI is not able to support the recommendations in the RIS as additional work is required to fully evaluate the impact of the introduction of Euro 5/6 into Australia. The FCAI considers that the draft RIS has significant shortcomings because it considers vehicle emissions in isolation. The draft RIS needs to be redone with at least the following included:

- The current review of CO₂ targets will impact on the benefit cost analysis conducted in the draft RIS and all vehicle emissions, i.e. CO₂, CO, HC, NO_x and particulates must be considered together.
- The fuel quality required for compliance with Euro 5/6 and the fuel currently available in Australia. In-service fuel standards are crucial for continued in-service delivery of the improved vehicle emissions from the vehicle technology introduced to meet Euro 5/6 limits, CO₂ targets and OBD requirements. Without fuel meeting the necessary fuel quality standards available in the market the anticipated benefits from Euro 5/6, i.e. reduced vehicle emissions, will not be delivered.
- The benefit cost analysis needs to include the broader impact on the Australian economy including cost to the domestic automotive manufacturing sector, the oil industry and ultimately, the cost to vehicle owners through an increase in the price of fuel.

In addition to the issues outlined above, there are a number of assumptions in the draft RIS that require reconsideration, including;

- The recommended option in the draft RIS has implementation timing for “base” Euro 5, Stage 1 Euro 5 and Euro 6 (Table 17, page 57) which does not appear to line up with all of the stages of the implementation of Euro 5/6 in the European Union.
- Fuel quality standards required to ensure in-service compliance with Euro 5/6 emission standards and OBD requirements.
- The technologies to meet Euro 6 are still under development by companies globally.
- The cost assumptions used in the draft RIS are based on the cost assumptions used in the EU when considering the introduction of Euro 5/6. The European market is very different to the Australian market with only around 15% of sales of light vehicles sourced from Europe. Accordingly, it cannot be assumed that technology available in Europe can be simply transferred and applied to Australia.

- The draft RIS does not recognise that significant difference in the Australian new light vehicle market from the European market and incorrectly assumes a relatively short implementation timing would be able to be met. Less than 15% of new light vehicles sold in Australia during 2009 were sourced from Europe while more than 65% were sourced from Asia.

Due to the significant impact on the vehicle industry, the FCAI considers that the government needs to provide the industry with sufficient time to fully consider the implications of the introduction of Euro 5/6. This should include a more comprehensive analysis, undertaken in full consultation with the automotive industry (and other stakeholders), before options for the introduction of Euro 5/6 emissions standards can be developed and submitted to government for a decision.

APPENDIX 1 – OVERVIEW OF THE AUTOMOTIVE INDUSTRY

The automotive sector is a globally integrated industry with many product lines sharing platforms and major components to achieve productivity gains from economies of scale. Even with more than one million new vehicles sold in 2008 and around 900,000 new vehicle sales in 2009, Australia comprises less than one and a half percent (1.5%) of the global market.

With growth expected to continue in the emerging economic markets of India, China, Russia and Brazil, Australia's share of the world market will decline.

Australia is one of the most open and competitive automotive markets in the world with more than 50 brands, 350 models and 20 source countries. In 2009, around 16% of new vehicles sold were manufactured locally with the remaining 84% of new vehicles imported from many countries and regions of the world including Asia (more than 60%), Europe, North America and Africa.

Table 1 below shows the major countries/regions of origin of new vehicles sold in Australia during 2009.

Table A1.1 – Country/region of origin of new vehicle sales in 2009

Country/Region of Origin	Percentage of new vehicle sales ¹
Australia	16%
Europe	13%
Americas	1.5%
Japan	36%
Korea	13%
South East Asia (predominately Thailand)	16%
Other (including China and South Africa)	4.5%

Notes:

1. Based on 2009 Vfacts

The motor vehicle is increasingly a global product and one of the most comprehensively regulated products. In considering regulations, the government's role is to balance social and economic benefits with safety and environmental performance.

As economies of scale are critical in the automotive industry all manufacturers have tended to limit the number of locations any one model is produced and that model is then cross-shipped to markets where there is demand. This approach initially benefits the manufacturer through reducing costs and ultimately benefits the consumer by improving affordability and increasing product choice.

APPENDIX 2 - PRODUCT DEVELOPMENT IN THE AUTOMOTIVE INDUSTRY

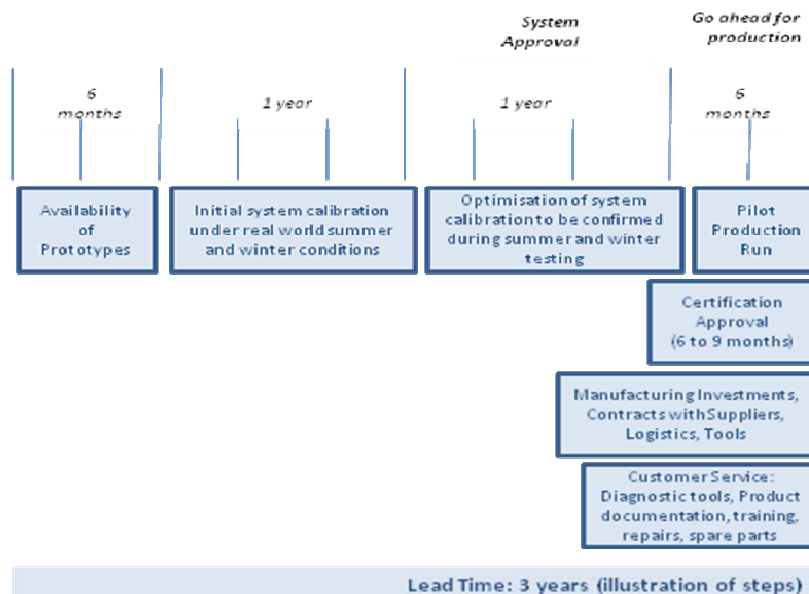
The vehicle industry is a global industry and product development plans are prepared to align with the introduction of international regulations.

Product development and research is a finite resource within each FCAI member. Even if a proven technology can be readily adapted to an existing model range, product development cycles, from concept to mass production of three years are typical. Due to the long lead times for product development, introduction of new technology are usually aligned with the introduction of new or upgraded models or the introduction of international regulations.

A generic three year product development period to fit proven technology to an existing model range typically comprises:

- Development of prototype – six months.
- Initial calibration of system in all weather and seasonal conditions – one year. It is important to undertake extensive testing to assess performance of a new system in all weather and seasonal conditions, especially in a country like Australia with a wide range of seasonal conditions and climates.
- Optimization of system in all weather and seasonal conditions – one year.
- Pilot production run – six months.

Figure A2.1 – Generic Three Year Product Development Cycle to Fit Proven Technology to an Existing Model Range



The above diagram also shows the activities undertaken during the last 12-18 months of system development to gain the necessary regulatory approvals invest in any manufacturing changes, enter into contracts with suppliers and the activities required for maintenance of the new system once in service.