
Light Vehicle CO₂ Emission Standards for Australia



Federal Chamber of Automotive Industries
Level 1, 59 Wentworth Avenue
Kingston ACT 2604
Phone: +61 2 6247 3811
Facsimile: +61 2 6248 7673

Contact: Mr Tim Reardon

December 2011

TABLE OF CONTENTS

Executive Summary	4
Introduction	6
Investment in New Technology	6
What is a CO ₂ Emission Standard.....	6
Reducing CO ₂ Emissions.....	7
<i>Vehicle Kilometres Travelled</i>	8
<i>Motor Vehicle Fleet</i>	9
<i>Energy Efficiency of New Vehicles</i>	9
<i>The Rebound Effect</i>	10
<i>An Integrated Approach to Reducing CO₂ Emissions</i>	11
<i>Emissions Trajectory</i>	11
<i>Approaches to Reduce CO₂: United Kingdom</i>	12
<i>Approaches to Reduce CO₂: Australia</i>	13
Reducing Average CO ₂ emissions from New vehicles	15
<i>The 2010 NAFC Target of 6.8 litres/100km</i>	15
<i>The 2010 NACE Target</i>	16
A New Target.....	17
<i>FCAI Modeling</i>	17
<i>Recommendation</i>	18
<i>The Cost of Abatement</i>	20
Allocating Corporate Targets	20
1: <i>Uniform Percentage Reduction</i>	21
2: <i>Corporate Specific Mass Based Target</i>	22
3: <i>Corporate Specific Footprint Based Target</i>	25
<i>Recommendation</i>	25
<i>Eco Technologies</i>	26
Super Credits.....	28
<i>International Approaches to Super Credits</i>	28
<i>Recommendation</i>	29

Pooling	30
<i>Recommendation</i>	30
Banking.....	30
Make Good Provision	31
Corporate Legal Entities.....	31
Data Collection and Reporting	31
<i>Recommendation</i>	32
Penalties	32
<i>International Approaches to Penalties</i>	32
<i>Recommendation</i>	34
Treatment of Niche Brands	34
<i>International Approaches to Derogations</i>	34
<i>Recommendation</i>	34
Single Standard For Light Vehicles	35
Legislation not Regulation	35
Exemption for Special Purpose Vehicles	35
Treatment of New Entrants	35
International Comparisons	36
<i>Drive Cycles</i>	36
<i>Sample Groups</i>	37
<i>Fuel Type</i>	37
<i>Exemptions and Credits</i>	38
<i>Consumer Preferences</i>	38
<i>International Comparisons</i>	38
Conclusion	39

EXECUTIVE SUMMARY

Passenger cars and light commercial vehicles in Australia emit around 9 to 10 per cent of national CO₂ emissions and therefore have a role to play in reducing Australia's national CO₂ emissions.

The emission profile of the new vehicle fleet has improved by around 16% over the past 8 years due to a combination of energy efficiency improvements from advanced vehicle technology and consumer preference for lower emission vehicles.

Similar emission reductions are anticipated to continue as a result of ongoing R&D investment in ultra-low emission technologies, rising fuel prices and consumer demand.

Australian consumers have access to a wide range of the most advanced, low emission vehicle technologies available anywhere in the world. With average automotive tariffs of around 3.5 per cent, Australia has one of the most open and competitive automotive markets in the world. Around 85 per cent of new passenger vehicles sold in Australia are imported from major vehicle manufacturing nations. Similarly, up to half of all vehicles manufactured in Australia are exported to world markets including North America, Europe, the Middle East and Asian markets.

Consumer demand for low emission vehicle technologies varies considerably between different countries and is dependent upon a range of factors including fuel price, urban density, average incomes, the quality of public transport, etc. These factors influence consumers' preference for the size of vehicle, fuel type and relative efficiency of vehicles.

The National Transport Commission found that if Australians had purchased the most efficient vehicle in the same class, average CO₂ emissions would be 135 g/km in 2010 rather than 212.6 g/km. This indicates that the technology required to reduce average emissions from new passenger vehicles is available in the Australian market.

Internationally, economies such as the EU, Japan and the US have intervened through a range of complementary retail consumer initiatives to lower the cost to consumers of purchasing low emission vehicle technologies. These initiatives include direct cash incentives, taxation concessions and differential registration costs. In recent years they have complemented these initiatives with mandatory efficiency targets for new vehicle sales.

Mandatory CO₂ emission standards, in the absence of a comprehensive strategy to reduce CO₂ emissions, may inadvertently increase CO₂ emissions from passenger motor vehicles. For example, improved efficiency of vehicles may result in increased passenger vehicle use, offsetting the benefits of improved efficiency.

Despite the absence of a comprehensive strategy to reduce CO₂ emissions from passenger transport in Australia, FCAI is supportive of a mandatory CO₂ standard as a mechanism to encourage uptake of advanced environmental technologies. The automotive industry is investing significant resources in a range of advanced environmental features to reduce fuel consumption and emissions.

Central to this support is the need to develop ambitious and achievable CO₂ emission targets. A CO₂ emission target for Australia should be realistic and reflect Australian consumers' preference for low emission technologies. Every vehicle manufacturer is committed to reducing CO₂ emissions from their fleet. However it should not be the intention of the Australian Government to use a CO₂ standard to raise revenue.

In establishing a CO₂ emission target for Australia, consideration needs to be given to the current level of adoption of advanced environmental technologies, the expected increase in availability of these technologies in future years, and the willingness of Australian consumers to purchase these advanced technologies. Critical to this assessment is the expected price and quality of available fuels.

FCAI analysis demonstrates that a target of 195 grams of CO₂ in 2015 and 176 grams of CO₂ in 2020 are achievable if consumers continue to demand more efficient and smaller vehicles. Achieving these targets will also require an increase in consumer demand for diesel powered vehicles.

Underpinning future targets should be a series of mechanisms that encourage manufacturers to introduce emerging vehicle technology into the Australian market as quickly as possible. This outcome can be facilitated through recognition of the importance of alternative fuels and eco-technologies in reducing CO₂ emissions from motor vehicles from in-fleet use, not simply through a static test procedure. Similar initiatives have been adopted in other national CO₂ emission standards.

After detailed analysis the FCAI's makes the following key conclusions and recommendations:

- There is merit in developing a mandatory CO₂ emission standard.
- The targets should be ambitious, yet achievable. The industry is committed to reducing CO₂ emissions but does not support measures to use this standard as a revenue measure.
- Improving the efficiency of new vehicles is a shared responsibility of industry, consumers and government.
- The majority of the industry prefer a mass based parameter, as the most internationally consistent method of regulation.
- The scheme should be designed to attract advanced technologies to the Australian market earlier than commercial forces may achieve, through credits for alternative fuels and advanced technologies.
- The scheme should be designed to incentivise the uptake of fuel efficient technologies that are not recognised through the test cycle.
- The standard should be supported through a single piece of legislation and apply to all vehicles under 3.5 tonnes.
- All brands including niche brands and new entrants, should be required to demonstrate a commitment to the target however, their unique nature should be taken into consideration in determining targets.
- Brands should have access to flexibility arrangements including pooling, banking and lending to ensure that each brand's commitment to reducing emissions is fully recognised through the standard.
- The scheme should be flexible, recognising the staged manner in which product cycles work and product investments are made.
- That financial penalties should be linked to the Carbon Price and applied only if the emissions target for all vehicles is not achieved.

INTRODUCTION

The Federal Chamber of Automotive Industries (FCAI) provides the following submission in response to the Australian Government's Discussion Paper on 'Light Vehicle CO₂ Emission Standards for Australia, 2011'.

FCAI is the peak industry organisation representing vehicle manufacturers and importers of passenger vehicles, light commercial vehicles and motor cycles in Australia.

The submission presents FCAI's views on key aspects of the design of a CO₂ emission standard for new motor vehicles.

INVESTMENT IN NEW TECHNOLOGY

Automotive manufacturers are investing heavily in a range of technologies and advances in vehicle design that have the potential to make further significant contributions to reducing vehicle CO₂ emissions. Some of the key approaches being pursued include:

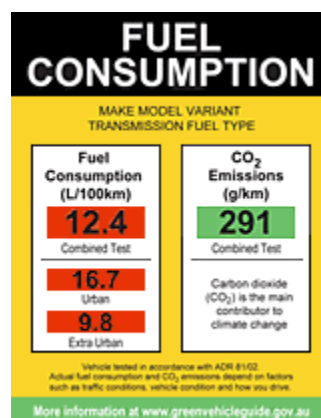
- Development of advances in electric vehicle capability and design, including advanced battery technologies;
- Improvements in vehicle design, including increased thermal efficiency in engines; reduced friction loss; enhanced aerodynamics; reduced rolling resistance and reductions in vehicle weight;
- Advances in hybrid vehicle technology;
- Development of enhanced alternative fuels capability, including new generation renewable biofuels; and
- Hydrogen fuel cell vehicles.

Significant opportunities exist for the uptake and further development and uptake of these technologies in the Australian automotive industry.

WHAT IS A CO₂ EMISSION STANDARD

All new light vehicles sold in Australia are required to display a Fuel Consumption Label (shown below) on the front windscreen. This includes all passenger cars, four wheel drives and light commercial vehicles up to 3.5 tonnes gross vehicle mass. The label indicates the vehicle's fuel consumption in litres of fuel per 100 kilometers (L/100km) and its emissions of carbon dioxide (CO₂) in grams per kilometer (g/km).

Figure 1: Fuel Consumption Label



The results shown on the Fuel Consumption label are based on a standard test procedure so consumers can reliably compare the performance of different models under the same test conditions. The test procedure does not simulate all 'real world' conditions and the primary aim of the label is to provide a common basis for comparison of individual vehicle models.

National Average Carbon Emissions (NACE) is a value which is determined by simply calculating the average CO₂ emissions, as reported on the Fuel Consumption label, from all new vehicles sold in the Australian market each year. There are approximately one million new light vehicles sold in Australia each year.

The Average CO₂ Emissions from all light vehicles sold in Australia was 212.6 grams of CO₂/km in 2010.

This result is 16% lower than in 2002 when the average CO₂ emissions are estimated to have been 252 grams of CO₂/km.

The NACE outcome of 212 grams of CO₂ in 2010 was lower than in 2002 for the following reasons:

- Improvements in vehicle technology: Improved engine and vehicle design has lowered CO₂ emissions (increased uptake of Hybrid powered vehicles, advanced engine technologies, reduced rolling resistance, improved aero-dynamics, etc.).
- Increased consumer preference for smaller vehicles: The new car market in Australia has increased by 32% since 2000 with the majority of this growth in demand for small and medium sized vehicles.
- Diesalisation: Consumer acceptance of diesel powered vehicles has continued to grow. Diesel powered vehicles can have up to 20% lower CO₂ emissions than alternatively fueled vehicles and

A CO₂ Emission Standard aims to ensure that all parties, consumers, industry and Government are working toward lowering the emissions from the average new vehicle sold in the Australian market each year.

REDUCING CO₂ EMISSIONS

The Australian Government has committed to a 5 to 20 per cent reduction in CO₂ emissions (against levels in the year 2000) in the economy by 2020.

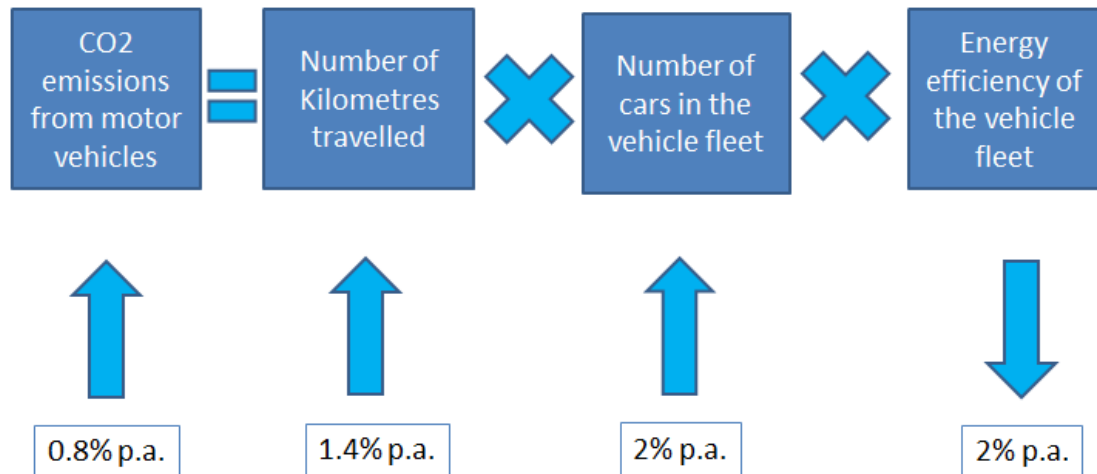
Passenger motor vehicles and light commercial vehicles (under 3.5 tonnes) produce around 9 to 10 per cent¹ of Australia's national CO₂ emissions and therefore have a role to play in reducing CO₂ emissions. Motor vehicle efficiency has improved significantly over the past 30 years resulting in an improvement in average fuel economy and lower CO₂ emissions.

However, improving the efficiency of new motor vehicles will not, by itself, reduce CO₂ emissions from the passenger motor vehicle fleet.

CO₂ emissions from motor vehicles are a factor of the number of kilometers traveled, average energy efficiency of the vehicle fleet and the number of vehicles on the road. This equation is depicted in Figure 2, below.

¹ 'Light Vehicle CO₂ Emission Standards for Australia', Discussion Paper, 2011, the Australian Government, page 3.

Figure 2: CO2 Emissions from Motor Vehicles

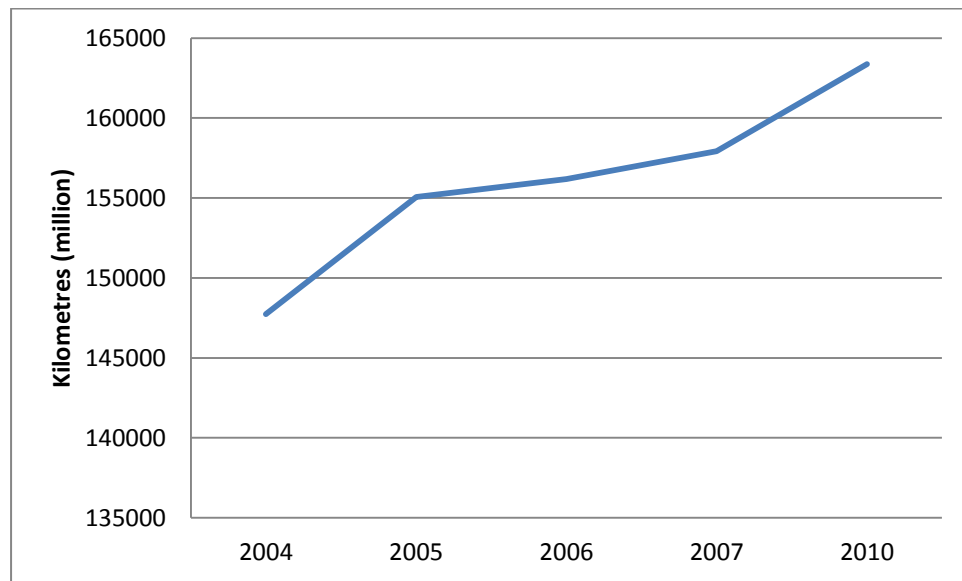


Unfortunately, increasing the energy efficiency of new cars does not necessarily result in a reduction in CO2 emissions from the motor vehicle fleet.

VEHICLE KILOMOTRES TRAVELLED

The Australian Bureau of Statistics reports that the total number of kilometers traveled in Australia by passenger vehicles is increasing by around 1.4 per cent each year, as demonstrated below, in Figure 3.

Figure 3. : Vehicle Kilometers Traveled



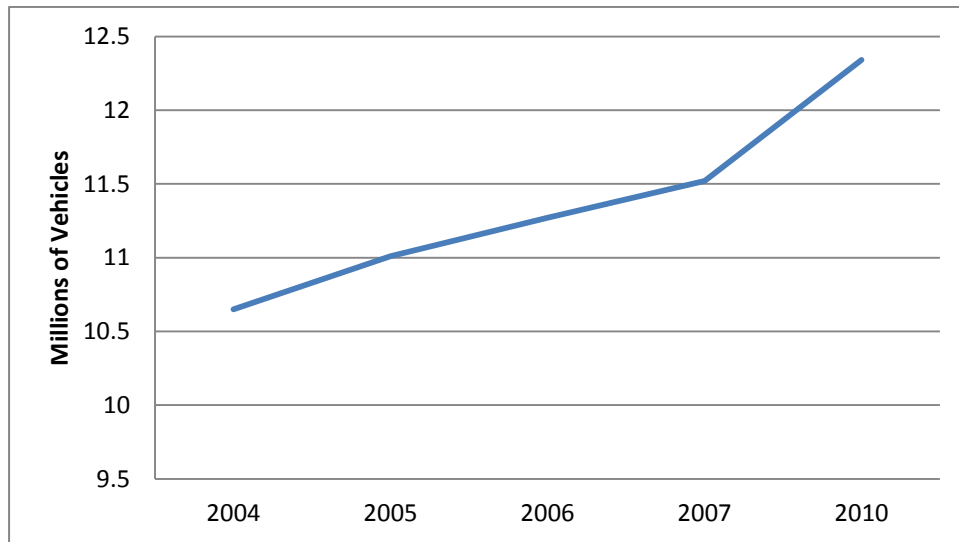
Source: ABS, Survey of Motor Vehicles Use (cat no. 9208.0)

Note: Equivalent data is not available for 2008 – 2009.

MOTOR VEHICLE FLEET

The Australian Bureau of Statistics also reports that the number of vehicles on Australian roads is increasing at around 2 per cent each year, as demonstrated below, in Figure 4.

Figure 4: Passenger Vehicle Fleet



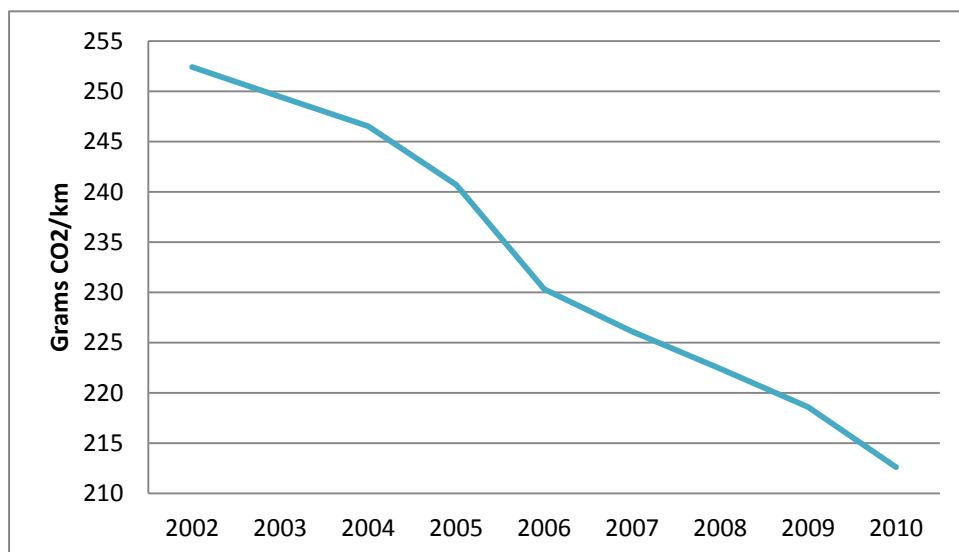
Source: ABS, Survey of Motor Vehicles Use (cat no. 9208.0)

Note: Equivalent data is not available for 2008 – 2009.

ENERGY EFFICIENCY OF NEW VEHICLES

The impact of an increase in the number of kilometers traveled and an increase in the number of vehicles on the road therefore more than offsets the reduction in CO₂ emissions from the average new motor vehicle, of around 1.3 per cent each year. The reduction in average CO₂ emissions from new motor vehicles under 3.5 tonnes is demonstrated below in Figure 5.

Figure 5: Average CO₂ Emissions from New Motor Vehicles



Source: FCAI, VFACTS

THE REBOUND EFFECT

In June 2011, the Productivity Commission Report on Carbon Emission Policies in Key Economies² noted that:

1. “By lowering operating costs of energy-using equipment — effectively making marginal energy use cheaper — improved energy efficiency can cause a secondary increase in the demand for energy. For example, more fuel efficient motor vehicles make travelling cheaper and hence provide users with an incentive to drive further and more often. This is called the energy efficiency direct ‘rebound effect’.
2. “Also, in the absence of substantial market failures, the cost of abatement imposed by fuel efficiency standards for new vehicles can be unnecessarily high. All of the abatement burden is placed on new vehicles — no ongoing incentives are in place to improve fuel efficiency of older vehicles, to update to more fuel efficient.”

While the average emissions of new motor vehicles or fuel efficiency of a vehicle can be observed, this is only one factor among several which are relevant in measuring emissions from a vehicle. Total vehicle emissions are dependent on the distance the vehicle is driven, the type of fuel used, road conditions, where the owner lives and his or her driving style.

² Productivity Commission, Carbon Emission Policies in Key Economies 2011, page 193-4.

AN INTEGRATED APPROACH TO REDUCING CO₂ EMISSIONS

While the automotive industry concentrates on undertaking R&D of new technologies to improve the fuel economy and lower the emissions from new passenger cars, this is a long-term process. Results of research programs initiated today can only be expected to reap benefits in the medium to long term. Reducing CO₂ emissions through vehicle technology can be more expensive than measures such as the increasing use of biofuels, better infrastructure and traffic management, and adopting an economic driving style. A comprehensive or integrated approach to reducing CO₂ emissions from passenger vehicles (reducing kilometres travelled, reducing the number of vehicles on road and improving the energy efficiency of the entire vehicle fleet) will result in larger, cost-effective CO₂ emission reductions from road transport than targeting vehicle technology.

A key component of an integrated approach to reducing CO₂ emissions from passenger transport is however the need to improve energy efficiency within new motor vehicles. For this reason, FCAI is supportive of actions to improve energy efficiency in new motor vehicles.

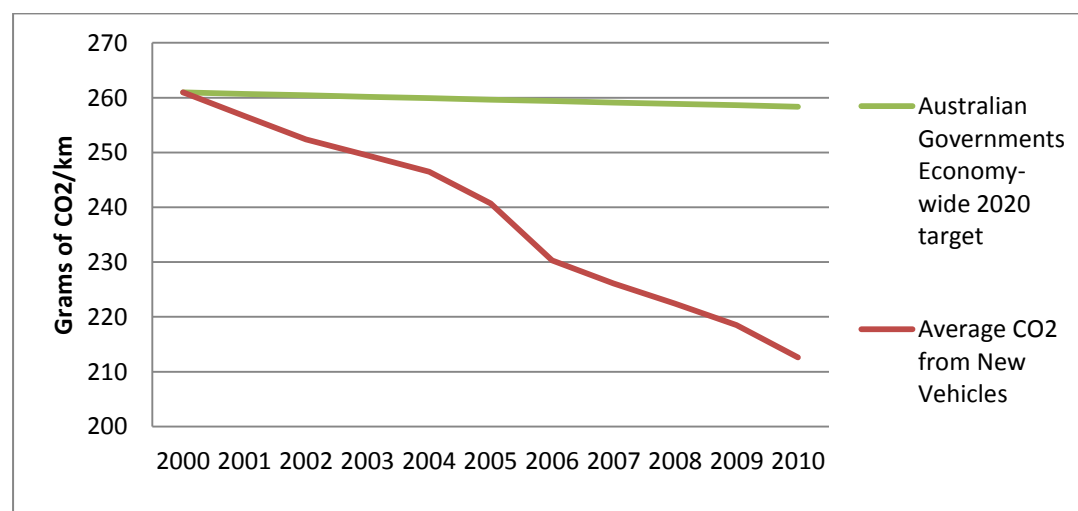
EMISSIONS TRAJECTORY

The Australian Government has established a target to reduce economy-wide carbon emissions by 80 per cent by 2050 (based upon emissions in the year 2000). The Australian Government has also committed to at least a 5 per cent reduction in CO₂ emissions by 2020.

If the Governments economy wide target of a 5% reduction by 2020 was applied to average emissions from new motor vehicles then the NACE target would be 247 grams of CO₂ in 2020. As average emissions are already around 213 grams of CO₂ in 2010 a more ambitious target is achievable. Figure 6 below demonstrates this 5 per cent reduction as applied to average CO₂ emissions from new motor vehicles and the actual reduction in average CO₂ emissions from new motor vehicles over the same period.

If average new vehicle CO₂ emissions were the only measure required to reduce CO₂ emissions in motor vehicles, emission reductions would be well ahead of the Australian Government's target for 2020 and on target to achieve an 80 per cent reduction in CO₂ emissions by 2050.

Figure 6: 15% Reduction in Average New Vehicle CO₂ Emissions Compared to a 5 per cent Government Target



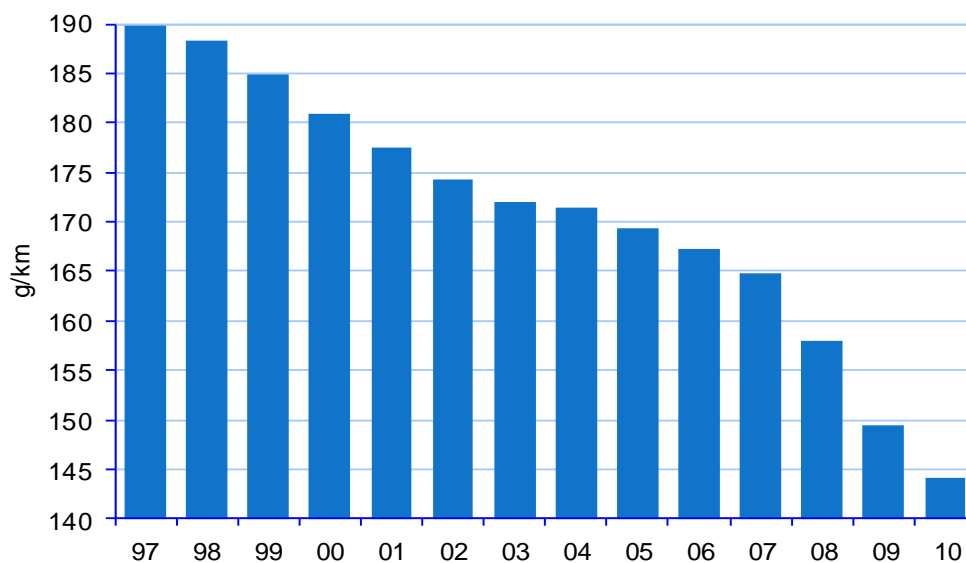
Note: FCAI has estimated that the NACE in 2000 would be approximately 260 grams of CO₂ by assuming that emissions from 2000 to 2002 were reduced at the same rate as they have in the period 2002 to 2010.

APPROACHES TO REDUCE CO₂: UNITED KINGDOM

Average CO₂ emissions from new passenger cars in the United Kingdom have reduced from 190 g/km in 1997 to 144.2 g/km in 2010.

This reduction was achieved through a combination of demand and supply-side approaches to ensure the supply of advanced technology and encourage consumers to purchase these technologies. It is worth noting that the UK does not have a mandatory CO₂ emissions target and that retail fuel prices are generally higher.

Figure 7: UK Average New Car CO₂ Emissions



Source: SMMT

Supply side initiatives: United Kingdom

The UK Government has introduced a number of initiatives aimed at encouraging R&D of new technologies into the retail market. These include:

- £200m Government investment in a network of Technology and Innovation Centres (launched 2011);
- Technology Strategy Board budget 2008 to 2011 of £711m for innovation investment;
- £45m for nine new university centres for innovative manufacturing funded via Engineering and Physical Sciences Research Council (EPSRC) Centres (launched 2011);
- EPSRC directing £760m during 2011/12 to research projects, over £80m in manufacturing alone;
- £20m TSB/ Low Emission Vehicle supply chain competition (total over £50m).

Demand side initiatives: United Kingdom

The UK Government has also introduced a number of initiatives aimed at encouraging motorists to purchase low emission vehicles. These include:

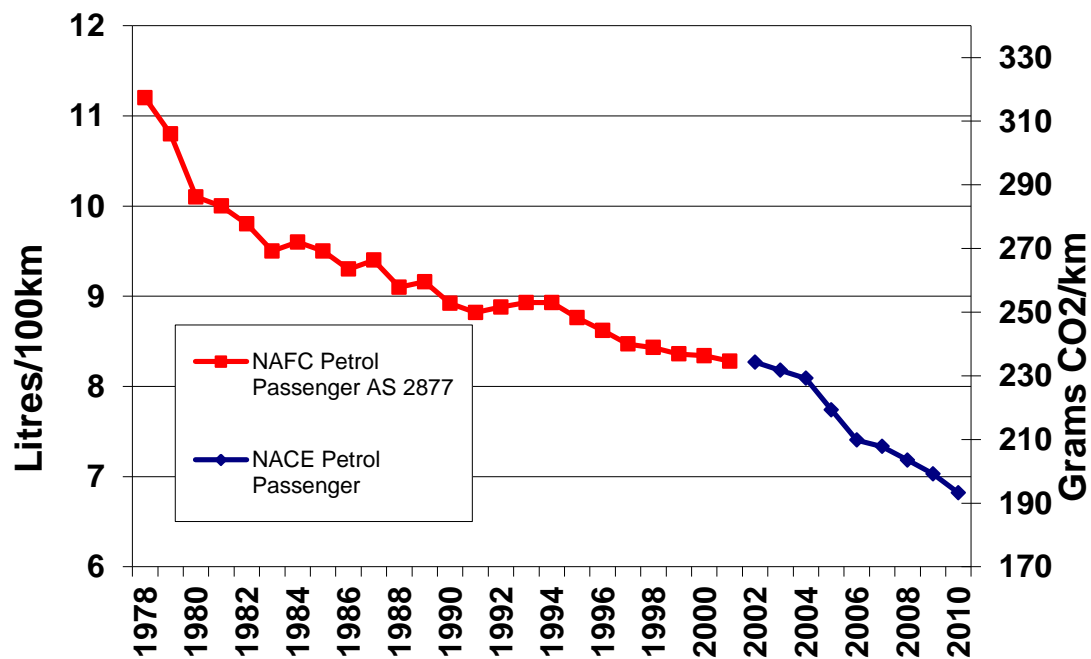
- £300m consumer incentives including:
 - £43m until March 2012 for reduced price vehicles;
 - £30m infrastructure programme for 8 Plugged-in Places locations;
- £45m Green Bus procurement fund;
- £25m ultra low carbon vehicle demonstration program;
- Vehicle Excise Duty exemption;
- First year capital allowances for fleet vehicles and vans;
- 0% Benefit in kind/ company car tax for five years;
- Lower rate of VAT for domestic electricity.

APPROACHES TO REDUCE CO₂: AUSTRALIA

CO₂ emissions and fuel consumption in Australia have improved by around 30 per cent over the past 30 years and around 15 per cent since 2000. Figure 8 below, demonstrates on-going improvement in the energy efficiency of the new vehicle fleet.

This outcome has been achieved in the absence of mandatory CO₂ emission standards.

Figure 8: Fuel Economy and CO₂ Emissions from New Light Vehicles in Australia



Note: National Average Fuel Consumption (NAFC) as measured by Australian Standard 2877 was replaced by the measurement of National Average Carbon Emission (NACE) as measured by the United National Economic Commission for Europe Drive Cycle at the request of the Australian Government.

Supply side initiatives: Australia

In 2008 the Australian Government established a \$1.3 billion Green Car Innovation Fund to encourage investment in R&D and “commercialization of Australian technologies that significantly reduce fuel consumption, greenhouse gas emissions, or the weight of vehicles.”

This scheme was abolished in January 2011.

Demand side initiatives: Australia

On 24 July 2010 Prime Minister Gillard announced the Cleaner Car Rebate which was designed to “support motorists to purchase new, low-emission, fuel-efficient vehicles.” The scheme was designed to operate over four years from 1 January 2011 and was expected to “result in significant cuts in Australian fleet emissions...” The scheme was estimated to cost \$394 million.

In January 2011 the Australian Government announced that the program would not proceed.

Passenger transport fuels, which have a substantial impact on consumer preference for low emission vehicles, have been excluded from the carbon price.

REDUCING AVERAGE CO₂ EMISSIONS FROM NEW VEHICLES

The Australian industry and Government have a long history of cooperatively developing targets to reduce fuel consumption and lower CO₂ emissions from new motor vehicles, dating back to the 1970s.

Figure 9: Targets and Results from Fuel Consumption and CO₂ Emission Targets

	Target	Actual
1983	9.5 litres/100km	9.5 litres/100km
1990	9.0 litres/100km	8.9 litres/100km
2000	8.2 litres/100km	8.3 litres/100km
2010	6.8 litres/100km	NA, details below
2010	222 grams of CO₂/km	212 grams of CO₂/km

These targets were developed cooperatively taking into consideration the expected technology improvements, changes in consumer demand, international action and the quality and price of Australian fuels.

THE 2010 NAFC TARGET OF 6.8 LITRES/100KM

In March 2003 the Australian automotive industry agreed to improve National Average Fuel Consumption (NAFC) to 6.8 litres/100km by 2010 for new petrol passenger vehicles.

This target was based on a number of assumptions, including that by 2010 the minimum fuel quality standard in Australia would be 95 RON with a maximum 10 ppm sulphur (i.e. Euro 4 standard). By 2005, it was evident that Australia would not have achieved the Euro 4 fuel quality standard by 2010.³

In 2003 the 'test cycle' used to calculate fuel consumption in Australia was changed from the ADR 37/01 cycle based on the US EPA regulations to the new European Drive Cycle (NEDC) as part of ADR 79/00. While both of these test cycles were primarily designed to measure motor vehicle emissions they are substantially different in terms of cycle time, length, maximum speed and accelerations.

As a consequence of the change in the 'test cycle', average fuel efficiency increased from 8.82 l/100 km in 2002 to 9.97 l/100km in 2003 (this is highlighted in Figure 9 above). Given the significant downward trend in fuel economy, this dramatic increase can only be attributed to the changes in the test cycle.

³ The RIS for 'Vehicle emissions and fuel quality standards for the post 2006 period', prepared by the Australian Department of Transport and Regional Services concluded that "applying the sulphur limit to regular unleaded or lead replacement petrol is not warranted on cost benefit grounds."

All new vehicles sold in Australia from 2003 are required to be tested against the new test cycle (ADR 79/00). This data is made available through the Government website, the Green Vehicle Guide, and on the fuel consumption label displayed on new vehicles.

As a consequence of the change in test cycles, vehicles are no longer tested to the old test cycle (ADR 37/01) and no data is available to record the industry's progress toward the 2003 NAFC target.

Conversion of the NAFC target to the new testing protocols also appears an impossible task, as will be described below (Standardization of test cycles, page 17).

Consequently, FCAI sought to establish a new industry target for 2010 based on average CO₂ emissions in a single summary measure of industry performance.

THE 2010 NACE TARGET

In 2005, FCAI established a voluntary target to reduce National Average Carbon Emissions (NACE) for all new vehicles (under 3.5 tonnes GVM) to 222 grams of CO₂/km by 2010. At the request of the Australian Government, the 2010 NACE target was expanded to include all vehicles under 3.5 tonnes, not just passenger vehicles, and therefore includes SUVs, light trucks and vans. Obviously, with these larger vehicles any new target for reduction in CO₂ emissions becomes more challenging.

The NACE target also includes all fuel types unlike the NAFC target which only incorporated petrol vehicles.

The NACE has improved continuously since data was first collected in 2002 from 252 grams CO₂/km to 212 grams CO₂/km in 2010, a reduction of 15 per cent.

A NEW TARGET

On 24 July 2010 the Prime Minister, Julia Gillard, announced a “New Emission Standard for Cars”. “Cuts of 14 per cent and 30 per cent would see national average emissions fall to 190 g/km (in 2015) and 155 g/km (in 2024). These levels will be used as the starting point for discussions with industry and stakeholders.”

There are conflicting challenges for the Government and industry in the development of a target. Whilst the Government seeks evidence of rapid improvements in average CO₂ emissions, the industry is constrained by the significant time and cost associated with changes to engine and vehicle design. New technologies can only be introduced to vehicles when new vehicle models are introduced to the market.

With the very short timeframe, likely to be less than three years once a target is regulated, a target in 2015 will not be able to achieve significant reductions in CO₂ emissions.

A 2015 NACE target of 190 grams of CO₂ in 2015, based on current trends is unlikely to be achieved without a dramatic increase in fuel price or retail incentives for consumers to purchase more efficient vehicles.

FCAI MODELING

To assist in the task of developing future CO₂ targets, FCAI engaged PricewaterhouseCoopers (PwC) to develop an ambitious, robust and achievable emissions target or standard. The target is based on analysis of technology improvements and changes in market segmentations (fuel type, vehicle size etc.).

PWC developed a model of future vehicle emissions in the context of the following observations:

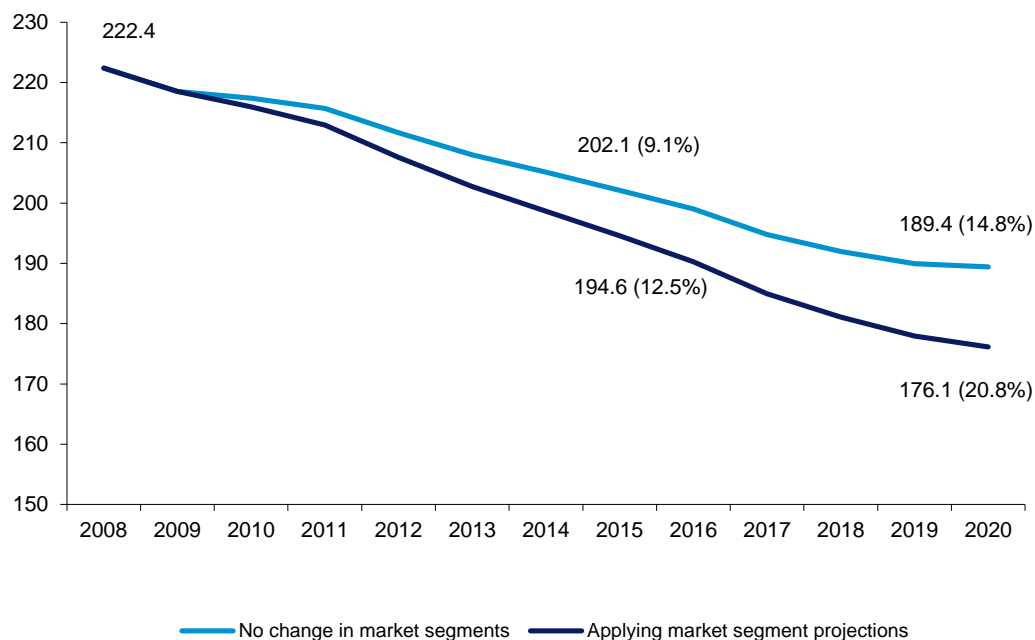
- The assessment is based on international analysis and consultation with Australian car manufacturers/importers representing 67 per cent of the Australian market;
- Carbon emission reductions are measured relative to 2008 levels (consistent with the RIS);
- Technology categories and emissions savings were based on a report prepared for the UK Government entitled “King Review of low-carbon cars (UK)” and tested with the automotive industry. Technology changes were modeled for each vehicle manufacturer and importer, with specific allowances made for whether the technology is likely to be introduced, the expected year of introduction and the estimated emission savings;
- Market share projections are based on consultation with FCAI and the automotive industry;
- Consistent with the RIS requirements, the modelling assumes:
 - No new regulations/changes to existing regulations impacting the car industry
 - No changes to government incentives (for consumers or the automotive industry)
 - No changes in relative fuel prices;
- Technologies which were specifically canvassed in this review include: petrol and diesel direct injection; variable valve actuation; smaller capacity engines (e.g. due to turbo-charging/supercharging, clean diesel or light-weighting); dual clutch transmission; stop-start; regenerative braking; reduced mechanical friction components; light-weighting; low resistance tyres; improved aerodynamics.

From this modelling PwC recommended that carbon emissions are projected to decrease by 12.5 per cent by 2015 (relative to 2008) and by 20.8 per cent by 2020. The shift to diesel vehicles and improvements in diesel technology alone are estimated to result in a 5.8 per cent improvement by 2015 and a 7.6 per cent improvement by 2020.

- In 2015, average CO₂ emissions are projected to reduce to 202.1 g/km (assuming no change in market share) or 194.6 g/km (applying market share projections).
- In 2020, average CO₂ emissions are projected to reduce to 189.4 g/km (assuming no change in market share) or 176.1 g/km (applying market share projections).

The detail and explanation of the methodology underpinning this analysis is reported in “Managing Carbon Emissions: Options for development of a standard”. This report is available at http://www.fcai.com.au/library/publication//pwc_fcai_final_report.pdf.

Figure 10: Forecast National Average New Vehicle CO₂ Emissions



RECOMMENDATION

FCAI notes that development of an ambitious and achievable target requires a detailed analysis of the technology currently fitted to motor vehicles in Australia, which also takes into account expected technology improvements and changes in consumer preference for low emission vehicles. Changes in consumer demand for technology are related to changes in the price of fuel and the relative price of Petrol, Diesel, LPG and alternative fuels.

This approach is consistent with the methodology adopted in Europe and the United States.

Consistent with the Australian Government targets for reducing emissions economy-wide by 5 to 25 per cent by 2020, FCAI believes that a 25 per cent reduction to 195 g/ CO₂ in CO₂ emissions by 2015 and a 32 per cent reduction to 176 g/ CO₂ by 2020 are appropriate targets.

Achieving the Government's emissions reduction targets in new vehicles, prior to the target dates, will allow time for these new vehicles to be adopted across the vehicle fleet.

THE COST OF ABATEMENT

As outlined in the Government's Discussion Paper, the EU had a voluntary agreement with car makers to reduce average CO₂ emissions for new passenger vehicles to 140g CO₂ by 2008. This EU target was not achieved. A new target of 130grams of CO₂/KM by 2012 was adopted in the EU and subsequently delayed due to the short implementation timeframe.

An analysis of this mandatory target by the European Automobile Manufacturers Association (ACEA) has estimated that the cost of this regulation will be up to 475 Euros per tonne of CO₂ during the period 2012 to 2015⁴. Moreover, a separate analysis undertaken by RWI Essen has estimated the cost of this approach equates to a carbon price of around 200 Euros per tonne of CO₂ and could be as high as 950 Euros per tonne of CO₂ after 2015.⁵

The carbon price in Australia is legislated to commence at \$23 per tonne in 2012 and increase each year to 2015. Therefore, the cost of abatement from passenger cars would range from 10 to more than 30 times the cost of abatement of carbon emissions from other sources.

ALLOCATING CORPORATE TARGETS

Every economy that has developed a CO₂ or fuel consumption standard has adopted a unique design parameter.

Figure 12. below shows the different approaches adopted in key markets.

Figure 12: Corporate Targets in Key Markets

	Standard	Parameter	Test Cycle
Japan	Fuel	Inertia Class	JC08
EU	CO ₂	Mass (kgs)	NEDC
China	Fuel	Mass (Class)	NEDC
Canada	CO ₂	Inertia Class/Footprint	CAFE
US	Fuel	Footprint	CAFE
Korea	Fuel	Engine Capacity/Mass	EPA
Australia	CO ₂	Industry average	NEDC

In considering options for burden sharing, FCAI has dismissed the following options:

1. Inertia classes: Similar to mass based parameter however, can create incentives to 'game the system' by shifting vehicles between classes.
2. Mass based classes (i.e. China): Similar to mass based parameter however it can create incentives to 'game the system' by shifting vehicles between classes.
3. Individual vehicle CO₂ emissions: overly restrictive.
4. Engine capacity: Poor measure of utility or technology.

⁴ www.acea.be

⁵ *A Regression on Climate Policy: The European Commission's Proposal to Reduce CO₂ emissions from Transport*, Manuel Frondel, Christoph M. Schmidt and Colin Vance, 2008

FCAI has undertaken detailed analysis of the following three options for allocating corporate CO₂ emissions targets (an overview of this analysis is provided at Attachment 1).

1: UNIFORM PERCENTAGE REDUCTION

In this approach the industry's CO₂ obligation is shared equally amongst all brands. Moreover, all brands would be prescribed a fixed percentage reduction of their Corporate Average Carbon Emissions (CACE) which is equal to the percentage reduction in the industry target.

For example, if the industry target is a 30 per cent reduction in National Average Carbon Emissions (NACE) each brand must achieve a 30 per cent reduction in their respective CACE.

This approach recognises that brands with low emissions in 2008 (the base year) will have a lower nominal reduction target compared to a larger brand. For example a brand with a low CACE in 2008 of 100 grams of CO₂/km will need to achieve a 30 gram reduction in CO₂/km while an alternative brand with a relatively high CACE of 300 grams of CO₂/km will need to achieve a 90 gram reduction in CO₂/km by the target year.

This model has one major flaw: it does not recognise that brands specialise in vehicles of different utility and that this may change over time. For example, a brand specialising in passenger cars may choose to expand into manufacturing SUVs and under this approach they would effectively be prohibited from expanding their model range into larger vehicle categories.

The uniform percentage reduction also penalises brands which are early adopters of new technology and severely limits their ability in future years to expand their sales into sales of larger vehicles.

Figure 13: Fixed Percentage Reduction

Group	CACE 2005	36%- reduction base 2005
BMW Group	228	147
Daimler AG	227	146
Ford	277	178
GM	252	162
Honda	202	130
Hyundai	213	137
Mazda	221	142
Mitsubishi	250	161
PSA	180	116
Nissan	254	163
Ssangyong	266	171
Subaru	236	152
Suzuki	190	122
Toyota	238	153
Volvo	264	170
VW AG	211	135
Average	241	155

Note: The data contained in this table is indicative only of any brand target. There are insufficient brands displayed in this table to draw a whole of market analysis of corporate targets. The corporate targets in this table should not be compared with other similar tables in this paper. The Brand groupings are indicative of the European market and are not reflective of likely Australian groupings.

2: CORPORATE SPECIFIC MASS BASED TARGET

In this approach a relationship between mass and CO₂ is established across the industry, reflecting the relationship between vehicle mass and CO₂ emissions.

In analysing mass as a parameter FCAI has come to the following conclusions:

- There is a strong correlation between mass and CO₂.
- The slope of the limit curve has a significant impact on CACE targets.
- A mass based parameter can create disincentive to light-weight vehicles, at the margin.
- Not all brands are required to reduce emissions to achieve a 2015 target of 190 grams, some brands are already below the mass limit curve for 2015.
- Mass creates unrealistic expectations on some brands, given the timeframe to 2015.

Figure 14 : Corporate Average Emissions and Mass Limit Curves

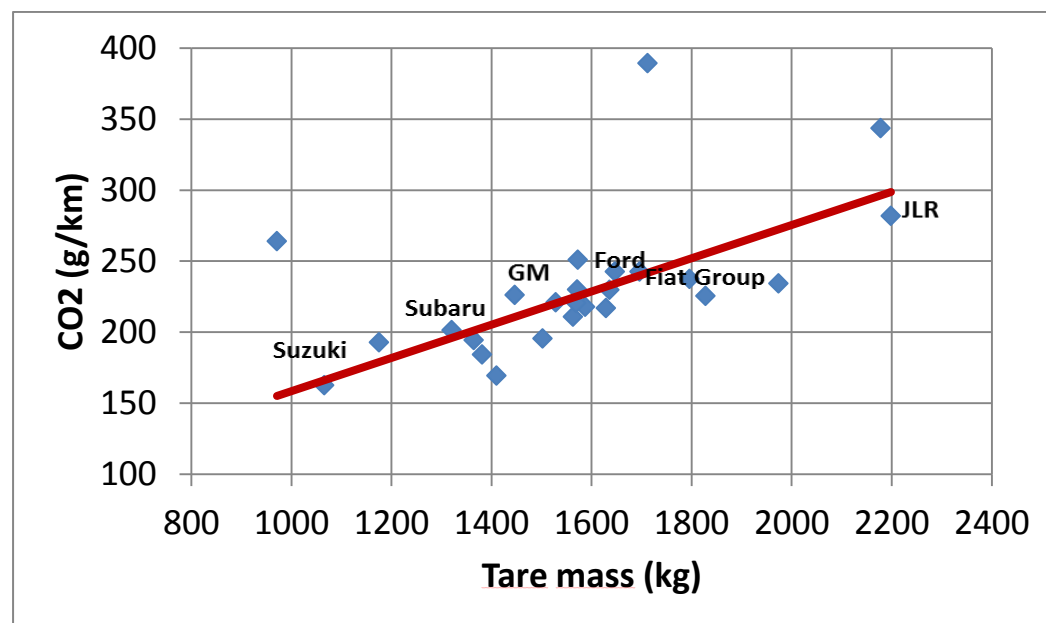
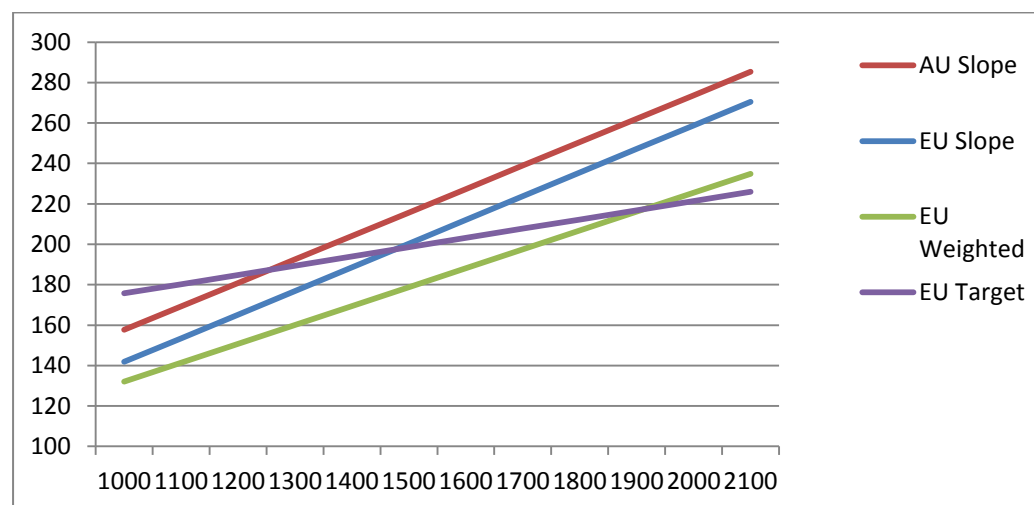


Figure 15: Comparison of Mass Limit Curves for Australia and the EU



To address the concern that the mass parameter can create unrealistic targets in the short-term (2015), the following “hybrid mass” option was considered.

The hybrid mass option recognises that a short-term target in 2015 does not provide adequate time for (some) brands to reduce CACE to achieve the limit curve, and places a maximum and minimum CACE target in addition to the mass limit curve. Moreover, to accommodate a NACE reduction of 15 per cent (222 grams in 2008 to 190 grams in 2015) an additional maximum CACE reduction target could be set at 20 per cent (i.e. no brand would be required to reduce emissions by more than 20 per cent).

Figure 16 below, demonstrates how different slopes impact on the relative targets of a sample of brands.

Figure 16: CACE Targets in 2015 with Mass as the Parameter

	CACE 2008	100% Slope	80% Slope	60% Slope	Targets 2015
Aston Martin	389	209	205	201	311
BMW Group	211	194	193	192	190
Daimler AG	217	200	198	196	195
Fiat Group	243	207	204	200	200
Ford	242	202	200	197	197
GM	251	194	194	193	201
Honda	194	173	177	180	175
Hyundai	184	175	178	181	166
Isuzu	225	220	214	208	203
JLR	282	258	244	231	225
Mazda	201	169	173	177	177
Subaru	226	182	183	185	181
Suzuki	193	154	161	169	169
Toyota	220	194	193	192	192
Volvo	237	217	212	206	206
VW AG	195	187	188	188	176
Average	222	191	191	191	188

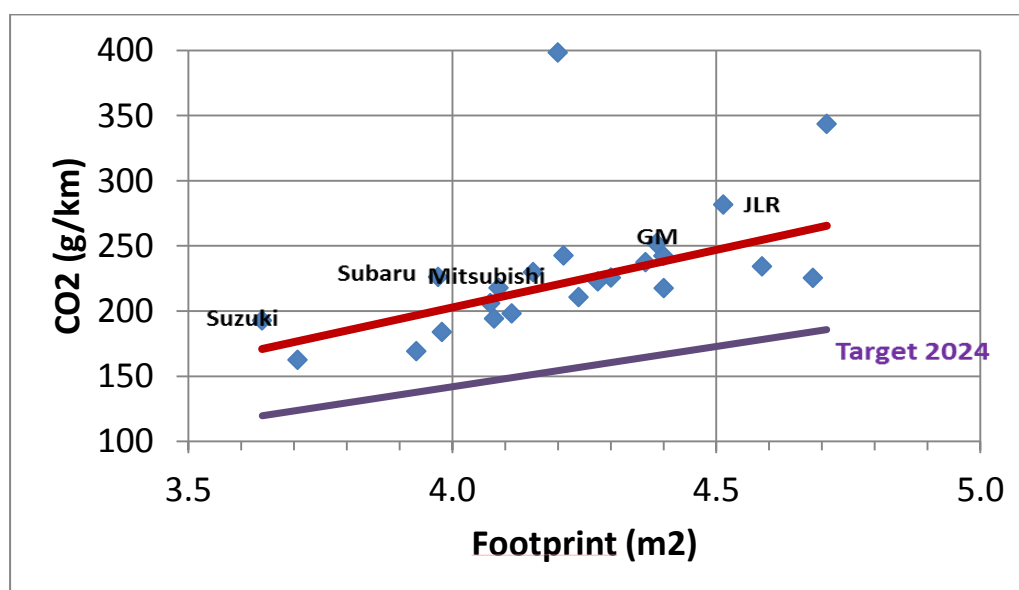
Note: The data contained in this table is indicative only of any brand target. There are insufficient brands displayed in this table to draw a whole of market analysis of corporate targets. The corporate targets in this table should not be compared with other similar tables in this paper. The Brand groupings are indicative of the European market and are not reflective of likely Australian groupings.

3: CORPORATE SPECIFIC FOOTPRINT BASED TARGET

The footprint based parameter is similar to the mass-based parameter with the exception that the parameter is determined based upon the length and width of vehicles. In analysing footprint as a parameter, FCAI has come to the following conclusions:

- There is a correlation between footprint and CO₂.
- It incentivises light-weighting of vehicles.
- Changes to the slope could be adopted to limit incentives to increase vehicle footprint (i.e. the US regulations have a cap and floor) however, there does not appear to be merit in altering the footprint limit curve in the Australian market.
- Footprint creates unrealistic expectations on some brands, given the timeframe to 2015.

Figure 17: Corporate Average Emissions and Footprint Limit Curves



RECOMMENDATION

In analysing the preferred design parameter it should be noted that all options considered by FCAI have inherent flaws (e.g. create incentives to game the system, distort brand behavior, may have perverse incentives such as increasing mass or footprint of a vehicle). It is because of these inherent flaws that there is no internationally consistent approach to allocating corporate targets.

After detailed analysis of the options, FCAI believes that only the parameter based models of mass and footprint warrant detailed analysis. Individual vehicle, model or segment based approaches are inferior to the parameter based approach.

FCAI has undertaken a detailed analysis of both the mass and footprint based parameters and concluded that the majority of the industry would recommend the adoption of a mass based parameter.

Australian vehicle design rules are harmonised with leading global standards and, consistent with this approach, FCAI believes mass is the most internationally consistent method of determining corporate specific targets.

ECO TECHNOLOGIES

The test procedure used to measure CO₂ emissions from motor vehicles requires all accessories on the vehicle to be turned off during the test procedure. These accessories include items such as climate control, audio equipment and lights etc. The operation of these items affects the fuel consumption and CO₂ emissions from vehicle use.

A number of brands have introduced advanced environmental technologies (eco-technologies) aimed at improving the efficiency of the vehicle during on-road use. These technologies may relate to the accessories of the vehicle and therefore not be recognised through the test procedure.

To recognise the role these eco-technologies play in reducing CO₂ emissions in real driving conditions, credit regimes have been established in other CO₂ standards (notably those in the United States and Europe) which recognise the benefits of these eco-technologies.

The intention of these credit initiatives is to account for the technologies that reduce overall CO₂ but are presently not fully accounted for in the test cycle. Subsequently, these credits do also act to encourage innovation and development of new technologies that reduce overall CO₂ emissions from vehicles.

The following principles might be considered in developing a similar eco-technology credit system in an Australian CO₂ standard:

- Adoption of eco-technologies be voluntary.
- Technologies already recognised in Europe or United States under similar schemes may be harmonised on evidence that the same technology is available in Australia.
- Framework should be impartial and equitable to all manufacturers.
- Every manufacturer is responsible for proposing and justifying their technology.

Determination of eco-technology credits:

- CO₂ credits are conceptually determined by measuring a baseline vehicle without a technology and then measuring the same vehicle with the technology and applying a usage factor.
- In practice, the manufacturer should modify the test cycle to demonstrate the applicable conditions in which the technologies achieve their CO₂ reduction. However, if justified, conditions may be varied from the cycle or not conducted on a dynamometer (as long as a fair comparison can still be made that the CO₂ emissions are reduced).
- In the case of devices to improve driver behavior (e.g. gear shift indicator, fuel economy gauge etc.) a set value should be applied (e.g. 2g CO₂/km) applicable to all manufacturers.
- Separate verification rules should be applied to each technology.
- To qualify for a CO₂ credit, the manufacturer should demonstrate an average CO₂ saving on at least two vehicles.
- Results should be reproducible by third parties.
- CO₂ credits should be allowed for technologies up to a maximum of 20g for any particular vehicle.
- There is no limit to individual technology saving (even 0.1g can be counted).
- CO₂ credit applies to the vehicle with that feature. If it is not standard then applicable fitting rate should be factored.

- Examples of technologies that may be applicable for credit include gear shift indicator (GSI), Tyre Pressure Monitoring System (TPMS), and efficient air conditioner, etc. Every manufacturer is responsible for proposing and justifying their technology.
- Additional technologies may be proposed by manufacturers.
- Technology must not have been operational during test cycle or, if operational, could be demonstrated to have no influence on the final result.

Where a technology is identical across a range of vehicles then a manufacturer may choose to measure each vehicle or use an average result for all vehicles (provided that the worst case vehicle and best case vehicle are tested and the average found).

Results may be common across a “model family” defined as:

- common vehicle classification
- common displacement, turbo charger, intake system etc.
- common fuel supply system
- common type of gear box (manual, auto), number of gear ratios, powered axles (front, rear, 4WD etc.)
- curb weight change not less than 5 per cent
- any other vehicles for which it is deemed necessary to be classified otherwise.

SUPER CREDITS

The primary objective behind a CO₂ crediting system is to encourage automotive manufacturers to implement environmental technologies into their portfolios sooner than commercial factors may otherwise demand.

Globally, there are a substantial number of consumer incentives on environmental technologies in the form of purchase rebates up to \$10,000, registration allowances, congestion charge exemption, parking space access and other demand side incentives.

Australian consumers do not have access to similar retail incentives and, combined with a range of other factors including a relatively low fuel price, only 0.41 per cent of passenger cars sold in Australia in 2010 emitted less than 100grams of CO₂/km.

With a mandatory fleet CO₂ emission target, a credit system for low emission vehicles will allow manufacturers to introduce high cost environmental technologies to balance their Australian product range.

INTERNATIONAL APPROACHES TO SUPER CREDITS

Globally there have already been a number of regions that have proposed crediting systems within their carbon emission standards. See examples below:

European Union:

Super Credits: Vehicles of CO₂ emissions below 50 g/km receive super credits and receive a weighting of:

- 3.5 cars in 2012 and 2013
- 2.5 cars in 2014
- 1 car from 2016 onwards

E85: CO₂ emissions of E85 vehicles are reduced by 5 per cent until the end of 2015, provided that at least 30 per cent of all filling stations in that country provide E85.

United States:

Advanced Technology Credits: A temporary incentive program to encourage the early commercialisation of advanced GHG/fuel economy control technologies, such as electric vehicles, plug-in hybrid electric vehicles, and fuel cell vehicles. Manufacturers who produce advanced technology vehicles will be able to assign a 0 g/mi CO₂ emission value to the first 200,000 vehicles sold in model years 2012-2016, or 300,000 vehicles for manufacturers that sell 25,000 vehicles or more in model year 2012. Production above these caps would include calculated upstream CO₂ emission values. The final rule also removed the bonus multiplier credits, which counted each advanced technology vehicle as up to two vehicles.

Off-Cycle Innovative Technology Credits: Emission credits for new and innovative technologies that reduce vehicle CO₂ emissions, when the emission benefits are not captured over the regulatory test cycle. Manufacturers must prove the amount of CO₂ benefit for each technology.

Air conditioning technologies:

- Technologies for more efficient air conditioning (e.g., externally controlled variable displacement systems) can be credited with up to 5.7 g CO₂/mile (4.2g CO₂/km);
- Low-leak refrigerant systems technologies could be credited at up to 7.8 g CO₂/mile (5.7g CO₂/km);
- Alternative refrigerants with lower global warming potential (e.g. HLO-1234yf) could be credited at up to 17.2 g CO₂/mile (12.7g CO₂/km).

Early Credits: A program allowing manufacturers to generate early credits in model years 2009-2011 and utilised within five years.

Flexible fuel vehicles (FFVs): The deployment of E85 vehicles, capable of running on up to 85 per cent ethanol by volume (and the rest gasoline), can be credited through model year 2015 consistent with the similar current provisions. These credits will have maximum FFV credit values of about 10 g CO₂/mile (7.4g CO₂/km) for passenger cars and 18 g CO₂/mile (13.2g CO₂/km) for light trucks in year 2013, and these limits would be decreased through year 2015. From model year 2016 on, E85 and other flexible fuel vehicles are to be credited based strictly on the use of the alternative fuel via a method that is not yet determined.

China:

Advanced Technology Credits: Vehicles of CO₂ emissions below 50 g/km receive super credits and receive a weighting of:

- 3 cars in 2015 to 2016
- 2 cars in 2017 to 2019
- 1.5 cars from 2020 onwards

Only domestically produced Battery Electric Vehicles (BEV) and Plug-in Hybrid Electric Vehicles (PHEV) are applicable for the government subsidy. Local manufacturers, including JVs, must possess at least one of the three core technologies: battery, electric motor and control system. Local manufacturers need to own intellectual property rights (at least the right of use and modification). Subsidy for government fleet (25 demonstration cities) and retail usage (6 demonstration cities) until end 2012 while subsequent policy is still pending.

RECOMMENDATION

FCAI recommends that a credit regime be established which creates a strong incentive for brands to introduce advanced technology into the Australian market sooner than commercial forces would demand. The following technologies should be considered as part of this credit regime:

Electric and plug-in hybrid electric vehicles:

- 10 x multiplier for EVs, PHEVs and sub 50g CO₂/km cars based on the market share of such vehicles. Multiplier to reduce when market share achieves a preset limit in the previous year.
 - <1% market share: 10X
 - 1% - <3% Market share: 5X
 - 3% - <5% market share: 2X
 - 5% or greater: 1X
- Or a review of the multiplier at a fixed time.

Sub 100 grams CO₂/km:

- Proposal: 5 x multiplier for sub 100g cars based on the market share of such vehicles. Multiplier to reduce when market share achieves a preset limit in the previous year.
 - <1% market share: 5X
 - 1% - <3% Market share: 3X
 - 3% - <5% market share: 2X
 - 5% or greater: 1X
- Or a review of the multiplier at a fixed time.

E85 and LPG:

- Proposal: 20% CO₂ reduction

POOLING

The objective of a CO₂ emission standard is to achieve a desired reduction in the CO₂ emissions from the average of new motor vehicles, in order to achieve an improvement in the energy efficiency of the vehicle fleet overtime. Identifying and providing corporate targets is necessary for the purpose of enforcement however, if the market-wide target is achieved then the objective of the policy has been successful, and there is no merit in enforcing corporate specific targets.

Pooling is a feature that has been adopted in a number of international CO₂ emission standards and allows manufacturers to voluntarily 'pool' with other manufacturers and offset emissions from one brand against another. Pooling can also provide flexibility in the event that a brand changes ownership and accommodate a brand that may have both a low and a high emission brand within a single corporate entity.

RECOMMENDATION

Manufacturers should have flexibility to decide how to meet their targets under this standard and should be allowed to average emissions over their new car fleet rather than having to respect CO₂ targets for each individual car. Similarly they should be able to average emissions across the new vehicle fleet rather having targets for each individual brand.

FCAI recommends that a system that facilitates 'pooling' amongst brands be adopted.

BANKING

Banking and lending recognise that brands have model cycles which are not coordinated with the Australian regulatory cycle and which may achieve their corporate target after the target year. Similarly, banking can encourage brands to introduce low emission technologies into the market earlier.

The establishment of banking and lending credits do require the establishment of annual limit curves, which is a relatively simple task once periodic targets have been established. The establishment of annual limit curves does not require the establishment of annual penalty arrangements.

MAKE GOOD PROVISION

Commentary to the 'Banking' provisions is the ability for a brand that may exceed their respective target in a given year to be able to exceed their target in the subsequent year, prior to incurring penalties. This type of 'make good provision, recognises that reductions in emissions can only be achieved when a brand introduces a new vehicle model and that the long development time and global nature of the industry, may result in a brand failing to achieve their respective target. Similarly, brands are exposed to changes in consumer preferences that are influenced by factors such as fuel prices, which are beyond their direct control.

FCAI proposes that in the event that a brand does not achieve its target by 5 grams of CO₂ or less, then they are permitted one year to 'make good' and exceed their subsequent annual target.

In the event that a brand fails to achieve their corporate target in two successive years they are liable for penalties, from both calendar years and until such time as the industry achieves its stated target or the brand achieves its corporate target.

CORPORATE LEGAL ENTITIES

Legal corporate identities will need to be identified for the purpose of this standard. While regulations relating to the importation of motor vehicles may appear to provide a large sample of vehicle brands in Australia it does not include all niche Australian vehicle manufacturers.

It may be necessary to require vehicle brands to register or declare all vehicle brands for the purpose of this standard.

FCAI looks forward to working with the Australian Government to identify ways to appropriately define and incorporate all vehicle brands in the Australian market.

DATA COLLECTION AND REPORTING

Historically, the average CO₂ emissions for new vehicles have been calculated from FCAI's VFACTS data.

FCAI does not however believe that it will be appropriate to use VFACTS for the purposes of reporting corporate specific data against this standard for the following reasons:

- Only FCAI members report through VFACTS and there is no easy mechanism to force brands that may enter the Australian market to report through VFACTS.
- A vehicle is considered to be sold and therefore incorporated within VFACTS when it is registered. This could encourage pre-registering vehicles prior to sale.

Despite this, FCAI will continue to publish an annual report demonstrating the change in average CO₂ emissions from vehicles based upon VFACTS data.

RECOMMENDATION

FCAI recommends that brands be required to report all necessary information under the CO₂ emissions standard to the Australian Government by the end of February in the year after each target year.

This will provide the Australian Government with the necessary information required to calculate the industry and corporate CO₂ emission outcomes and provide a legal basis upon which any excess emissions charges may be applied.

PENALTIES

A CO₂ emissions standard is not a revenue mechanism. It should not be the aim of the standard to impose unrealistic targets or impose excessive financial penalties. It is the aim of all vehicle manufacturers to reduce CO₂ emissions and achieve all regulatory goals. Penalty arrangements should only be applied as a last resort, where entities have failed to demonstrate significant progress toward achieving the industry and government's agreed CO₂ targets.

Penalty arrangements should be carefully designed to encourage compliance with the regulation resulting from a reasonable research and development investment rather than offering a commercial option for non-compliance. Non-compliance with the objectives of a standard by any individual brand would undermine the desired outcomes of the industry.

Penalty arrangements under a CO₂ emission standard for passenger motor vehicles should also be consistent with the price for carbon imposed on other industry sectors. Emissions of CO₂ have the same impact on the environment regardless of whether their origin is from passenger cars or other segments of the economy. Similarly, passenger transport should not incur a carbon price higher than other segments of the economy.

Within this context, penalties imposed on vehicle manufacturers for failing to achieve a CO₂ emissions target should be consistent with the price of CO₂ imposed in other sectors of the economy.

INTERNATIONAL APPROACHES TO PENALTIES

CO₂ regulations which include punitive penalties for non-compliance exist in the United States of America (USA), Europe (EU) and Japan. Other markets are at varying stages of implementation of CO₂ regulation, and penalty clauses are not finalised.

Europe

Penalties in EU are to be phased in over the 2012-2018 period for passenger cars starting at €5 per gram exceedence per km per vehicle in 2012 increasing to a final level of €95 in 2019. Identical penalties are applied to LCVs with a two year delay. Vehicles with specific emissions of less than 50g CO₂/km are counted as multiple vehicles during the phase in period. Penalties are applied to the manufacturer or pool manager.

USA

Penalties in the USA are treated differently for fuel consumption (CAFE) and CO₂ (GHG) depending on the agency responsible for their regulation. Under GHG regulation, the Environmental Protection Agency (EPA) is able to impose a penalty of up to US\$37,500 per vehicle. EPA can take into consideration a number of factors when imposing a penalty. These factors include gravity of the violation, economic benefit or saving from the violation, size of the violator's business, violator's history of compliance, action taken to remedy the violation, effect of any penalty on the violator's ability to continue in business and any other matters as justice may require.

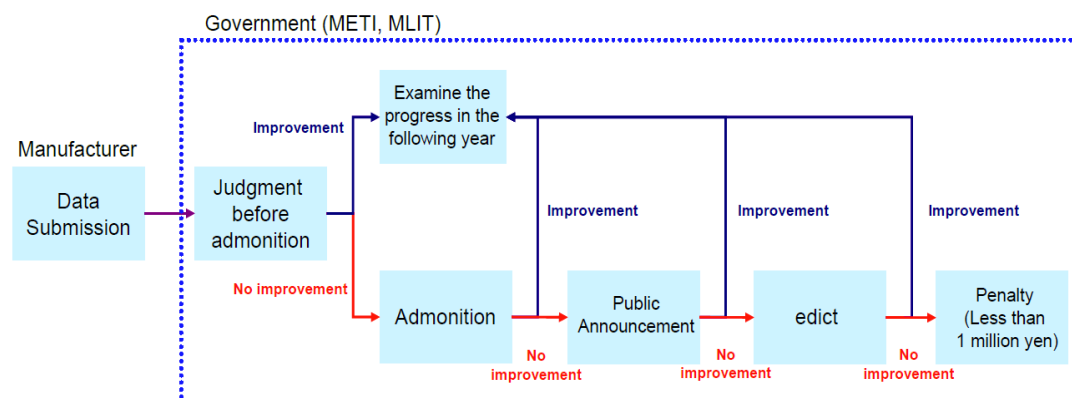
Both regulations in the USA allow for carrying forward and backwards of credits effectively meaning that penalties will only be payable after the third year of non-compliance. Trading of credits is also possible, promoting lowest cost abatement of emissions.

Penalties have been in place in the guise of the so-called "gas guzzler tax" in the USA since 1983. In that time, importers have paid the majority of the in excess of US\$600 million in penalties.

Japan

Penalties exist in the Japanese fuel efficiency regulation but they are relatively small and not imposed immediately upon non-compliance. Other financial and non-financial, direct and indirect measures are seen as more effective measures to enhance compliance with the regulations.

Procedure for penalty when standard is not met at the target year



Source: <http://www.jama-english.jp/>

Culturally, it is highly undesirable for any Japanese corporation to be "named and shamed" in a public announcement of non-compliance. This action can result not only in public embarrassment, but also in the manufacturer having its product removed from government and major fleet purchasing lists. As a result, domestic manufacturers (especially) will go to great lengths to avoid the public announcement available to regulators in the Japanese regulation.

Indirect measures include highly progressive taxes based on the vehicle mass and engine capacity and imposed when the vehicle is first purchased and upon re-registration. The result of these taxes is a change in demand for lighter vehicles and/or smaller engines. The Japan Automobile Manufacturers Association (JAMA) estimates that the owner of a subcompact car (750 kg kerb weight) will pay \$4,000 less in taxes relative to a heavier passenger car (1,100 kg kerb weight) over the lifetime of the vehicle (JAMA 2007). In this way, penalties are effectively transferred to the end user rather than the manufacturer.

RECOMMENDATION

FCAI recommends that any penalties for non-compliance with vehicle CO₂ emission regulation should be tied to the carbon price. This will ensure that the penalty associated with CO₂ emissions is consistent across industries in future years.

TREATMENT OF NICHE BRANDS

Niche vehicle manufacturers that specialise in high-performance or heavy duty vehicles have limited capacity to achieve a target established by parameter based mechanism, despite achieving significant reductions in emissions from their vehicles.

In the Australian new vehicle market, 94.2 per cent of vehicles are sold by only 15 brands. These brands each have a market share of more than 1 per cent of the annual new vehicle sales and would report a combined CO₂ outcome of 211.9 grams compared to the national average of 212.6 grams of CO₂/km.

It should also be an underlying principle that all vehicle brands be required to demonstrate a commitment to achieving the industry target.

INTERNATIONAL APPROACHES TO DEROGATIONS

The EU CO₂ standard provides a 'derogation' for niche manufacturers. These niche manufacturers are not exempt from the requirement to reduce CO₂ emissions; rather they are required to demonstrate a reduction in CO₂ emissions from their new vehicle sales.

EU derogations for low volume manufacturers:

1. Manufacturers with sales of less than 10,000 units annually (must have separate design and production facilities):
 - Can make an application to the Commission and seek a specific corporate "emissions target consistent with its reduction potential, including the economic and technological potential to reduce its specific emissions of CO₂ and taking into account the characteristics of the market for the type of car manufactured.
2. Manufacturers with sales of between 10,000 and 300,000:
 - Can apply for derogation from the target calculated by the mass based parameter, and therefore be granted a 25 per cent reduction on the average specific emissions of CO₂ in 2007.

RECOMMENDATION

FCAI recommends that low-volume brands be considered niche manufacturers and be able to negotiate separate CO₂ emission reduction targets with the Australian Government. These 'niche' manufacturers should be required to demonstrate a reduction in CO₂ emissions equivalent to the industry average.

SINGLE STANDARD FOR LIGHT VEHICLES

FCAI is supportive of a single combined standard for all light vehicles under 3.5 tonnes. While international approaches provide separate standards for light commercial vehicles and/or SUVs, previous Australian CO₂ standards have been based on a combined target.

A combined target recognises that there is some substitution between passenger and commercial vehicle sales and provides consistent policy objectives for both market segments.

FCAI analysis of the light commercial vehicle market also indicates that there is limited, or no, correlation between mass and footprint. Therefore, to establish a CO₂ emissions standard for light commercial vehicles would require a separate methodology and accounting regime. Two separate regimes for passenger and light commercial vehicles may add to the regulatory burden compared to the option of a combined standard for all vehicles less than 3.5 tonnes.

LEGISLATION NOT REGULATION

FCAI recommends that a single piece of legislation be established to underpin the objectives of this CO₂ emissions standard. This would assist in communicating the objectives of the standard to international car manufacturers.

FCAI believes that a regulatory mechanism, which could more easily be adjusted by future parliaments, would not provide the industry with the necessary certainty for product design and planning.

EXEMPTION FOR SPECIAL PURPOSE VEHICLES

FCAI recommends that emergency service and civil defense vehicles not be included within the calculation of the NACE result. This includes vehicles sold for use in the following services:

- Ambulance services
- Fire brigades
- Police
- Emergency response services (e.g. State Emergency Services)
- Military including vehicles for peace keeping activities
- Motorhomes
- Armored vehicles
- Hearses
- Vehicles modified for improved disability access.

These vehicles are not typically used for on-road passenger use or have specific technical requirements which are not typically consistent with the objectives of this standard. Incorporating these types of vehicles within the standard could create an incentive for brands to withdraw these special purpose vehicles from the market.

TREATMENT OF NEW ENTRANTS

All vehicle brands have a responsibility to improve average CO₂ emissions from new passenger motor vehicles. FCAI recommends that all new entrants (after the 2008 calendar year) to the Australian market be required, regardless of sales volumes, to achieve the 'limit curve' established by the parameter based mechanism, regardless of their sales volumes.

INTERNATIONAL COMPARISONS

Globally, a variety of different approaches have been adopted in an effort to reduce CO₂ emissions.

Meaningful international comparisons of relative emissions from vehicles are very difficult to establish.

There are eight key differences in international reporting of CO₂ emissions for motor vehicles:

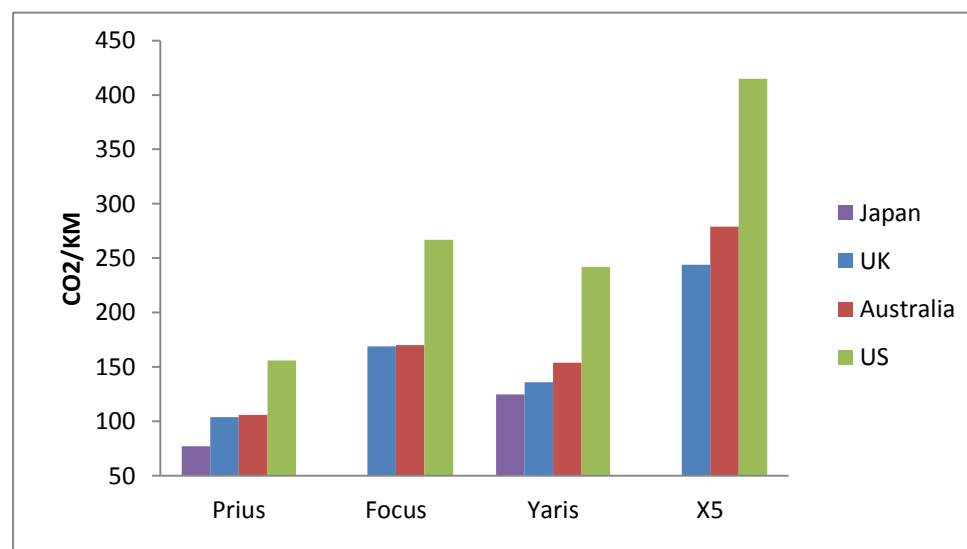
1. Different drive cycles
2. Different sample groups
3. Different fuel qualities
4. Fuel types
5. Exemptions and concessions for certain vehicle types
6. Credits for inclusion of safety features and air-conditioning gases
7. Different consumer preferences
8. Reporting of results compared to targets

DRIVE CYCLES

The different approaches to reducing vehicle emissions combined with different testing protocols adopted in each market make it extremely difficult to compare national CO₂ or fuel consumption data.

Figure 18 below shows the reported emissions from selected vehicles across a number of different markets. This data was collected from respective government publications.

Figure 18: CO₂ Emissions from Selected Vehicles



* All efforts were made to compare identical vehicle models with the same drive-train however, variations in the specification of vehicle between countries is inevitable due to factors such as road resistance, ambient air temperature and altitude.⁶

** Whilst Australia and the UK use the same testing methodology (NEDC) the graph above shows that reported vehicle CO₂

⁶ Green Vehicle Guide; www.greenvehicleguide.gov.au

US EPA; www.epa.gov/greenvehicles/index

UK UCA; www.vcacarfuel.data.org.uk

emissions in Australia are consistently higher than in the UK. This could perhaps be explained due to variations in testing procedures (i.e. different ambient temperatures or altitudes) and/or specification changes (such as tyre density).

While the Toyota Prius is ostensibly identical throughout the world, the reported CO₂ emissions in each country are significantly different, ranging from 77 grams of CO₂ per kilometer in Japan to 156 grams of CO₂ in the US. This variation is largely due to different testing protocols adopted in each country. These testing protocols require different ratios of city and highway driving and therefore result in significantly different reported CO₂ emissions for individual vehicles.

Some testing procedures report data for city and highway driving separately, others provide a consolidated result. The proportion of city and highway driving affects the net results. The Japanese drive cycle, for example, includes 20 per cent city driving and 80 per cent highway driving. The CAFE assumes an 40/60 share of driving.

The variation in drive cycle is further complicated by numerous test cycles used within the United States, predominantly by state government regulatory agencies.

SAMPLE GROUPS

Each key market uses a different definition of motor vehicles to report national average carbon emissions and fuel economy.

Figure 19: Vehicle Types Included in national average carbon emissions or fuel economy

	Cars (M1)	SUVs	4X4	Utes	Light Trucks	Light Buses
Europe	Yes	Yes	No	No	No	No
Korea	Yes	Yes	No	No	No	No
Japan	Yes	Yes	No	No	No	No
China	Yes	Yes	No	No	No	No
US	Yes	No	No	No	No	No
Australia	Yes	Yes	Yes	Yes	Yes	Yes

Note: The EU and the US have separate regulatory standards for light commercial vehicles which are not represented in the above figure.

FUEL TYPE

Diesel fuel provides up to 20 per cent lower carbon emissions for an equivalent sized petrol vehicle. Demand for diesel powered passenger cars in Australia is around 12 per cent of annual new vehicle sales compared to over 80 per cent in some European countries including France and Belgium and around 51 percent across the EU.

The reasons for these different consumer preferences relate predominantly to fuel prices, relative fuel prices and consumer incentives/taxes relating to CO₂ emissions from vehicles.

EXEMPTIONS AND CREDITS

As a consequence of perceived needs to stimulate particular technologies or fuel types a number of international jurisdictions have provided, or are currently considering, an exemption for certain vehicle types from the reported tail-pipe emissions of vehicles.

The EU also proposed to provide:

- Super credits for electric vehicles which magnifies each electric vehicle sale by up to five-fold.
- A 10 per cent reduction in reported tail-pipe emissions for vehicles that are bio-fuel compatible.

Similarly the US CAFÉ regulations provide credits for advanced air-conditioning gases and the use of bio-fuels.

CONSUMER PREFERENCES

Larger vehicles have relatively higher fuel consumption and carbon emissions when compared against small vehicles. Consumers purchasing decisions are influenced by factors including the price of fuel, geography, availability of public transport, road quality and urban densities.

Australian consumers have a much stronger demand for larger vehicles than consumers in European markets.

Figure 20: New Vehicles sales by Country and Segment

	Australia	France	Germany	UK	Italy
Light	22%	47%	32%	39%	39%
Small	39%	35%	36%	35%	33%
Medium	16%	11%	24%	20%	16%
Large	24%	7%	8%	5%	5%

INTERNATIONAL COMPARISONS

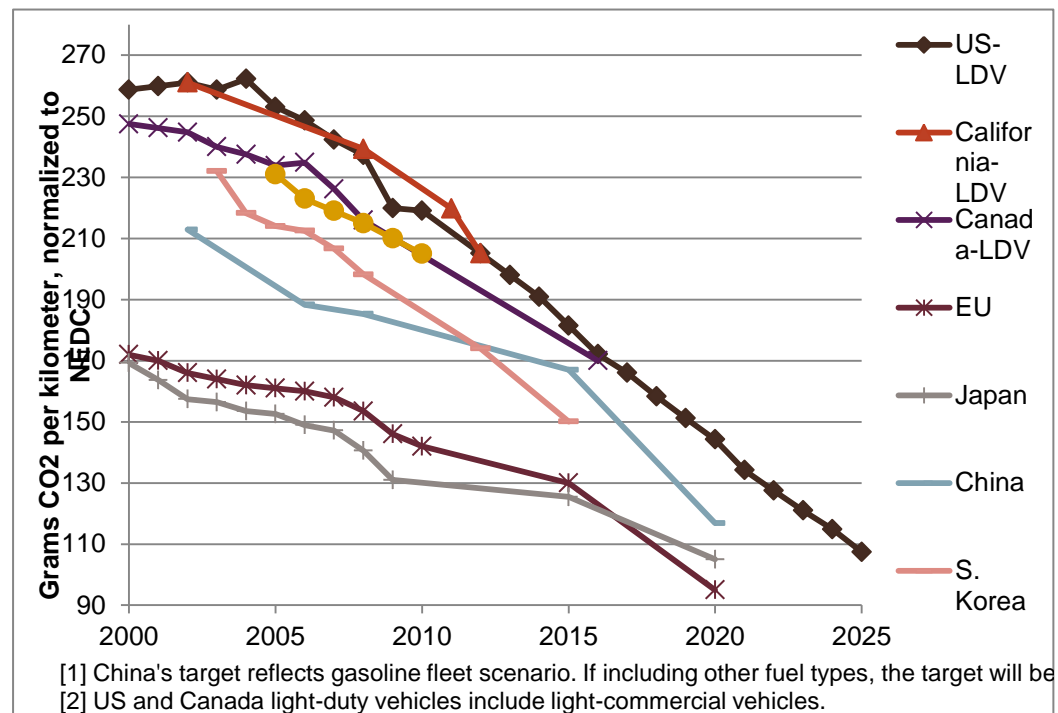
International comparisons, such as the work undertaken by the ICCT shown below in Figure 21, are frequently misrepresented.

This analysis demonstrates that consumers in each different market choose vehicles with different fuel consumption and CO₂ emissions due to a range of factors including: fuel price, relative cost of diesel, average incomes, consumer incentives for low emission vehicles, and urban density.

Those seeking to represent this analysis as demonstrating that the vehicles imported into Australia are less efficient than in other markets should note the findings of the National Transport Commission that, if Australians had purchased the most efficient vehicle in the same class, average CO₂ emissions would be 135 g/ CO₂ in 2010, rather than 212.6 g/ CO₂⁷, significantly lower than in Europe.

This analysis also demonstrates the global nature of the automotive industry, that all vehicle manufacturing nations are seeking to reduce average CO₂ emissions from passenger motor vehicles.

Figure 21: International Comparisons



Source: <http://www.theicct.org/passenger-vehicles/global-pv-standards-update/>

CONCLUSION

Reducing CO₂ emissions from motor vehicles is a complex challenge of which improving the efficiency of the new motor vehicle fleet is only one part of the solution.

After detailed analysis FCAI makes the following key conclusions and recommendations:

- There is merit in developing a mandatory CO₂ emission standard.
- The targets should be ambitious, yet achievable. The industry is committed to reducing CO₂ but does not support measures to use this standard as a revenue measure.
- Improving the efficiency of new vehicles is a shared responsibility of industry, consumers and government.
- The majority of the industry prefer a mass based parameter, as the most internationally consistent method of regulation.

⁷ National Transport Commission: Carbon Dioxide Emissions from New Australian Vehicles 2010, May 2011, Page iii.

-
- The scheme should be designed to attract advanced technologies to the Australian market earlier than commercial forces may achieve through credits for alternative fuels and advanced technologies.
 - The scheme should be designed to incentivise the uptake of fuel efficient technologies that are not recognised through the test cycle.
 - The standard should be supported through a single piece of legislation and apply to all vehicles under 3.5 tonnes.
 - All brands including niche brands and new entrants, should be required to demonstrate a commitment to the industry target however, their unique nature should be taken into consideration in determining targets.
 - Brands should have access to flexibility arrangements including pooling, banking and lending to ensure that each brand's commitment to reducing emissions is fully recognised through the standard.
 - The scheme should be flexible, recognising the staged manner in which product cycles work and product investments are made.
 - That financial penalties should be linked to the Carbon Price and applied only if the fleet emissions target is not achieved.

Attachment 1: Analysis of options for allocating corporate CO2 emissions targets

	Parameter		
	Fixed %	Mass	Footprint
International precedents	Nil	EU, China, Japan, Korea, India (under various different instruments)	United States
Simplicity	Simple.	Complex.	Complex.
Efficiency at achieving industry target	Highly efficient	Inefficient: Due to changes in brand average mass, all brands may fall below the limit curve yet the industry fail to achieve its target	Inefficient: Due to changes in brand average mass, all brands may fall below the limit curve yet the industry fail to achieve its target
Equity	Highly inequitable: Does not recognise difference in average mass, footprint, changes in consumer demand for features or expansion of market share into larger vehicle categories	Relatively equitable across brands	Relatively equitable across brands
Data issues	Determining the base year is difficult and critical to allocating corporate targets	Require improved data set, increased reporting requirements	Require improved data set, increased reporting requirements
Correlation with CO ₂	Higher targets for brands with above average emissions	Strong correlation between mass and CO ₂	Acceptable correlation between footprint and CO ₂
Impact on safety	No direct correlation established	No direct correlation established	Correlation between footprint and safety
Impact on technology	Technology neutral	May create an incentive to increase vehicle mass	May create an incentive to increase vehicle footprint
Other	Does not recognise the utility of vehicles. i.e. a brand cannot expand from small cars to larger vehicles	Recognises the different utility of vehicles through average mass	Recognises the different utility of vehicles through average footprint