Submission

Infigen

Level 17, 56 Pitt St,
Sydney NSW 2000
Australia

T 02 8031 9900
infigenenergy.com

Infigen Energy Ltd
ABN 39 105 051 616

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Subject **VicGrid Consultation**

Overview:

Infigen Energy (Infigen) welcomes the opportunity to make a submission. Infigen delivers reliable energy to customers through a portfolio of wind capacity across New South Wales, South Australia, Victoria, and Western Australia, including both vertical integrated assets and PPAs. Infigen also owns and operates a portfolio of firming capacity, including a 123 MW open cycle gas turbine in NSW, a 25 MW / 52 MWh battery in SA, and 120 MW of dual fuel peaking capacity in SA. Our development pipeline has projects at differing stages of development covering wind, solar and batteries. This broad portfolio of assets has allowed us to retail electricity to over 400 metered sites to some of Australia's most iconic large energy users.

Infigen has recently been purchased by Iberdrola. With more than 120 years of history, Iberdrola is a global energy leader, the world's number-one producer of wind power, an operator of large scale transmission and distribution assets in three continents making it one of the world's biggest electricity utilities by market capitalisation**.** The group supplies energy to almost 100 million people in dozens of countries, has a workforce of more than 37,000 employees and operates energy assets worth more than €123 billion. Together, Infigen and Iberdrola are leading the transition towards a sustainable energy model through investments in renewable energy, smart grids, large scale energy storage and digital transformation, offering advanced levels of service to all our stakeholders and customers.

1. Overview

Competitive transmission can bring value to Australian energy customers by bringing both innovation and competitive pressure to network design and lifetime costs. The solutions needed for a just and speedy energy transition are varied and should include technologies capable of using every MWh of renewable energy harvested and providing that energy to load centres on demand over assets that have a high utilisation factor.

This means an integrated approach to planning and considering how to minimise the cost of MWh's generated, stored and transported.

2. Roles of VicGrid

We consider that key roles for VicGrid include, but are not limited to:

1. To be responsible for deployment of the strategic renewable development plan and coordinate with government planning authorities and stakeholders to publish and deliver a roadmap that allows required resources to be brought to market that realise its delivery.
2. Be the owners of the roadmap and through consultation publish and review the projects that are required to ensure its success.
3. Work with stakeholders to define a functional specification for each project, running a competitive process for their construction, ownership and maintenance. Day to day operations and outage coordination should be carried out by AEMO
4. Liaise with AER & AEMO for the effective integration of the REZ development into the system including the commercial arrangements and operating conditions for the generator.
5. Provide co-ordination between AEMO and generators to ensure alignment in availability of transmission network capacity.
6. Any support mechanisms for generators in these zones to be separate from the transmission process but coordinated through VicGrid providing confidence for generators to participate in REZ zone auctions.

In terms of other organisations who may be carrying out a similar role to VicGrid there are no clear comparisons. However, as an example of a state body contracting the development of transmission assets the New York State Energy Research & Development Authority (NYSERDA), as the primary agency for the renewable transition, carries out elements of the proposed scope as well as a much wider remit. At this moment they are running an RFP for renewable energy to be delivered into New York City through new HVDC transmission assets.

2.1.1 National reforms

We recommend that the Victorian Government collaborate closely with the New South Wales and Queensland governments (and related organisations such as the Consumer Trustee In NSW) to, where practical and expedient, align standards and approaches.

3. Competition in transmission

We are very much committed to supporting the energy transition that is currently underway in Victoria and more than capable of financing, building, owning, and operating the transmission assets outlined in stage 1 and 2 projects.

As a fundamental part of driving this innovation and ensuring consumers get the best value possible, the VicGrid organisation would be an ideal vehicle to run competitive processes for the transmission connection of these REZ zones whilst maintaining the fundamentals of a transmission system;

1. Efficient expansion avoiding duplicity
2. Security of supply and reliability
3. Transparency and third-party access

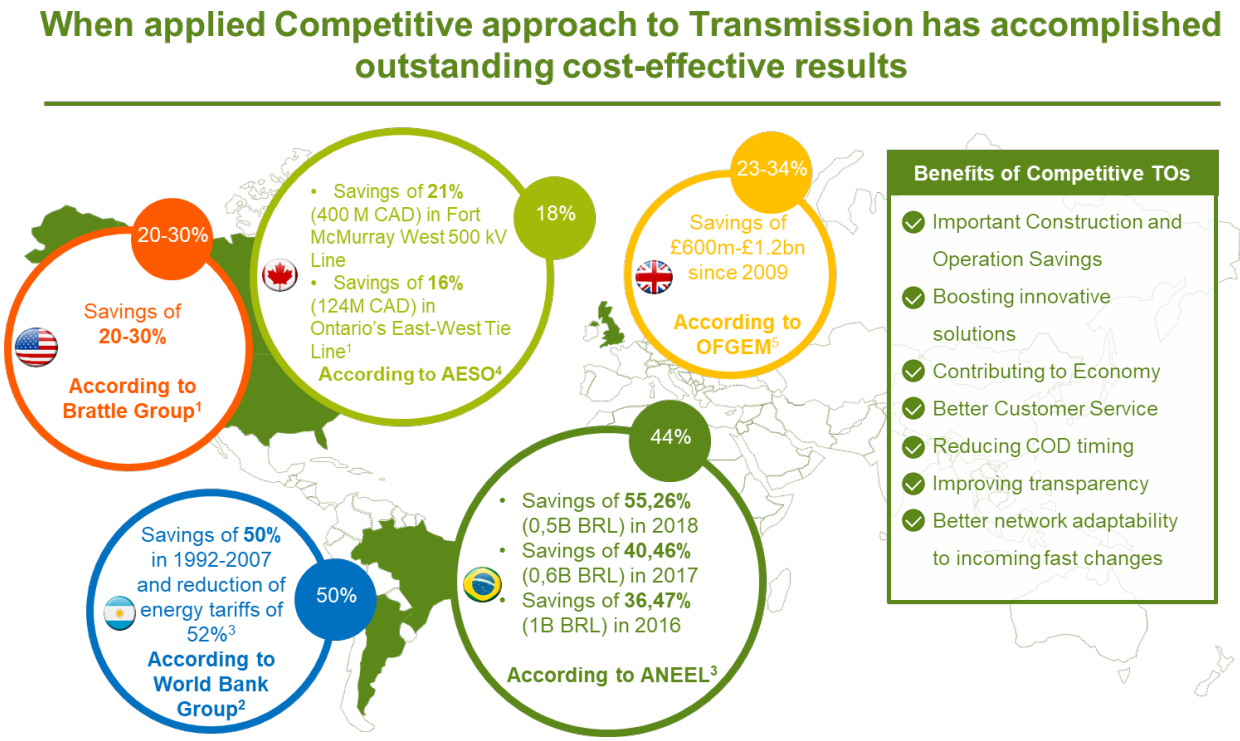
This process would ensure a fair market price is secured against a functionally specified requirement putting particular weight on cost, utilisation, environmental impact and effective operational date for the proposals. In turn the successful bidder should have access to an annual revenue stream that properly apportions risk to those who are best placed to mitigate it in order to minimise finance costs and linked to MW's connected (not MWh's) with penalties for non-availability and incentives for exceeding availability guarantee and facilitating additional connected MW's to the zone. Competitive processes also provide an opportunity to structure the process to call for innovative ideas on reinvestment and local content from communities affected by the development to provide an enduring benefit in rural areas.

The key advantages of competition are;

1. Encourages innovation and has the potential to bring new sources of technical expertise
2. Brings procurement benefits through engagement with high volume transmission companies
3. Introduces a greater range of financing options for transmission construction

Competition in other countries has allowed savings to be accrued for the consumer relative to the normal regulatory process.(See Fig below)

Opening up the development of these assets to a competitive process that provides a fair return for investors and customers can increase value to the overall system.



4. REZ market design

Historically, new transmission and network resources have only been developed when a clear (and costly) constraint has emerged. TNSPs have struggled to scale new connections efficiently (i.e., access economies of scale in anticipation of new resources). We note in particular that the constraints in Western Victoria could be interpreted not as a failure of generators to plan and coordinate, but as a shortcoming of network planning to identify a high quality energy resource area and develop appropriate, anticipatory transmission to enable new generation,

We therefore support the proactive approach by the Victorian government to unlock renewable resources. We also thank the Government for publishing the list of proposed Stage 1 and Stage 2 developments that allow for consideration and discussion.

Critically, when considering the development of new network, VicGrid needs to consider high impact low probability events (also known as the "fat tail" of the probability distribution) that are not well captured by pure cost benefit analysis (that inevitably underestimates the pace of change and "unknown unknowns").

In planning for the future, other countries have struggled at times to anticipate the speed and scale of the transformation required in enabling a sustainable energy future. The REZ concept provides Australia with the opportunity to demonstrate commitment to installing the right level of infrastructure to support the delivery of its policies (and Australia's commitments to reduce emissions in a manner consistent with limiting anthropogenic climate change to no more than 2 degrees Celsius above pre-industrial levels), and give investment certainty to generators, transmission owners and customers. Anticipatory expenditure is therefore necessary; this carries some risk of mis-timed investment, but risks and costs be minimised by structuring incentives and network access contracts to drive rapid development of REZ generation.

4.1 Facilitating investment in merchant REZs

VicGrid can play an important role in facilitating collaboration between networks and market participants to manage the risks facing each party whist promoting efficient investment in shared network infrastructure.

Iberdrola may be able accelerate the Victorian Government's proposed projects by developing REZs without underwriting, if appropriate regulatory frameworks for access and charging within the REZ are established.

Additionally, there may be opportunities for VicGrid to support merchant (speculative) REZ proposals. Various risk sharing designs for merchant REZs have been proposed (see for

example Simshauser (2020)[1] and PIAC's proposals[2]). These frameworks allow investors to manage or share the risks of investments until the REZ is fully contracted by market participants.

VicGrid will need to establish clear procedures for developing and allocating shared infrastructure and ensure market power cannot be used to stifle competition, while also ensuring frameworks are in place to incentivise market participants to co-invest in shared infrastructure to facilitate investment with networks and capture some of the benefits highlighted above.

We would be happy to discuss these proposals further, including how they would work from the perspective of both an independent generator and an independent network developer.

4.2 Efficient use of the network

When upgrading the existing shared network, Infigen considers an open access regime to be most appropriate: consumers have paid for the shared network, and incremental upgrades cannot be easily isolated. Such upgrades could then be funded through a RIT-T or cost-benefit test, and developed through a contestable process where appropriate.

For new transmission build, which unlocks new areas, these upgrades could either be open access (as was the case with the transmission network to date) or there may be a role for generators to contribute to the transmission costs in exchange for access rights. This could range from "first mover advantage" rights (auctions for the right to develop a project within the REZ) through to some level of firm access to the edge of the REZ. Alternatively, governments could underwrite developments with these obligations transferred to consumers proportionately with the lines usage.

Generators funding transmission will reduce the immediate costs to consumers (TUOS) but will increase cost of the project, which will ultimately be passed onto consumers. This will increase the wholesale cost of energy, which may result in larger wealth transfers from consumers to all generators (specifically through inframarginal rents to thermal generators that do not pay for transmission) and so need to be carefully considered.

We also note that socio economic benefit for customers can be increased by ensuring there is sufficient capacity to deliver energy from the REZ to load centres, and by using long duration storage to maximise utilisation of the transmission lines.

4.3 Project selection behind a REZ

We consider that markets will be most likely to deliver an efficient generation mix, with any inefficiencies borne by generators not consumers, but this may not be possible if firm access rights are to be allocated. Therefore, if firm access is offered for state-developed

[1] https://www.researchgate.net/publication/349711124_Renewable_Energy_Zones_in_Australia's_National_Electricity_Market

[2] Appendix A.3 https://www.aemc.gov.au/sites/default/files/2019-10/EPR0073%20-%20Renewable%20Energy%20Zones%20Discussion%20Paper.pdf

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REZs, there will be a role for VicGrid in determining the efficient capacity (and mix of resources) to be developed in the REZ.

Critically, some level of curtailment is likely to be efficient (i.e., a 1000 MW line can efficiently host more than 1000 MW of capacity, even if some curtailment occurs in a small number of hours). As discussed below, energy storage can assist with managing this congestion.

4.4 Role of storage

Efficient network use can be improved through the consideration of long duration storage solutions, like pumped hydro in the REZ or liquid air at either the collector hub or the generating station (the latter being more flexible in terms of location) to time shift the energy to the time of day when the transmission capacity is available or the system demand requires its deployment. While this will increase the base generation costs for the units not directly deployed, it also allows for a reduced need for fossil fuel support across the day and allows for a higher capacity to be located in each of the zones.

We note the Victorian Big Battery's role as a "virtual interconnector" is an example of such a project. The structure of the any REZ access rights will determine whether energy storage can be developed as a standalone asset, or whether it will need to be developed in parallel with the REZ (e.g., VicGrid seeking tenders for a specific capacity of energy storage to be developed).

4.5 Operating life of network assets

To minimise annual costs and maximise operational life these assets should be amortised over their normal economic operating life (typically 50years) and not tied to the operating lifetime of the connected generation assets. These will typically be repowered after 20 or 25 years and with the grid infrastructure already in place the business case and risk profile of replanting is much reduced compared to the original development. Globally, early windfarms constructed in the 90's are being repowered with larger capacity and more efficient turbines. As technology advances there will be a natural breakpoint for replanting turbines and panels that we are installing today. The effect of this increased lifespan will help reduce the cost per MWh of transmission for generators and consumers.

5. Views on proposed projects

5.1 Faster developments are valuable

From a new transmission perspective, environmental and planning concerns are an issue that should be considered both in terms of including the views of a varied set of stakeholders but also considering speed of deployment to market. Solutions that allow earlier connection of renewable technologies to load centres can compensate for the additional capital costs through realisation of the socio-economic benefits of providing lower cost renewable power to customers.

Utilisation of cable systems instead of traditional overhead lines can reduce the time to deployment by years and have a much lower impact on local communities through the planning, construction and operational phase of the assets. The nature of the REZ development principles and the concentrated demographics of Australian population and load centres lends itself well to the deployment of large scale HVDC cable circuits and convertors.

As technology continues to mature and when considered together with planning processes and construction timeframes the cost differential between overhead lines and underground cables is converging.

Typically, this type of infrastructure can avoid protracted environmental permitting processes and large-scale opposition to developments and can accelerate the projects development phase to allow much earlier commissioning, the ability to utilise public road verges and existing utility corridors/ right of ways can allow innovative and speedy installation techniques. These underground circuits have the benefit of being resilient during extreme weather events and provide little additional risk to the environment during extreme dry conditions.

This earlier deployment unlocks value earlier than traditional solutions and can offset the additional capital cost by bringing lower cost renewable generation to market earlier to the benefit of consumers and alleviate constraints on the network that benefits suppliers.

In many countries already well advanced in the energy transition the installation of cable connected assets has become the normal way to overcome difficult and protracted planning processes and allow for speedier deployment and connection of assets. This is sometimes difficult to justify under traditional regulatory models as the counterfactual is often the overhead line solution where the wider benefits and costs are not always considered. This base assumption has also a compounding effect when the collector substations have a number of lines radiating from them to generating centres. Often this requires compulsory powers to be deployed to achieve final permitting, all if this takes time and can result in unprogrammed delays.

5.2 Consideration of all options

The specific proposed projects seem reasonable and we agree that clear-cut projects should be fast tracked where possible. However, there may be an opportunity to consider non-network solutions or alternative approaches that deliver additional value and support higher penetrations of renewable projects in the future at least-cost.

There could be a valuable role for VicGrid in providing clear and standardised Information to the market about non-network alternatives, and creating consistent rules around how they are valued.

- For consideration of non-network alternatives, it would be helpful to publish not just the absolute requirements (i.e., MW and MVARs required) but also magnitude and duration of the relevant constraints (for example, X MW for Y hours on high

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temperature days above 35°C, X MVARs required on a daily basis from 10am to 2pm for 4 hours etc.)

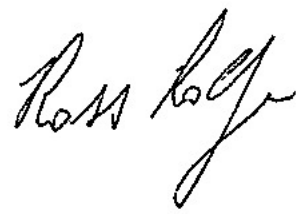
Synchronous condensers can provide a straightforward solution for some grid stability issues but other technologies may provide a wider role in providing these services. Liquid Air Energy Storage (LAES) and Compressed Air Energy Storage (CAES) are examples of systems have the ability to carry out the functions of the synchronous condenser when deployed, as the front-end compressor and back end generator have the necessary characteristics to provide many system services with the added benefit of storing the energy that they absorb for future deployment, either to fulfil further services or to balance demand. These systems run at round cycle efficiencies of around >60%, have operating characteristics similar to pumped hydro and can effectively time shift energy to both store and generate power over long durations. We believe that deploying technologies like this can have a faster impact on renewable deployment and reduce curtailment across the network.

Similarly, as with the Victorian Big Battery, portfolios of energy storage can deliver an effective, low-cost, alternative to network upgrades.

Conclusion:

We look forward to the opportunity to continue to engage, as both a developer of renewable and storage assets and as a developer, owner, and operator of future transmission assets. If you would like to discuss this submission, please contact Dr Joel Gilmore (Regulator Affairs Manager) on joel.gilmore@infigenenergy.com or 0411 267 044.

Yours sincerely



Ross Rolfe
Managing Director

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