Geoff Brown & Associates Ltd

REVIEW OF MR STEPHEN DAVIDSON'S SUBMISSIONS ON AA4 DRAFT DECISION

Prepared for

ECONOMIC REGULATION AUTHORITY

16 August 2018

Report prepared by: Geoff Brown

TABLE OF CONTENTS

SECTIONS

DISCLAIMER

This report has been prepared for the Economic Regulation Authority to assist it in its review of Western Power's proposed revisions to its current access arrangement. Geoff Brown and Associates Ltd accepts no responsibility to any party other than the Authority for the accuracy or completeness of the information or advice provided in this report and does not accept liability to any party if this report is used for other than its stated purpose.

Geoff Brown & Associates Ltd
77 Taylors Rd
Mt Albert
Auckland 1025
New Zealand
www.gbassoc.com

Ph/Fax: 64-9-846 6004
Mob: 64-21-466 693
Email geoff@gbassoc.com

1. INTRODUCTION

Mr Stephen Davidson made a total of six submissions to the Economic Regulation Authority (Authority) on its Draft Decision on Western Power's proposed revisions to the Access Arrangement, which would apply for the AA4 regulatory period. The Authority has asked Geoff Brown & Associates to review and comment on certain aspects of his submissions, and this report documents the advice that we provided to the Authority.

2. SERVICE STANDARD BENCHMARKS

2.1 SUBMISSION

Mr Davidson's submits that the service standard benchmarks should measure how well the distribution and transmission systems perform their functions according to their design and that the design requirements are stipulated in the Technical Rules. He goes on to say that if the service standard benchmarks are set at a lower level, then effectively part of the assets are redundant, and customers should not have to pay for that.[1]

2.2 COMMENT

Service standard benchmarks (SSBs) define the *minimum* level of service Western Power must deliver across different parts of the network. In any year that Western Power does not meet all is SSBs, under the Access Arrangement it automatically loses any gain sharing mechanism (GSM) reward to which it would otherwise be entitled. Furthermore, it also runs the risk of civil penalties under Section 11.6 of the Access Code. Hence, the consequences to Western Power of not achieving even one of its SSBs in a given financial year are potentially serious.

Service levels can be volatile year on year because they are driven not only by the design of the network but also by environmental factors, such as the weather, over which WP has no control. The SSBs are set by the Authority based on the historic performance of the whole network. Because they reflect minimum acceptable service levels, and because the consequences of not achieving SSBs are serious, they reflect a worst-case scenario – the level of service Western Power expects to be able to deliver when nothing goes right.

That said, we see a number of flaws in Mr Davidson's submission.

- His submission suggests that he believes that SSBs represent the level of service typically provided by WP. This is not the case – the levels of service typically provided are significantly higher than the SSBs and are more accurately reflected in the targets set for each measure under the Service Standard Adjustment Mechanism (SSAM). It is possible that Mr Davidson does not fully appreciate the difference between SSBs and service standard targets.

- The Technical Rules apply only to assets installed after the Technical Rules Commencement Date. Most of the assets on the network were installed prior to this and many would not be capable of meeting the service standards the Technical Rules are intended to deliver; and

- Some of the parameters that determine the service levels delivered are not reflected in the Technical Rules. The condition of older assets on the network that are reaching the end of their economic life is one example.

[1] Submission 1, Mr Stephen Davidson, 14 June 2018, Attachment 2.

3. TRANSMISSION - DISTRIBUTION SYSTEM BOUNDARY

3.1 SUBMISSION

Mr Davidson submits that the boundary between the transmission and distribution system should be clarified.[2]

3.2 COMMENT

Mr Davidson appears to be referencing paragraph 866 of the Draft Decision where the Authority states *zone substation transformers are included in the distribution system.*

Zone substation transformers are "supply transformers" under the Technical Rules, which are very clear that these form part of the transmission system – see the definition below. We have always considered zone substation transformers to be a transmission asset because they operate at a primary voltage of either 66 kV or 132 kV.

supply transformer	A *transformer*, forming part of the *transmission system*, which delivers electricity to the *distribution system* by converting it from the *voltage* of the *transmission system* to the *voltage* of the *distribution system*.

The distribution system is defined in the Technical Rules as:

distribution system	Any apparatus, *equipment*, plant or buildings used, or to be used, for, or in connection with, the transportation of electricity at nominal voltages of less than 66 kV and which form part of the *South West Interconnected Network*.

We have always considered the boundary between the transmission and distribution system to the low voltage (11kV or 22kV) terminal of the supply transformer rather than the perimeter fence of the zone substation, as suggested by Mr Davidson.

At present distribution service level measures (SAIDI and SAIFI) exclude faults originating from the transmission system (which presumably includes supply transformers as per the above definition). Transmission service level exclusions specified in the current Access Arrangement are mixed. Circuit Availability (CA) and Average Outage Duration (AOD) explicitly exclude zone substation transformers whereas System Minutes Interrupted (SMI) and Loss of Supply Event Frequency (LoSEF) do not. We see no reason for this differentiation.

3.3 RECOMMENDATION

The Authority should clarify with Western Power the boundary between the transmission and distribution systems, and also the treatment of zone substation transformer outages in determining service level measures for both SSBs and the SSAM. All transmission service level measures should include zone substation transformers.

[2] Submission 1, Mr Stephen Davidson, 14 June 2018, Attachment 3.

4. MEASUREMENT OF REACTIVE ENERGY

4.1 SUBMISSION

Mr Davidson strongly objects to metering installations that cannot measure the consumption and demand of reactive energy. The implementation of this suggestion would enable reactive consumption to be measured and charged to consumers who excessively use it.[3]

4.2 COMMENT

As is apparent from Section 6.8.1.3 of Western Power's original Access Arrangement Information, its proposal to include metering costs in the Investment Adjustment Mechanism (IAM) is targeted at small users in the mass market. Western Power is concerned that there may be retailer demand to transition from accumulation metering to time of use metering at a faster rate than has currently been allowed for. We suspect this is unlikely unless full retail competition is introduced, which could result in a large number of retailers competing for mass market consumers by introducing innovative product offerings.

Mr Davidson is arguing that Clause 3.4.7(b) requires mass market consumers to maintain a power factor above 0.8 lagging and that, without measuring reactive power consumption, Western Power cannot monitor whether these consumers are compliant. He correctly states that if there is a high level of non-compliance, then Western Power must provide additional capacity to supply the extra reactive power and this comes at a cost. However, the minimum power factor of 0.8 is relatively low and he has provided no evidence of widespread non-compliance. He has also not called for the requirement to be made more stringent, even for new connections.

There is no evidence that there is a significant problem that needs addressing at this stage, and our brief internet search did not turn up a distribution network service provider anywhere in the world that routinely measured domestic power factor or charged domestic consumer for low power factor. That said, we suspect changing electricity consumption patterns, such as the replacement of incandescent lights with LEDs, means that domestic power factors are reducing. The penetration of domestic smart meters will increase over time irrespective of whether there is retailer demand, and this will have the added benefit of enabling this domestic power factor trend to be monitored. This would provide the data necessary to determine whether there is an economic case for further action in this area, as Mr Davidson appears to assume.

Larger consumers have more stringent power factor requirements and are already contestable. We suspect that in most cases reactive power is already measured, or could be measured, with the existing meters. If this is not the case, the cost of installing these meters would be relatively small due to the small number of consumers relative to the mass market.

[3] Submission 1, Mr Stephen Davidson, 14 June 2018, Attachment 4.

5. COST OF CONNECTION ASSETS

5.1 SUBMISSION

Mr Davidson is concerned that when new user is connected to the network new assets are installed on Western Power's side of the connection point. In this event the cost of these assets is incurred by existing users of the network, who are primarily small consumers, rather than the new connection.[4]

5.2 COMMENT

Assets on Western Power's side of a connection point that are used to supply a single user are classified as connection assets rather than as shared assets. Under clause 7.1 of Western Power's Contributions Policy, a connection applicant must pay the full cost of any connection assets required. Furthermore, if an upgrade to assets shared with other consumers is required to for the connection, the applicant must pay a capital contribution as determined by the incremental revenue component of the New Facilities Investment Test (NFIT).

The situation envisaged by Mr Davidson should not arise.

[4] Submission 1, Mr Stephen Davidson, 14 June 2018, Attachment 5.

6. DEFINITION OF SYSTEM MINUTES INTERRUPTED

6.1 SUBMISSION

Mr Davidson submits that the system peak demand denominator used in calculating the SMI impact of a transmission system interruption should be the system demand at the time of the interruption rather than the peak system demand of the transmission network. He considers that the measure should reflect the percentage loss of the electricity supply experienced by the customer and notes also that the peak system demand is not known at the time of the interruption.[5]

Following on from these concerns, he has proposed changes to the definition of SMI in the AA3 Access Arrangement. Specifically, he proposes modifications to the mathematical formula incorporated into the definition and the deletion of all exclusions except force majeure events.

6.2 COMMENT

6.2.1 Peak System Demand

The internationally accepted definition of a system minute is the energy delivered by a transmission system operating at its peak demand for a period of one minute. In this case, as the peak demand is not known until the end of the year, the Authority uses the peak demand at the end of the previous year as the basis for the measurement. This allows the system minutes lost to be tracked from the beginning of the year.

Mr Davidson's suggests that the denominator used in the SML measure should be the actual peak demand at the time of the fault. He argues:

> *The rationale is that one should observe the event from the customer's perspective, and at the instant in time when that customer lost its electricity supply. The principal measure should be the percentage loss of the electricity supply experienced by the customer. If the supply is completely interrupted, then it should be measured and reported as 100% (loss of supply).*

Mr Davidson appears to be of the view that, from a customer's perspective, it is the ratio of energy not supplied to the total energy being delivered by the network at the time of the interruption that is important. We disagree – when energy is not served to a customer, it is the amount of energy not served due to the interruption that is of concern. The total load being delivered by system at the time of the interruption is not relevant to the customer. A customer that is not served with 100 MWh of energy is not going to be concerned about whether the occurred at a time when system demand was 3,000 MW or when it was 4,000 MW. There is therefore no reason to weight the loss of the 100 MWh higher when the system demand was only 3,000 MW, which is what Mr Davidson appears to suggest.

To clarify this point, assume the system peak demand is 4000MW and the minimum demand on the network is 2000MW. Assume also that a load of 100MW is interrupted for 2 hours - for the purposes of this exercise we will assume no variation in load over the two-hour interruption. The unserved energy would then be 100 x 2 = 200 MWh.

Assuming the system peak demand is the normaliser the SMI would be 200 x 60 / 4000 = 3 system minutes. However, using Mr Davidson's approach, if this same interruption occurred at a time of minimum demand, the SMI would double to 6 system minutes (200 60 / 2000). We don't agree with this approach as the impact on the customer (i.e. 200MWh of unserved energy) is the same in both situations irrespective of the level of demand on the whole system at the time of the interruption.

The definition of SMI in the AA3 Access Arrangement defined the "System Peak MW" as *the maximum peak demand recorded on the South West Interconnected System for the*

[5] Submission 2, Mr Stephen Davidson, 14 June 2018

previous financial year. As the SMI loss measure excludes energy not supplied to customers taking a non-reference service, the total coincident demand of non-reference service customers at the time the peak demand was set should be excluded. We understand that in practice Western Power already makes this adjustment but nevertheless believe the definition in the Access Arrangement should make this clear.

6.2.1.1 Recommendation

The definition of "System Peak MW" in the Access Arrangement definition of SMI should be changed to *the system peak demand recorded on the South West Interconnected System less the coincident demand of customers directly connected to the transmission system and receiving a non-reference service.*

6.2.2 Other Definitional Issues

The definition of SMI in the AA3 and revised proposed Access Arrangement is:

Table 13: Application of system minutes interrupted

	System minutes interrupted Meshed Radial
Unit of Measure	Minutes per year.
Definition	Over a 12 month period: • System minutes interrupted Meshed is the summation of MW (in minutes) of Unserved energy at substations which are connected to the Meshed transmission network divided by the System Peak MW; and • System minutes interrupted Radial is the summation of MW (in minutes) of Unserved energy at substations which are connected to the Radial transmission network divided by the System Peak MW, that is, for both Meshed and Radial transmission network separately: $\frac{\sum \text{MW (in minutes) of Unserved Energy}}{\text{System Peak MW}}$ where: • "Unserved energy" relates to outages on transmission circuits (including all overhead lines, underground cables, power transformers, reactive compensation circuits and transmission zone substation equipment) for unplanned events including extreme events, but not including the events defined as exclusions. • "System Peak MW" is the maximum peak demand recorded on the SWIS for the previous financial year.
Exclusions	One or more of: • Planned interruptions. • Momentary interruptions (less than one minute). • Unregulated transmission assets. • Interruptions affecting the *transmission system* shown to be caused by a fault or other event on a third party system (for instance, without limitation interruptions caused by an intertrip signal, generator unavailability or a consumer installation). • *Force majeure* events affecting the *transmission system*.

- We agree with Mr Davidson that the expression:

  MMWh of Unserved Energy x 60

  is more correct as the expression

  MW (in minutes) of Unserved Energy

currently used in the numerator of the definition is mathematically meaningless. However, while the existing expression has not caused any past confusion, the expression proposed by Mr Davidson is already used in the definition of Loss of Supply Event Frequency (LoSEF) in the same documents.

- We also suggest the term *transmission zone substation equipment* in the first bullet below the mathematical formula be clarified to remove any doubt as to whether this include transformers. See Section 3.2 above.

- Mr Davidson submits that the only exclusion should be force majeure events. However:

    - exclusions of planned interruptions and unregulated transmission assets are consistent with the Authority's regulatory objectives;

    - momentary interruptions don't have a material impact on system minutes lost; and

    - the final two bullets exclude events over which WP management cannot reasonably control or mitigate.

  The exclusions are generally consistent with those allowed by the AER in its transmission service level definitions. – see Schedule 1 of the AER's *Service Standard Guidelines*[6].

[6] *Statement of Principles for the Regulation of Transmission Revenues, Stervice Standards Guidelines. 12 November 2003.*

7. ZONE SUBSTATION TRANSFORMERS

7.1 SUBMISSION

Following on from his concerns regarding the boundary between transmission and distribution, Mr Davidson considers zone substation power transformers should not be excluded from the circuit availability service standard benchmark. He considers further evidence for this is that the Rapid Response Spare Transformers are managed and deployed as required by the NCR criterion by the distribution part of WP's business, not the transmission part as the latter is not ring-fenced from the former. He also notes that, although Western Power has separate licences for transmission and distribution, it operates them in a co-ordinated manner so the AEMC quote in para 1057 of the Draft decision "beyond the ability of the service provider to control" does not apply to Western Power in respect of zone substation power transformers.[7]

7.2 COMMENT

We agree with Mr Davidson. As noted in Section 3.2 above, zone substation transformers are defined in the Technical Rules as transmission assets, and there is no obvious technical or regulatory reason why they should be treated any differently from other transmission assets in the measurement of service levels.

As noted in Section 3.2, the Access Arrangement definitions for CA and AOD exclude zone substation transformers but those for SMI and LoSEF do not. We do not see the rationale for this and, as noted in Section 3.3 above, we do not consider that zone transformer outages or faults should be excluded from any transmission service measure.

[7] Submission 3, Mr Stephen Davidson, 14 June 2018

8. LOSSES

8.1 SUBMISSION

Mr Davidson wants changes to Section 9.2 of the Access Arrangement to impose a requirement on WP to minimise losses on the distribution network and those parts of the transmission network not under AEMO's control.[8]

8.2 COMMENT

We have no concerns regarding the change proposed by Mr Davidson. However, it is unlikely to have any material impact since losses are primarily driven by network design.

[8] Submission 4, Mr Stephen Davidson, 14 June 2018

9. APPLICATIONS AND QUEUING POLICY

9.1 SUBMISSION

The Authority has asked us to comment on:

> *Mr Davidson's view expressed on page 3[9] that clause 3.7(f) [of the Applications and Queuing Policy (AQP)] requiring a full description of any exemption to the Technical Rules sought by the applicant actively encourages non-compliance with the Technical Rules from the very beginning of all projects. [He considers this] often results in the least cost development options (compliant with the Technical Rules, but not preferred by the applicant) not being investigated at all, therefore leading to the unnecessary/inefficient project related capex and opex incurred by Western Power and unnecessary consequential rises in the cost of electricity to small users. He considers exemptions from compliance should be the measure of last resort, not a starting point for a project.*

9.2 COMMENT

The Access Code objective, as specified in clause 2.1 of the Code is:

> *The objective of this Code (**"Code objective"**) is to promote the economically efficient:*
>
> *(a) investment in; and*
>
> *(b) operation of and use of,*
>
> *networks and services of networks in Western Australia in order to promote competition in markets upstream and downstream of the networks.*

This Code objective will not be met if Western Power imposes unnecessary barriers to entry to a connection applicant in the form of higher costs that have no technical justification.

Section 3 of the Technical Rules specify the requirements a connection applicant must meet for the connection to be automatically approved. These requirements are necessarily conservative because Western Power cannot require users to meet more stringent requirements. There will therefore be situations where these requirements are excessive in that an applicant that did not meet these requirements could connect without imposing additional costs or constraints on Western Power, adversely impacting other network users, or putting the security or operation of the network at risk. In such situations it would not be consistent with the Code objective of promoting market competition (or Mr Davidson's objective of minimising costs to consumers) if the applicant was not allowed to connect. The ability to request an exemption or derogation from the Technical Rules provides a mechanism where such applications can be assessed on their merits on a case by case basis.

This situation is not unique to Western Power and is analogous to the negotiated access arrangement provisions in the National Electricity Rules.

[9] Submission 4, Mr Stephen Davidson, 14 June 2018, Attachment 2