



Australian Energy Market Commission

Issues Paper – Energy Market Arrangements for Electric and Natural Gas Vehicles

APA Group is pleased to have an opportunity to comment on the Australian Energy Market Commission (AEMC) Issues Paper – Energy Market Arrangements for the Electric and Natural Gas Vehicles (“**Issues Paper**”) and commends the AEMC for preparing the paper. The design and implementation of appropriate energy market arrangements necessary to facilitate the economically efficient take up of electric and natural gas vehicles is an important issue for the Australia and as such, APA is pleased to be able to provide comment on some of the issues raised within the paper.

About APA Group (APA)

APA is a major ASX-listed gas transportation business with interests in gas infrastructure across Australia, including 12,700 km of natural gas pipelines, over 2,800 km of gas distribution networks and gas storage facilities. APA is Australia's largest transporter of natural gas, delivering more than half of Australia's annual gas use through its infrastructure.

APA also has investments in other energy infrastructure through minority interest in Envestra, the Ethane Pipeline Income Fund, Energy Infrastructure Investments, Gas Distribution Investments and the Hastings Diversified Utilities Fund. APA's involvement also extends to the provision of services to most of these companies.

APA is committed to the expansion of the gas networks that it owns and operates, which has resulted in steady investment in natural gas infrastructure around Australia.

Benefits of Natural Gas

Whilst natural gas is a fossil fuel, it is more greenhouse efficient than coal or oil, indeed it is only half as emission intensive as black or brown coal and is the cleanest burning of all fossil fuels. It is colourless, odourless, and non-toxic.

Natural gas provides low emission energy for applications ranging from home appliances to vehicles to commercial buildings through to large industrial processes. Natural gas is a key fuel for the transition fuel to a low emission economy.

Natural gas is currently utilised as a low emission transportation fuel predominantly for “return to base” bus fleets, but for other fleets vehicles such as trucks, forklifts and taxis.

With indigenous oil supplies in decline, given the abundance of Australia's natural gas reserves, an increasing role for natural gas as a transportation fuel has the potential to reduce the cost to Australia of oil that would otherwise be imported.

Summary of Key Points

Firstly, our concern is that the Issues Paper's key finding, of electric vehicles becoming established as the dominant emerging technology, is premature, particularly when considering ongoing and rapidly changing dynamics in terms of fuel price, technology development, and technology costs.

Secondly, whilst electric and natural gas vehicles potentially compete against each other in some market segments and not in others, the Issues Paper seems to conclude that there exists a simple choice between the technologies. This approach could inadvertently result in reduced competition through ‘picking winners’, which would also diminish consumer choice.



Thirdly, that the impact of electric vehicles on the electricity market could result in the need for further investment in infrastructure, particularly if charging cannot be controlled adequately. This could result in diminished consumer affordability.

Fourthly, rising electricity prices driven by greater investment in electricity infrastructure could see those consumers *without* electric vehicles subsidising those *with* electric vehicles.

Finally, given the uncertainty around these emerging technologies, APA is concerned that funding to develop and deploy emerging natural gas technologies has been refused in the recent Access Arrangement processes. APA recommends that the AEMC develop regulatory principles to allow funding for gas networks to support the development and deployment of innovative technologies.

Further, APA would be pleased to assist and support AEMC in any further consultation concerning electric and natural gas vehicles.

Introduction

This paper incorporates a high level response to the issues raised because of the high degree of uncertainty around the likely direction and development of electric and natural gas vehicles. This includes specific commentary on the a number of the key conclusions of the Issues Paper, as well as more general commentary considering the key principles derived from the National Electricity Objective and National Gas Objective.

Commentary on some Key Conclusions of the Issues Paper

Dominant Emerging Technology

The Issues Paper “found that the take up of electric vehicles is likely to be low in the short to medium term – but by 2020 they could comprise 20 per cent of new car sales, which could rise to a possible 45 per cent of new car sales by 2030”.

In regard to NGVs, on the other hand, the Issues Paper “observes that the likely take up of natural gas vehicles will be low in the long term”.

APA’s view that is it could take some time for a reasonable level of certainty around future prospects to emerge, in regard to the two technologies, and that a fundamental conclusion of the paper, namely that electric vehicle technology will be dominant emerging technology and that natural gas vehicles will not have great market reach, is premature.

APA’s subjective judgement is that diesel and petrol vehicles will continue to dominate market share through to 2030. Hybrid petrol electric vehicles will be the dominant form of electric vehicle, and that utilisation of natural gas vehicles will grow in selective market segments. For example, current prospects for the utilisation of natural gas as a fuel for heavy vehicles are positive.

Current Regulatory Arrangements

APA supports the view that current regulatory arrangements are suitable to facilitate the uptake of natural gas vehicles, with the exception that the current regime does not provide funding for the gas networks to support the development and deployment of evolving technologies such as natural gas vehicle technology.

Principles outlined in the Issues paper

The Issues Paper interprets the principles of the National Electricity Objective and the National Gas Objective in the review of energy market arrangements applying to electric and natural gas vehicles, so as to seek to:



- facilitate **consumer choice** in the way they use these technologies;
- **allocate costs** to the party that causes these costs, in as much as is feasible;
- to ensure that the **security, safety and reliability** of the electricity system and the supply of natural gas is maintained; and
- **foster competition and innovation**, including innovation among business models, in the provision of services supporting these technologies.

APA supports the application of these principles, and considers each in turn.

1. Facilitate consumer choice in the way they use these technologies

If the findings of the Issues Paper are accepted, it would be expected that consumers would experience an increasing reliance on electric vehicles and have perhaps little or no choice in regard to natural gas vehicles. APA's view is that this finding is premature. The judgement that electric vehicle technology will be more successful does not seem to adequately consider the impact of a carbon tax, and is based on forecasts of rising natural gas prices. Recent experience in the United States, where gas prices are currently very low and natural gas is in surplus despite predictions of shortfall only a few years ago, illustrates the difficulty with forecasting future natural gas prices. Premature assessment of the technologies might not only end in deterministic outcomes but also effectively result in 'picking winners'.

Interestingly the DRET Paper of December 2011, "Strategic Framework for Alternative Transport Fuels" paper is less conclusive and predictive about the potential outcomes for electric and natural gas vehicles.

The DRET Paper provides a summary below (shown below) of potential applications of various fuel types, including CNG, LNG and electricity, across different market segments. It shows that although there are common markets segments for electric and natural gas vehicles, there are also speciality market segments where one fuel is potentially going to be more dominant than the other. The table also shows that the future is likely to require a portfolio of solutions rather than just one or two fuels covering all market segments.



Table 3: Potential application of alternative transport fuels⁵²

Type of fuel	Light passenger vehicles	Light trucks	Medium vehicles	Heavy vehicles	Rail	Aviation	Marine
Petrol	√	√	√	-	-	-	-
Diesel	√	√	√	√	√	-	IFO/MDO
Liquefied petroleum gas	√	√	√	√	-	-	-
Compressed natural gas	√	√	√	√	√	-	-
Liquefied natural gas	-	-	√	√	√	-	√
Ethanol (conventional and advanced)	√	√	√	√	-	-	-
Methanol	√	√	-	-	-	-	-
Biobutanol	√	√	-	-	-	-	-
Biodiesel (FAME)	√	√	√	√	√	-	In some cases
Advanced biofuels from bio-oil	√	√	√	√	√	√	√
Electricity	√	√	√	-	√	-	-
Fuel cell (hydrogen)	√	√	buses	-	-	auxillary power	auxillary power
Gas-to-liquid	√	√	√	√	√	√	√
Coal-to-liquid	√	√	√	√	√	√	√
Oil shale (shale-to-liquid)	√	√	√	√	√	√	√
Dimethyl Ether	-	-	-	√	-	-	-

It is reasonable to assume that if the market does develop for electric vehicles only, outcomes in terms of (i) pricing, (ii) product and service development, and (iii) efficiencies of production and distribution will be less beneficial to consumers, than if competition existed across fuel and vehicle types.

2. Allocate costs to the party that causes these costs, in as much as is feasible

If as the Issues Paper concludes, electric vehicles develop to be the dominant emerging technology, (and natural gas vehicles experience a significantly lower market penetration), electricity consumption will increase:

“This extra consumption could lead to lower electricity retail tariffs, on average, for consumers as network and system costs are spread over a greater volume.

However, this effect could be cancelled out if electric vehicles created additional costs to the market. Cost will be affected by the impact of vehicle battery charging on peak demand and whether additional network and generation investment is needed to support that extra demand”.

Given that affordability has become such a key energy and social issue for Australians generally, the possibility of cost increase as a result of the introduction of a new technology is a major concern. If recent experience with reverse cycle air-conditioners is any guide, and if electricity costs do increase as a result of the introduction of electric vehicles, then it is likely that the higher costs will be effectively ‘spread’ over electricity users generally, and certain electricity users will potentially pay more when they do not own an electric vehicle.



3. To ensure that the security, safety and reliability of the electricity system and the supply of natural gas is maintained

Australian electricity networks already experience peak electricity demand issues, in all jurisdictions, typically as a result of the impact of the increased penetration of reverse cycle air-conditioners. If managed poorly, growth in electricity demand for electric vehicles has the potential to impact the supply security provided by the electricity networks.

By way of comparison, Australia's gas networks have not experienced equivalent issues arising from rapid growth in peak demand. Generally gas networks demonstrate superior continuity of supply characteristics. In Victoria, ESC reporting indicates that the average natural gas consumer will experience loss of supply once every 43 years, whereas in the case of electricity the average consumer will experience two losses of supply each year. The difference in reliability of supply can be attributed to the following:

- gas lines are underground and less prone to damage from traffic accidents and natural disasters
- gas networks are not damaged from overloading events whereas power networks are susceptible
- gas networks do not totally fail in performance levels when capacity is stressed.

It would seem that the operational resilience of gas networks is a desirable characteristic for the task of supplying energy into the transport sector. This directionally points to the gas networks being in a better position to absorb the additional load that could come from supplying natural gas vehicles.

4. Foster competition and innovation, including innovation among business models, in the provision of services supporting these technologies.

In APA's recent Queensland Access Arrangement Submission to the Australian Energy Regulator for the period 2011/12 -2015/16, APA sought funds to support the development and deployment of emerging gas technologies, including natural gas vehicle fuel technologies. APA was unsuccessful in securing this funding.

The development and deployment of evolving natural gas vehicle technologies is undertaken with the goal of increasing the volumes of gas transported on the gas networks. These activities are designed to benefit the consumer, by providing choice of transportation fuels, and reducing the average price of natural gas through the transport of greater volumes, thereby providing spin-offs to the whole of the gas industry.

Other industry participants, including energy retailers, equipment manufacturers and installation and service contractors do not, and will not, undertake this activity because they have little, if any, capability or incentive to do so.

Energy retailers invest in brand positioning and also provide multiple fuels to their customers (autogas, natural gas and electricity). They are ambivalent to the consumer's fuel choice and will only support natural gas in preference to other fuels when it is more profitable than alternatives. They have no incentive to facilitate the deployment of new technologies when other retailers could potentially benefit by securing supply to consumers who have selected vehicles utilising these new technologies.

Installation and service contractors, while dependent on continued utilisation of natural gas vehicles for work, do not have the resources or incentives necessary to undertake these deployment activities. Original Equipment Manufacturers inevitably focus on their home markets, and are typically represented by agents in Australia. They are interested in the immediate sale of the compressor or fuel tank rather than the development of a market over the longer term.

In contrast, as the gas network owner will continue to transport gas to consumers over many years, it has an incentive to undertake activities to facilitate the deployment of evolving natural gas vehicle



technologies because such activities are critical to sustaining the volumes of gas transported, given the currently limited range of residential applications for natural gas. This activity promotes a competitive market not only between fuels, but also between equipment manufacturers, all to the benefit of consumers.

APA believes that there is well established regulatory rationale and precedent for an establishing an innovation allowance of the type suggested here. That rationale is set out in the following Attachment.

It is essential that the regulatory framework allows adequate funding for the deployment of evolving natural gas vehicle technologies. In the absence of such funding, opportunities to increase volumes transported on the gas networks through the provision of a choice of transportation fuels will be foregone, which is disadvantageous to consumers.



ATTACHMENT A – REGULATORY RATIONALE AND PRECEDENT FOR THE APPROVAL OF AN INNOVATION ALLOWANCE

In September 2009, the Australian Energy Market Commission (AEMC) released its final report titled “Review of Energy Market Frameworks in light of Climate Change Policies”. In the report, the AEMC made the following point;

“As noted in the 2nd Interim Report, given the rate of change that is possible, there are potentially significant gains to be made from facilitating innovation in the approach distribution businesses take to managing reliability on the network. This may include changing the way distribution businesses work within the existing technological parameters or researching and developing new types of technology.

We considered that additional funding to assist distribution businesses to undertake research and development may be warranted in this circumstance. Submissions agreed that there would be benefits to providing additional support for innovation funding.”¹

To explore this proposition, the AEMC commissioned NERA Economic Consulting (NERA) to consider:

“whether a separate innovation funding scheme is required for network businesses and, if so, what design options should be considered.”²

The NERA report specifically considers whether network businesses have sufficient incentives to undertake complex and potentially uncertain research and development to meet expected network operation challenges and facilitate DSP in the market.

The NERA paper:

- describes the lack of incentives for network businesses to undertake innovative R&D as part of the existing regulatory arrangements;
- briefly summarises R&D funding schemes within Australia and selected other countries;
- sets out the possible design options for a R&D funding scheme; and
- provides NERA’s conclusions, and sets out their recommendations.

NERA concluded that;

“the existing regulatory arrangements seek to provide a strong incentive for distributors to seek out all available cost savings. On face value this would suggest that they would in turn create incentives for distributors to undertake research and development investments that are expected to lead to further cost savings. However, in practice the arrangements are likely to create a disincentive to undertake research and development because:

- the speculative nature of some research and development might not satisfy the capital expenditure tests of the regulator;
- many innovation projects are likely to have payback periods that extend across regulatory periods and the regulatory framework does not allow the firm to keep those benefits in order to justify the initial investment; and
- cost efficiency benefits are ultimately passed onto customers in the form of lower prices, and so distributors may be reluctant to invest in research and development if the benefit stream is not sufficient to justify the initial outlay.”³

¹ Review of Energy Market Frameworks in light of Climate Change Policies” Final Report (30 September 2009) page 121

² An Innovation Funding Scheme for Network Businesses” A Report for the Australian Energy Market Commission (31 August 2009) – Appendix E page 187

³ NERA page 7



This highlights how the existing regulatory arrangements result in less than optimal investment in R&D, ie R&D would only be undertaken if it led to overall cost savings within the same regulatory period. However, due to its inherent nature the benefits of R&D are normally not realised for some years. This dilemma can be circumvented by implementing a R&D allowance (or innovation allowance) scheme, whereby a distributor is allocated a nominal percentage of its revenue for R&D.

In its November 2004 Electricity Distribution Price Control Review, OFGEM noted

“5.39 Since privatisation, expenditure on research and development by DNOs has declined. In the current environment, where DNOs face a number of new challenges, it is questionable whether this is optimal. Ofgem has investigated the potential costs and benefits of additional development expenditure (rather than “pure” research) and found that the potential benefits seem likely to exceed costs. Ofgem has also considered whether there is reason to suspect market failure in respect of R&D funding by DNOs. While this is not clear cut, it is possible that the regulatory system is perceived to be such that it undermines the commercial incentive for R&D that the patent system provides in other sectors (for example because patents do not protect against the regulator transferring benefits to customers by reducing prices).

5.40 Ofgem has therefore proposed an Innovation Funding Incentive (IFI) to cover most of the cost of development projects focussed on the technical development of distribution networks to deliver value (i.e. financial, supply quality, environmental, safety) to end consumers. IFI projects might be expected to embrace all aspects of distribution system asset management from design through to construction, operation maintenance and decommissioning.”

In its December 2007 Gas Distribution Price Control Review, Ofgem established an Innovation Funding Incentive for Sustainable Development (IFI/SD) which was modelled on the scheme already in place for electricity distribution. Ofgem deliberately established a wide remit for the types of projects that qualify including for example “projects that combat climate change, promote other environmental benefits, enhance the strategic asset management of critical national infrastructure and improve safety in the industry and in homes (for example, through research into CO safety issues).”