

12 August 2011

Mr John Pierce
Chairman
Australian Energy Market Commission
Level 5, 201 Elizabeth Street
Sydney NSW 2000

Dear John,

Grid Australia submission in response to the proposed National Electricity Rule change: Definition of Temporary Over-Voltage Limits

Grid Australia welcomes the opportunity to respond to the proposed Definition of Temporary Over-Voltage (TOV) Limits Rule change.

Grid Australia is supportive of any endeavour to further the National Electricity Objective. However, upon careful analysis, Grid Australia considers that the Rule as proposed would not serve this objective as it has both unintended adverse consequences and technical implementation issues.

Grid Australia members are not aware of any other examples in the National Electricity Market (NEM) where TOVs are the basis of constraints. Grid Australia therefore proposes that, in this instance, it would be more appropriate to further the National Electricity Objective by means of derogation to allow increased TOV limits at George Town, rather than implement a rule with NEM-wide coverage.

Grid Australia's concerns with the Rule as proposed relate to:

- lack of clarity regarding the processes for setting TOV limits and revision of those limits at some future time. Grid Australia considers this issue to be particularly problematic;
- the potential for participants to influence TOV limits for their own advantage, possibly creating a barrier to entry for future participants;
- the technical investigation which would be required prior to changing a TOV Reference Level from its default value places an additional administrative burden on the TNSP which is only warranted to the extent that there are offsetting economic benefits;
- uncertainty regarding who pays for (i) the technical investigation and (ii) any replacement equipment potentially necessary to facilitate higher TOV limits;

- the likely technical difficulties associated with implementing a change in TOV limits to the meshed network, because TOVs may simultaneously affect numerous points in the network. In other words, it may not be possible to allow an increase in TOV limits at one connection point unless TOV limits are also increased further out into the meshed network; and
- ambiguities in the drafting of the proposed Rule change.

Details of Grid Australia's concerns are found in Attachment 1 to this submission. Attachment 2 provides responses to the questions posed in the AEMC's Consultation Paper.

The above concerns relate to the Rule as proposed should it have NEM-wide coverage. Alternatively a derogation could be considered to specifically address concerns related to the regional issue.

Should the AEMC determine to implement the proposed Rule, Grid Australia requests that consideration be given to the following amendments:

- inclusion of clear guidance on the process by which a TNSP revises the TOV Reference Level;
- a statement to clarify that the beneficiary of altered TOV limits pays the cost of determining and implementing such limits;
- other changes to clarify drafting issues, as discussed further in Attachment 1.

Given the unintended consequences of the proposed Rule, Grid Australia believes that sufficient concerns have been identified to demonstrate the Rule is controversial and should be subjected to the normal Rule change process.

Grid Australia would welcome the opportunity to meet with the AEMC to discuss this submission. If you require any further information, please do not hesitate to contact Paul Rayner on (03) 6274 3689 or me on (08) 8404 7983.

Yours sincerely,



Rainer Korte
Chairman
Grid Australia Regulatory Managers Group

ATTACHMENT 1: IMPLEMENTATION ISSUES

Market and Process Issues

Lack of clarity regarding process to alter TOV limits

The proposed Rule contains no guidance on who can trigger a review of TOV limits and on what basis they can request it, nor does it contain guidance on the TNSP's obligations to undertake the review. Potential issues are:

- If a TOV limit is set, and a new participant installs plant based on that limit, what flexibility does the TNSP have to revise that limit at some future time in the event it proves to be a barrier to entry for a future proponent?
- In cases where a higher TOV limit is only possible if the TNSP upgrades its own equipment, is the TNSP obliged to upgrade its equipment to facilitate the higher TOV limits?
- Is a TNSP obliged to consult with all parties connected to a particular network location prior to implementing a changed TOV limit? How widely would it be expected that the TNSP consult?
- What process should the TNSP adopt if consulted parties submit opposing viewpoints?

Prescriptive guidelines addressing issues such as these would be problematic in that there will inevitably be scenarios that prescriptive guidelines do not consider. The AEMC Consultation Paper considers that the process for changing TOV limits would be the same as that for changing the value of normal voltage. The existing Rules do not define a process for changing normal voltage. It is noted that the proposed Rule does not refer to any process and the AEMC should give consideration to clarification of the process to address some of the above concerns.

First mover advantage for new connections

For a proposed new connection at a point in the network where there are no issues preventing an altered TOV limit, the proponent would consider they have reasonable grounds to request a TOV reference level that is most appropriate for its proposed plant. However, this TOV reference level may not be optimal for subsequent connections at that connection point, and an altered TOV limit may therefore be a barrier to entry for subsequent proponents. This would be especially true of wind generation systems, which have low tolerance to over-voltages.

As stated above, the process for the TNSP to alter the TOV reference level back to the default value is unclear.

Technical investigations necessary to facilitate TOV limit increases

Grid Australia considers that in assessing potential changes to TOV limits, it would require TNSPs to undertake extensive investigations prior to recommending any non-default TOV reference level to AEMO. This would be necessitated to examine risks to equipment, power system security issues and compliance with existing connection agreements.

Such investigations need to be thorough and place an additional administrative burden on the TNSP. The assertion made in Hydro Tasmania's Rule change proposal that "the majority of

costs associated with implementing the proposed Rule are expected to be incurred through the consultation process itself” should be further examined.. Furthermore, for new connections in which the proponent requests a non-standard TOV limit at a connection point as part of a negotiated access standard, the acceptability of this TOV limit is an additional factor to be assessed within the 30 day timeframe mandated under clause 5.3.4A(e).

Costs associated with changes to TOV limit

The proposed Rule does not address the question of who pays for the investigation a TNSP will need to undertake if a proponent requests a TOV limit which is different from the default value, nor does it address the question of who pays for the costs of any equipment required to be upgraded to implement increased TOV limits. For new connections, this could be captured as part of the Connection Application fee. However, for existing connections it is not clear how these costs will be funded.

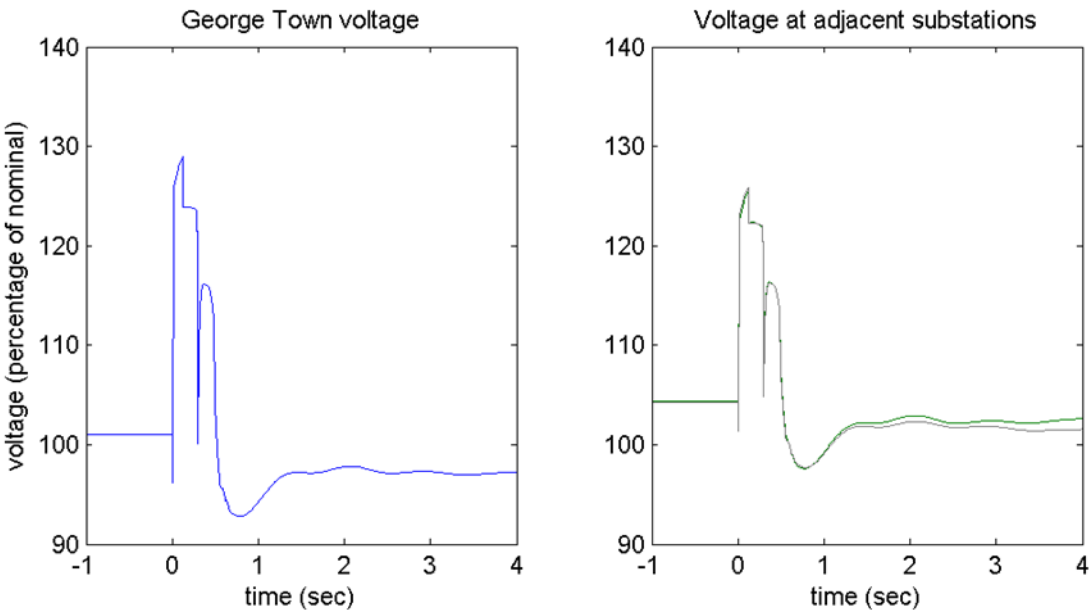
Technical Issues

Implementation difficulties in a meshed network

Although the Rule makes provision to define different TOV limits at various points in the network, in reality a TOV event that occurs at one point in the network will also be seen (to a slightly lesser extent) at nearby points in the network. This is shown in Figure 1, which shows a TOV following Basslink tripping. Observe that not only does the TOV disturbance occur at George Town substation (the connection point for Basslink), but the TOV is also observed at the two nearest substations. This is due to the fundamental physics of electrical networks and cannot be avoided.

In this case, even if the TOV limit was increased at George Town, the (unchanged) limit at the two nearest substations would still be breached.

Figure 1: A Basslink-induced TOV event is also seen at other points in the network. The connection point (George Town) voltage is on the left, the voltages at the two nearest substations (Hadspen and Sheffield) are shown on the right.



This example demonstrates that it may not be possible to allow an increased TOV at one connection point in the network without also allowing an increased TOV limit at adjacent points in the network. Practically speaking:

- if a TNSP wished to increase the TOV reference level at one network location only, it would be only be possible to increase it by a marginal amount;
- if a TNSP was to increase the TOV reference level by a higher amount, then the TOV reference level will also need to be increased further out into the network as well. There may be customers connected, possibly further away from the point initially under consideration, who cannot withstand higher TOV limits than presently exist. This will preclude the TNSP from raising the TOV reference level at the connection point initially under consideration, to the level initially anticipated.

Cross-jurisdictional issues

The TOV propagation phenomenon described above would cross interconnector boundaries for TOV events occurring close to interconnectors. TOV limits in one jurisdiction would impact on the TOV limits acceptable in neighbouring jurisdictions. The investigation of altered TOV limits near interconnectors would therefore require input from more than one TNSP.

Similarly, investigation of altered TOV limits for network locations close to DNSP connection points would require the input from both the TNSP and the DNSP. Grid Australia anticipates that DNSPs, who have a substantially larger customer base, less detailed information about connected customer equipment, and higher exposure to customer complaints, may not be able to accept higher TOV limits.

Ambiguities in the drafting of the proposed Rule

There are some minor definitional issues regarding the proposed Rule, which would be open to interpretation. Whilst Hydro Tasmania's Rule change proposal document is clear in their intended outcome of the Rule change, the actual text of the proposed Rule change does not entirely reflect this intention. In particular:

- The Rule change proposal document intends that the TOV reference level be limited to -10% to +10% of nominal voltage. However, the proposed definition of the TOV reference level does not reflect this:

TOV reference level

The reference level determined by the TNSP and approved by AEMO for the purpose of setting temporary overvoltage limits. The default reference level shall be normal voltage.

- The proposed rule change includes an amendment to Figure S5.1a.1. The current version of Figure S5.1a.1 clearly indicates that beyond 900ms, the limit of 10% above normal voltage applies. The proposed Figure S5.1a.1 is undefined beyond 900ms. Whilst it can be inferred from the proposed text of S5.1a.4 that the steady state voltage limits would apply beyond the time period for which Figure S5.1a.1 is defined, this is not explicitly stated.

ATTACHMENT 2 – RESPONSE TO AEMC QUESTIONS

This section specifically addresses the questions raised in the AEMC Consultation Paper

Question 1: Is there a risk of damage to high-voltage equipment?

1.1. An increase in the TOV limits has the potential to adversely affect equipment owned by major energy users and generators who are connected to the high voltage network. Is there a significant risk of damage to high-voltage equipment that could arise by increasing the TOV limits by up to 10% above existing levels?

1.2. Contingency events under low fault level conditions are more likely to lead to large increases in voltage over very brief periods. Given the extreme but brief nature of the voltage increases, is there likely to be specific important equipment that is particularly vulnerable?

In response to both questions, there is a risk of equipment damage from increased TOV limits, and for this reason a TNSP would be obliged to undertake a thorough assessment on the impacts of increased TOV limits on a case-by-case basis. An investigation is likely to include consultation with relevant connected parties.

Question 2: Are there increased costs of network connection?

2.1. An increase in the TOV limits would allow for higher voltage disturbances to be permitted within the Rules. What would be the costs associated with upgrading equipment or purchasing new equipment to meet higher voltage capability requirements? Is it possible to quantify these costs?

It is not possible to quantify the costs associated with upgrading equipment as cost depends on the equipment required to meet the higher voltage capability and would need to be considered on a case-by-case basis.

2.2. In the Tasmanian case, new connecting participants have not previously operated in an environment where the normal voltage was higher than the current rating of 220 kV. Is there likely to be a significant difference between additional costs imposed on existing participants compared to new connecting participants?

Changes in costs could result from a range of scenarios which may include, for example, an increase in costs to fund the need to upgrade equipment, or the impact on the market price for participants. Grid Australia disagrees with the assertion in the Hydro Tasmania's Rule change proposal that the main cost of the proposed Rule would be that of the Rule change process itself. It is not possible to quantify the costs that may be potentially imposed on existing participants compared to new connecting participants. This would need to be considered on a case-by-case basis.

Question 3: Is there an increased risk to system security?

3.1. High voltage network equipment has automatic relay switches that disconnect from the power system when the voltage exceeds a certain threshold. A generator that automatically disconnects from the network, due to the operation of its over-voltage protection, may cause further disconnections by forcing the system voltage to a higher level. Is there an increase in risk to system security arising from an increase in TOV limits?

The effects of subsequent generator disconnections on system voltage would vary.

The impacts of scenarios such as described above would be identified by the TNSPs investigation. It is only if there is no adverse impact that the TNSP would agree to alter the TOV reference level.

3.2. Could an increase in the TOV limits by up to 10% above existing levels allow voltage surges to occur that could trigger self-protection mechanisms on high-voltage equipment?

Yes and an investigation would identify the impacts resulting from such a scenario.

Question 4: What are the risks of NSPs adjusting TOV limits?

4.1. The proposed Rule would allow the NSP to initiate a change to the TOV limits that will not impact the minimum connection standards of participants. Are there any risks associated with the NSP initiating a change to the TOV limits (with the approval of the market operator) at a connection point?

The most likely non-technical risks are breaches of existing connection agreements and potential competition issues, (e.g. proving to be a barrier to entry to future proponents. Technical risks will be examined via the investigation previously discussed.

Given the potential risks, it is unlikely that a TNSP would initiate any changes to TOV limits unless it was specifically requested by a participant and/or there was a material binding constraint, and there is no adverse effect on customers.

4.2. Any recommendation by the NSP to change the TOV limits will require approval from the market operator. Are there any changes to the approval process or specific factors that the market operator should take into consideration beyond the principles outlined generally in Rule 5.1 of the Rules? Does Rule 4.1.1(b), in combination with the respective connection agreements, provide sufficient protection to already connected participants?

In general the existing Rules provisions are adequate: the market operator is responsible for system security and therefore has a vested interest in not altering TOV limits unless it is certain there are no adverse consequences. A TNSP must uphold the provisions of its connection agreements, plus it is responsible for the safe operation of its own transmission assets. A TNSP therefore has a vested interest in not altering TOV limits unless it is certain there are no adverse consequences. Grid Australia considers that these requirements adequately protect existing connected participants.

Question 5: What are the risks of participant influence on TOV limits?

5.1. Are there any risks or benefits that might arise from a greater level of market participant influence on TOV limits?

The proponent of this Rule change, Hydro Tasmania, has a vested interest in increasing TOV limits at the George Town substation in order to remove potential constraints on Basslink. It is conceivable that other participants could also utilise their influence on TOV limits to their own advantage, and potentially to the disadvantage of existing or future potential market competitors.

For example, a new proponent wishing to install a traditional synchronous generator (with an inherent ability to operate through TOV events) may attempt to influence the TNSP to agree to an increased TOV limit. The proponent could claim that the TNSP should accept a higher TOV limit because it will reduce the proponent's costs and there is no adverse impact on existing participants. However, the proponent is also aware that wind generators have limited ability to operate through TOV events without disconnecting, and the increased TOV limit may prove to be a barrier to entry for any future competitor wishing to install wind generator technology.

A further impact of participant influence on TOV limits relates to a TNSP's obligation to respond to proposed negotiated access standards for new connections within 30 business days, as required by Rule 5.3.4A(e). The addition of a TOV Reference Level as an additional variable open to negotiation requires the TNSP to conduct further investigations, which are not presently contemplated, within the 30 business day limit of 5.3.4A(e). Grid Australia requests that the AEMC considers the implications of this.

5.2. Are there any concerns regarding the process for the NSP to initiate a change to the reference voltage?

The process for a TNSP to initiate a change to the TOV reference level is not defined and this is likely to be problematic. The lack of process concerns have been discussed in detail in Attachment 1. The AEMC would need to give consideration to clarifying the process, to address those concerns.

The AEMC should consider as part of this proposal how costs associated with requests for change to the existing arrangements should be funded. This could include, for example, the costs of the investigation into a change of TOV limits, and costs of any equipment changes that may be required to facilitate those changed limits.