



**AUSTRALIAN  
AUTOMOBILE  
ASSOCIATION**

**Constituent  
Members**



# ALTERNATIVE TRANSPORT FUELS

## 2010

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# Alternative Transport Fuels

## Issue

This paper addresses the key issues of oil dependency in Australia and greenhouse gas emissions from vehicles.

## Background

A need for the Australian motoring clubs to collectively develop a national position on alternative transport fuels is borne from developments that have taken place on a global scale such as the FIA Global Fuel Economy Initiative, as well as domestically through various state-focussed initiatives such as the NRMA-commissioned Jamison Report and the ATSE Alternative Fuels Symposium, supported by RACV.

The paper focuses on addressing issues both from an environmental perspective (e.g. greenhouse gas emissions and air pollution) as well as fuel security (e.g. finite oil reserves and price uncertainties). The aim is to form a unified policy that sets performance based targets and avoids “picking winners”. It also allows for regional market drivers and consistent industry signals to help determine the most efficient outcomes including the possibility, where appropriate, for mandates to be developed.

The outcome of this position paper is a number of policy positions as described below and in the attached paper. Collectively, these policy positions represent a robust yet flexible national alternative transport fuels pathway which allows for the consideration of factors pertaining to the individual States such as regional development as well as life cycle and energy balance assessments.

## Policy Positions

### Targets

- Policy 1* A national Low Carbon Fuel Standard (LCFS) should be adopted to enable Governments to regulate fuel GHG emissions and allow industry and consumers to determine the most efficient fuel strategies to achieve emission targets.
- Policy 2* A national voluntary vehicle carbon emission target of 130g CO<sub>2</sub>/km should be adopted.

### Research & Development

- Policy 3* AAA advocates that research and development of second generation biofuel technologies be continued.
- Policy 4* AAA urges oil companies to continue to improve fuel quality and alternative fuels
- Policy 5* Further research is required to look at the technical issues that would allow greater uptake of LPG.
- Policy 6* Ongoing research into the most effective ways to produce electricity from renewable resources is required.
- Policy 7* Ongoing research and development of fuel cell technology and hydrogen fuel is proposed, especially where the hydrogen can be generated through renewable sources.

*Policy 8* Life Cycle Analyses and Energy Balance Analyses should be included in all assessments of new technologies (vehicles, alternative fuels and vehicle-fuel interactions).

#### **Government Incentives & Initiatives**

*Policy 9* As new innovations and technologies become available to the market, governments should adopt policies and incentives that encourage the use of a wide mix of power and fuel systems to enhance consumer choice and gradually reduce dependence on fossil fuels. This should be extended to include low emission vehicles and alternative transport technologies, and should not be done using rebates or excises.

*Policy 10* Governments should continue with policies and incentives that support the use of LPG and provide assistance to the LPG industry to maximise production capacity.

*Policy 11* Further incentive choices should be investigated to allow for greater uptake of CNG/LNG in the short to midterm, targeting heavy vehicles.

#### **Community Education & Behaviour Change Programs**

*Policy 12* The AAA Clubs should continue to assist motorists to reduce fuel consumption and environmental impacts of transport through voluntary behaviour change, for example through 'travelsmart' style programs, eco-driving and modal shift.

*Policy 13* The AAA Clubs should continue to play an active and increasing role in encouraging the community to take up alternative transport and sustainable mobility options

#### **Advocacy & Communication**

*Policy 14* The AAA Clubs should continue to play an active and increasing role that calls for a drastic increase in investment and service quality of our public and active transport systems.

*Policy 15* Legislation is required to ensure all electric vehicles will be supplied by clean renewable energy.

*Policy 16* The AAA Clubs should further develop community education, lobby governments and influence industry to reduce oil dependency, using existing fuels and vehicles.

# AAA PUBLIC POLICY FORUM PAPER 2010

## ALTERNATIVE TRANSPORT FUELS

### 1.0 BACKGROUND

*On the road to greener motoring* (2008), the AAA Clubs' climate change statement forms the framework for the Clubs' action on climate change. Interspersed amongst the many policy positions within the statement are direct (and indirect) references to alternative transport fuels and the significant role they must play in addressing the issues of climate change. These include:

- **Policy 1.1** ... AAA can assist motorists to reduce their carbon 'footprint' through behavioural change<sup>1</sup>
- **Policy 2.1** ... There needs to be a focus on investment in vehicle technology and design<sup>2</sup>
- **Policy 4.5** ... Governments should support provision of consumer information to encourage the purchase of green vehicles and fuels and fuel efficient driving
- **Policy 4.6** ... Governments should adopt policies that encourage the use of a wide mix of power and fuel systems
- **Policy 4.9** ... Governments should not promote fuels that result in an increase in net carbon footprint
- **Policy 4.12** ... Oil companies should improve fuel quality and alternative fuels.
- **Policy 4.15** ... Emission standards and taxation should guide performance standards for all fuel types.

Two documents of national significance were also released during this period - the NRMA-commissioned *Jamison Report* and the *ATSE National Symposium* outcomes paper. Both documents served as detailed roadmaps for alternative transport fuels in Australia and postulated how to reduce our dependence on oil. Both, also offered pathways of a different perspective and in doing so, highlighted the need for AAA Clubs to bring together a detailed analysis of alternative transport fuels and formulate a suite of policy positions from the AAA Clubs' perspective. A subsequent position paper issued by RACQ in November 2009 puts forward a view that in order to provide a future focussed framework for reducing carbon from fuels, fuel performance standards in the form of a "Low Carbon Fuel Standard" (LCFS) should be adopted.

### 2.0 STRATEGIC CONTEXT

The contribution of greenhouse gas (GHG) emissions through human activity and its interconnectivity with climate change is well-documented. The transport sector alone is responsible for approximately 15% of Australia's GHG emissions with passenger cars responsible for more than half of these emissions (Figure 1).

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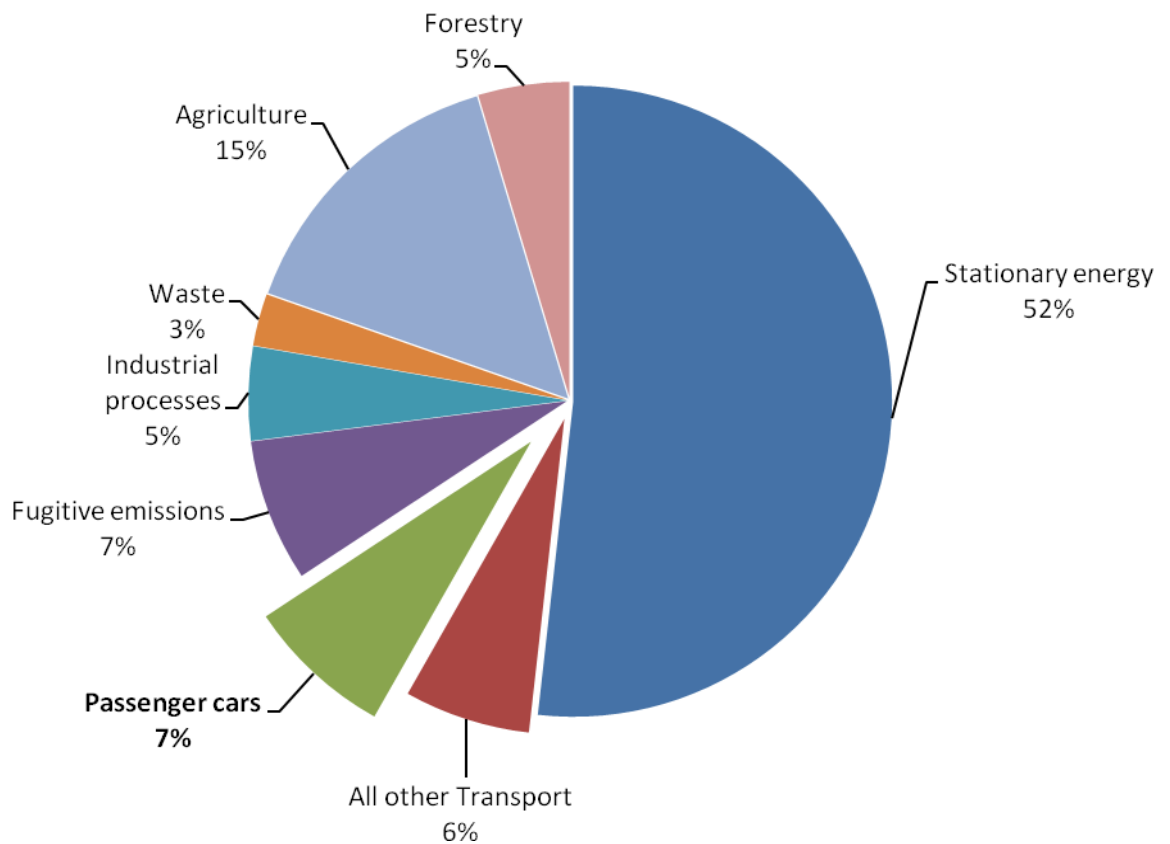
<sup>1</sup> *On the road to greener motoring* Policy 1.1 includes "switching to cleaner fuels" as a cost effective behavioural change means

<sup>2</sup> *On the road to greener motoring* Policy 2.1 includes "alternative fuels" being nominated by approximately 30% of respondents in a 2007 AAA National Survey of Motorists' Attitudes and Priorities as a realistic solution for reducing the impact that cars have on the environment (behind alternative cars at 43% and equal to public transport)

More of a concern is that use of passenger vehicles is projected to increase emissions by 39% on 1990 levels by 2020. All of this is occurring, despite Australia's commitment to a 60% reduction on 1990 emissions by 2050 through its ratification of the Kyoto protocol.

Even a short term cut of 5% on 2000 emissions by 2020 (adopted by the Federal Government) will not be attainable under present projections unless deep and early cuts in GHG emissions are brought in within the next few years.

As stated in the AAA Climate Change Statement, a cut in transport emissions is not enough – efforts to abate GHG emissions must be shared across all sectors of the economy. Furthermore, the need to reduce transport emissions must be considered alongside the need to maintain sustainable mobility for all Australians.



**Figure 1 - Australia's GHG emissions by sector (Source: AGO 2009)**

In the above context, the role of alternative transport fuels to assist in reducing environmental impacts (i.e. GHG reductions) is an imperative. Another imperative relates to uncertainty around the long-term supply and retail price outlook for conventional transport fuels. In short, there is a significant economic and environmental case for the adoption of alternative vehicles and fuel technologies. A summary of these imperatives is described below:

## **2.1 The Environmental Imperative**

### **2.1.1 GHG Emissions from Road Transport**

(As described in 2.0 and depicted in Figure 1).

### **2.1.2 Vehicle-Related Urban Air Pollution**

Air quality in major Australian cities has been steadily improving due to more stringent fuel quality and emission standards. In particular, the move from Euro 2, to 3, to 4 emission standards has reduced oxides of nitrogen, carbon monoxide and hydrocarbons significantly. Even so, the Australian motor vehicle fleet continues to be a significant contributor of these and other volatile organic compounds and particulate matter (National Pollutant Inventory 2006).

## **2.2 The Transport Energy Imperative**

### **2.2.1 Declining National Oil Self-Sufficiency**

Australia's demand for oil is forecast to increase by 50% between 2000 and 2020, while national oil production is simultaneously forecast to decline sharply. The net effect of this relationship is expected to be a decline in Australia's oil self-sufficiency from 100 per cent in 2000 to around 50 per cent in 2010. On present trends, Australia will be meeting only a fifth of its needs from domestic resources by 2030 (The Australian Government Energy Resource Assessment 2010). The decline in Australia's oil self-sufficiency creates significant challenges for securing Australia's energy future in the face of global competition for energy. In particular, the nation's inability to supply the majority of its own future energy needs means that the Australian transport industry will be increasingly exposed to the volatilities of the global oil market, potentially creating adverse consequences for Australia's competitive position in the global economy.

### **2.2.2 Price Outlook and Long-Term Availability of Conventional Transport Fuels**

Transport fuels in Australia have been subject to unprecedented price fluctuations in recent years, with Australian retail prices escalating from an average of 95 cents per litre in 2005 to a national average price of more than \$1.60 in mid-2008 (falling again to about \$1.19 in February 2010). The price outlook is driven by three key factors: demand, supply and exchange rate.

The 'demand-side' perspective suggests the increase in global fuel prices is being almost solely driven by increased global demand, particularly from the emerging Asian economies of India and China.

The 'supply-side' perspective suggests that increases in global fuel prices are being driven by limited supplies of cheap oil, or the early peak oil scenario. However, it is widely debated as to when and to what extent peak oil will take effect. For example, it has been suggested that global oil production would peak at 40 million barrels per day in 2007 (Hubbert 1956). This compares with actual production of about 85 million barrels per day in 2007 (Oilwatch Monthly, November 2007).

The 'exchange rates' is the third factor that influences fuel prices. Like many other commodities sold internationally, fuel is paid for in US dollars. This means that the price of fuel in Australia is influenced by movements in the \$A/\$US exchange rate. If the value of the Australian dollar rises against the US dollar, then the price of petrol for Australians is likely to decrease. Conversely, if the value

of the Australian dollar relative to the US dollar decreases, the price of petrol for Australians tends to increase.

### **3.0 POLICIES AND REPORTS ON ALTERNATIVE FUELS**

#### **3.1 FCAI Voluntary Code of Practice for fleet CO<sub>2</sub> reduction (2003)**

In April 2003, the Federal Chamber of Automotive Industries (FCAI) introduced a Voluntary Code of Practice, committing the industry to a progressive reduction in national average fleet consumption targets for passenger cars to 6.8 litres/100km by 2010.

The FCAI code was superseded by the National Average Carbon Emissions (NACE) target in mid-2005 that tracks CO<sub>2</sub> emissions.

#### **3.2 Senate Inquiry into Future Oil Supply and Alternative Transport Fuels (2006)**

AAA set out its position on alternative transport fuels in its submission to the Inquiry. The submission described the roles of vehicle and alternative fuels' performance.

AAA also noted substantial assistance provided by Commonwealth Government for alternative technologies and industries, but there is little to report of outcomes to date.

The final report of the Senate concluded there is a need to reduce oil dependency in long term to reduce GHG emissions, mitigate costs and mitigate risks to supply. The report recommended Government facilitate progress on alternative transport fuels, vehicle technologies, congestion pricing, public transport and land use and transport planning.

#### **3.3 CSIRO Future Fuels Forum Report (2008)**

The report *Fuel for Thought*, released in June 2008, discusses the current concerns about increasing oil prices and GHG emissions that will drive changes to the transport fuel mix. The report notes that it is important to plan now to ensure changes are for the better.

The forum considers Government interventions are needed, as individuals are unlikely to act effectively. However these interventions should be carefully considered to avoid unintended negative consequences.

The report concluded that technological solutions alone would not meet future challenges. Travel choices (mode, vehicle, amount etc) will be as important as technological solutions, especially as there is still considerable uncertainty about which technologies will work.

#### **3.4 Jamison Group (2008 - 2010)**

The July 2008 report *A Roadmap for Alternative Fuels in Australia: Ending our Dependence on Oil*, commissioned by NRMA Motoring and Services, discusses the role of alternative transport fuels in ending Australia's dependence on oil.

In February 2010, the Jamison Group released their second independent report *Fuelling future passenger vehicle use in Australia*, highlighting the challenges facing Australia including a potential risk that oil imports will grow from current levels of 55 per cent of total oil consumed to more than 80 per cent over the next decade. The contention is this will have an adverse impact on Australia's balance of trade.

This second report outlines possible strategies to reduce Australia's transport oil dependence by adopting alternative fuels and technologies such as hybrids and

electric cars fuelled by renewable energy. The Jamison Group warn that if nothing is done to develop new transport energy sources now, we will fall further behind leaving Australian motorists exposed to further volatility in oil prices.

The report warns that there is no silver bullet solution to securing Australia's transport energy future and calls on the Australian Government to adopt a five-step approach:

1. Introduce compulsory fuel consumption standards in line with the European Union.
2. Adopt planning strategies that will reduce private fuel use, including significant upgrades of public transport.
3. Utilise Australia's resources to develop more bio-fuels from various feedstocks.
4. Convert some of Australia's considerable natural gas and liquefied petroleum gas for use in vehicles.
5. Commit to the fast-track of electric vehicles using electricity from renewable sources.

To build on the findings of the Jamison Group report, NRMA hosted an Alternative Fuel and Technology Summit in March 2010. Key decision makers and stakeholders were brought together to identify ways to overcome obstacles hindering the development and production of alternative fuels and technologies already available and to help determine a concrete plan to progress these solutions. Outcomes of the Summit can be found in Appendix I.

### **3.5 ATSE Alternative Fuels National Symposium Outcomes Paper (2008)**

ATSE Symposium 2008 revealed in its outcomes a two-step plan with the 'loose' objective to achieve carbon free transport by 2050.

The first step focuses on utilising existing technologies in order to prepare (or 'buy time') for the next step which focuses on research and development to 'wean' us off oil dependence.

For the immediate future, Australia should encourage existing technologies, which will reduce its dependence on imported transport fuels. None of these have zero carbon emissions, as they depend on fossil fuels but as Australia has almost unlimited supplies of coal and gas, they will enable Australia to reduce its dependence on imported hydrocarbon fuels. They do provide some emission relief and will give a window in which to prepare for an electric world. Specific actions include:

1. Encourage the use of hybrid vehicles;
2. Provide fiscal or other encouragement for the heavy transport, bus/taxi fleet and agricultural operations to move to CNG and LNG;
3. Provide continued support for LPG conversion as long as Australia is a net exporter of LPG;
4. Encourage exploration for oil (a notable point of difference with the findings in the Jamison Report);
5. Give preferential treatment to the importation of efficient and low emission light vehicles;
6. Stimulate use of gas to liquid (GTL) and coal to liquid (CTL) fuels (noteworthy, given that in Section 5.0 it is suggested that these technologies

have up to 80% worse carbon outcomes than conventional fuels when whole of life cycle is considered).

These first-stage actions are part of a strategy to reduce import demand urgently but do not in themselves lead to a zero GHG emission scenario. However, they do provide for some GHG reduction and allow time for preparations, planning and research to enable such a scenario to be achieved. Without this window, Australia may run into severe fuel import challenges.

The second part of the plan will require significant investment in research and planning of urban environments and infrastructure, as it will largely be based on an electrified vehicle fleet and, in part, on second generation biodiesel. While there are examples of light electric vehicles there are none for heavy transport (except for a small fleet of electric locomotives in Queensland), which is a significant part of the Australian fleet. Similarly, carbon-free base-load electricity is not available in Australia even though nuclear generation is common worldwide and geothermal is common in other countries where the conditions are suitable.

A research and development program is required, coupled with the take-up of existing technologies available elsewhere. Both the form of power generation and the utilisation in vehicles will require ongoing study and acceptance.

### **3.6 ATSE Biofuels for Transport: A Roadmap for Development in Australia (2008)**

This study comprehensively summarises the current status of transport biofuels and related technologies in the Australian context, to provide input to formulation of government policy development and to assist in guiding future research priorities.

The ATSE report *Biofuels for transport: A roadmap for development in Australia* was also released at the symposium. The report recommends that a national Biofuels Institute be established, allowing Australia's bio-industry researchers to work together and achieve greater outcomes in the domain than they can by working separately.

The report also finds that biofuels have a useful role to play as Australian transport fuels and can contribute to GHG mitigation and energy security. The ATSE concludes that second generation biofuels hold significant promise but more focused R&D is essential for eventual technological success.

### **3.7 The Garnaut Climate Change Review (2008)**

The final report of the Garnaut Review, released in September 2008, included consideration of the impacts of high oil prices and population growth on transport systems, and the transformation to lower-emissions transport options.

The report considers it likely that low-emission vehicles will be the most important source of decarbonisation of the transport sector.

Governments are said to have an important role in this transformation through urban planning to facilitate mode shift, which may account for a quarter of emissions reductions in urban passenger transport.

### **3.8 Alternative Fuels Conversion Program (AFCP) (2002 – 2008)**

This Federal Department of Environment, Heritage, Water and the Arts program concluded on 30 June 2008. Since 2002, the program solely supported trials of alternatively-fuelled or hybrid diesel/electric engines in heavy vehicles in order to assess their commercial viability and environmental performance.

Over 60 projects were funded through the program, covering bus and truck fleets using CNG, LNG, LPG, hydrogen fuel cell and hybrid diesel/electric technologies.

The AFCP demonstrated that environmental benefits do not automatically flow from the use of alternative fuels. It proved very difficult to achieve better greenhouse performance than a diesel engine, especially by simply using an engine conversion kit.

Engines must be designed and optimised to operate on the alternative fuel, with the greenhouse outcomes able to be tested across the full operating spectrum. The AFCP also highlighted a lack of awareness among some engine and fuel providers about the nature of GHG emissions and how they differed from air pollutants.

### **3.9 Federation Internationale de L'Automobile (FIA) Make Cars Green (2008)**

Make Cars Green is an international environmental campaign coordinated by the FIA and is aimed at reducing the impact of motoring on our planet.

Through the Campaign, a declaration has been made which states an automotive fuel emissions target of 140g CO<sub>2</sub>/km<sup>3</sup>.

The target applies to passenger cars and is not a limit for each vehicle, but an average value for new vehicles by manufacturers across the whole fleet, so some vehicles might produce more than the target amount of CO<sub>2</sub> per kilometre, but these need to be offset by vehicles producing less than the target. This target value is determined using current drive cycles.

The development of a new World Wide Harmonised Light Duty Test Procedure (WLTP) is not expected to be finalised until 2014 (at the earliest) and so should not have a significant effect on the AAA's current considerations for alternative fuels.

In addition, a target of 130g CO<sub>2</sub>/km for passenger cars (category M1) has been adopted by the European Parliament and will be applicable to an increasing percentage of new vehicles from 2012. Unlike air quality standards, vehicles not meeting their target CO<sub>2</sub> levels are not prohibited from being sold, but are subject to a financial penalty (fine). Through a study of the current and predicted European fleet, the allowable levels of CO<sub>2</sub> produced from vehicles of varying masses were determined to establish the 130g CO<sub>2</sub>/km target.

The target for light commercial vehicles (category N1) is 175g CO<sub>2</sub>/km.

The average greenhouse gas emission rating for new cars sold in Europe in 2009 was about 145g CO<sub>2</sub>/km, while the Australian equivalent was 211g CO<sub>2</sub>/km. This comparison is raised to highlight the major challenges to be faced within Australia in order to meet likely targets.

### **3.10 Federal Government Energy Strategy Framework Paper (2009)**

The energy policy will be set out in a White Paper ('the Energy White Paper'). The Energy White Paper will identify a comprehensive policy framework that will be durable to 2030 and beyond, yet be flexible and adaptable to meet new challenges and opportunities as they arise. This will include short- to medium-term actions for government and industry.

Amongst other energy issues, the Energy White Paper will consider the infrastructure required to meet Australia's future transport needs and those of national energy markets, and its investment outlook.

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<sup>3</sup> FIA refers to the target as a "Fuel Economy Target". AAA and the Clubs favour the term "Fuel Emissions Target"

### **3.11 Global Fuel Economy Initiative (50by50) (2009)**

Launched on March 4, 2009 by the United Nations Environment Programme (UNEP), the International Energy Agency (IEA), the International Transport Forum (ITF) and the FIA Foundation (FIAF), the 50by50 initiative aims to catalyse and help harmonize large reductions of GHG emissions and oil use through improvements in automotive fuel economy in the face of rapidly growing car use worldwide.

50by50 targets an improvement in average fuel economy (reduction in fuel consumption per kilometre) of 50% worldwide by 2050.

With complementary measures to auto fuel economy, including smart urban planning and more public and non-motorized transport in cities, this is likely to result in at least a stabilisation of CO<sub>2</sub> emissions from the global car fleet, which would make an important contribution to meeting the CO<sub>2</sub> targets identified by the International Panel on Climate Change (IPCC) and supported by G8 recommendations.

### **3.12 Obama Government Mandatory Vehicle Fuel Efficiency Targets (2009)**

In May 2009, President Obama launched a plan requiring five per cent improvements in fuel efficiency each year between 2012 and 2016, reducing the required average fleet consumption to 6.6 litres per 100km in the US. To date, ten car companies and the United Auto Workers Union (UAW) have embraced the national program because it provides certainty and predictability to 2016 and includes flexibilities that will significantly reduce the cost of compliance.

## **4.0 CURRENT POSITIONS ON ALTERNATIVE FUELS**

### **4.1 Queensland Shale Oil Moratorium (2008)**

The Queensland Premier announced in August 2008 a 20 year moratorium on exploration and mining of the McFarlane oil shale deposit, near Proserpine. Plans to produce 1.6 billion barrels of oil from the deposit were abandoned after concerns were raised about harm to the Great Barrier Reef, tourism and the health of local residents.

Mining of the existing oil shale deposit and operation of a demonstration shale oil plant in Gladstone will be allowed under strict environmental conditions. However legislation will prohibit any new mines in Queensland for at least 20 years.

Over 92% of Australia's oil shale deposits are located in Queensland.

### **4.2 NSW Biofuel Mandates**

The *Biofuel (Ethanol Content) Act* 2007 set out a minimum ethanol content requirement of 2% in respect of the total volume of petrol sales in NSW, at the primary wholesale level commencing 1 October 2007.

The *Biofuel (Ethanol Content) Amendment Act* 2009 came into effect on 1 October 2009. The Amendment Act:

- renamed the original Act to become the Biofuels Act 2007
- increased the volumetric ethanol mandate to 4% from 1 January 2010
- further increased the ethanol mandate to 6% from 1 January 2011
- required all regular grade unleaded petrol to be E10 from 1 July 2011
- established a volumetric biodiesel mandate of 2%
- increased the biodiesel mandate to 5% from 1 January 2012

NRMA supports the mandates.

### **4.3 Queensland Biofuel Mandates**

The Queensland Government confirmed its commitment to introduce a 5% ethanol mandate in 2010. RACQ is opposed to the Queensland Government 5% ethanol mandate. A more detailed research paper describing the technical, environmental and economic performance of biofuels was released in September 2008, which supported the development of sustainable biofuels, but questioned current government policies to assist the industry.

### **4.4 Victorian Biofuels Inquiry (2008)**

The Victorian Parliamentary Inquiry into Mandatory Ethanol and Biofuels Targets concluded in February 2008 that the risks of any biofuels mandates outweigh the potential benefits.

RACV's position is that the current 10% limit on ethanol content in petrol is maintained, clearly labelled, and not mandated.

### **4.5 RAA Biofuels Position**

RAA's position is in line with the agreed AAA position as stated in the Senate submission referred to in 3.2. Specifically, RAA believes:

- Biofuels should not be mandated – consumers are entitled to choose between blends of fuel;
- The amount of biofuel mixed with regular fuel must be subject to an upper limit. This is necessary because vehicle manufacturers have advised that using biofuels might void vehicle warranties. Vehicle manufacturers maintain a list of vehicles that are able to satisfactorily operate on the 10% ethanol limit already in place;
- There should be clear labelling at point of sale that provides consumers with information on the suitability of the use of biofuels in their vehicle. This labelling should include information on any impact on fuel economy or potential implications on vehicle warranty; and
- The use of biofuels should not increase petrol prices or the cost of motoring (noting in particular the lower energy content of some biofuels and the resulting negative impact on fuel economy).

### **4.6 National Fuel Excise Changes (2010)**

In the 2010–11 Budget, the Federal Government announced that it would amend a '2004–05 Budget measure to introduce an energy content-based fuel excise system'. Under the amended excise, the rate for ethanol would be set at 25 cents per litre from 1 July 2011. This rate would be phased down to a final rate of 12.5 cents per litre with effect from 1 July 2015. The production subsidy to domestic ethanol producers would also be progressively reduced from 22.5 cents per litre on 1 July 2011 to zero from 1 July 2015 (there will be no offsetting grants for excise-equivalent customs duty).

In the context of the existing fuel excise, this change is supported, however the position of the AAA remains for the fuel excise to be replaced with a road user charge.

With the national fuel excise change, States would need to review their mandate positions.

## 5.0 OUTLOOK FOR ALTERNATIVE FUELS

Rare Consulting prepared a discussion paper, *Vehicle Technology Pathways*, for the RTA in late 2008 which included an evaluation of the future outlook for the adoption of alternative fuels. Key findings of the report include:

- An increasing body of authoritative literature suggests that first generation biofuels (and biofuel blends) do not provide any substantial GHG emissions benefit relative to conventional transport fuels. In addition, production of these fuels is likely to be limited by the combined constraints of land availability and food demands. These two factors, coupled with rising feedstock prices for producers and the imposition of a federal fuel excise on all alternative fuels from 1 July 2011 (in accordance with the Fuel Tax Act 2006), are likely to result in the reduced availability of this fuel in the future.
- Second generation biofuels however are likely to figure prominently in the transport energy mix in the future though the commercial availability of these fuels will be dependent upon substantial breakthroughs in production technology. Second generation fuels are not expected to be available in significant volumes before 2025 (and third generation possibly even further afield).
- There is significant uncertainty about the greenhouse benefit of current CNG engine technologies when considered on a life cycle basis. This uncertainty relates to the lower combustion efficiency of spark-ignited natural gas engines relative to compression ignition diesel engines and the operating cycle of the vehicle.
- A number of LNG trials undertaken in Australia have yielded mixed results in terms of net greenhouse benefit, due largely to variations in the combustion efficiency of different natural gas add-on technologies. Currently, there is a lack of heavy duty gas engines available for sale in Australia suggesting that growth in the use of this fuel in the Australian commercial vehicles sector is unlikely to be significant in the short term.
- Substantial research and development work is being undertaken in respect of the commercial production of synthetic diesel using coal to liquids and gas to liquids technology. When considered on a life cycle basis, the emissions generated by coal to liquids and gas to liquids fuels are up to 80% higher than conventional transport fuels. The future commercialisation of these transport fuels is likely to be constrained by the need to develop more carbon-efficient manufacturing processes and/or develop carbon capture and storage technologies. As a consequence, synthetic fuels are unlikely to be available for transport use in the short to medium term.
- LPG is already widely used in some sections of the passenger car market, helped by federal government incentives for the purchase of conversions. However as reported by COAG 2008, the claimed emissions benefit of using LPG in light vehicles has not been realised in Australia owing to the suboptimal performance of Australian LPG technologies relative to the more sophisticated European systems. The likely high cost of this technology and the limited availability of Autogas suggest that there is limited opportunity to realise a significant emissions benefit from the increased use of this fuel in the short to medium term.
- Hydrogen (and fuel cell vehicles) is still very much in the prototype stage and the advancement of this technology for transport is complicated by major challenges relating to the cost, complexity, fuel handling and absence of low carbon

production sources. The majority consensus is that hydrogen will not be available as a transport fuel in the next 25 years at least.

- The greatest technology opportunity for the reduction of GHG emissions from passenger cars and light commercial vehicles lies in the adoption of hybrid electric (30% reduction) and full electric (70% reduction). The realisation of the benefits of full electric vehicles is wholly dependent on the use of energy generated by renewable sources. (Further expansion of this point and the local outlook of electric vehicles is provided in the September 2009 edition of Motoring Directions issued by AAA).

Whilst addressing biofuels and their limitations from an environmental perspective, the above report does not adequately evaluate them in the context of fuel security and rural/regional development. These factors, together with life cycle and energy balance assessments, should be incorporated into all alternative fuel and technology cost/benefit analyses.

## **6.0 LOW CARBON FUEL STANDARD (LCFS)**

RACQ issued a position paper in November 2009 offering LCFS as a means of providing a future focussed tool to support all the players (car manufacturers, energy generators, and infrastructure providers) who are working towards providing a broad suite of alternative fuels and technologies.

In summary:

- LCFS is a performance standard that measures CO<sub>2</sub> equivalent grams/unit of fuel energy, taking account of emissions across the entire energy pathway from well to wheel.
- LCFS enables regulation of fuel GHG emissions and the imposition of downward trends, while allowing industry and consumers to determine the most efficient means to achieve the desired outcomes (i.e. market driven). It also avoids perverse outcomes and inefficiencies associated with government “picking the winners” before any mature technology pathways are established.
- Performance standards under a LCFS would require the establishment of a benchmark and a methodology for determining the carbon intensity of fuels provided. In short, this means an agreed fuel standard pathway would be developed and agreed between government and fuel providers (as is being progressed in California and the European Union) to form a targeted transport fuel standard for each fuel type.
- California and the European Union are progressing toward international LCFS.
- Potential benefits of adopting a LCFS include:
  - Provides for a “one size fits all” approach to reducing carbon emissions from fuels meaning that instead of governments “picking and choosing” fuels they feel will be the winners and providing support to select providers, the market will examine emissions across the lifecycle and adopt innovative strategies to meet the standards.
  - Provides the opportunity for the market to plan and accommodate the necessary changes to provide for lower carbon content in fuels -that is, in allowing the market to determine the most effective, compliant mix of fuels using the least cost methodology, the impost on providers and consumers will be reduced.

- All carbon emissions across the lifecycle are measured and accounted for.
- Provides greater economic and environmental benefits than any more specified fuel regulation or mandate.

## **7.0 DISCUSSION**

### **7.1 Major Issues for our Members**

There is widespread awareness of the need to reduce our use of oil however, the case for AAA to be involved in and form a position on alternative fuels, should focus on all the factors contributing to this need, namely the combined influence of the two global imperatives:

- growing need to reduce the environmental impacts of vehicle-related emissions on the urban and natural environments.
- uncertainty around the long-term supply and retail price outlook for conventional transport fuels;

This is supported by a growing concern by Australian motorists about the effects of vehicle emissions on environment (i.e. 2007 ANOP survey data which indicated almost 80% are concerned).

Alternative fuels as a “solution” need to be pursued as part of an overall package of measures including for example: alternative vehicles and engine technology, public transport, behaviour change programs and intelligent transport systems (ITS). Interestingly, the ANOP results also indicate there is increasing interest in alternative vehicles as a solution, over other options including alternative fuels.

A need for Government to adopt a future focussed framework (e.g. LCFS) that accounts for carbon emissions across the entire energy pathway and allows the market to determine the best strategies to adopt as opposed to the Government deciding which fuels it will support is also emerging as a likely pathway.

Simultaneously, oil companies should continue to strive to improve fuel quality and alternative fuels.

### **7.2 Need for a National Approach**

As noted by the CSIRO Future Fuels Forum report, the issues of oil dependence and GHG emissions (i.e. the two global imperatives) should be tackled simultaneously.

Although alternative fuel policy is an issue of national importance, the ability to arrive at a coordinated, consistent and unified approach to their solution is unlikely for many reasons and this needs to be given due consideration by AAA and the Clubs (e.g. allowances for geographical, political and other differences between States such as prosperous local biofuel or natural gas industries) This is expanded on in Section 7.4.

For an effective performance standard position to be adopted, such as a LCFS, a national approach is much more favourable than a State adoption so as to avoid the likely situation of companies shuffling stock across borders to avoid compliance.

### **7.3 Definition of Alternative Transport Fuels**

To be fully encompassing of a future map, there is a case for alternative technologies such as hybrid drive trains and electric motors to be included alongside fuels in this paper. Similarly, there should be acknowledgement of the role of ultra low emission petrol vehicles as part of the solution.

An agreed performance standard, such as a LCFS, combined with a voluntary vehicle carbon emission target should also be included to provide a future focussed framework.

#### **7.4 Regional Specificity**

There is a significant environmental and economic case for the adoption and use of a mix of alternative fuels and technologies which may alter regionally around the country due to, for instance, the localised abundance of a specific fuel type that is more economically (and possibly more environmentally) viable than another fuel variant that is considered better elsewhere. Geo-thermal for instance, which is expected to provide sustainable electricity generation in the near future, will likely be much more viable in areas “close to the source” as initial feasibility studies indicate significant losses of energy the further it is “piped”. Governments should adopt policies that encourage the use of a wide mix of power and fuel systems.

#### **7.5 Biofuels**

AAA generally supports the availability of biofuels on the expectation consumer protection concerns about labelling and retail pricing are met. The report of the Senate Inquiry, the previous discussion paper and other reports including those of RACQ and the NRMA Jamison Group raise concerns about feedstock, land use and water supplies for current production techniques. Second generation biofuels produced from non-food crops, waste products and algae are promising but are still some years off commercial production.

There is probably a case for current biofuel use for transport to be maintained, however proposals to increase current levels should be withheld subject to a comprehensive environmental, social and financial risk analysis.

AAA should support and advocate for research and development of second generation biofuel technologies in accordance with the ATSE Biofuels Road Map.

#### **7.6 LPG**

With large reserves of gas available and advantages for GHG emissions, LPG is seen as a useful alternative fuel, albeit with limited vehicle applications. AAA has supported current Government LPG policies but has also drawn attention to the large Budgetary and economic cost of the subsidy (including that for ethanol) as outlined in the AAA submission on Future Oil Supply and Alternative Transport Fuels (see Section 3.2). The Jamison Group on the other hand, have called for greater government assistance to encourage vehicle conversions and facilitate infrastructure.

AAA should support the current position held by the Governments regarding Government incentives and assistance to be provided for the LPG industry.

Further research is required to look at the technical issues that would allow greater uptake of LPG.

#### **7.7 CNG/LNG**

While noting the low energy density of CNG and LNG, issues of energy requirements and GHG emissions of compression, and infrastructure requirements, there is support for heavy vehicle use of these fuels.

AAA should advocate for further incentive choices to be investigated to allow for greater uptake of CNG/LNG in the short to midterm, targeting heavy vehicles.

## **7.8 GTL/CTL**

GTL and CTL technology is regarded as expensive and having little GHG advantage (see Section 5.0), but has environmental benefits due to the very low sulphur and aromatics content of the synthetic fuel produced. The Senate Inquiry concluded the technology as risky to investors and the Jamison Group rejected these fuels as a product of the coal lobby and a waste of funds and research effort. However, the findings of the ATSE forum suggest that use of GTL and CTL fuels should be stimulated and recent developments in Queensland by Linc Energy seem promising.

Given the vast reserves of coal available, AAA should push for further research and development of GTL and CTL technologies with the intention of not prematurely eliminating any possibilities that could form part of a global transport energy mix and carbon reduction plan in the future if, for example, carbon capture and storage technology also improves.

## **7.9 Electric**

It appears likely that hybrid and electric vehicles will be the most successful alternative technology in the medium term, with many major manufacturers now developing vehicles for release in the next year or two and EV infrastructure models such as Better Place ready to commence trials in Australia by 2011.

The Victorian Government is also currently seeking expressions of interest from the public, energy providers and car manufacturers to take part in an EV trial commencing the second half of 2010.

While an effective counter to oil dependency, the environmental advantages of electric vehicles relies on their construction methods and battery production and disposal, and the emission of the power stations generating the electricity they use.

There is also a need for infrastructure standards to be established prior to electric vehicles and electric vehicle infrastructure (e.g. re-charging stations) becoming mainstream.

AAA should support the introduction of electric vehicle on the condition commitments are made on improvements to the stationary energy sector as well as electric vehicle infrastructure standards are created.

Further to improvements in the stationary energy sector, AAA should advocate the requirement for renewable energy sources (e.g. as proposed by ActewAGL) for electric vehicles.

As the Jamison Group have suggested, the viability of using electric vehicles to feed into the power grid, and householders to generate their own power to recharge vehicle batteries should be pushed on the condition adequate standards of safety and health can be achieved.

## **7.10 Hydrogen**

Major car manufacturers' involvement in developing hydrogen fuel cells have received media attention recently, but most organisations regard this technology as being at least 30 years from commercial production (if at all).

The Jamison Group consider that electric cars will be the dominant technology before hydrogen infrastructure and fuel cell energy issues could be overcome. The Garnaut Review believes there could be place for hydrogen if the costs of the required infrastructure fall considerably.

AAA should support ongoing research and development of fuel cell technology and hydrogen as a fuel source, especially if it can be shown that hydrogen can be generated through renewable sources.

### **7.11 Non-Fuel Strategies**

The AAA, Senate Inquiry, CSIRO, Jamison Group and Garnaut Review reports all note the importance of transport planning and demand in addressing oil dependency and environmental issues. The CSIRO regard future travel choices to be as important as technological solutions, and the Jamison Group recommends government planning considers sustainable mobility.

AAA should strongly push for these issues to be considered alongside alternative fuel and vehicle technologies due to the previously established contention that a “mix” of solutions will be necessary to meet the challenges.

AAA and all the motoring organisations should continue to play an active and increasing role encouraging sustainable mobility through transport planning, public transport and personal transport.

Other demand-side issues relate to motorists’ choices on how and when they travel. However motorists generally believe technological solutions are required over changing their driving habits. AAA and the clubs encourage eco-driving to reduce fuel consumption and vehicle emissions, but this is seen as a separate issue to oil dependency. That said, AAA should continue to assist motorists to reduce fuel consumption and environmental impacts through behaviour change programs such as eco-drive.

The Clubs’ eco-driving campaigns should be expanded to encourage individuals to be more responsible for reducing their use of oil products due to proven trial results (e.g. Monash University trial, 2009<sup>4</sup>) showing significant fuel use savings can be made by motorists who follow eco-drive principles.

Given natural timelines between research, development and introduction of different alternative transport fuels, the AAA motoring clubs should further develop community education, lobby governments and influence industry to reduce oil dependency now, using existing fuels and vehicles.

### **7.12 Government Interventions**

The CSIRO report noted that while the issue discussed in Section 7.11 have societal impacts, individuals are unlikely to make adequate preparations for the diminishing availability of oil. The AAA, CSIRO, Senate Inquiry and, in particular, the Jamison Group and ATSE see major roles for governments in changing the vehicles and fuels we use and how we use them.

AAA, together with the States, will need to consider issues pertaining to domestic State circumstances to allow for the development of alternative transport fuel industries.

AAA advocates that there should be a choice of incentives and fuels, without any rebates or excises. This choice of incentives should be extended to include low emission vehicles and alternative transport technologies.

### **7.13 Low Carbon Fuel Standard (LCFS)**

RACQ has placed a strong case in favour of adopting an LCFS. In effect, an LCFS would allow Governments to regulate fuel GHG emissions and allow industry and consumers to determine the most efficient fuel strategies to achieve the desired outcomes.

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<sup>4</sup> Symmons, M.A., & Rose, G. (2009). Eco-drive training delivers substantial fuel savings for heavy vehicle drivers.

AAA should favour a national adoption of a LCFS, rather than a State by State adoption to prevent the issue of companies “shuffling across jurisdictions” to avoid compliance. It should also favour an LCFS position in conjunction with a voluntary vehicle carbon emission target of 130g CO<sub>2</sub>/km.

AAA should investigate further how LCFS will work with or complement a national carbon trading scheme, including the Mandatory Renewable Energy Target (MRET) and the trading of Renewable Energy Certificates (RECs).

Given that some states have moved to support alternative transport fuel industries differently, a clear understanding of how a LCFS will work in those states is required.

#### **7.14 Voluntary Vehicle Carbon Emission Target**

AAA should favour a national LCFS in conjunction with a vehicle carbon emission target of 130g CO<sub>2</sub>/km that is in-line with the target adopted by the European Parliament (see Section 3.9). It should be noted that a 130g CO<sub>2</sub>/km target is dependent on test/drive cycles and should be applied by manufacturer across the whole fleet.

The challenges faced by the Australian automobile industry needs to be taken into account (using the disparity in average greenhouse gas emission ratings for new cars currently sold in Europe compared to Australia as a guide), and as such AAA should favour a voluntary target until 2015 bringing it in line with the national fuel excise changes timeline.

## 8.0 POLICY POSITIONS

### Targets

- Policy 1* A national Low Carbon Fuel Standard (LCFS) should be adopted to enable Governments to regulate fuel GHG emissions and allow industry and consumers to determine the most efficient fuel strategies to achieve emission targets.
- Policy 2* A national voluntary vehicle carbon emission target of 130g CO<sub>2</sub>/km should be adopted.

### Research & Development

- Policy 3* AAA advocates that research and development of second generation biofuel technologies be continued.
- Policy 4* AAA urges oil companies to continue to improve fuel quality and alternative fuels
- Policy 5* Further research is required to look at the technical issues that would allow greater uptake of LPG.
- Policy 6* Ongoing research into the most effective ways to produce electricity from renewable resources is required.
- Policy 7* Ongoing research and development of fuel cell technology and hydrogen fuel is proposed, especially where hydrogen can be generated through renewable sources.
- Policy 8* *Life Cycle Analyses and Energy Balance Analyses should be included in all assessments of new technologies (vehicles, alternative fuels and vehicle-fuel interactions).*

### Government Incentives & Initiatives

- Policy 9* As new innovations and technologies become available to the market, governments should adopt policies and incentives that encourage the use of a wide mix of power and fuel systems to enhance consumer choice and gradually reduce dependence on fossil fuels. This should be extended to include low emission vehicles and alternative transport technologies, and should not be done using rebates or excises.
- Policy 10* Governments should continue with policies and incentives that support the use of LPG and provide assistance to the LPG industry to maximise production capacity.
- Policy 11* Further incentive choices should be investigated to allow for greater uptake of CNG/LNG in the short to midterm, targeting heavy vehicles.

### Community Education & Behaviour Change Programs

- Policy 12* The AAA Clubs should continue to assist motorists to reduce fuel consumption and environmental impacts of transport through voluntary behaviour change, for example through 'travelsmart' style programs, eco-driving and modal shift.
- Policy 13* The AAA Clubs should continue to play an active and increasing role in encouraging the community to take up alternative transport and sustainable mobility options

## **Advocacy & Communication**

*Policy 14* The AAA Clubs should continue to play an active and increasing role that calls for a drastic increase in investment and service quality of our public and active transport systems.

*Policy 15* Legislation is required to ensure all electric vehicles will be supplied by clean renewable energy.

*Policy 16* The AAA Clubs should further develop community education, lobby governments and influence industry to reduce oil dependency using existing fuels and vehicles.