

27 October 2011

Mr John Pierce
Chairman
Australian Energy Markets Commission
PO Box A2449
Sydney South NSW 1235

Via website: www.aemc.gov.au

Ref: Project EMO 0022

Dear Mr Pierce

Response to AEMC Approach Paper – *Energy Market Arrangements for Electric and Natural Gas Vehicles*

The Energy Networks Association (ENA) welcomes the opportunity to respond to the Approach Paper - *Energy Market Arrangements for Electric and Natural Gas Vehicles*.

ENA supports a cohesive review of energy market frameworks that encompasses both electric vehicles and natural gas vehicles. However, In ENA's view it is premature to determine whether additional energy market regulation or changes to current energy market arrangements are required to facilitate the market uptake of EVs and NGVs. This is broadly due to the following reasons:

- A whole range of trials are currently underway to evaluate various aspects of EV technology, battery charging technology, interoperability, consumer preferences, standards, and many other issues
- The Australian Government's Alternative Transport Fuels Strategy is currently at an advanced stage of development and the outcomes of that strategy are likely to impact on any review of energy market frameworks focussing on EVs and NGVs
- There are high levels of uncertainty regarding the likely market uptake of EVs and NGVs
- Other established mechanisms employed by the energy sector may be more appropriate than energy market arrangements in terms of addressing the issues and realising the benefits associated with EVs and NGVs

ENA also makes the observation that there has been minimal focus to date on other technologies that have had a significant impact on energy markets and energy networks such as air conditioners. Nor has there been any focus on mechanisms to provide benefits such as demand response enabling devices for demand management.

ENA has the following specific comments on the Approach Paper.

Request for Advice

We note the acknowledgement that the NEO and NGO require that security, safety and reliability of the system be maintained and suggest that these aspects of the energy supply chain can be effectively addressed by existing mechanisms employed in the energy sector for

other sources of load such as air conditioners. These mechanisms are typically of a technical nature (eg. Australian Standards and other technical and safety standards etc.) and it is noted that these are out of scope for this Request for Advice, however the recent work by Standards Australia¹ as part of the Victorian EV Trial is commended to the AEMC as a source of information and as an example of another approach to assessing future market scenarios.

We also note the requirement that energy markets facilitate informed consumer choices with respect to electric vehicles and we suggest that this aspect of the Approach Paper be expanded to include a requirement that consumers be provided with choices regarding electric vehicle charging infrastructure, services and providers.

Analytical Framework

We propose that the stated Objective at Step 4 of the proposed Analytical Framework be amended from ‘... identify the appropriate electricity or natural gas market arrangements.’ to read ‘... identify the barriers to the market uptake of EVs and NGVs imposed by the current energy market regulatory arrangements’.

Similarly, the Objective at Step 5 should therefore be amended to read ‘... identify the changes required to remove the barriers identified.’

Potential Uptake of EV Technology (Step 2)

We note and concur with the statement that there is a high degree of uncertainty regarding the market uptake of EVs. That said, there are a range of trials and studies currently underway in Australia to examine a whole range of technical and commercial issues that will ultimately impact on the market uptake of EVs. We note that a number of these trials and studies are cited in the Approach Paper however it is not clear whether (1) all those cited will be completed in a timeframe that enables their use in the proposed Stages of this review, and (2) whether this is a complete list, noting our earlier comment regarding Standards Australia’s work that has not been cited.

Furthermore, scenario modelling exercises have also been carried out on a range of possible futures for the Australian alternative transport fuels market to inform the development of the Alternative Transport Fuels Strategy (the Strategy). The Department of Resources Energy and Tourism (RET) has engaged CSIRO to carry out this work (we note that the report is not published at the time of this submission)². We also note that CSIRO has conducted scenario modelling of alternative transport fuels for the Australian Treasury³.

In order to eliminate duplication of effort, in ENA’s view, the Commission should use the outputs of the modelling cited above as the basis for estimating the market uptake of EVs and NGVs on a national basis into the future and not devise a separate set of scenarios catering for various levels of EV and NGV uptake as proposed in the Approach Paper.

Notwithstanding the above comments, we support the notion that the potential penetration of EVs in Australia’s transport mix requires making assumptions and predictions on a wide range of variables, the nature and extent of influence of which will only be clearer at the

conclusion of the aforementioned trials and research. The non-exhaustive list of variables listed in the Approach Paper could, we suggest, be improved with the following additions:

- the global production of EVs and other vehicles, the proportion of these that will be made available to the Australian market and the bases for these decisions (eg. market size, commercial margins, suitability of products, ease of entry (with respect to approvals), etcetra)
- the relative prices of those vehicles in terms of the purchasing costs, fuel and maintenance costs, and the changes in this relativity over time
- the rate and level of improvements in efficiency in technologies
- the relative price of batteries and their value or cost of disposal at 'end of useful life' of the EV
- transport policy at State and Federal level – at present we see little evidence of consistency, coordination or leadership in this area (with the exception of Victoria) however we recognise that this situation may improve with the finalisation and implementation of the Strategy
- consumers' preferences, transport needs and incomes
- the availability of electric charging infrastructure by the various types and the level of investment (private, public and commercial) in the development of this crucial element

In response to Question 1, we suggest that there is unlikely to be any differences in these drivers that are specifically related to energy market frameworks between NEM and WA. At present ENA has no further comment on this question.

Impact of EVs on electricity markets (step 3)

The impact (which may be positive or negative) of EVs on electricity markets is of primary concern for ENA members and the variable of electricity demand vis-a-vis system capacity is central to this concern. It is true that the load on the network associated with recharging EV batteries could have impacts on generation and network operation and may necessitate network augmentation, however it is too early to assess the level of this required to support the penetration of EVs over the life of the assets in the energy supply chain. Similarly, the increase in load could cause problems for electrical systems within the household or other premises or site where charging occurs – this may also necessitate investment in system augmentation at the premise or site level. By way of example, one model of EV on the Australian market requires a 15 Amp circuit for charging which is not a typical facility in most residential premises.

The nature of the impact (positive or negative) of EVs on electricity networks is largely a function of the timing of EV charging with respect to the timing of existing loads on the network. The ability of distribution businesses to control or at least influence the time and rate (in terms of kW) of EV charging will determine the level of impact. We note that the use of pricing incentives to assist in this area is an element of the Power of Choice Review and that it is recognised that the interaction between market participants will lead to new challenges.

We eagerly await the results of the Power of Choice Review as an input to further consultation on the impact of EVs on the electricity market and on network operation.

In terms of the suggested risk of transformer overload due to high EV uptake, we believe that this is no different to the risk of transformer overload due to a high uptake of any other consumer appliance such as air conditioning. This is a planning and augmentation issue at distribution level and should this be an issue it will be dealt with under existing systems and procedures. Furthermore, it should be noted that transformer overload is but one area of risk for distribution businesses – the location, volume, type and level of charging infrastructure in an area serviced by the network may have more widespread and serious implications on network operation and investment.

We note the discussion on the potential for EVs to assist in addressing electricity demand / capacity issues by acting as a form of energy storage and welcome the recognition that the technology to enable vehicle to grid (V2G) capabilities is currently at a nascent stage. ENA members acknowledge the potential for V2G however the real impact over time of this type of facility will, we believe, be a function of which stakeholders have control of the time and rate of EV charging from, or discharging to, the distribution network. The additional aspect of embedded generation in the form of ‘microgrids’ needs to be assessed as the EV may discharge but not entirely (if at all) and at different levels to the distribution network – this has further implications for network operation and balancing.

We agree that there is potential scope for integrating EVs with renewable generation however we suggest that a great deal of thought is needed, both within and external to the process outlined in this Approach Paper, regarding the responsibility for advancing and coordinating work in this area.

The proposal that two way inverters may be needed to be developed and installed to support V2G ignores the notion that some or all of the technology needed to accommodate this benefit could be ‘on board’ the EV (along with metering and other system elements). This approach would reduce or negate the need for DNSPs to implement smart grid technologies specifically for EVs. In relation to the statement regarding the need to place incentives on DNSPs to implement such technologies, we suggest that other stakeholders will also need to invest in technologies and infrastructure and that in the absence of this support from the broader market , incentives to DNSPs are one approach likely to remove barriers to the implementation of V2G in order to realise benefits from the growth of the EV market in Australia.

Question 2

What are the costs and benefits that EVs may introduce into Australia’s electricity markets? Please provide evidence if available.

First, there are likely to be benefits however the extent of these, both in the short and long terms, is unclear at this time. So too, is the level of investment needed by networks and to be provided in parallel by other market participants to access these benefits and as such the level

of certainty on the suite of benefits available to networks does not support investment in activities other than trials at this point in time. Regarding some of the stated potential benefits, many are being assessed under the trials mentioned above and we maintain that it is too early to quantify which, if any, benefits will be realised and to what extent. That said, we are concerned that, on the basis of data and reports from various sources, it would appear that the potential benefits of EVs and future levels of market penetration in Australia may be overstated at present.

Second, the costs to networks in providing energy and associated infrastructure to support EVs (in addition to other challenges in the current and future market) are unknown at this time but they are expected to be significant and may exceed the benefits that accrue to network businesses from the introduction and growth of EVs in Australia. Until we have more reliable data on the penetration of EVs by volume and rate and their charging needs in terms of infrastructure (by location, volume, concentration, size, type and ownership) it is not possible to provide an estimate of costs to network businesses. In particular EV market uptake estimates (both nationally and on a local geographical area basis) are required in order to estimate the increases in demand and load and the consequent impact on generation and network augmentation.

Question 3

What are the appropriate electricity market regulatory arrangements necessary to facilitate the efficient uptake of EVs?

We propose an alternative question, this being *'What are the current electricity market arrangements that should be considered for review based on the barriers identified to the market uptake of EVs imposed by the current energy market regulatory arrangements?'*

Question 4

What are the required changes to the current electricity market regulatory arrangements and suggestions for reform to facilitate the efficient uptake of EVs?

Consistent with our previous remarks, we believe that it is too early in the process to answer this question. We also suggest that the clarity of responses in future consultation can be improved by a more detailed definition of *'... efficient uptake of EVs'*.

Question 5

Are there any electricity market regulatory arrangements that affect EVs which may also apply to NGVs

At this point in time we are unable to identify any specific market regulatory arrangements that affect both EVs and NGVs. In the future, tariffs and metering arrangements may have significant impact but they would probably not be linked in any way and should be treated separately.

In terms of EVs and NGVs, ENA makes the observation that these are often seen as competing technologies. However, in our view this is not necessarily the case since each application has benefits to offer users with different transport needs. We believe that this review should consider EVs and NGVs as complementary solutions to Australia's transport needs.

Natural Gas Vehicles

Regarding the projected market uptake of NGVs on a national basis, we refer again to the modelling exercises conducted by CSIRO.

Impacts of NGVs on natural gas markets (Step 3)

The following comments are provided in response to some of the specific impacts that NGVs could have on gas markets identified in the Approach Paper:

- Whether there is sufficient gas supply to meet extra demand due to the uptake of NGVs; in our view this is unlikely to be an issue given Australia's abundant reserves of natural gas and the projected (relatively low) market uptake rates of NGVs in the CSIRO modelling.
- The impacts on gas balancing are likely to be minimal given that the increases in gas throughput due to the uptake of NGVs are not likely to be significant, at least in the short term, and any additional load is likely to be relatively predictable on daily gas balancing basis.
- The demand for connection and new network infrastructure is not likely to be significant and would be considered on a case by case basis under the gas distributor's Access Arrangement, consistent with any other increases in load at an existing connection or for the connection of a new load.
- In terms of the impacts of metering and billing, there may be issues that need to be examined in relation to vehicle refuelling appliances installed at commercial and residential premises. On the other hand, commercial and depot based refuelling stations would be treated as commercial customers and metering and billing would be managed under established processes.

The ENA has identified the transport sector as a potential growth area in the domestic natural gas market and as such growth in this segment will help justify future investment in gas supply infrastructure. Furthermore, increasing the uptake of NGV's will lead to an increase in gas network throughput or at least offset current trends of reducing average volumes per customer. Reducing average consumption over time leads to higher network tariffs and higher delivered gas prices which will lead eventually to loss of customers, in turn perpetuating cost increases. Therefore in ENA's view, increasing the uptake of NGVs, and other gas applications, will have longer term beneficial impacts in terms of investment in infrastructure, optimal network tariffs and delivered gas prices to customers.

In terms of the first part of Question 7: 'What are the costs and benefits that NGVs would introduce into Australia's natural gas markets?'

The benefits and barriers of alternative transport fuels, including natural gas and electricity, have been identified in the Strategy. The benefits can be summarised under the main categories of energy security, environment and regional development. The barriers to the uptake of alternative fuels include the costs of switching, lack of infrastructure, technology and product constraints, policy and regulatory barriers, the absence of national standards, information failures and labour and skills constraints.

Regarding the example stated where an increase in demand for natural gas due to the uptake of NGVs may create material issues for the electricity generation market due to affecting supply or price of gas and that this may have secondary effects on electricity supply or prices; in our view it is much more likely that future increases in the adoption of large scale gas powered generation will have an impact on gas supply and prices thereby potentially impacting on the uptake of NGVs compared to other alternative fuel vehicles.

Question 8: Consistent with our response to question 3, we propose an alternative question: *'What are the current natural gas market regulatory arrangements that should be considered for review based on the barriers identified to the market uptake of NGVs imposed by the current energy market regulatory arrangements?'*

Question 9: Consistent with our response to question 4, we believe that it is too early in the process to answer this question.

We suggest that the clarity of responses in future consultation can be improved by a more detailed definition of '... efficient uptake of NGVs'.

In conclusion, the market uptake of NGVs is expected to deliver benefits to the Australian economy in terms of energy security and greenhouse gas reduction, benefits to gas networks and consumers in terms of increased gas throughput leading ultimately to lower gas network tariffs and lower (or at least more stable) delivered gas prices.

If you have any questions on this paper, please do not hesitate to contact Dale Weber on (02) 6272 1515.

Yours sincerely



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Director Gas & Energy Market Development

¹ <http://www.standards.org.au/LinkClick.aspx?fileticket=k2H7DlwZpdA%3d&tabid=94&mid=423>

² CSIRO, *Possible Futures: Scenario Modelling of Australian Alternative Transport Fuels to 2050 (2011)*

³ Commonwealth of Australia (2011) *Strong Growth, Low Pollution: Modelling a carbon price – Update:* http://www.treasury.gov.au/carbonpricemodelling/content/update/Modelling_update.asp