OTTER presentation speaking points
10 September 2009

Slide One: Presentation to OTTER on Potential Regulation of Raise Contingency FCAS

- ☐ The FCAS Timeline
- ☐ Dispelling FCAS Myths
- ☐ What others have said to date (and why)

Slide Two: Timeline Apr 08 FOS Review Start

It was clearly understood in 2008 that for Tasmania to have a mix of generation, thermal plant will need to provide FCAS.

- ☐ Any proper analysis of the current issues has to start with the 2008 TFOS Review by the AEMC Reliability Panel which involved considerable public consultation and independent advice to AEMC by AEMO and CRA: See Appendix B to the AEMC Reliability Panel's Final Report which lists all the steps in this process (Item 1 of Information Pack).
- ☐ Existing and planned generation at the time:

  Hydro Tasmania
  - hydro plant
  - the original Bell Bay power station thermal units which had been converted to gas (and providing FCAS)

  AETV (then a subsidiary of Alinta)
  - existing plant: the 3 FT8 open cycle gas-fired units acquired from HT in 2007 (commissioned by HT in 2006 & due to be refurbished)
  - future plant: plans for new 210MW CCGT baseload & 60MW OCGT peaking plants

  Roaring 40s
  - existing plant: Woolnorth windfarm
  - future plant: potential Musselroe windfarm

  Gunns
  - future plant: proposed 190MW thermal unit

- ☐ This was a very comprehensive process which established consensus on what the issues were:

- Historical reliance on hydro for industrial development (hydro being the lowest cost source of energy) but cannot build more (so next best option for growth is gas-fired generation and wind).

- So what is the lowest cost form of gas-fired generation and the most efficient mix of generation having regard to system security (FCAS) implications.

- Limited fast raise and lower FCAS (R6 and L6) because hydro plant is typically not a good source of this.

- FCAS shortages were at times already causing inefficient outcomes - HT has had to manage this by operating inefficiently.

- To understand why hydro plant is not a good source of R6, we need to look at a typical hydro trapezium in comparison to a typical CCGT plant.

Slide Three: R6 FCAS Comparison

Hydro is the most efficient source of energy but an inefficient source of FCAS. Hydro plants lose average 4MW of energy to provide 1MW of R6.

- ☐ Hydro plants are very efficient sources of energy but not technically well suited to fast FCAS.

- ☐ Hydro machines only start to contribute FCAS after 2-3 seconds (not fast response).

- ☐ Efficient running range is often around 90% of full output but this does not mean the additional 10% can be used for fast raise as assumed by OTTER.

- ☐ Typically maximum efficiency is around 70-90% of full load flow or machine MW output depending on turbine design. Most US and European hydro plants will not operate below 50% of turbine rating for any significant period – below 60% subject to rough zones usually requiring air injection to minimise vibration which further reduces efficiency. Operating like this for long periods will deteriorate plant and increase maintenance cost.

- ☐ HT quite often has to operate some plant at output of 10-20% to supply FCAS, which is very costly and inefficient

- ☐ In contrast to AETV 1.5:1, the upper angles of HT machine trapeziums mean average 4:1 energy sacrifice. The bid trapezium in slide 3 is for an actual hydro plant (4.1:1) selected as representative of the average Hydro Tasmania capability.

Note the efficiency curve. The CCGT trapezium is an actual bid trapezium (2:1). The efficiency curve is unknown but would be expected to follow the FCAS:energy line such that maximum R6 can be provided at minimum efficient load.

- ☐ The seasonal nature of inflows also limits capacity (either too much or too little inflow). Inefficient FCAS supply depletes the available energy resource.

- ☐ It is not true that there is minimum to no start up cost as assumed by OTTER: there are higher than normal stresses in start up and shut down; the rule of thumb in hydro industry is that a start and a stop cycle is equivalent to 8-10 hours of operation.

Slide Four: Timeline Aug 08 Draft FOS Decision

What is the most efficient mix of generation for Tasmania? It was always known this means an efficiency trade off: lowering energy cost v increasing FCAS cost.

- ☐ It was recognised that large CCGT units are a lower cost form of gas-fired generation than the type of gas fired plant that would meet the existing TFOS so there would be a supply side saving in changing TFOS to facilitate the use of CCGT as an alternative to more expensive thermal plants.

- ☐ BUT it was also recognised that this would increase FCAS requirements so there would be a supply side cost.

- ☐ There were 5 options on the table and the critical factor in assessing them was the cost of FCAS implications, in particular R6: (Item 2 of Information Pack).

  option A: no change to standards
  option B: minimum changes to standards that would not increase FCAS
  option C: tighten standards but with mitigation to reduce FCAS impacts
  option D: tighten standards with no mitigation (significant increase in FCAS)
  option E: adopt full NEM standards (very significant increase in FCAS)

- ☐ Options D and E were ruled out due to FCAS. Thermal plant was pushing for option C on the basis that the increased FCAS they would bring made this option feasible.

- ☐ It was considered obvious that thermal plant would provide FCAS capability (an integral part of new entry):

- the Bell Bay units owned by HT were doing this (this is the plant that would have been transferred to AETV on 31 March 2009 and would have provided its share of FCAS during April 2009 had Aurora not decided not to take it)

- the FT8's sold to Alinta in 2007 had been set up by HT to have both R6 and L6 capability (not registered by AETV)

- all modelling by Alinta always assumed new entrants would provide FCAS: see table 4.1 of the Hill Michael Stage 2 Report in Alinta's 29 July 2009 submission (Item 3 of Information Pack). (It was also assumed that their inertia would reduce the MG requirement – but note the impact of the May 2009 change in this regard.)

☐ CRA did the initial cost benefit analysis for AEMC (27 August 2008) and the AEMC's draft decision (28 August 2009) based on this was essentially a compromise solution – finely balanced but a reasonably justified outcome IF one assumes new plants will bring more FCAS.

☐ Remarkable consensus on the issues at the time. Differences were all about how to achieve the best trade off for Tasmania. Debate about this was rational, factual and measured (as it was recognised that the system security consequences of not having enough FCAS were too massive to play games based on pure self interest).

CRA in its 27 August report stated that *"It is notable that no submissions to the Reliability Panel were opposed to facilitating entry but were divided on how this occurs"* and also that *"Advice from NEMMCO and Transend, and the views of stakeholders making submissions on the issue, all point to untenable costs if contingency size is unfettered. Submissions from Alinta accept the benefit of limitations on contingency size where needed. Accordingly a package of changes that include a limitation on contingency size, and obligations for new entrants to procure additional services together with a narrowing of frequency bands within the standards, are warranted and provide a net benefit."*

☐ To understand why there was such consensus & rational debate, it is necessary to understand the severity of not having enough R6 and to do this we need to look at how co-optimisation works (figure 1 from HT's submission).

Slide Five: Co-optimisation R6

Cannot separate FCAS and energy outcomes and cannot separate Tasmanian and mainland impacts. R6 shortage will affect energy and

mainland as well.

- The following is a simplified explanation - it looks only at R6 and energy and holds all other variables constant. It is also assumed the Victorian region is representative of the NEM (ie no other constraints impacting). Actual co-optimisation occurs across all 9 spot markets and all regions and is much more complex.

- The 210MW shown in slide 5 is what HT estimates as a reasonable number for the maximum generator contingency (144MW) post the TFOS and inertia changes (there are some higher estimates being expressed but are unlikely to eventuate due to other system constraints). The 45 degree angle shown in slide 5 shows that 1MW of Basslink flow can either be used for energy or R6 as the link simply transports both energy and FCAS, it does not produce the FCAS.

- walk through G to A as per submission

    - Point G: At this point the supply side limitation has fully counteracted the co-optimisation process (due to the physical export limit) and price separation occurs in the particular spot market or spot markets.

    - Point F–G: If NEMDE dispatches Basslink in this region then there is no limitation on the co-optimisation process. The flow is purely determined by the combination of the global energy and R6 bid stacks without the influence of any limitations.

    - Point E-F: Through this section NEMDE has determined that the most economic outcome is to provide a proportion of R6 regionally and another proportion globally that enables the relative energy flow between Tasmania and Victoria. Assuming all other variables are the same, higher priced energy bids in Tasmania will tend to push the flow towards point E, while higher priced R6 bids in Tasmania will tend to push the flow away from point E (as illustrated in HT's submission). The co-optimised outcome reflects the availability and relative pricing of supply side services. This is where a shortage of a particular supply side service may "trap" Basslink, effectively denying a flow reversal.

    - Point D-E: To transition the no-go zone, spot market separation is required (all energy and R6 must be supplied locally), which generally requires a reasonable differential in energy price to overcome R6 services within the co-optimisation process as services are duplicated within regions. So even though the spot markets are separated this is still the optimal

economic outcome for the market as a whole. Generally, it is unlikely that Basslink would remain in the no-go zone for any more than 1 dispatch interval because there will generally be a lower cost solution than supplying the two regions independently once the cable de-blocks (can flow in either direction for next interval).

- Point B-C: This is very similar to F-G where global bid stacks are fully co-optimised to determine most economic solution without limitations on the co-optimised outcome. The difference here is that there is a limitation acting on the co-optimisation process that specifically requires some local R6 to accommodate the loss of Basslink. This requirement is allocated locally with the rest of the maximum generator contingency (MG) requirement sourced from the global bid stack (which includes Tasmanian bids). Under the current formulation this local requirement is reasonably constant and averages around 30MW. It is important to note that, in submitting R6 bids, Tasmanian providers cannot differentiate between local requirement and the global bid stack.

- Point A-B: Again, through this section NEMDE has determined that the most economic outcome is to provide a proportion of R6 regionally and another proportion globally that enables the relative energy flow between Tasmania and Victoria. Assuming all other variables are the same, higher priced energy bids in Tasmania will tend to push the flow towards point A, while higher priced R6 bids in Tasmania will tend to push the flow away from point A (as illustrated in HT's submission).. The co-optimised outcome reflects the availability and relative pricing of supply side services.

- Point A: At this point the supply side constraint has fully counteracted the co-optimisation process (due to the physical import limit) and price separation occurs in the particular spot market or markets.

- As can be seen from this segmentation, with the exception of points A and G, energy and R6 are co-optimised across the entire range of Basslink flow.

☐ There is an important difference between <u>outcomes of co-optimisation</u> and outcomes that are <u>not</u> the result of co-optimisation.

- Outcomes of co-optimisation are inherently unstable – designed to be volatile to allow efficient supply demand responses (eg at/near point A)

- The only local R6 that is not an outcome of co-optimisation is the approx. 30MW requirement to cover Basslink importing - however this is not what the complaints to OTTER are about. Typically, 20-40MW of R6 is available from hydro plant under normal operating conditions.

- HT agree that this 30MW is inefficient under new supply-side scenarios and have plans to remove it if we can get the various stakeholders aligned. Just as we have commenced doing on the export side, this is achieved through normal market processes.

- The bigger issue is the gap between Z (reasonable estimate 210MW shown in slide 5) and the amount of R6 available from hydro plant under efficient operating conditions (typically 20-40MW referred to above).

Slide Six: Co-optimisation L6

There is also a shortage of L6 (recognised in the TFOS Review).

- Slide 6 just shows L6 and energy and holds all other variables constant.

- Note that the reason for the difference between the amount of L6 while Basslink is in the no-go zone (shown as 135MW in slide 6) and at point G maximum export (shown as 90MW) is inertia. (Inertia also explains why in slide 5 the R6 while Basslink is in the no-go zone is less than at point A.)

- Note that work underway to remove the ~30MW L6 local requirement during Basslink export is nearly done.

- AEMO's 26 August advice to AEMC noted that the proposed changes to TFOS would increase L6 requirements. AEMO highlighted the need for the first two new plants to bring new FCAS to market.

- AEMO also noted that the increased L6 requirement could not be met by currently available L6 from hydro plant. The old Bell Bay thermal units had been providing 50MW of L6 each, which would need to be replaced now these units have been retired.

- Limiting the size of the Network contingency is also worthy of examination to determine if reducing the requirement is a better economic option than increasing supply. In the medium term this could be achieved by building a 3rd transmission line into RTA.

- Historical concerns prior to April 2008 focused more on L6 than R6 but increases in L6 supply and larger R6 requirements mean R6 is now more of an issue – particularly as it is harder to deliver R6 from generation plant(it involves forgoing more energy to provide R6 than L6).

Slide Seven: Co-optimisation R6 & L6

There is a real issue with the impact of R6 and L6 shortages.

- Slide 7 combines R6, L6 and energy and holds all other variables constant.

- AEMO recommended limiting contingency size (to reduce the increase in R6 required for MG) and requiring at least the first two new thermal plants to provide L6.

- To illustrate how FCAS impacts are fundamental to the issue of what changes to TFOS Tasmania can accommodate (and why options D and E were ruled out), consider the following example given by AEMO:

  "Under light load conditions there will be high requirements for both R6 and L6 services. For instance, if we consider the following scenario:
  - Basslink in service and importing
  - A single higher efficiency thermal generating plant operating at 210MW but not offering L6 services
  - Bell Bay Units 1 and 2 decommissioned or out of service
  - Hydro Plant in service capable of supplying only 100MW of both R6 and L6 services

  Then to meet these requirements Basslink would have to be operated with at least 370MW of raise head room and 120MW of lower head room. However such simulataneous requirements would be incompatible.

  However, if this single higher efficiency thermal generating plant was operating at say 144MW or was providing about 70MW of L6 service then there would be a compatible range of operating but it would still be considerably more restrictive than at present."

- In other words, looking at slide 7, if the R6 and L6 triangles become too large there will be no import flow target at which both can be met fully from global supplies (limiting co-optimisation) and a point at which some of both must be met from local supplies. If there is not enough local supply to meet both at this flow target, then the dispatch engine may not be able to solve. It was clearly understood in 2008 that this is the type of severe outcome everyone was trying to avoid.

Slide Eight: Timeline Dec 08 FOS Decision & Causer Pays Rule Submitted

For the changes to TFOS to work, additional supplies of FCAS need to be delivered. What is an efficient mechanism for encouraging investment in such additional supplies?

- ☐ The draft decision essentially became the final determination: option C tighten the standards with mitigation (limit the contingency size).

  Extract from CRA 27 Aug 2008 report referenced earlier: …"*a package of changes that include a limitation on contingency size, and obligations for new entrants to procure additional services together with a narrowing of frequency bands within the standards, are warranted and provide a net benefit."*

- ☐ The determination could only achieve two of the three components of the "package" required to produce a net benefit.
  - Contingency limits; and
  - Narrowing of frequency bands.

  The third component would need to be achieved through another mechanism, which the Reliability Panel suggested could be in the form of a rule change.

- ☐ CRA's advice to the Reliability Panel was that changing the standards and relying on the market to bring forward additional FCAS carried risk, specifically the risk that availability and price will be stretched.

- ☐ In other words, for the net benefit to be realised, the additional R6 and L6 promised by new thermal plants would need to be delivered (otherwise option C would have been ruled out for the same reason that options D and E were).

- ☐ Suggestions were made by CRA and AEMC about looking at some pricing signals like runway pricing to make sure new plants delivered this. The HT causer pays rule change was initiated in response to these suggestions.

- ☐ This is the economic debate we would have been having now but for the following developments:

  - Aurora's acquisition of AETV from Alinta.
    deal announced in August, done in Sept but Aurora could not take control until ACCC approval which was granted 29 October 2008

  - Aurora's commercial decision (as new owner of AETV) not to have any FCAS capability – this had effect of changing the delicate balance sought to be achieved by the AEMC's decision by reducing the expected

amount of available FCAS while increasing AETV's exposure to FCAS cost (an economically irrational decision to make in the context of everything that had occurred in the FOS review).

- The AEMO change in the way inertia is treated (May 2009) which had the effect of increasing Tas MG requirements exacerbates the shortage issue. This is a point Hydro Tasmania repeatedly made during the TFOS review (making Aurora's decision not to provide FCAS even more economically irrational). NB: We have not seen the full impact of this change yet as Tas generation has been higher due to good inflows for the majority of the time that AETV's CCGT plant has been operating since the May change.

  Item 4 of the Information Pack contains an ETAC paper on inertia. HT was very influential in establishing the Inertia Issues Working Group and promoting it as an ETAC initiative. This is yet another example of being pro-active to resolve issues using normal market processes.

- ☐ The impact of these developments is that the finely balanced cost benefit test applied in the TFOS review is no longer met and the outcomes everyone worked hard to avoid in the TFOS review are now a real risk of becoming the reality

Slide Nine: AETV FCAS Liability

The only significance of April 2009 is that it exposed Aurora's poor risk management decisions.

- ☐ No real significance to the events of April 2009 – these would not have been viewed by market participants as anything other than the market at work but for Aurora's decision not to have any FCAS capability and clearly not to have any risk management strategy in place other than to turn this into a regulatory debate.

- ☐ Note that the Bell Bay thermal plant declined by Aurora would have covered its exposure. This plant had been regularly used for FCAS. HT had taken all steps to facilitate transfer of ownership of the plant, with one generator in full running condition, at midnight on 31 March 2009. It was Aurora's decision not to take transfer, advised to HT on 25 March 2009, for reasons unknown to HT. Given the one week's notice the transfer would not proceed, HT was no longer in a position to keep this plant running after 31st March; Aurora's decision

effectively resulted in local supply of R6 and L6 being removed from the market on and from 1 April 2009.

- What happened to Aurora is a commercial consequence of poor commercial decisions – regulatory processes should not be manipulated to insulate market participants from such commercial consequences and allow them to avoid investment.

- Now other proposed plant seems to have jumped on board so they can avoid having to provide FCAS too (setting a trend for gas-fired generation which, if encouraged by regulators, will make the shortage situation even worse; resulting in a less competitive environment for both generation and retail).

Slide Ten: Timeline Aug 09 Causer Pays Draft

Economic market issues have been hi-jacked by thermal generators who do not want to make investment in increasing FCAS supplies.

- The Causer Pays Rule Change Process commenced with the Final Decision on TFOS and was initiated in response to suggestions in the AEMC Reliability Panel's final determination. At that time, the issues were clearly understood to be all about economic efficiency and investment incentives (how to get more FCAS which is critically needed for system security).

- However, post April 2009 the economic issues have been hi-jacked by Aurora's reaction to the events of April 2009 and its apparent regulatory strategy for avoiding such investment. This makes objective, rational analysis of the economic issues impossible. In this changed climate of inaccurate and misleading information, HT believes it is impossible for the AEMC to undertake a proper assessment of the rule change: see HT submission 10 September 2009 (Item 5 of the Information Pack).

- HT has noted the change in the position of thermal generators from promising more FCAS in order to justify changing the TFOS to acting as if they cannot or should not be expected to invest in FCAS. The response by Aurora and AETV to the Causer Pays Draft Decision has not explained this change of position. (Item 5 of the Information Pack).

Slide Eleven: Summary of Submissions

The position being put forward to OTTER now is totally inconsistent with everything that occurred in the FOS review.

- ☐ Aurora / AETV position post April 2009 contradicts everything said during the 2008 FOS review.

- ☐ Aurora when it first acquired AETV told AEMC it stood by the position out forward by the previous owner Alinta:
  See the 1 Oct submission by AETV to AEMC: "The new owners are in full support of previous submissions provided by Alinta Energy into this review process."

- ☐ The position being put forward post April 2009 that gas-fired generation cannot or should not provide FCAS (and so is dependent on HT FCAS) is inconsistent with the AEMC's decision to adopt option C in the TFOS Review. Had this position been accepted in 2008, the changes to TFOS could not have been made.

- ☐ The position apparently being put forward post April 2009 that HT can provide all the FCAS Tasmania needs without sacrificing efficiency is factually incorrect and inconsistent with the advice from AEMO and submissions to the AEMC in 2008.

- ☐ There has been no proper analysis of what the FCAS requirements are in Tasmania post the inertia changes, to what extent there are sufficient available supplies to meet those requirements and the extent of potential for additional supplies.

- ☐ Simply stating that someone is a monopoly supplier because they are currently the only registered provider in Tasmania is not good enough.

Slide Twelve: Cost and Savings Allocation

On a cost benefit analysis Tasmania would be better off with no CCGT if new thermal plants won't provide FCAS. If thermal plant cannot (or will not) provide FCAS then the changes to the TFOS are no longer economically justifiable.

- ☐ The TFOS Review looked at <u>supply side cost savings</u> from using CCGT (instead of more expensive thermal plant) versus <u>increased supply side costs</u> as a consequence of additional FCAS requirements.

- ☐ But, as noted by CRA and AEMC, this process could not deal with the issue of how these supply side savings and costs were allocated.

- ☐ In the TFOS Review, CRA and AEMC noted that the savings from using CCGT (estimated by CRA as being around $4MW) would be captured by one group of generators (new thermal plants able to use CCGT rather than a more expensive type of thermal

plant) but the costs of increased R6 requirements would be borne by all generators.

- ☐ The primary beneficiary of these approx. $4MW savings is AETV which is owned by the incumbent retailer Aurora. New retailers competing with Aurora cannot access these savings.

- ☐ What this means is that the benefits of the changed TFOS will captured by the incumbent retailer while the costs will be borne by a combination of HT, new retailers and customers.

- ☐ How is this efficient? How is this good for competition? How is this in the public interest?

Slide Thirteen: Summary

- ☐ April '08 – Issues
  - New generation required
  - Trade off of supply side costs and benefits
  - R6/L6 availability and costs central to equation

- ☐ Dec '08 – TFOS Determination recommends 'package' of measures required to ensure net benefit
  - Slightly tighter FOS
  - Contingency size limit
  - Obligation for new entrant to bring new R6/L6 to market

- ☐ Apr '09 – high prices expose AETV's commercial choice not to provide or procure FCAS – inconsistent with TFOS submissions

Slide Fourteen: Where to from here?

- ☐ OTTER announce intent to declare Hydro Tasmania raise contingency FCAS as declared service.

- ☐ April 08 issues exacerbated and remain unaddressed

- ☐ How does declaration of a single participant address the key FCAS issues?

- ☐ What are the market and competition risks created by such a declaration? What is the message sent to the market?

- ☐ Insufficient FCAS has led (and will continue to lead) to market events (such as Basslink becoming trapped) that significantly impact the market and produce inefficient outcomes. A crucial aspect of the TFOS Review and the Causer Pays proposed rule change was how to ensure that new entrant plants provide or

procure additional FCAS. HT's concern is that telling the market that the problem is instead a "monopoly provider" problem and that the solution is regulation sends a clear message that there is no need for new entrant plants to deliver this additional FCAS. This will result in higher energy supply costs in the long term, which will be borne by consumers.