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Dr John Tamblyn
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Dear Dr Tamblyn

REVIEW OF ENERGY MARKET FRAMEWORKS IN LIGHT OF CLIMATE CHANGE POLICIES

CitiPower and Powercor Australia (**the Businesses**) welcome the opportunity to comment on the Australian Energy Market Commission's (**AEMC**) *First Interim Report: Review of Energy Market Frameworks in light of Climate Change Polices* (**Review**).

The Businesses are distribution network service providers (**DNSPs**) operating in the Victorian electricity market. As a result of the Government's recent climate change initiatives, the Businesses have experienced a growth in connection enquiries and applications from distributed generation. The Businesses support the connection of distributed generation to their networks provided that these connections promote the National Electricity Market (**NEM**) Objective and in particular:

> *the long term interests of consumers of electricity with respect to price, quality, reliability and security of supply of electricity and the reliability, safety and security of the national electricity system.*

Importantly, the Businesses wish to highlight that there are some key network barriers which need to be addressed in order to facilitate future connections in a manner which supports the NEM Objective and the Businesses' safety obligations. It is this aspect of the AEMC, review which the Businesses wish to comment on.

1. General overview

There are numerous recent Victorian and Commonwealth Government climate change policies, programs and incentive schemes which seek to encourage greater investment in renewable and lower carbon intensity generation. This has resulted in the Businesses experiencing a greatly increased number of connection enquiries and applications from distributed generation. Importantly, because the typical size of distributed generation is relatively small (generally less than 100MW) it is more cost

effective for proponents to seek connection to the distribution system rather than the transmission network.

In accordance with the Victorian Distribution Code (**Code**) requirements, the Businesses must connect customers seeking connection, but only if they have met the relevant technical requirements:

- Clause 2.2 requires that the distributor must use it best endeavours to connect a new customer; and
- Clause 2.6.1(d) requires that the distributor must connect a customer subject to the customer complying with reasonable technical requirements required by the Distributor.

The Businesses note that while they support the connection of distributed generation to their distribution systems, they are constrained in approving many of these applications because of increased:

- Risk of the Businesses reaching technical limitations on their distribution systems, known as fault level limitations; and
- Limitations on existing rural distribution system infrastructure resulting in potential high cost connections, limited connections or the connections not proceeding at all.

Each of these issues is discussed below.

2. Fault level issue in high density areas

The existing distribution systems have been planned and developed having regard for the traditional flow of electricity from the transmission network to the end customer via the distribution system. Typically this has meant that generation sources are located well upstream from local distribution customers.

Key equipment installed on the distribution system is designed with a maximum fault level limit. Exceeding the equipment's designed fault level limit will increase the risk to the reliability and safety of the distribution system.

The connection of distributed generation to the existing distribution system requires electricity to flow in two directions - to the end customer for consumption and back into the network when the user is exporting excess generation capacity. Distributed generation typically connects to the distribution system directly adjacent to customers, thereby increasing the fault level energy that will flow into the local network when a localised network fault occurs.

While the Code does not specifically place obligations on the Businesses to maintain fault levels within set levels, it does require that the Businesses (clause.3.1(b)):

> *develop and implement plans for the acquisition, creation, maintenance, operation, refurbishment, repair and disposal of its distribution system assets and plans….:*
>
> - *to comply with the laws and other performance obligations which apply to the provision of distribution services including those contained in this Code;*
> - *to minimise the risks associated with the failure or reduced performance of assets; and*

- *in a way which minimises costs to customers taking into account distribution losses;*

This means that the Businesses must have regard for maintaining fault levels within safe limits that are consistent with the provision of a reliable and secure supply of electricity to their customers.

The Businesses have not built or planned their distribution systems to accommodate the high levels of new connections, and connection enquiries and applications, from embedded generators, resulting from the Government's recent climate change initiatives. These initiatives, including the City of Melbourne 1200 Project (*Zero Net Emissions by 2020*), have the objective of attracting investment in significant distributed generation connected directly into the CitiPower distribution system.

The Businesses are increasingly constrained in approving the connection applications without risk of potentially compromising the fault levels in many areas of the distribution system. In order to safely and securely facilitate the future connection of distributed generation the Businesses can:

- Require the proponents to ensure that their generation unit will not adversely impact on the technical requirements by, for instance:
  - Requiring that the generation unit is fitted with equipment that will limit the impact on the distribution system and isolate faults, such as through fault limiting equipment or switch mode technology; or
  - Permitting the generation unit only to operate at certain times.

  This requirement would impose significant additional costs on the proponents which could result in the project not being financially viable and therefore prevent it from proceeding; or
- Augment or replace its existing distribution system equipment to safely and securely allow increased connection of distributed generation in areas of the distribution systems that are being pushed towards their design limits. This will impose significant additional costs on the Businesses which were not recognised in the Businesses' building block allowances by the Essential Services Commission of Victoria (**ESCV**) at the 2005 Electricity Distribution Price Review (**EDPR**). The Businesses intend to raise this issue with the Australian Energy Regulator as part of their Regulatory Proposals for the 2011-15 regulatory control period.

Alternatively, the proponents may operate independently of the distribution system. This however could affect and limit the benefit such a project may have.

3. Network limitations in remote areas

The recent government climate change and energy efficiency initiatives and renewable energy targets (**RETs**) have also increased the applications and enquiries from wind generators seeking connection to the Businesses' distribution systems. The nature, and impact, of wind generators on the surrounding environments means that the location of existing and proposed wind farms tends to be in remote areas where the customer density is relatively low. These areas, such as the southwest of Victoria, are however characterised by sparse low capacity electrical infrastructure which is not configured or constructed to accommodate large quantities of distributed generation.

Under the current Victorian regulatory framework:

- The Businesses are required to use their best endeavours to connect a new customer; and
- Connection and augmentation works for new customer connections are classified as excluded services[1] and are made contestable under the ESCV's Guideline 14. Given the scope of connection and augmentation work are not known before the customer has requested the connection, the fee is quoted in accordance with the ESCV's Guideline 14. In particular, clause 3.3 of the Guideline requires that the customer's capital contribution is to be calculated as the difference between the incremental cost of the connection and the incremental revenue[2].

This means that:

- If there is sufficient spare capacity in the existing network and no, or little, augmentation is required to facilitate the connection, then the difference between the incremental cost and revenue is likely to be relatively small and therefore commercially acceptable to the proponent; however
- If there is insufficient capacity left in the existing shared network to safely and reliably connect the customer then the Businesses may need to undertake significant upstream augmentation in order to connect the customer. In this case, the difference between the incremental cost and revenue of connecting is likely to be significant and may far outweigh the benefits to the proponent of connecting.

This therefore results in:

- A "first mover" advantage for wind farm proponents, whereby the first proponent seeking to utilise the existing spare capacity of the distribution system does so at the lowest possible cost; and
- The "second mover" problem, whereby subsequent proponents who also want to utilise the same network face a fully utilised network system (assuming the first mover utilised all of the spare capacity). In order to connect their wind farm to the network, they may potentially incur significant network augmentation and / or new extension asset costs. These costs might, however, be so significant that it becomes commercially unviable to connect to the distribution system.
- All subsequent movers may benefit from the investment made by the "second mover" ("free-rider" problem) until the network is again fully utilised.

To overcome the problem of the "second mover" a proponent may be able to:

- Accept a connection arrangement whereby they can generate while some capability on the system is available, such as when the first mover wind farm is not generating. The uncertainty of access to the network grid usually makes this an unattractive and commercial unviable option; or
- Review the design and size of its farm's generation. Some wind farms connect commercially acceptable smaller generation farms, reducing their cost to augment the electrical network.

[1] This is in accordance with the Victorian Electricity Supply Industry Tariff Order 2005 (2005 Tariff Order).
[2] Plus the value of the security fee.

In line with current regulatory requirements, the Businesses develop connection offers based on the proponent's specific needs. It would, however, be more efficient if the Businesses considered all connections (including potential new connection) when designing a proponents network solution. This would allow the Businesses to identify a greater number of potentially more efficient and financially viable solutions.

Currently Powercor Australia has 17 separate wind farm proposals either under negotiation or being proposed that equate to more than 660MW of additional generation. This is very significant additional load on a relatively sparse network. The businesses have undertaken extensive modelling of the likely connection costs under different scenarios. This modelling clearly demonstrates that efficiency gains may potentially result from the Businesses considering several connection applications together, rather than each separately. The following example, based on actual information, illustrates this.

Four proponents (proponent 1- proponent 4) are separately seeking connection to a certain segment of the distribution system. If the Businesses develop a network solution:

- For each proponent independently, in order of application received, and assume that each connection application is accepted, then:
    - The network design solution for proponent 1 would involve the construction of 35 km of new line at $5million and upstream augmentation costs of at least $5 million. Proponent 1 would be required to fund this expenditure; and
    - Significant further work would be required in order to allow proponents 2, 3 and 4 to connect to that segment of the network. These proponents would be required to fund this expenditure.
- Having regard for the requirements of all four proponents concurrently, then a network solution involving the construction of a new line, costing a total of $14 million, directly from the terminal station could service all proponents i.e. all proponents could connect to this line. This cost would be shared amongst all the proponents. It is estimated that this network solution would save a total of around $12 million

This clearly demonstrates the efficiency gains can potentially be identified if the Businesses are required to consider several connection applications together, rather than each separately.

Conclusion

The Businesses support the connection of distributed generation to their distribution systems, including wind farms, provided that these connections promote the National Electricity Market NEM Objective and the Businesses' safety obligations.

The Businesses believe that an alternate regulatory model for harnessing the potential benefits of distributed generation, and addressing the current network barriers discussed above in sections 2 and 3, is the construction of dedicated wind farm connection assets ('Energy Parks'). These assets would form part of the regulated shared network and would have sufficient capability to connect a foreseeable number of future wind farms. These Energy Parks could be constructed in remote areas where the customer density is relatively low as well as Greenfield developments in urban and CBD areas.

The Businesses note that "energy parks" have been adopted in the United Kingdom and in the Netherlands:

- United Kingdom distributors, as part of the current regulatory arrangements, that are proposed to be extended in their next set of regulatory arrangements, have an allowance for the establishment of 'energy parks'. The Businesses understand that under this arrangement, in suitable and specified locations, distributors are able to augment the network (whether high density urban or rural) such that it is able to support the connection of distributed generation, the costs of which are recovered over the larger customer base.
- In the Netherlands, a distributor has built an entirely new and separate 20 kV network with adequate capacity for potential distributed generation growth. This followed a significant growth in connection requests that required capacity far beyond the capacity of the existing infrastructure. The expenditure on the new network was born by the distributor and recovered over the larger customer base.

In light of the growing support for "energy parks" in other countries facing the same issues, the Businesses see merit in the AEMC considering this approach as a possible means of promoting climate change policies and initiatives in a manner that is consistent with and supports the NEM Objective.

Should you have any further questions in relation to this submission, please do not hesitate to contact me on (03) 9683 4465 or at bcleeve@powercor.com.

Yours sincerely

[signed]

Brent Cleeve

MANAGER PRICE REVIEWS