Infrastructure Capital

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Ms Jessica Shaw MLA
Chair, Economics and Industry Standing Committee
Parliament House
GPO Box A11
Perth WA 6837

Dear Ms Shaw

Inquiry into Microgrids and Associated Technologies in WA

Infrastructure Capital Group Ltd (ICG) welcomes the opportunity to make this submission on the emergence and impact of electricity Microgrids in Western Australia to the Economics and Industry Standing Committee.

ICG is a mid-market infrastructure fund manager with 17 years' experience. ICG is focused on investments in Australia and has a national presence with four offices across the country to source and manage investments for our investors. ICG operates and manages five infrastructure assets located in Western Australia, making up nearly $500m or more than a third of our assets under management.

With rapid innovation of technologies in generation, transmission/distribution and storage, the range of potential solutions to electricity supply problems has greatly expanded. Microgrids, including distributed renewable generation and BESS, are increasingly cost competitive with traditional 'poles and wires', especially for distant, low load areas.

However, some regulation, and strict separation between the functions of WA's three electricity utilities, appears to us to have unnecessarily complicated the uptake of Microgrids.

We would be pleased to appear before the Committee, if the Committee so requests. We can also explain 'in camera' to the Committee, some of our own experiences in WA pursuing innovative developments in electricity supply.

If you require anything further, please contact me directly or Hugh Webster - 0408 728 141 and hugh.webster@infrastructurecapital.com.au

Yours sincerely

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SUBMISSION

to

ECONOMICS AND INDUSTRY STANDING COMMITTEE

Of the Legislative Assembly of the Parliament of Western Australia

The Emergence and Impact of electricity Microgrids and associated technologies in Western Australia

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Introduction

What are Microgrids? And why are they particularly relevant to Western Australia?

A definition of a Microgrid is a useful place to start, particularly in the discussion below regarding regulatory barriers.

We have adopted a description used by an executive from the Public Utilities Office that a Microgrid is a "multiple network and distributed energy resource" (EISC Hearing[i]). An electricity 'grid' usually refers simply to the electricity network connecting customers (or smaller isolated networks) and is distinguished from centralised generation resources. In the case of a Microgrid, however, we include any generation producing the electricity consumed by the customers connected to the Microgrid and any associated storage.

Microgrids, so defined, have always been important in Western Australia where many communities have been serviced, mainly by Horizon Power, with electricity generated and delivered through an isolated grid. The same is true to a greater or lesser extent in all Australia's States and Territories (except possibly the ACT.) Traditionally, these isolated systems would simply comprise the relevant distribution network assets and diesel gen-sets, or gas-fired generation if the load was large enough and gas deliverable.

The emergence of distributed generation, especially small renewables, has changed the landscape for electricity provision with a large and growing number of consumers, both individuals and corporates, supplying their own electricity, mainly from rooftop solar panels. We do not regard such installations on a single site, even a remote mine or large factory, as a 'Microgrid' unless:

- it is permanently, or frequently, isolated from a larger electricity grid; and
- it has multiple connections and customers.

The current position of Microgrids within the Western Australian Electricity Sector

For a number of reasons, principally economic and technical, Microgrids are appearing as efficient solutions in Western Australia for a number of supply reliability problems arising in remote and 'fringe of grid' communities.

Although Microgrids have existed as long as remote communities have had a distributed electricity supply, new technology has introduced innovative possibilities for some distributed supply to separate, wholly or partly, occasionally or permanently, from a larger grid, whether the SWIS or a small town-based grid in other parts of the State.

The recently-awarded contract for a Microgrid at Kalbarri highlights the innovative role that new technology can play in overcoming reliability problems caused by long transmission interconnections. Interconnected power for 'fringe of grid' communities may remain the lowest average cost electricity supply, but a Microgrid solution could solve reliability problems that once only expensive transmission enhancement might have been able to.

Any significant replacement of transmission or distribution network assets, particularly for a single load at the end of a long connecting line, could now be compared with the Microgrid solution located closer to the relevant load.

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Terms of Reference

a) The potential for Microgrids and associated technologies to contribute to energy supply, in both metropolitan and regional WA

In principle, technologies being deployed within a Microgrid, may also be used separately to supplement, or overcome a particular problem, within a traditional power system. Nothing introduced to support or allow Microgrid solutions, for example specific regulatory arrangements or exemptions, should discourage the use of any new technology that may be developed in the future.

The following are examples of two situations where we would expect to see a Microgrid solution considered as viable economic and technical alternative to the traditional extension of a centralised grid (eg the SWIS):

- **New demand in the regions**
  Subject to a fairly easy calculation on the cost of installing transmission, if it were too expensive to connect to an existing grid/network to a site for a new load (eg. a major new mine), you would expect to see a Microgrid solution. Although, today the generation mix is quite likely to be hybrid combining traditional diesel or gas-fired generation with renewables or battery storage.

  Even a small load, such as a new farm or remote business, may not support the expense of a long electricity interconnection but could rely on a Microgrid.

- **Replacement of existing network/generation in the regions**
  Western Power, and presumably Horizon Power to a lesser extent, have major capex requirements for replacement and upgrade of network assets. If such capex is required, the opportunity to introduce a localised Microgrid solution may arise if the localised upgrade is significant and immediate. A good example of which is the replacement of fire-damaged networks in the Esperance region with Microgrids being installed at various rural properties rather than re-establishing power lines.

Microgrids are not, however, a universal solution, even for individuals wealthy enough to go "off grid". The main benefit of the electricity line linking point loads to a centralised grid is that generation is shared and optimised; any single user will require redundancy to be built in to meet its maximum demand requirements, which may be occasional; the total maximum demand for multiple users interconnected to large-scale generation, will always be less. However, in certain circumstances, the cost of that interconnection may be such as to outweigh the redundancy needed for a single load.

One key factor in determining the viability of alternative arrangements will be distance of the load from a centralised grid, both for electricity transmission and possibly the transport of fuel (if necessary for generation). Another is latitude, which will also influence the choice of any renewable energy alternatives, with wind preferred closer to the southern coastline of WA and solar in the north.

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b) Opportunities to maximise economic and employment opportunities associated with the development of Microgrids and associated technologies

Given Western Australia's size, population and economy, Microgrids are an obvious potential solution, particularly in remote or regional areas, for emerging electricity supply reliability problems.

Clearly using Microgrids in substitution for traditional transmission, distribution or generation, will largely depend on a cost-benefit analysis, including both capital and operating cost. Other direct benefits will include CO_2 emission reductions, to the extend generation supporting the Microgrid improves renewables penetration.

In our view, the near term opportunities to maximise economic and employment opportunities depend on a broad deployment, where beneficial, of Microgrid technologies. In the longer term, depending on the success and scale of this deployment, other opportunities may emerge in advanced manufacturing, raw material resourcing, and ICT. Any progress in these areas will likely arise where WA's unique environment requires unique technology solutions, which can be developed locally and go on to compete nationally or globally.

If WA's unique supply challenges are to be overcome using the best available technologies, R&D and local skills will emerge to adapt those technologies to local circumstances. WA's environment and geography should drive activity in university and other research, manufacturing and operations; the benefits of all of which may then be exported.

Near term opportunities for employment in design, engineering and construction, and ongoing opportunities in asset operations, will also depend on competition amongst technologies and providers to meet WA's circumstances and challenges.

There are several significant impediments to realising these near term opportunities, which we will address below in relation to barriers.

c) Key enablers, barriers and other factors affecting Microgrid development and electricity network operations

Most electricity in Western Australia, and in other States, was generated, transmitted, distributed and supplied by a single State-owned utility, formerly SECWA. Western Australia, however, has had a long history of private generation direct to major customers, such as miners, operating in diverse parts of the State.

Restructuring SECWA, and its successor entities, and the involvement of the private sector in generation and more recently supply, has added to the range of competitive solutions for electricity supply problems.

However, it is still the case that it is large, integrated utilities of Western Power, Horizon Power and Synergy which are principally responsible for electricity supply in Western Australia. Although privately-owned generation, including rooftop solar, have significantly reduced Synergy's share of generation, there is next to no direct private ownership of electricity networks which are not for business *'own use'*.

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Regulatory arrangements, such as the requirements for network owners to be suitably licensed, should, of course, remain. As should statutory safety requirements affecting the operations of electricity assets, including networks.

The major barriers to greater deployment of Microgrids are, in our view:

- Limited investment capability of the major utilities
- Restrictions inherent in each utility's procurement processes.

Although not, strictly speaking, a barrier to increased use of Microgrids, there is also a risk that if deployment in a particular location changes the regulatory treatment of the customer or load, then it could discourage the use of that solution. An obvious example is a Western Power load becoming disconnected from the SWIS and statute requiring Horizon Power to assume responsibility for any new assets.

We would recommend the incumbent utility control the upgrade or replacement, to ensure the cost/benefit analysis is undertaken solely on an economic and technical grounds, rather than whether a utility's asset base is going to grow or shrink as a result. This will also avoid the problem of comparing alternative solutions to the same problem if each is proposed by a different utility, eg Western Power puts forward a network solution and Horizon Power a Microgrid solution, or vice versa.

The speed and scale of deployment of Microgrids by SOEs will also be constrained by utility balance sheets and capex/opex budgets, as they must continue to operate on a sound commercial basis. Private investment for new projects should help to overcome inherent limits on public resources (both financial and personnel) if it can be introduced with broad political support. Competitive procurement processes will also support the introduction of new technologies and best pricing.

However, the SOE utilities will struggle to deploy a large number of Microgrids in a short space of time given each project will likely be quite small and require significant time and effort to procure. Each Microgrid solution will also likely be bespoke, require its own planning, approval and development, as well as procurement of technology, design and construction.

Clearly there has been strong demand, and competition, for any Microgrid opportunity put out to tender by Western Power and Horizon Power – private capital is readily available, and only restricted by the rate at which new opportunities emerge from the planning and development departments of the utilities.

Given Microgrids, by their very nature, tend to be local and closely involve a relatively small number of customers, community-initiated solutions should also be welcomed. The technical benefits of Microgrids in particular locations will be well-understood by local consumers or communities which are affected by, say, unreliable supply of electricity or wish to see more renewables deployed. And such solutions should be encouraged by Government if there is an overall public benefit. Replacement of perfectly functional equipment for altruistic, as opposed to financial or technical, reasons, is a political not an economic decision.

Unfortunately, the economic benefits of investing in renewables, or some Microgrids, and any ongoing savings in operations, maybe less obvious to end consumers where a uniform tariff applies and changes to it will only happen based on a utility-wide basis.

ICG considers that to maximise private sector investment in Microgrid deployment, each of the utilities should encourage investigations into suitable opportunities by interested providers.

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We recommend that:

- Utilities publish assessment criteria for electricity supply improvements, applicable broadly where Microgrid technology may be deployed; and
- The Government establish a policy to evaluate 'unsolicited' or 'market-led' proposals, to enable communities, technology providers and others to promote sensible solutions to utilities.

Thank you for the opportunity to make this submission.

Andrew J Pickering
Chairman & Chief Investment Officer
Infrastructure Capital Group

[i] Evidence of PUO, Hearing on 14 Feb 2018