

9 December 2011

**Mr Michael Sutton**  
Assistant Secretary  
Surface Transport Policy  
Department of Infrastructure and Transport

Via email: [michael.sutton@infrastructure.gov.au](mailto:michael.sutton@infrastructure.gov.au) and [CO2standards@infrastructure.gov.au](mailto:CO2standards@infrastructure.gov.au)

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## **LPG AUSTRALIA**

### **SUBMISSION TO THE DEPARTMENT OF INFRASTRUCTURE AND TRANSPORT**

#### **Light vehicle CO2 emission standards for Australia**

Dear Mr Sutton

LPG Australia appreciates the opportunity to make a submission in response to the Department of Infrastructure and Transport's *Light vehicle CO2 emission standards for Australia* discussion paper.

This submission seeks to demonstrate that Australia's Autogas sector is uniquely placed to help Australia's transport sector quickly reduce its Greenhouse Gas (GHG) emissions, as well as improve energy security and reduce air pollution. The entry of new Liquefied Petroleum Gas (LPG) vehicles and technology into the Australian market and the continuing ability to retrofit the current light vehicle fleet to LPG, presents an opportunity for governments and industry to work closely together to deliver the community dividends increased use of LPG offers.

The Submission will address the need to improve energy security and combat climate change by reducing light vehicle CO2 emissions and improving air quality.

LPG makes a significant contribution to meeting Australia's energy needs in two distinct ways:

- a. as a stationary energy source, it is the gaseous fuel used by domestic, commercial and industrial customers in the many parts of Australia or applications where natural gas is unavailable; and
- b. as an automotive fuel (Autogas), LPG provides a clean, economical fuel for some 700,000 light vehicles.

LPG Australia is the national peak body which represents the LPG industry – the participants in the LPG supply chain, LPG marketers and equipment manufacturers, and the providers of services and products to the industry. LPG Australia is responsible for the development and growth of the LPG industry in support of Australia's national interest and the Australian community.

LPG Australia has over 150 members including some of Australia's largest energy companies such as Origin Energy, Elgas Ltd and Wesfarmers Kleenheat Gas. Small to medium size manufacturers and technology companies are also well represented in our membership base.

LPG Australia has an ongoing working relationship with the Infrastructure and Transport portfolio in respect to vehicle standards and the safe transport of dangerous goods.

This submission will focus on LPG's use as an automotive fuel which accounts for around 60 per cent of the LPG consumed in Australia. In particular, it will highlight how increased Autogas use can help combat climate change, which is the focus of *Light vehicle CO2 emission standards for Australia* discussion paper, as well as improve Australia's energy security and reduce air pollution.

The release of dedicated LPG Ford and recently announced GMH vehicles represents a significant and innovative development for Australia's Autogas industry. New Australian developed factory fitted LPG systems deliver better performance than their petrol equivalents with up to 16 per cent less CO2 emissions. The new LPG systems include vapour and liquid injection technologies which now, more than ever, match and more often surpass the power and drivability of petrol systems, as well as extend vehicle maintenance schedules. The increased vehicle efficiency is achieved by the systems directly interfacing with vehicles' engine management computer systems which maintain optimal engine tuning, thereby improving performance and further reducing emissions.

In 2010, LPG Australia commissioned research by Rare Consulting on the prospects for LPG as a light vehicle fuel in Australia to 2030. This research concluded that petrol and diesel would remain LPG's main competitors out to 2025 and that improved LPG technology is the key to LPG increasing its market share over this period. A copy of the research can be found at:

<http://lpgaustralia.com.au/site/library.php?task=detail&type=0004&id=0054>

Further information about the prospects for LPG as an automotive fuel in Australia, along with the barriers to its further take-up, is covered in "Future Directions 2030: A roadmap for the Australian LPG vehicle industry" prepared by LPG Australia. A copy of the Road Map can be found at:

<http://lpgaustralia.com.au/site/library.php?task=detail&type=0004&id=0052>

### **Combating climate change**

LPG Australia strongly supports the Australian Government's efforts to address climate change. In addition, LPG Australia considers the transport sector must contribute its fair share to reducing Australia's output of GHG emissions. Australia's Autogas industry can help the transport sector make such a contribution.

LPG powered vehicles emit significantly less GHG emissions than equivalent petrol powered vehicles. For example, the LPG powered Ford Falcon EcoLPi released in September 2011 produces 14 per cent less grams of carbon dioxide equivalent per kilometre travelled (203 gm CO<sub>2</sub>-e/km) than its petrol equivalent (236 gm CO<sub>2</sub>-e/km).

In addition, around 80 per cent of the LPG produced in Australia is sourced from natural gas fields, which has a lower GHG intensity (0.186 kilogram CO<sub>2</sub>-e per kilogram of LPG produced) than LPG produced in refineries (0.364 kg CO<sub>2</sub>-e/kg of LPG produced). Moreover, industry forecasts suggest the production of LPG from natural gas fields in Australia could double over the next ten years as a number of major natural gas developments come on stream. As a result, increased Autogas use could make a substantial contribution to the Australian transport sector's efforts to reduce its GHG emissions.

In 2010, LPG Australia commissioned research by Rare Consulting which showed the use of LPG instead of unleaded petrol in passenger vehicles in Australia could decrease GHG emissions by such vehicles by 13 per cent. This research, which could assist the Department of Infrastructure and Transport's work on

developing light vehicle CO<sub>2</sub> emission standards, also analysed the GHG emissions of other passenger vehicle fuels. A copy of the research can be found at:

<http://lpgaaustralia.com.au/site/library.php?task=detail&type=0004&id=0053>

### **Reducing light vehicle CO<sub>2</sub> emissions**

LPG Australia strongly supports the Australian Government's commitment to apply mandatory CO<sub>2</sub> emission standards to light vehicles in Australia from 2015 as a practical measure to reduce transport sector GHG emissions. It offers the following responses to the questions posed in the Department's *Light vehicle CO<sub>2</sub> emission standards for Australia* discussion paper.

*Q1 Do you support the setting of staged short and medium term targets?*

LPG Australia supports the setting of staged short and medium-term light vehicle CO<sub>2</sub> emission standards targets to assist the vehicle industry and the tiered supply chain plan future vehicle designs and technology options, and to quantify and deliver Government policy outcomes related to carbon reduction.

*Q2 If yes, do you consider 2020 is the logical date for a firm second stage target?*

LPG Australia considers 5 years to be a reasonable period between light vehicle CO<sub>2</sub> emission standards targets. Given the Government's commitment to set a target for 2015, 2020 is then a sensible date for which to set a firm second stage target.

*Q3 Do you consider it is appropriate to set a target beyond 2020 at this stage?*

In-principle, LPG Australia supports 5 yearly indicative targetting beyond 2020, provided it is based on agreed valid assumptions, is subject to review and is not in the nature of a firm binding target.

*Q4 Do you consider 2010 is the appropriate base year for determining the targets?*

LPG Australia does not oppose 2010 being used as the base year for determining light vehicle CO<sub>2</sub> emission standards targets for Australia.

*Q5 What rate of CO<sub>2</sub> emissions reduction do you consider is achievable by 2015 and 2020 in Australia?*

On the basis of international experience, particularly in Europe, and research cited in the Discussion Paper and its own commissioned research, LPG Australia considers substantial light vehicle CO<sub>2</sub> reductions could be achieved using existing automotive technologies, including alternative fuels. In addition, as discussed in relation to Question 10, CO<sub>2</sub> emissions could be reduced further, both rapidly and significantly, by modifying existing vehicles. Moreover, vehicle manufacturers and/or suppliers can use marketing and pricing policies to influence the average emissions profile of the vehicles they sell in a particular year.

As a result, the Discussion Paper's Scenario 6, which entails 3 per cent per annum reductions up to 2015 and 5 per cent per annum reductions up to 2020, should be viewed as a starting point for emissions reductions. While this is the most stringent scenario outlined in the Discussion Paper, it is important to note that the average annual reduction in CO<sub>2</sub> emissions in Australia over the last 8 years has been 2.1 per cent without mandatory CO<sub>2</sub> emissions standards.

*Q6 What do you think is a reasonable CO<sub>2</sub> target for the Australian new light vehicle fleet in 2015 and 2020?*

Drawing on the Discussion Paper and in line with the position outlined with regard to Question 5, LPG Australia considers 183g/km and 141g/km to be the starting point for targets for reduced average CO<sub>2</sub> emissions levels for Australia's light vehicle fleet in 2015 and 2020 respectively.

*Q7 Are there any impediments to Australia achieving the more ambitious rates of reduction embodied in Scenarios 5 (2.5% pa reduction to 2015 and 5% pa to 2020) and 6 (3% pa reduction to 2015 and 5% pa to 2020) above?*

LPG Australia considers the biggest impediment to Australia achieving significant reductions in CO<sub>2</sub> emissions from light vehicles to be lack of community awareness of:

- a. the private benefits that can be obtained by using vehicle technologies that reduce fuel costs as a result of using less fuel and/or less expensive fuel; and
- b. the national interest (in excess of the private) benefits that can be obtained by using vehicle technologies that reduce CO<sub>2</sub> emissions as a result of using less fuel and/or fuel that produces lower CO<sub>2</sub> emissions.

Consequently, LPG Australia supports efforts to raise community awareness of these benefits with the aim of optimising the value and benefits of LPG. Greater awareness of these benefits would make vehicle purchasers more willing to pay extra for vehicle attributes which they consider would save them money over time and/or improve the environment.

That said, LPG Australia acknowledges that local automotive manufacturers may not be able to pass on to consumers the full costs of achieving significant reductions in CO<sub>2</sub> emissions from light vehicles in the face of competition from imported vehicles. Nevertheless, LPG Australia considers any government assessment of possible initiatives to help local automotive manufacturers adjust to new low emission standards should also take into account the positive influence imported technology and vehicles can have on reducing vehicle emissions.

*Q8 Do stakeholders have any information on costs and benefits of standards which would assist DI&T in the preparation of the cost benefit analysis for the implementation Regulatory Impact Statement (RIS)?*

In addition to the LPG Australia commissioned research by Rare Consulting on passenger vehicle GHG emissions cited above, submitted at Annex A are estimates prepared by LPG Australia members of the future availability, volumes and prices of automotive LPG systems in Australia, both factory-fitted and after-market conversions.

*Q9 Should Australia set a single set of CO<sub>2</sub> targets for all light vehicles, or is there merit in establishing separate targets for passenger vehicles (cars and SUVs) and for LCVs (utes and vans)?*

LPG Australia supports establishing a single set of CO<sub>2</sub> emissions targets for all light vehicles. Such an approach would help minimise compliance and administrative costs and, unlike separate targets for different categories of vehicles, would not create an incentive to switch from a category with a stringent target to another with a less stringent target.

*Q10 Do you support the idea of bonus credits for new technology vehicles (such as EVs), flex fuel vehicles and other technologies, or should the CO<sub>2</sub> standard be purely performance based, treating all vehicles on the same basis (using the CO<sub>2</sub> emissions result on the standard ADR test)?*

Bonus credits for selected vehicle technologies might enable some manufacturers and/or suppliers to meet their emission reduction targets. But such credits, however chosen, would not reduce actual CO<sub>2</sub> emissions – in fact they would detract from Australia's efforts to reduce its emissions.

Consequently, LPG Australia does not support bonus credits for particular technologies. It considers any credits should be based on CO<sub>2</sub> reduction performance and all vehicles should be treated the same using the CO<sub>2</sub> emissions result on the standard Australian Design Rule (ADR) test.

With this in mind, rather than provide bonus credits for selected vehicle technologies, LPG Australia proposes the recognition of CO<sub>2</sub> reductions as a result of vehicle modifications that take place after a vehicle has left its manufacturer's factory but before its first registration. In other words, manufacturers and/or suppliers would be able to claim the lower post-modification emission factor rather than the higher unmodified one.

In-principle, such recognition should be available to any technology that is able to reduce emissions. In practice, this initiative would need to require:

- a. validation that a particular type of modification will reduce CO2 emissions;
- b. assurance, via a national certification scheme, that whoever undertakes the actual modification of a vehicle is sufficiently skilled and qualified to do so properly so that the modification's potential CO2 emission reductions are realised; and
- c. the vehicle remains covered by the manufacturer's and/or supplier's warranty against defects.

Given such recognition would be premised on the delivery of reduced GHG emissions, the proposal's integrity would depend on quantifying the environmental performance of various modification technologies. For example, while some LPG converted vehicles deliver up to 16 per cent less CO2 emissions than their petrol equivalents, results vary for different LPG technologies combined with different vehicles.

As a result, there would be a need to validate a modification system's claimed emission reductions and ensure it satisfied applicable emission design standards. In the case of ex-factory vehicles, what would be required is the relevant ADR certification test with the CO2 reducing modification fitted, with the ADR test results applicable to vehicle components unaffected by the modification carried forward. Once certified, the new lower CO2 emission rating would be assigned to the appropriate legal entity and shown on the Government's Green Vehicle Guide.

Once a particular type of modification technology to reduce CO2 emissions had been validated, the next step would be to ensure whoever undertook the actual modification of a vehicle was sufficiently skilled and qualified to do so properly so that the modification's potential CO2 emission reductions were realised.

For example, the quality of gas kit installation can have a significant bearing on the real-world environmental and economic performance of a gas powered vehicle. Incorrect installations can also present a safety risk to the vehicle user and the general public. In response, LPG Australia has developed a *National Personnel Certification Scheme* to reassure governments and the public of the competency of Autogas equipment installers and maintainers. The *Scheme*, which was developed by a joint panel comprising government and industry representatives and will continue to be operated by LPG Australia, provides assurance of:

- a. appropriate training of personnel in gas kit installation, gas systems inspection and gas safety;
- b. a workshop that is equipped for gas vehicle repair in accordance with Australian Standards and State/Territory workplace safety requirements; and
- c. the use of gas tanks and gas components that comply with all relevant Australian Standards.

Consequently, LPG Australia suggests that all modifications that might be recognised should be able to provide assurance, via a similar national certification scheme, that the modifications will be done properly and safely.

*Q11 If you support credits, what vehicle types do you consider qualify for a credit and why?*

Not applicable.

*Q12 Do you support an attribute based standard?*

LPG Australia offers no comment on this question.

*Q13 If so, do you have a preference for mass or footprint?*

Not applicable.

*Q14 If you do not favour an attribute based standard, what is your preferred approach and why?*

Not applicable.

*Q15 Do you consider there are any other data elements which might also be required for the standards to be effective and enforceable?*

In addition to the key data elements identified in the Discussion Paper, LPG Australia suggests the following data might be required if its proposal outlined at Question 10 to recognise CO2 reductions as a result of vehicle modifications is accepted by the Government.

- a. The nature and characteristics of modifications that reduce CO2 emissions.
- b. The required skills and qualifications of those able to properly undertake modifications that reduce CO2 emissions.
- c. The legal entities that might be assigned vehicle CO2 emissions following vehicle modifications to reduce emissions.

*Q16 Do you agree that the current VFACTS database (supplemented and audited as necessary) is suitable as the primary data source for assessing and reporting compliance with the standards?*

LPG Australia has no in-principle objection to the VFACTS data collected by a private company being used by the Government as the primary source information to administer its emission standards. In practice, this information may need to be supplemented, including in relation to the additional data elements identified at Question 15. In particular, LPG Australia notes that the Federal Chamber of Automotive Industries (FCAI) does not represent all legal entities that might be assigned vehicle CO2 emissions.

*Q17 Do you also agree that data collected for the purposes of the standard should be made publicly available on an annual basis?*

LPG Australia supports the data collected for the purposes of the standard being made publicly available on an annual basis provided legitimate industry concerns about the release of commercial-in-confidence data can be addressed.

*Q18 Do you agree that the Motor Vehicle Standards Act is the most appropriate primary legislation under which to write appropriate CO2 regulations?*

LPG Australia offers no comment on this question.

*Q19 If not, what alternative legal framework would you propose?*

Not applicable.

*Q20 Do manufacturers, particularly suppliers, have any views regarding the identification of responsible entities under the standards?*

Not applicable.

*Q21 Do you consider there is merit in allowing manufacturers to pool, or is it an approach that manufactures are unlikely to pursue?*

LPG Australia offers no comment on this question.

*Q22 Do you think there is sufficient merit to warrant the inclusion of banking and trading systems as a feature of Australia's CO2 standards?*

LPG Australia offers no comment on this question.

*Q23 Do you agree such systems are only possible where annual targets are set?*

LPG Australia offers no comment on this question.

*Q24 Do you agree that financial penalties are the most effective way to address non-compliance?*

LPG Australia agrees that financial penalties are the most effective way to address non-compliance and supports linking such penalties to the price of carbon.

*Q25 If not, what alternative would you suggest?*

Not applicable.

### **Improving energy security**

Not only is Australia completely self-sufficient in LPG but it is also a net exporter of LPG. In 2010, Australia's net exports of LPG totalled 859 kilotonnes, which reflects 2,737 kilotonnes of local production, from both natural gas fields and refineries, well exceeding total domestic demand of 1,806 kilotonnes.

In addition to natural gas field processing facilities and refineries to produce LPG, Australia also possesses well established infrastructure for the storage and distribution of LPG. In particular, there are over 3,200 Autogas refuelling stations across the nation. This infrastructure enables Australia's more than adequate supplies of LPG to be reliably supplied to Australian consumers.

LPG is also very affordable. On average over time, Autogas costs up to 50 per cent less at the bowser than petrol.

The above factors demonstrate that increased Autogas use in Australia could offset the likely decline in Australia's liquid fuel security identified by the Australian Government's 2009 National Energy Security Assessment as a result of issues such as:

- a. a greater reliance on longer global supply chains;
- b. a likely trend to high average crude oil prices and a greater global reliance on unconventional oil;
- c. the significant investment challenge required to meet rising global demand; and
- d. the continued risks of geopolitical uncertainty in key production centres.

### **Reducing air pollution**

LPG's inherently clean burning characteristics make it an ideal automotive fuel emitting significantly less GHG emissions and other pollutants than petrol-powered equivalents. In particular, LPG has two physical properties that are particularly relevant to its local air quality (LAQ) footprint:

- a. while there is a degree of natural variation in its composition, LPG has a comparably high heating value, meaning it contains more energy per kilogram than most competing fuels; and
- b. LPG's simple molecular structure makes it easily combustible, giving it a lower pollutant emissions profile than most other fossil fuels.

In one of the most comprehensive studies of its kind, the European Emissions Test Programme (EETP) study, which was sponsored by governments and energy companies and conducted by four testing laboratories, directly compared LPG, petrol and diesel automotive emissions. Through well-to-wheel analysis, in 2004 the EETP study showed LPG to be:

- a. clearly lower than petrol and diesel on nitrous oxides;
- b. essentially equivalent to petrol and well below diesel on particulate matter; and
- c. just below petrol yet well above diesel on hydrocarbons.

For carbon monoxide, LPG came out higher than petrol and both were significantly higher than diesel. On emissions of so-called 'toxics' (such as aldehydes, benzene, toluene, xylenes, polyaromatic hydrocarbons and so on), LPG nearly always generated a footprint lower than diesel's and often lower than petrol's.

More information about the EETP study and other similar studies is provided in a 2009 study by Atlantic

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Michael Carmody', with a large loop at the start and a small flourish at the end.

Michael Carmody  
Chief Executive Officer

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LPG Australia Council Working Group – Road Map LPG Vehicles  
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Annex A: Estimated future availability, volumes and prices of automotive LPG systems in Australia

**Estimated future availability, volumes and prices of automotive LPG systems in Australia**

	2015 - 2019						2020 - 2024					
	Light	Small	Medium	Large	SUV	Ute/LC	Light	Small	Medium	Large	SUV	Ute/LC
Original Equipment (OE) LPG offering available	NA	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓
Aftermarket (AM) LPG Kits available	NA	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓
OE LPG Sales Volume (units)	NA	2,695	5,390	29,645	6,738	4,043	NA	3,805	7,611	20,549	6,596	3,805
Aftermarket LPG Sales Volume (units)	NA	1,000	15,000	60,000	10,000	10,000	NA	5,000	15,000	50,000	7,500	7,500
Incremental Price (OE) (\$/unit)	NA	\$1,500	\$2,000	\$2,500	\$2,500	\$2,500	NA	\$1,050	\$1,400	\$1,900	\$1,900	\$1,800
Incremental Price (AM inc fitment) (\$/unit)	NA	\$2,000	\$2,500	\$3,000	\$3,000	\$3,000	NA	\$1,850	\$2,250	\$2,750	\$2,750	\$2,750

	2025 - 2029						2030 - 2034					
	Light	Small	Medium	Large	SUV	Ute/LC	Light	Small	Medium	Large	SUV	Ute/LC
OE LPG offering available	NA	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓
Aftermarket LPG Kits available	NA	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓
OE LPG Sales Volume (units)	NA	8,939	7,957	17,682	6,385	3,684	NA	10,780	6,634	13,267	5,597	3,110
Aftermarket LPG Sales Volume (units)	NA	7,500	15,000	40,000	5,000	7,500	NA	10,000	12,500	30,000	5,000	7,500
Incremental Price (OE) (\$/unit)	NA	\$1,200	\$1,500	\$1,750	\$1,750	\$1,650	NA	\$1,050	\$1,350	\$1,600	\$1,600	\$1,500
Incremental Price (AM inc fitment) (\$/unit)	NA	\$1,600	\$2,000	\$2,400	\$2,400	\$2,400	NA	\$1,500	\$1,900	\$2,100	\$2,100	\$2,100

	2035 - 2040						2040 - 2044					
	Light	Small	Medium	Large	SUV	Ute/LC	Light	Small	Medium	Large	SUV	Ute/LC
OE LPG offering available	NA	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓
Aftermarket LPG Kits available	NA	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓
OE LPG Sales Volume (units)	NA	9,835	4,371	7,649	5,282	2,732	NA	8,401	3,111	5,600	4,667	2,334
Aftermarket LPG Sales Volume (units)	NA	7,500	12,500	25,000	2,500	5,000	NA	5,000	12,500	15,000	2,500	5,000
Incremental Price (OE) (\$/unit)	NA	\$1,050	\$1,350	\$1,600	\$1,600	\$1,500	NA	\$950	\$1,100	\$1,500	\$1,500	\$1,400
Incremental Price (AM inc fitment) (\$/unit)	NA	\$1,250	\$1,700	\$1,850	\$1,850	\$1,850	NA	\$1,000	\$1,500	\$1,750	\$1,750	\$1,750

**Estimated future availability, volumes and prices of automotive LPG systems in Australia**

	2045 - 2049					
	Light	Small	Medium	Large	SUV	Ute/LC
OE LPG offering available	NA	✓	✓	✓	✓	✓
Aftermarket LPG Kits available	NA	✓	✓	✓	✓	✓
OE LPG Sales Volume (units)	NA	7,144	2,041	2,551	3,827	1,913
Aftermarket LPG Sales Volume (units)	NA	5,000	12,500	7,500	2,500	5,000
Incremental Price (OE) (\$/unit)	NA	\$850	\$1,000	\$1,300	\$1,300	\$1,200
Incremental Price (AM inc fitment) (\$/unit)	NA	\$1,000	\$1,500	\$1,750	\$1,750	\$1,750

## Notes:

- 1) LPG kits for small cars available if demand is there.
- 2) Price is volume sensitive. Increase in volume will result in decrease in incremental price.
- 3) Pricing is incremental price to the purchaser and does not take into account government or other rebates
- 4) Pricing will be emission legislation sensitive.
- 5) Sales will depend on oil prices and LPG/ULP differential.
- 6) IC (Internal Combustion) vehicles numbers, both sales and fleet, will reduce with introduction of EVs and other alternatives.
- 7) Diesel engines expected to increase share of SUV and LC market.
- 8) Fleet cars will move from "large" to "medium" car size as time progresses.
- 9) Large car sales and fleet size will decrease over time. Small increase in medium cars. Growth will be in small and light cars
- 10) OE small LPG cars would likely be by Hyundai, or European import, not necessarily a domestic supply.
- 11) Potential for LPG "Range Extender" engines for EVs has not been incorporated in analysis.

## Source:

LPG Australia members