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Future Fuels Strategy

Department of Industry, Science Energy and Resources

Via web: <https://consult.industry.gov.au/climate-change/future-fuels-strategy>

## **Submission to *Future Fuels Strategy: Discussion Paper***

On behalf of Victorian electricity distribution networks, CitiPower, Powercor and United Energy, thank you for the opportunity to provide feedback on the *Future Fuels Strategy Discussion Paper* (the Strategy) to help facilitate the evolution of this growing market.

Our three networks distribute electricity to and from 1.8 million homes and businesses located in regions spanning 65% of Victoria. We are also participating in a number of projects and trials to enable the shift to a clean energy future including:

- Supporting four trials into electric vehicle technology to further develop industry understanding of residential and business customer behaviour, use of tariff incentives and charging behaviour in collaboration with industry partners ENA and Jemena, and retailers Origin Energy and AGL.
- Developing energy storage technology through projects utilising both LV grid-connected batteries positioned on power poles as well as larger neighbourhood batteries.
- Facilitating greater solar export capacity on our networks by augmenting and upgrading our assets.

As identified by the Strategy, these initiatives respond to consumer demand and reflect the growing energy choices available to customers to help reduce costs and support environmental objectives.

While our data shows electric vehicle (EVs) take up on our distribution network is currently low, we are preparing for this to potentially increase rapidly. Our Regulatory Proposals for 2021-2026 (currently due for a final determination from the Australian Energy Regulator on 30 April) forecast rapid growth in all forms of distributed energy resources over the period. This includes the potential for vehicle to grid exports from electric vehicles.

For example, as at December 2020, there were around 1,200 electric vehicles housed in the United Energy network which represents less than 0.2% of the 700,000 customer connections. By 2025, AEMO data forecast this number to be five times greater at 6,200.

This data, and our own internal scenario analysis confirms the need for policy choices to ensure the uptake of EVs does not exacerbate existing network peaks and drive avoidable expenditure through a combination of tariffs, demand management and other policy settings. This will ensure customers can maximize the benefits of EV ownership while electricity networks continue to provide safe, affordable and reliable energy to all customers.

We support the government's initiative to plan for the enabling priorities defined in the Strategy from an early stage in the EV industry's development in Australia.

We recognize networks such as ours are essential partners for public charging proponents, fleet managers and individual customers who are seeking to make the most of the availability and development of EV technology.

One of the key risks associated with the potential rapid development of this sector is the impact on network voltage, DER export capacity and power quality for customers. This is a lesson learned from the rapid development of solar photovoltaic systems. However, the potential impact from electric vehicles has the potential to be greater given the energy required to fully charge an EV battery and the high levels of export volumes potentially generated.

Of the Government's five priority initiatives therefore, our submission focuses on the three policy areas that directly influence our networks and customers:

- *Electric vehicle charging and hydrogen refuelling infrastructure where it is needed:* Ensuring data sharing and collaboration across the energy sector and broader EV industry to support the efficient and smart rollout of charging infrastructure.
- *Improving information for motorists and fleets:* We see a role to play for networks in making sure customers receive the right information at the right time from reliable sources.
- *Integrating battery electric vehicles into the electricity grid:* This is where we need to ensure customer choices and charging behaviour support user needs while mitigating higher peak demand.

Following are our responses to some of the questions proposed for each of these priorities.

If you have questions or would like further information, please contact my colleague, Greg Hannan, CitiPower, Powercor and United Energy Head of Network Strategy and Non Network Solutions on [Greg.Hannan@ue.com.au](mailto:Greg.Hannan@ue.com.au).

Yours sincerely,



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## RESPONSE TO DISCUSSION PAPER QUESTIONS

### **Priority: Electric vehicle charging and hydrogen refuelling infrastructure where it's needed.**

#### **1. Public Charging Planning and Blackspots**

Our networks are already working closely with vehicle charging manufacturers, vehicle manufacturers and automotive industry bodies such as the RACV to support the development of public charging network.

These discussions have reinforced that refuelling blackspots vary by network. The needs of an urban metropolitan network such as CitiPower, versus a rural/regional network like Powercor and a seasonal tourism dependent region such as the Mornington Peninsula (serviced by United Energy) raise unique challenges based on:

- The size of the network and length of distribution feeders involved in servicing regional and rural communities and the relative distance between communities
- The capacity of the network depending on current and planned utilisation rates
- The socio-economic profile of the regions including prevalence of touring as part of a tourism offer or the presence of heavy vehicle transportation routes

In addition, planning for refueling blackspots needs to consider current distribution network planning and competition as well as the costs associated with any additional capacity required.

Network planning is a dynamic area of investment and activity as distribution networks like ours prepare for:

- Development of Renewable Energy Zones as described under the AEMO Integrated System Plan (for example, there are four zones in the Powercor region in western Victoria)
- Augmenting capacity to enable greater distributed energy resource exports into the sub-transmission and low voltage networks
- Localised demand for community energy projects to share solar and wind resources and increasingly including energy storage and vehicle charging services.

Accordingly, we would be pleased to work with ARENA and public charging proponents to developing plans for infrastructure within each of our networks and models that may be funded by the Future Fuels Fund to better factor all planning considerations.

#### **2. Technical issues remaining and commercial barriers**

We are working with multiple public charging companies that aim to establish networks of high-capacity chargers. These high-capacity charging stations have an ultimate demand of typically between 1MW and 2MW.

There is often a trade-off public charging companies have to make between offering the ideal customer experience and the cost to provide network capacity at these locations.

Given electricity distribution network regulation is founded on a user-pays system, the costs of establishing and connecting public charging would be incurred by the developer.

Often the ideal locations are those that have access to facilities that allow the EV users access to food and services in an indoor setting, such as a service station. However, depending on the location of these sites, the existing network capacity may be limited and require significant customer funding to upgrade to the required capacity.

For example, if a company is aiming to establish a charging station at an existing rural service station on the highway, the existing capacity may only be 200kVA. This would potentially, at a minimum, trigger the installation of a new high voltage to low voltage 2 MVA transformer. However, if the company was to choose a location within the town (which may require the EV user to make a small detour), the charging site may be able to be established with minimal incremental cost.

We understand the challenge this presents in balancing customer convenience with electricity availability. It is for this reason the results of current trials into EV customer charging behavior will be influential in understanding the potential demand for public infrastructure.

Separately, we are creating a framework for public charging businesses and others to work with us early in their planning process so we can understand the reasons behind their location choice for a new high capacity charger.

A high-level assessment of the preferred sites and advice on the connection considerations can be provided based on planning options. We have already tested this approach with a number of companies, and this has allowed them to make timely decisions in relation to site selection. We would welcome the opportunity to share the learnings from our framework with the Government.

## **Priority: Improving information for motorists and fleets.**

### **1. What is the most important information to provide motorists?**

While there is considerable information available about electric vehicles and their benefits, our research has found there is limited material for customers about the network implications of buying an EV.

Advice for potential EV purchasers within our networks is now available on our website at: <https://www.powercor.com.au/lineylessons/take-control/electric-vehicles/>

This provides independent advice on considerations for EV motorists which may otherwise cause obstacles to their charging experience. It includes advice to:

- Check your home's electricity supply: Depending on the EV chosen and the number of kilometres driven each week, it may be necessary to upgrade a home's electricity supply from single phase to three phase. Also, low voltage connections to older homes and

buildings in Victoria (especially those built before 1970) may not have sufficient energy capacity to support the additional demand that may be created by an EV charger.

- Be clear about set up costs: A dedicated EV charging point may need to be set up by a Registered Electrical Contractor in line with Australian Standards and the Victorian electricity rules. On average, research in Victoria has shown setting up a home charging outlet costs around \$1,750 for the circuit wiring plus an outlet cost of between \$100 for a standard power point and \$2,500 for a fast-charging unit.
- Ensure your connections are safe: For example, never daisy-chain extension leads to charge an EV parked outside the home or on the street.

As members of the Electric Vehicle Council, we encourage customers to utilize the publicly available information they also offer regarding the benefits of EVs and maps of public EV chargers in Australia.

Increasingly, we are now receiving feedback from customer advocacy groups that residential customers installing solar photovoltaic systems are sizing these units in anticipation of buying an EV in the future. Advice to motorists on how to structure their home's energy system to connect their rooftop solar to EV charger and potentially, a behind the meter battery, is another area of technical support that is emerging.

To this end, the current work to review the National Construction Code for new residential development planning is an important step to ensuring new homes are able to accommodate greater electrification such as EVs.

We would support collaborative initiatives between the Federal Government and the industry to work together to provide customers with consistent, or centralized, and easy-to-understand information about all considerations customers need to make before deciding on upgrading to an EV.

## **Priority: Integrating battery electric vehicles into the electricity grid**

The mass uptake of EVs has the potential to bring about significant change in the load profile of the network and creates an opportunity for new tariffs and flexible demand management that will support customers to get the most out of their investment.

As recommended in the Strategy, it is important that areas where high amounts of EV charging are occurring are identified and that adequate monitoring and adaption are in place while demand management initiatives evolve.

### **1. Opportunities for Vehicle-to-Grid technology**

We encourage consideration of incorporating smarter technology into EVs that will support customers to maximise the benefits of these vehicles and provide network operators another way of managing demand.

Vehicle-to-Grid (V2G) technology is a key component for fostering a smart network. As the technology becomes more available in Australia, it is vital that people are informed of the benefits that can be provided to consumers and the broader electricity market and network.

Intelligent two-way communication between the electricity grid and vehicles will enable networks to manage electricity resources better and empower vehicle owners to earn money by selling power back to the grid.

AusNet Services and CSIRO conducted a trial during the summer of 2013/14, finding that even with a modest 11.8kWh vehicle battery pack up to 1.1kW of power could be exported to the grid during evening peak times. Further trials with an expanded data set encompassing driving intention have the potential to deliver a more complete “smart charging” solution.

While V2G technology is not yet widely used in the Australian EV market, it does present positive opportunities for consumers and networks. V2G will be an enabler of a number of capabilities including the levy of ToU tariffs and controlled charging. These capabilities will be able to be leveraged to integrate renewable generation and other forms of DER for the benefit of the grid and all its end users in real-time and in response to specific network events and constraints. Importantly and for future trials, the dispatch must be within limits set by the driver or fleet operator, so that the driver or fleet operator always has sufficient power left in the battery for driving.

In addition, V2G could be an attractive feature for consumers as it could potentially be used to generate revenue. When coupled with distributed intermittent generation, the possibility of micro-grids arises, potentially empowering customers with independence from grid power availability. All of these options’ present possibilities in the delivery of action *4.3 Trial emerging charging technologies through the Future Fuel Fund*.

From a network distribution perspective, the highest priority knowledge sharing area is electricity demand management. Mass uptake of EVs is likely to change traditional peak and off-peak energy times, so it is vital that consumers are aware of the benefits of using the grid to their advantage, lowering costs and decreasing the need for costly electricity infrastructure upgrades if the uptake of electric vehicles ignores these considerations.

## **2. Opportunities for tariff innovation or reform**

Tariff and pricing incentives are relevant to both V2G planning and also an important topic for motorists to understand in order to ensure they get the best value for money from their EV experience.

In July 2021, Victorian distribution networks will introduce a new two-part Time of Use Tariff which creates an incentive for customers to charge their EVs either during the day (when solar export generation is high) or during off-peak times late in the evening.

Without an incentive, our hypothesis is that motorists will habitually plug in their cars to a charger when they return home from work between 4pm and 7pm. This corresponds with the nightly peak demand on electricity networks which, unless managed, could lead to higher augmentation costs to increase capacity.

Shifting this load to other parts of the day therefore enables customers to gain more favourable pricing and enables networks to better manage demand. We therefore see this as a critical piece of information that motorists need to understand. If we can shape their behavior from the day their receive their EV, we can establish positive usage patterns that will benefit both motorists and networks in the long term.

Victoria is at a distinct advantage with the state-wide use of smart meters. Advanced analytics utilizing smart meter data combined with our participation in various EV research trials, are enabling a greater understanding of consumer behaviour when their EVs are plugged into the network.

### **For further information**

If you have questions about the content of this submission or would like to discuss how our networks can support the further development of the Future Fuels Strategy, please feel welcome to contact:

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