07 August 2008

Alinta

Alinta Energy (Tamar Valley) Pty Ltd
ABN 29 123 391 613
Alinta Plaza
12 - 14 The Esplanade
Perth WA 6000
GPO Box W2030
Perth WA 6846
Telephone +61 8 6213 7000
Facsimile +61 8 6213 7092
www.alinta.net.au

Mr Ian Woodward
Chairman, Reliability Panel
Australian Energy Market Commission
Level 5, 201 Elizabeth Street
Sydney NSW 2000

Dear Mr Woodward

Review of Frequency Operating Standards for Tasmania
Frequency Standard Supplementary Submission

This letter provides Alinta Energy (Tamar Valley) Pty Ltd (AETV) commitments in support of submissions to the Reliability Panel on the subject of the review of the Frequency Operating Standards (FOS) in Tasmania.

1 Background

The Tasmanian FOS is not consistent with the other regions of the NEM. The AEMC has previously identified that the present Tasmanian FOS is a barrier to entry for industrial type gas turbine or steam turbine technology in Tasmania. AEMC has directed this formal review of the Tasmanian FOS.

AETV wishes to connect a 210 MW combined cycle gas turbine (CCGT) generating unit into the Tasmanian electricity network at George Town. The nominated CCGT cannot be connected in Tasmania under the current FOS.

AETV has previously made the following submissions:

- Initial submission in our letter of 24 April 2008 with the enclosed Frequency Standard Development Report;
- Additional submission dated 24 July 2008 as response to NEMMCO's questions about the assumptions made in our initial submission;
- Detailed market simulation report by ROAM Consulting submitted on 29 July 2008;
- Final presentations made to the panel on 30 July 2008.

In assessing changing the Tasmanian FOS a consequential issue of contingency size has to be considered. Hydro Tasmania (Hydro) has submitted to AEMC that in its view there are increased costs associated with a contingency size greater than 144MW. AETV in its submissions of 29 and 30 July 2008 has also identified that

CCGT output above 144 MW needs to be managed or constrained under some system load circumstances.

AETV has discussed proposed approaches to managing the issue with Hydro Tasmania. The focus has been on developing a solution to the increased contingency size without increasing Frequency Control Ancillary Services (FCAS) costs to the Tasmanian system but enabling the connection of industrial gas turbine or steam turbine technology in Tasmania.

This submission outlines the proposed approach to managing the increased contingency size. It is our understanding that Hydro Tasmania will also provide a submission on an approach to managing this issue.

2 Dealing with Increased Contingency

The introduction of the AETV power plant potentially increases the contingency level and hence FCAS costs.

AETV provided modelling by ROAM Consulting submitted to AEMC on 29 July 2008. This modelling identified that CCGT output above 144 MW needs to be managed or constrained under some system load circumstances. This management (constraint) will become increasingly necessary at CCGT outputs above 160 MW, as the cost of FCAS and the issue of Basslink export entrapment need to be managed to ensure efficient market outcomes.

There are a number of mechanisms for managing the increased contingency.

Hydro has submitted that the output of the CCGT needs to be constrained to a level which matches availability of FCAS, particularly the 6 second Raise service (R6). We agree with this position and are in general agreement with Hydro Tasmania's views on the need for management of the CCGT output to avoid trapping Basslink in export mode.

Following discussions with Hydro in relation to this option outlined in their submission, AETV proposes the following:

- That NEMMCO will develop appropriate constraints to dispatch the maximum capacity of the CCGT to a number of key measurements in Tasmania, particularly system load, Basslink flow, system inertia, and other factors (such as to facilitate Basslink reversal). We believe that this is the most transparent solution in the long term.

3 Assessment of CCGT Co-optimised Dispatch

AETV proposes that the constraint on the CCGT dispatch should be based on a function of load or Basslink flows and other parameters that are relevant to facilitate the Basslink reversal and other FCAS related issues as per the previous modeling work undertaken and submitted to the Reliability Panel by AETV (ROAM modeling).

Importantly, the constraint will provide a direct incentive to AETV to secure interruptible loads in Tasmania to operationalise the constraint equation and to

enhance the output capability further. In the process AETV will reduce the impact of magnitude of loss of the CCGT on the system and permit higher output while retaining the largest contingency permitted in Tasmania at the time.

The interruptible load would be armed and monitored by NEMMCO via the SCADA system. The monitored value will be included in setting the CCGT target as less than or equal to constraint equation value plus the SCADA value of the monitored load. In the event the load is not available then it is perceived that the constraint formulation will set the value.

Preliminary discussions with NEMMCO have indicated that it would be feasible to constrain the CCGT output at times when FCAS would be unavailable at low prices in Tasmania in either of the options.

The proposed approach would be to mimic the outcome of co-optimising FCAS and energy markets in Tasmania through an open loop process of setting the maximum output to which the CCGT could be dispatched.

The following graphs show the forecast relationships between Tasmania Local Generation (Demand + Basslink flow), Tasmania Inertia, Basslink flow and CCGT dispatch, for a co-optimised operation of the Tasmanian system, based on minimum Tasmania cost of supply. The cost that is minimized through co-optimisation is equal to: Tasmania local supply cost plus cost of import from Victoria plus Tasmania R6 cost.

In the modeling undertaken, no allowance has been made for interruptible loads that may be contracted by AETV and therefore the outcomes are the worst case situation in terms of R6 requirement. Additional interruptible load will augment the output of the CCGT beyond the values determined and also assist in operationalisation of the constraint equation determined targets.

The first graph from the modelling (Figure 1) shows that Tasmania inertia is highly correlated with Tasmania local generation. This outcome supports the basis for being able to dispatch the CCGT to higher levels when inertia is higher.

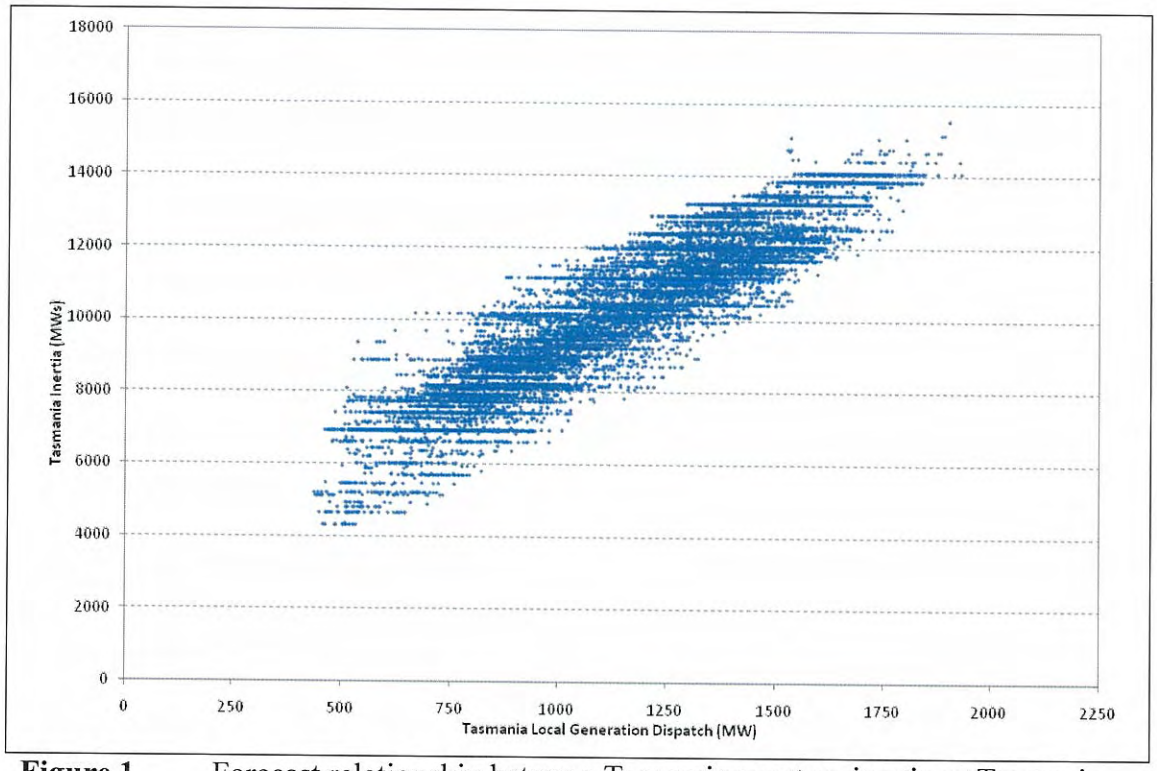

Figure 1 Forecast relationship between Tasmanian system inertia vs Tasmania local dispatch

The second graph (Figure 2) shows the correlation between Tasmanian local dispatch and Basslink flow, with the simulated 'no go' zone apparent. The 'no go' zone has been built into the market simulations and therefore any constraint formulation involving Basslink flow, Tasmanian local generation/inertia should also be able to address the 'no go' zone operational mode in real-time dispatch.

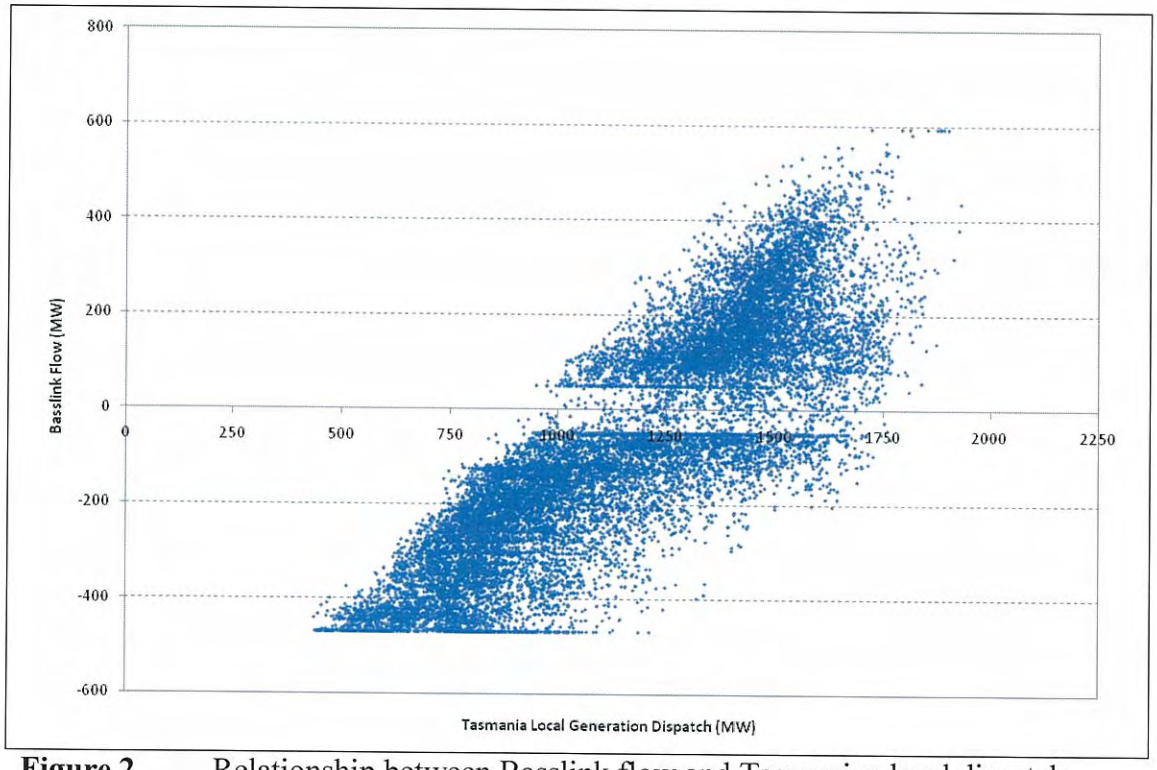

Figure 2 Relationship between Basslink flow and Tasmanian local dispatch

The following graphs (Figures 3-4) provide a correlation of forecast average CCGT dispatch outcomes with Tasmania local dispatch and Basslink. Figure 3 shows a strong correlation, on an 'average by time of day' basis, between CCGT co-optimised dispatch and Tasmania local dispatch. This would form the basis for a rule to curtail the CCGT dispatch when inertia is low. For clarity, the 'average by time of day' forecasts are shown in the graphs to illustrate the general relationship between CCGT dispatch and Tasmania local dispatch over the day.

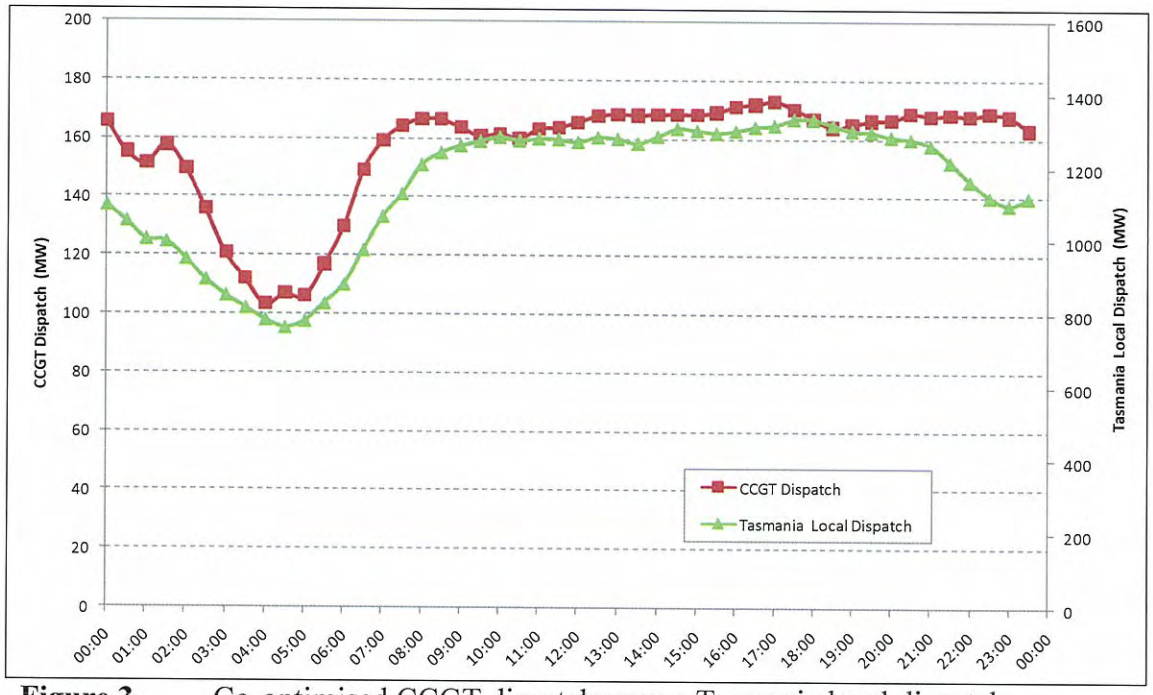

Figure 3 Co-optimised CCGT dispatch versus Tasmania local dispatch

The following graph (Figure 4) shows that on an 'average by time of day' basis, the co-optimised CCGT output is highly correlated to Basslink flow. In other words, the CCGT would be reduced in output when Basslink import increases and vice versa, thus matching the dispatch of the plant to the ideal operation of Basslink. Further analysis shows that Basslink tends to switch from a northerly to southerly flow from around late evening to the early morning (depending on season), followed by a switch from southerly to northerly flow in mid morning. This direction switch is typically assisted through a reduction in CCGT dispatch in the modelling.

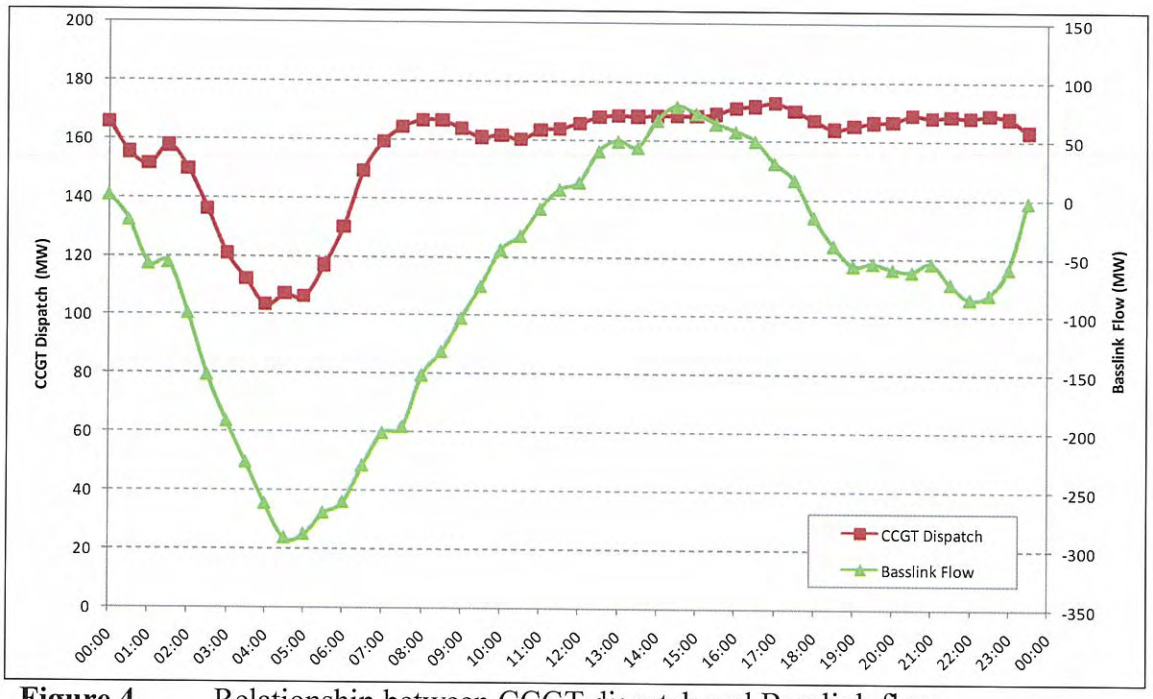

Figure 4 Relationship between CCGT dispatch and Basslink flow

The final figure below (Figure 5) shows the overall co-optimised dispatch of the CCGT plant in the form of a duration curve. This demonstrates the proportion of time that the unit would be able to be dispatched when co-optimised with Basslink and Tasmania FCAS requirements.

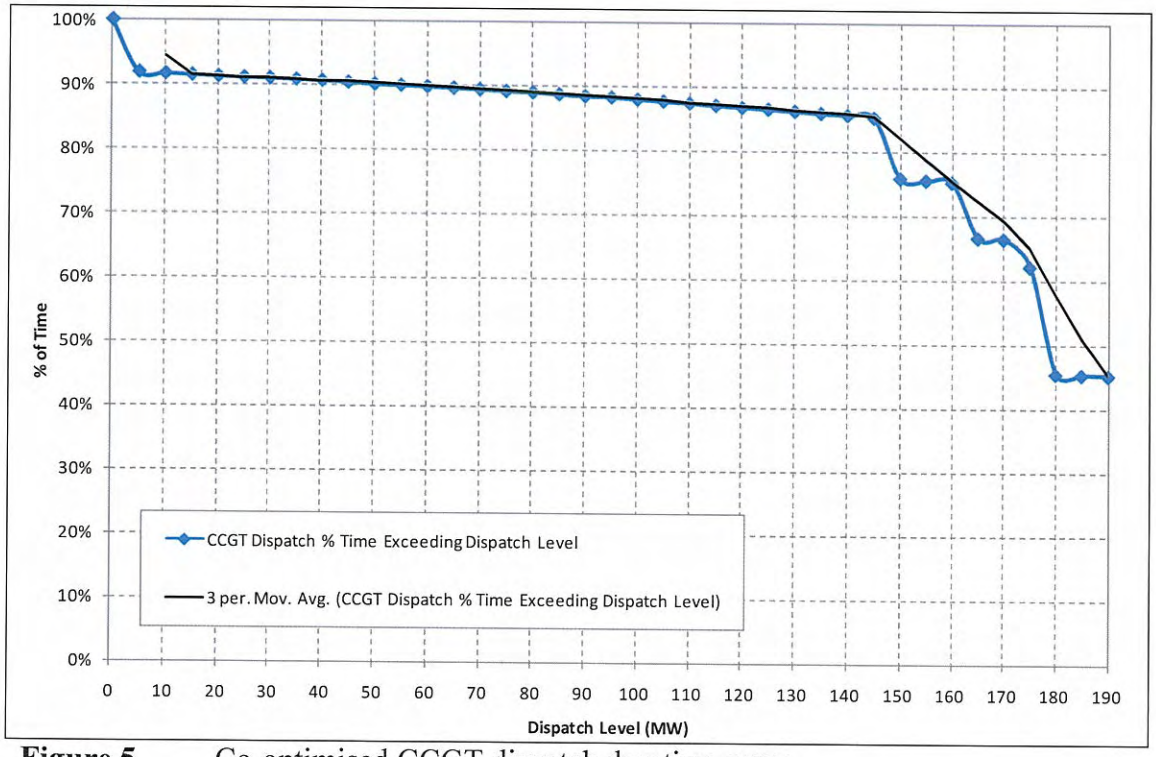

Figure 5 Co-optimised CCGT dispatch duration curve

The relationships shown in Figures 1 to 4 above, to be validated by further detailed modelling, would form a basis for developing rules in the NEMDE constraint

equations and the CCGT unit maximum dispatch limited accordingly. The outcome is represented in Figure 5.

4. Feasibility of Co-optimised CCGT and FCAS Dispatch in NEMDE

There are several alternative methods that may be effective in co-optimising the CCGT dispatch with FCAS requirements in the Tasmania region including:

a) NEMDE already has a 2-pass solution to resolve the Basslink no go zone, which could incorporate constraining down the CCGT when sufficient FCAS would otherwise not be available locally;

b) Rather than a pre-dispatch evaluation, a cumulative negative settlement residue 'trigger' could be applied to reduce CCGT output and facilitate Basslink reversal; and

c) A high bid could be applied to Basslink MNSP, which would constraint down the CCGT and therefore allow a Basslink reversal in the following dispatch interval.

5. Legal Framework

The AEMC referral of 18 March 2008 required the Reliability Panel to revisit the Tasmanian frequency operating standard. The Scope of the Review explicitly draws on Clause 8.8.1 (a) (2) of the Rules which requires the Reliability Panel to determine the power system security and reliability standards on the advice of NEMMCO. The advice of NEMMCO of 23 May 2008 identified that "if sufficient FCAS could not be procured ..., then NEMMCO could be forced at times to constrain flow on Basslink or the output of the largest Tasmania generating unit". If this cannot be achieved the security of Tasmanian supply will be compromised.

NEMMCO has identified in its advice of 23 May 2008 that some form of constraint of Basslink or the largest generating unit will eliminate the security risk associated with FCAS availability. By implication an appropriate constraint arrangement will make the standard change implementable in Tasmania.

In addressing these system security issues the Reliability Panel needs to determine if the AETV proposals for managing the larger size contingencies that will flow from the change in frequency operating standards are adequate for maintaining system security. This will be delivered by one of the market mechanisms described by this submission.

6. Summary

AETV sees the situation as follows:

- Limiting dispatch at all times to a maximum of 144 MW is a waste of resources which is supported by the ROAM modeling presented above.

- Dispatch at 210 MW is only achievable for a limited amount of time at the higher end of Tasmanian system load levels and/or high levels of Tasmania generation dispatch.

- ☐ A compromise is needed which reduces the barriers to entry of new generation into the market while ensuring least cost market outcomes.

- ☐ NEMMCO to develop constraints on the dispatch of the maximum capacity of the CCGT that align with Tasmanian system limitations.

This is broadly consistent with how AETV intends to operate the CCGT and does not compromise the Basslink flexibility to reverse flow.

Please contact Allan Coleman or Les Green if you have any queries on these matters.

Yours sincerely

Allan Coleman
Project Director
Tamar Valley Power Station Project