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Ms Jessica Shaw, MLA
Chair
Economics and Industry Standing Committee
Parliament House
4 Harvest Terrace
WEST PERTH WA 6005
(by email: dworth@parliament.wa.gov.au)

Dear Ms Shaw

Please find below answers to the four questions the Committee was seeking a response to that were unable to be addressed during the hearing on 11 April 2018.

1. **What was the initial impetus for Horizon Power investigating the usefulness of microgrids in WA?**

Horizon Power's 37 discrete systems located outside of the North West Interconnected System (NWIS) are defined as microgrids. Microgrid development, operation and optimisation has been our core business since our inception. The disruption to the industry resulting from new technology and the rapid rise of renewables means that the traditional generation and distribution of electricity will not continue as it is today and Horizon Power must adapt. In 2011/12, Horizon Power undertook a strategic review with the purpose of cutting as much cost as it could from the business in order to launch into the development of microgrids to drive further value through the uptake of technology and incorporation of distributed energy resources (DER). We were able to test this new technology on our microgrids before anybody else because of our vertical integration, advanced metering platform and our inherited high cost to serve systems. We have also worked with our customers to give them the confidence to participate by installing renewable energy and working with us to achieve high levels of DER at a lower average cost into the future. The ultimate goal of this work is to bring costs down to benefit customers and reduce the subsidy paid by government, improve resilience and reliability for regional and remote customers, and decrease our carbon footprint through distributed energy resources.

2. **How does Horizon Power decide a community or a customer is a candidate for either a microgrid or a stand-alone power system?**

Horizon Power has established, through economic modelling, the blueprint for each of its microgrids. The blueprint models the optimal system configuration for a particular town, and provides a recommendation between three design options: centralised generation, high distributed energy resources (DER) penetration and stand-alone power system (where all customers are on off-grid solutions). The cost to supply individual customers is higher in very remote towns or at the end of a long feeder line, driving the choice of a particular solution. It is also important to remember that supply solutions have to be bundled with demand solutions (such as maximum demand tariff or demand side management) for optimal outcomes. It is through the process of blueprint analysis the determination is made as to which is more cost effective of either of the three options to deploy in any situation.

3. **In terms of the Carnarvon microgrid, will its development allow Horizon Power to lift the current cap on customers feeding power from their solar panels into the grid?**

Through our modelling work for microgrid systems we have identified that higher levels of DER will be used effectively into the future. The microgrid trials in Carnarvon are designed to provide solutions to the challenges of hosting higher levels of renewables. The development of the Carnarvon microgrid through those trials is expected to lift the current cap on the installation of more solar which can feed back into the network. Specifically, the small grid on our network chosen for the microgrid trial (Gibson Street Feeder) already exceeds 100 per cent solar penetration for short periods. This will be further boosted to much higher levels to investigate, develop, test and put into action mitigations to any issues that may arise, for example voltage fluctuation mitigation. These mitigations will be developed to be applied to any microgrid or high solar penetration part of the grid. Utility-grade batteries are also being trialled in Carnarvon to reduce spinning reserve, and therefore fuel costs, but importantly to support higher levels of renewables being incorporated because more of this energy can be stored. This will therefore definitely assist in lifting levels of renewable energy penetration and other devices such as distributed batteries through a learn by doing and analysing approach.

4. **What considerations does Horizon Power need to make to prepare its transmission and distribution systems for the greater public use of electric vehicles?**

The first consideration regarding electric vehicles for Horizon Power is whether customers will buy them or not, and how quickly will they replace internal combustion engine vehicles. Australia is one of the developed countries with the lowest rate of take-up of electric vehicles. Lack of financial incentives, long distances, low number of cars available and lack of infrastructures are pointed as the main reasons for this low take-up. These hurdles are even more prominent in regional WA, where the take up of electric vehicle is expected to remain low for residential customers in the foreseeable future, unless specific strategic initiatives are undertaken. From a microgrid design standpoint, there are three more considerations to take into account:

- Customers behaviours around charging can still be shaped for greater benefits of the system: when demand is at its lowest, and should be influenced with adequate pricing signals

- Monitor electric to grid technologies and their integration in the distributed energy resources management systems (DERMS) operating the microgrids and orchestrating DER
- Alternative to electric vehicles such as hydrogen technology, potentially delivering a more palatable value proposition to customers in remote areas

Should you require any further information about the questions, please contact Manager Strategy Sami Zouad on 0432 809 066.

Yours sincerely

Frank Tudor
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HORIZON POWER