



**AUSTRALIAN  
AUTOMOBILE  
ASSOCIATION**

**Members:**



Australian Automobile Association

Submission to:

Australian Energy Market Commission's  
Energy Market Arrangements for Electric  
and Natural Gas Vehicles  
Approach Paper

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WORLD WIDE AFFILIATION THROUGH THE AIT AND FIA



The Australian Automobile Association (AAA) welcomes the opportunity to make a submission to the Australian Energy Market Commission's (AEMC) Energy Market Arrangements for Electric and Natural Gas Vehicles Approach Paper.

The AAA advocates the interests of Australian motorists nationally and internationally. The AAA's members include all of Australia's state and territory motoring clubs:

- National Roads and Motorists' Association (NRMA) Motoring and Services;
- Royal Automobile Club of Victoria (RACV);
- The Royal Automobile Club of Queensland (RACQ);
- Royal Automobile Association of South Australia (RAA);
- Royal Automobile Club of Western Australia (RAC);
- Royal Automobile Club of Tasmania (RACT);
- Automobile Association of the Northern Territory (AANT); and
- Royal Automobile Club of Australia (RACA)

Through these organisations, the AAA represents the interests of almost 7 million motorists and, indirectly, all Australian motorists at the national and international levels.

The AAA supports the uptake of electric and natural gas vehicles in Australia's vehicle fleet. The AAA also supports the AEMC's approach to this issue. The AAA agrees with the findings of the approach paper that suggests more of these vehicles will enter the market in the next few years and become more affordable for motorists. The AAA considers these vehicles to be part of the sustainable future transport mix, and have the potential to reduce greenhouse gas emissions and reduce Australia's dependence on imported oil.

## Recommendations

1. The AEMC should investigate the capacity of the natural gas market to supply commercial refuelling stations to maximise uptake of Compressed Natural Gas (CNG) vehicles.
2. In order to maximise the environmental benefits of the uptake of electric vehicles, charging should be done exclusively using renewable energy. This will require planning to ensure this is a viable option now and into the future.
3. To ensure efficient participation in the National Energy Market, there should be incentives in place to encourage motorists to charge their electric vehicles during off-peak periods. This will minimise initial impact on energy grids and spread market demand for energy across the day.
4. The Federal Government and energy companies should continue to investigate and invest in smart grids that accommodate the use of smart appliances in regard to electric vehicles.
5. AEMC's advice should include consideration of using smart meters as a means of better managing energy consumption across the grid in relation to charging electric vehicles.
6. The AAA believes there is potential for metering requirements to be reviewed to ensure there are no significant impediments to the uptake of electric vehicles in the corporate and government sector.

## Factors influencing uptake of Natural Gas Vehicles

The AAA believes the following factors will influence the uptake of natural gas vehicles:

- Fuel prices;
- Fuel consumption of petrol and diesel-fuelled cars;
- Refuelling infrastructure;
- Reliability and safety;
- Government incentives; and
- Emergence of other fuels and other technology;

At present, CNG and Liquefied Natural Gas (LNG) are options most easily exploited initially by vehicle fleet operators using depots with refuelling capability, as they can bypass many of the initial infrastructure issues that would act as a barrier for private motorists.

In terms of energy security, there is a very strong case for the uptake of CNG vehicles to be pursued aggressively in Australia. Currently, Australia imports between 40-50 per cent of crude oil to meet demand.<sup>1</sup> This is contrast to natural gas, where 40 per cent of production is exported.<sup>2</sup>

In relation to refuelling CNG vehicles, evidence overseas suggests that these vehicles can be refuelled in a comparable time to petrol or diesel-fuelled vehicles.<sup>3</sup> At present, this provides CNG vehicles with a significant advantage over electric vehicles in this regard. In addition, while the range of CNG vehicles is significantly less than petrol or diesel-fuelled vehicles, CNG vehicles currently have superior range to electric vehicles.

To ensure widespread uptake of CNG vehicles, there needs to be a sufficient number of gas fuelling stations available across the country. Studies need to be conducted to investigate the feasibility of gas providers supplying commercial refuelling stations, particularly along the east coast.

While home filling stations are available, they will come at significant extra cost to consumers and fuelling times would be significantly slower (around 8 hours).<sup>4</sup> Some modifications of the domestic gas supply infrastructure, such as increasing delivery pressure of the supply system would be required in order to deliver the gas at sufficient pressure.<sup>5</sup>

As a result, motorists may be better served through investment in commercial refuelling stations. The AAA believes there will be sufficient interest from private enterprise to provide commercial stations to motorists. The key will be for energy providers to consult with these refuelling stations regarding connection to supply and installation of necessary infrastructure. Current service stations near a natural gas pipeline would be a good starting point.

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<sup>1</sup> [http://gastoday.com.au/news/the\\_australian\\_natural\\_gas\\_vehicle\\_industry/004426/](http://gastoday.com.au/news/the_australian_natural_gas_vehicle_industry/004426/)

<sup>2</sup> IBID

<sup>3</sup> <http://automobiles.honda.com/civic-natural-gas/refueling.aspx>

<sup>4</sup> <http://alternativefuels.about.com/od/naturalgasvehicles/a/cngconversion.htm>

<sup>5</sup> <http://www.mynrma.com.au/images/About-PDF/Jamison-Group-Fuelling-Future-Passenger-Vehicle-Use-in-Australia-February2010.pdf>,

The AEMC should investigate the capacity of the natural gas market to supply commercial refuelling stations to maximise uptake of CNG vehicles.

## Energy Source for Charging

Obviously the widespread use of electric vehicles would require development of suitable infrastructure, particularly in relation to Australia's electricity grids. Ideally, electric cars would be charged purely from renewable sources to maximise their environmental benefits.

The AAA notes the company Better Place has signed an agreement with an energy company in the ACT to ensure electric vehicles are charged exclusively using renewable energy.<sup>6</sup> It plans to sign similar agreements with other energy utilities as its network rolls out around the country.

While this is the preferred outcome, it may be difficult for energy providers to honour this commitment, as the vast majority of Australia's energy supply is from non-renewable sources. In 2009, renewable energy contributed about 7 per cent of Australia's electricity production; with 5 per cent sourced from hydroelectricity (non-renewable sources were coal 77 per cent, gas 15 per cent and oil 1 per cent).<sup>7</sup> However, the Mandatory Renewable Energy Target of 20 per cent by 2020 will help to achieve this commitment.

The carbon price may also help to achieve this, but is unlikely to have a significant impact on this statistic in the short to medium term. If electric vehicles prove to be popular with motorists, this may put pressure on energy companies to supply the network using renewable energy.

In order to maximise the environmental benefits of the uptake of electric vehicles, charging should be done exclusively using renewable energy. This will require planning to ensure this is a viable option now and into the future.

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<sup>6</sup> <http://www.betterplace.com.au/about-us/faqs.html>

<sup>7</sup> International Energy Agency, [http://iea.org/stats/electricitydata.asp?COUNTRY\\_CODE=AU](http://iea.org/stats/electricitydata.asp?COUNTRY_CODE=AU)

## Factors influencing uptake of Electric Vehicles

The AAA believes the following factors will influence the uptake of electric vehicles:

- Battery costs & life;
- Battery range;
- Availability of charging infrastructure;
- Reliability and safety;
- Fuel prices;
- Fuel consumption of (internal combustion engine) ICE cars; and
- Government incentives

These factors are largely consistent with the factors mentioned in the approach paper.

The NRMA's Jamison Report has modelled scenarios based on a portfolio of actions required to drastically reduce oil dependence by 2030. It states that to reduce oil dependence by 75 per cent by 2030, electric vehicles would need to make up one third of Australia's car fleet to contribute to an overall reduction on oil dependence by 12 per cent.<sup>8</sup> In addition, the company Energeia forecasts electric vehicles will account for one quarter of all cars on the road in Australia by 2030.<sup>9</sup>

The AAA believes a significant factor that will influence the uptake of electric vehicles is how far motorists can travel before having to recharge. A study by Deloitte conducted earlier in the year indicated that 68 per cent of respondents would want an electric vehicle with a range of 320km or more and being able to charge in 2 hours or less.<sup>10</sup> This is in spite of most individuals indicating they travel less than 80km a day.<sup>11</sup>

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<sup>8</sup> <http://www.mynrma.com.au/images/About-PDF/Jamison-Group-Fuelling-Future-Passenger-Vehicle-Use-in-Australia-February2010.pdf>, 14

<sup>9</sup> <http://www.energeia.net.au/documents/Electric%20Vehicles%20-%20Driving%20a%20Revolution%20-%20EXTRACT.pdf>, 2

<sup>10</sup> <http://www.deloitte.com/assets/Dcom-Australia/Local%20Assets/Documents/news-research/Press%20releases/Australia%20EV%20findings2011.pdf>, 1

<sup>11</sup> <http://www.deloitte.com/assets/Dcom-Australia/Local%20Assets/Documents/news-research/Press%20releases/Australia%20EV%20findings2011.pdf>, 5

## Charging Infrastructure

In order for electric vehicles to gain sufficient uptake in the market, adequate charging infrastructure needs to be put in place. There is a growing need for widely distributed publicly accessible charging stations, some of which support faster charging than is currently available from domestic supplies.

### Impact on Utilities

As electric vehicle ownership grows, infrastructure loading on the electricity grid will increase. Currently, the average Australian household uses 18 kWh per day.<sup>12</sup> One of the electric vehicles currently for sale in Australia the Mitsubishi i-MiEV has a battery rated at 16 kWh.<sup>13</sup> Obviously, if households purchase an electric vehicle this is likely to significantly increase their average use of electricity, which in turn will put pressure on the utility network.

Initially, the network should be able to cope with an increase in demand as it is envisaged that electric vehicle owners will charge their vehicles overnight during the off-peak periods. However, it would be unwise to automatically assume motorists will all charge their vehicles at this time. At least to begin with, force of habit with conventional ICE (internal combustion engine) vehicles may lead to people charging their vehicles when the battery is low or flat, which would lead to sporadic charging activity on the network. In addition, local electricity distribution equipment at the individual residential block level is at risk if several neighbours should plug in their vehicles simultaneously during peak demand.

To ensure efficient participation in the National Energy Market, there should be incentives in place to encourage motorists to charge their electric vehicles during off-peak periods. This will minimise initial impact on energy grids and spread market demand for energy across the day.

Energy providers in partnership with Governments should be proactive and invest in smart grids that combine advanced communication, sensing and metering infrastructure with the existing electricity network. The AAA notes the current work being undertaken by the Federal Government as part of its *Smart Grids, Smart City* program.<sup>14</sup>

A smart grid incorporates consumer equipment and behaviour in grid design, operation, and communication. Smart Grids should accommodate smart appliances such as electric vehicle supply equipment (EVSE) which enable motorists to charge their vehicles using higher voltage to better manage their energy use and reduce costs. Furthermore, smart appliances can enable access to communication capabilities which would allow motorists to benefit from real time electricity pricing as well as incentive based load or emergency load reduction signals.

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<sup>12</sup> <http://www.abcdiamond.com/australia/average-household-electricity-consumption/>

<sup>13</sup> <http://www.mitsubishi-motors.com.au/microsites/i-miev>

<sup>14</sup> [http://www.ret.gov.au/energy/energy\\_programs/smartgrid/Pages/default.aspx](http://www.ret.gov.au/energy/energy_programs/smartgrid/Pages/default.aspx)

There is also potential to incorporate swarm logic software in relation to electric vehicles. Swarm logic software is based on the idea that each individual node makes a decision based on the actions of the group and would be a good way to manage charging of electric vehicles.<sup>15</sup> The notion is that electric vehicles being charged on the same station, communicate with each other so that charging can be managed dynamically in succession.<sup>16</sup> It provides a better method of managing energy consumption.

The Federal Government and energy companies should continue to investigate and invest in smart grids that accommodate the use of smart appliances in regard to electric vehicles. AEMC's advice should include consideration of using smart meters as a means of better managing energy consumption across the grid in relation to charging electric vehicles.

## **Metering Requirements**

The AAA highlights that rules and regulations in relation to metering requirements may need to be reviewed in order remove potential impediments to the uptake of electric vehicles. The use of electric vehicles, particularly for business use will present a series of challenges regarding energy consumption and liability for charges. Such examples include the following:

**Renewable energy accountability to prove zero emissions motoring** – Companies and Government fleets that have greenhouse gas abatement strategies or targets will require accurate metering information regarding energy consumed in charging their electrical vehicle fleet.

**Vehicles provided to employees for work purposes** – Workers in certain occupations such as sales representatives and couriers often keep company cars at home. Any charging costs for these vehicles need to be ultimately paid for by the employer.

**Self-employed people** – People in self-employment need to be able to easily separate vehicle charging costs from their home electricity costs for tax purposes.

**Employees bringing their own EVs to work** – Employees may wish to charge their vehicle at their work. Any charging costs for these vehicles should be ultimately paid for by the employee.

The AAA believes metering requirements will not be a major impediment for the uptake of electric vehicles amongst the general motoring population. However, the examples highlighted suggest there may be impediments to the uptake of electric vehicles in the corporate and government sector.

The AAA believes there is potential for metering requirements to be reviewed to ensure there are no significant impediments to the uptake of electric vehicles in the corporate and government sector.

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<sup>15</sup> <http://gigaom.com/cleantech/managing-electric-vehicles-like-a-swarm-of-bees/>

<sup>16</sup> IBID