

Directions paper – Frequency control rule changes

STAKEHOLDER SUBMISSION TEMPLATE

The template below has been developed to enable stakeholders to provide their feedback on specific questions that the AEMC has identified in the directions paper for the frequency control rule changes.

The rule changes discussed in the frequency control directions paper are:

- AEMO – *Primary frequency response incentive arrangements* (ERC0263)
- Infigen Energy — *Fast frequency response market ancillary service* (ERC0296)

This template is designed to assist stakeholders provide valuable input on the questions the AEMC has identified in the directions paper. However, it is not meant to restrict any other issues that stakeholders would like to provide feedback on.

Given the breadth of issues discussed in the directions paper, it is not expected that all stakeholders respond to all the questions in this template. Rather, stakeholders are encouraged to answer any and all relevant questions.

SUBMITTER DETAILS

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CHAPTER 4 – FAST FREQUENCY RESPONSE MARKET ANCILLARY SERVICE

Question 1: Section 4.5.3 – PROBLEM DEFINITION AND REFORM OBJECTIVE — FFR RULE CHANGE

What are stakeholders’ views on the problem definition and reform objective for FFR as set out in section 4.5.3 of the directions paper?

The AEC supports the Paper’s recognition of FFR as a “missing market” that requires resolution consistent with the recommendations of the Energy Security Board.

Question 2: Section 4.7.1 – FFR PROCUREMENT

In relation to the discussion of potential procurement arrangements for FFR services in section 4.7.1 of the directions paper:

- What are stakeholders’ views on the pros and cons of establishing new FCAS market arrangements for FFR services versus revising the existing arrangements to incorporate FFR within the fast raise and fast lower services?
- Do stakeholders agree that the existing arrangements for contingency FCAS provide an appropriate model for FFR market arrangements?
- What are stakeholders’ views on how each of the proposed procurement arrangements for FFR would interact with the arrangements for the existing contingency services?
- Are there any aspects of the existing contingency FCAS arrangements that should be varied for procurement of FFR services?

(Note – the bullet points in this column align with the bullet point questions in the first column).

- The AEC recognises that either approach can achieve the objective. As a general principle the former (creating two additional FCAS categories) is preferred as it does not require respecification of existing categories and thereby complicating them and potentially excluding some existing providers.
- The contingency FCAS markets’ designs seem appropriate for procuring FFR. Replicating the design into new FFR up and down categories has the attraction of familiarity and presumably low implementation costs for AEMO and existing FCAS providers.
- To the extent FFR and fast services are partially substitutable, this is readily manageable as the dispatch engine can co-optimize across FCAS services as it already does between Regulation and Delayed.
- If replicating the existing contingency FCAS design, there may be very little variation to the design required. The most critical decision is the treatment of inertia discussed at Question 6.

Question 3: Section 4.7.2 – FFR PRICING ARRANGEMENTS

In relation to the discussion of potential pricing arrangements for FFR services in section 4.7.2 of the directions paper:

- What are stakeholders’ views on the pros and cons of maintaining the existing FCAS pricing arrangements for FFR services?

- There are significant attractions in maintaining the existing pricing arrangements and replicating them into two new FFR FCASs. The FCAS’ market designs intentionally create common-clearing commodity prices. This approach supports competitive valuation and comparison of its provision which in turn supports risk management and ultimately efficient investment decisions. The simplicity of the approach allows, for example, all FCAS payers to calculate their exposures real-time.
- The present approach recognises differential performance through the registration process: i.e. superior providers are apportioned a greater volume, rather than a higher price.

<ul style="list-style-type: none"> • What are stakeholders' views on the potential pros and cons of incorporating performance-based multipliers into the pricing arrangements for FFR services? • Do stakeholders have any other comments or suggestions in relation to the pricing arrangements for FFR services? 	<p>Retaining this approach has great attractions for the simplicity of the market, and should ultimately achieve the same economic and technical result as a more complicated price multiplier approach.</p> <p>AEMO's cited concern from its Renewable Integration Study concern that this will lead to under-procurement of total MW does not seem logical. This confusion arises from the present doubling of the nameplate MW value from instantly responding services. This concern can be resolved simply by either (a) halving the calculated registered capacity of providers, or (b) doubling AEMO's procurement quantity. Either of these would have the same economic result as the more complicated differential pricing.</p>
<p>Question 4: Section 4.7.3 – FFR COST ALLOCATION</p>	
<p>In relation to the discussion of arrangements for the allocation of costs associated with FFR services set out in section 4.7.3 of the directions paper:</p> <ul style="list-style-type: none"> • What are stakeholders' views on the arrangements for the allocation of costs for FFR services? • Would it be appropriate for the cost of FFR services to be allocated in a similar way to the existing arrangements for the allocation of contingency FCAS costs? 	<ul style="list-style-type: none"> • The AEC concurs with the Paper's observation that the FFR performs a similar function to the existing contingency services and the cost recovery should be replicated as per those services. <p>It should be noted that the rationale for the existing allocation of contingency raise services costs to generators is not as straightforward as the Paper suggests: generator contingencies being the "causer". In fact, much of the contingency raise costs accrue to protect against network rather than generator contingencies. The question of the allocation of contingency raise costs is however outside the scope of this rule change, and it is best that the design of FFR raise should adopt align with the current approach.</p>
<p>Question 5: Section 4.8 – ISSUES FOR CONSIDERATION – FFR</p>	
<p>Are stakeholders aware of any additional issues that the Commission should take into account in developing market ancillary service arrangements for FFR?</p>	
<p>Question 6: Section 4.8.1 – VALUATION OF INERTIAL RESPONSE</p>	
<p>In relation to the potential arrangements for the valuation of inertial response described in section 4.8.1 of the directions paper:</p> <ul style="list-style-type: none"> • What are stakeholders' views on the valuation of inertial response as part of the contingency services, including the proposed new FFR 	<ul style="list-style-type: none"> • The AEC strongly supports the Post 2025 review's desire to value the "missing markets" challenge and inertial response is a key part of this. To the extent it is technically substitutable with FFR, the inclusion of inertial response within a new FFR market potentially presents an elegantly simple way to achieve this. <p>However the Paper has noted "It is not envisaged that a complete arrangements for the</p>

<p>contingency services?</p> <ul style="list-style-type: none"> • What are stakeholders' views on the current governance arrangements for contingency services; where the detailed service specification is determined by AEMO and documented in the MASS? (Is it appropriate for the NER to provide further guidance on how inertial response should be considered in the MASS?) 	<p>valuation of inertia will be developed and implemented through the FFR rule change...arrangements for inertia is being led through the ESB's essential system services market design initiative". The AEC considers it would be unfortunate if the division of responsibilities between the market bodies results in duplicative designs.</p> <p>In order to remove natural inertial response from fast services, AEMO presently applies a rather artificial subtraction which discriminates against spinning providers in comparison to static FCAS providers. Whilst this has only a minor impact when integrating response over six seconds, it would be very material when applied to a two second response.</p> <p>The AEC recognises that it is presently unclear if FFR and inertial response are fully substitutable, and that AEMO is likely to desire a minimum level of spinning inertia for some time. This means that work should continue on ways to procure conventional inertia as a standalone service, but it doesn't mean the FFR market should be designed to exclude it. Instead, an inertia service could be seen as a "top-up" for when the FFR market has not recruited enough.</p> <ul style="list-style-type: none"> • Ideally the governance division between the rules and MASS should be consistent across the services, including FFR. The AEC noted however in its earlier submission that if the AEMC's preferred FFR design is to incorporate inertial response, this should be documented in some way in order to avoid simply replicating the MASS' exclusion of inertia from the other services. This could be either incorporated legally within the rule or simply made explicit in the final determination.
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Question 7: Section 4.8.2 – PRICE RESPONSIVE DEMAND FOR CONTINGENCY SERVICES

<p>In relation to the discussion of arrangements for incorporating price responsiveness into the procurement of contingency services in the NEM set out in section 4.8.2:</p> <ul style="list-style-type: none"> • What are stakeholders' views on the potential pros and cons associated with the implementation of a "demand curve" approach to procurement of FCAS? • What are stakeholders' views on the priority of such a change to the market frameworks? • If such an approach was to be implemented, what are stakeholders' views on the appropriate governance arrangements, including the potential oversight role for the AER? 	<ul style="list-style-type: none"> • Conceptually the economic case for a demand curve – where more service is bought when the price is low - is strong. However until recently it was disfavoured as being inconsistent with the deterministic "technical envelope" concept enshrined by the Rules. The discrete technical envelope does have the advantage of being simpler to govern and for a competitive market to understand. <p>If a demand curve is introduced, the AEC suggests that the existing discrete technical envelope be retained, i.e. AEMO should procure at any price to stay within the current boundaries. The demand curve would then permit additional opportunistic FCAS purchases where its price is judged to be lower than the probabilistic benefit of the additional "beyond-minimum" security.</p> <ul style="list-style-type: none"> • Now that the Energy Security Board has endorsed a demand curve approach, it is appropriate the AEMC to consider where it can be applied. But the complexities of such a
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	<p>demand-curve are large and it should not be rushed. It is suggested that the AEMC separates this question from the design of the FFR market. Instead, the AEMC should set up a separate review to investigate how demand curves could be simultaneously introduced across all ancillary services.</p> <ul style="list-style-type: none"> • A demand-curve requires a difficult value judgement balancing a known additional cost against a calculated benefit derived of a probabilistic risk of a major disturbance. The AEC considers this task would be inappropriate for the market operator. The body that has been specifically created to, and already does, make such judgements is the Reliability Panel. It thus seems the obvious choice and it is unclear why the Paper only contemplated the AER.
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Question 8: Section 4.8.3 – INTERACTION BETWEEN MANDATORY PFR & FFR ARRANGEMENTS

<p>What are stakeholders’ views in relation to the potential interactions between new FFR arrangements and the Mandatory PFR arrangement?</p>	<p>The AEC considers the recently imposed narrow deadband mandatory PFR problematic in many ways, not least that it runs contrary to the valuation of “missing markets” as directed by the Energy Security Board.</p> <p>The Paper has identified a technical conflict between narrow deadband mandatory PFR and the proposed FFR in that contingency services may be consumed before a contingency by the obligation to provide mandatory PFR. This concern also exists in relation to the other contingency FCASs.</p> <p>The paper then discusses further complex mechanisms that could be imposed to inhibit this consumption. This is symptomatic of the “tangled web” of patches that a mandatory obligation begets. The AEC recommends instead that the FFR be designed around an expectation that the narrow-deadband mandatory PFR expires with its current sunset. It should be assumed that future narrow-band PFR will be purchased under a form of market mechanism that is additional to, rather than interferes with, other services.</p>
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Question 9: Section 4.8.4 – IMPLEMENTATION AND STAGING FOR FFR

<p>In relation to the discussion of the implementation arrangements for FFR services as set out in section 4.8.4:</p> <ul style="list-style-type: none"> • What are stakeholders’ views in relation to the process for the implementation of FFR arrangements in the NEM? • What are stakeholders’ views on the potential need for interim or transitional arrangements as part of the transition to spot market 	<ul style="list-style-type: none"> • The AEC agrees with the suggested implementation process in the Paper. • The AEC accepts the matters of concern listed by AEMO that need further investigation. However this should be through analysis and modelling now rather than trialling some kind of partial FFR solution. The timeframes allow for this analysis to be performed such that only the complete market solution is implemented. <p>Assuming the FFR market largely duplicates the existing contingency FCAS, these provide AEMO a range of variables and constraints which it can use if necessary for progressive</p>
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arrangements for FFR?	refinement. For example they permit maximum locational quantities to be specified and co-optimisation constraints with other FCAS.
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CHAPTER 5 – PRIMARY FREQUENCY RESPONSE INCENTIVE ARRANGEMENTS

Question 10: Section 5.1.3 – THE ROLE OF MANDATORY PFR

In relation to the discussion of the role for a mandatory obligation as part of the enduring PFR arrangements in the NEM, set out in section 5.1.3:

- Do stakeholders agree that a mandatory PFR arrangement provides a valuable safety net to help protect the power system from significant non-credible contingency events?
- Do stakeholders agree that the narrow, moderate and wide settings for a mandatory PFR response band adequately represent the broad policy options for the frequency response band for Mandatory PFR?

- The AEC considers that mandatory PFR is inconsistent with the valuation of “missing markets” philosophy and distorts to existing markets. These problems are most severe with respect to the current rule which includes a near zero deadband. As the deadband widens, the materiality of the problems lessen.

AEMO desires that all existing frequency capability be made available to protect the system from extreme non-credible contingencies such as that which occurred 25 August 2018. In our supplementary submission of 22 September 2020 we proposed a pathway that retained mandatory PFR but only with a very wide, “last-resort”, deadband.

The AEC disagrees with AEMO’s characterisation that the widening of generators’ deadbands, that are presently obliged to be narrow, would be “perverse”. On the contrary, this would clearly separate market-based services that correct normal conditions from mandatory services that provide a last-resort against extreme events. It would standardise the fleet to a known response characteristic.

- This policy option characterisation seems reasonable.

Question 11: Section 5.4 – PROBLEM DEFINITION AND REFORM OBJECTIVE — PFR INCENTIVE ARRANGEMENTS RULE CHANGE

What are stakeholders’ views on the problem definition and reform objectives for enduring PFR arrangements set out in section 5.4?

The dot point discussion in section 5.4 of the paper is a strong and fair distillation of the issues to be dealt with in respect of PFR. The AEC also agrees with the five actions proposed, with the exception that the last item – revision to the frequency operating standard – should not be the final stage. Instead the reliability panel’s determination of a desired frequency outcome should lead the design rather than vice-versa.

Question 12: Section 5.4.1 – ECONOMIC ANALYSIS OF MANDATORY PFR

In relation to the discussion of the costs and benefits of Mandatory PFR arrangements set out in section 5.4.1:

- What are stakeholders' views of the indicative curves for costs and benefits of Mandatory PFR with respect to the frequency response band settings, set out in figure 5.4?
- Do stakeholders agree that the frequency response band setting is a key variable for the determination of enduring PFR arrangements that meet the power system needs and are economically efficient over the long term?
- What are stakeholders' views on the effectiveness of the exemption framework under the Mandatory PFR arrangement?
- What are stakeholders' views on the role that the allowance for variable droop settings plays in relation to the cost impacts of Mandatory PFR?
- Based on the initial roll out of the Mandatory PFR arrangement to generators over 200MW, what are stakeholders' views on how the cost impacts of Mandatory PFR are impacted by the proportion of the fleet that is responsive to frequency variations?
- What other considerations are there in relation to developing effective and efficient arrangements for PFR in the NEM?

- Figure 5.4 presents an interesting characterisation of the costs of generators providing mandatory PFR at different dead-band levels. The discussion is fair as a static discussion of the burden on conventional generators' operation, but misses the more insidious impacts of a mandatory narrow dead-band obligation, which are:
 - The dynamic economic effects: the analysis doesn't consider the impact on the valuation of service provision and the incentive to invest in new/retain existing PFR supply.
 - That it assumes an infinite supply of mandated frequency response will always be on-line: it does not look forward to the likely future where unrewarded supply has evaporated.
 - The distortion of FCAS markets, both in their pricing and operation.

The above three points constitute the AEC's main objections to narrow band mandatory PFR, rather than conventional generator active mileage as implied by the illustration.

- A wide frequency response band setting is necessary to minimise the distortionary issues of Mandatory PFR.
- The AEC is unable to yet comment upon the effectiveness of the exemption framework.
- If a wide deadband is used, variable droop settings appear to become unimportant.
- The AEC concurs that narrow band frequency performance has become much tighter following the implementation of Mandatory PFR on only a small number of large conventional units. The AEC draws the following lessons from that experience:
 - That the circumstances are highly conducive to a competitive market in Normal Operating Frequency Band (NOFB) PFR – only a small number of providers are needed to deliver a very strong frequency performance.
 - That the performance arose from large ageing coal generators, and we need to provide a value stream to ensure investment in adequate PFR replaces them as they withdraw.
 - That AEMO is very pleased about the much narrower frequency characteristic, yet agrees that the previous characteristic which caused it such concern was nevertheless within the NOFB Frequency Operating Standard (FOS). This contradiction highlights how seriously the FOS requires revision, but as yet there remains no immediate plan to align the FOS and AEMO's expectations.
- See response to first dot point.

Question 13: Section 5.5 – ADVICE FOR ENDURING PFR ARRANGEMENTS

What are stakeholders’ views of the Commission’s proposed approach to obtaining advice to inform its determination of enduring arrangements for PFR in the NEM?

AEMO is a key partner in this activity, for example in providing technical analysis on the likely frequency outcomes of any design proposed by the AEMC. This section 5.5 of the Paper however is overly reliant on upcoming AEMO advice in leading into the design, e.g.

“Finally, AEMO’s views are sought on the design of the enduring market and regulatory arrangements for frequency control in the NEM, including the role of Mandatory PFR...Views on the policy options and pathways to enduring PFR arrangements....will be sought.”

The AEC considers the Paper places AEMO beyond their role as a technical advisor, into that of an economic adviser or market designer.

The AEC would support the use of independent technical expertise to assist the AEMC with its interpretation of AEMO’s technical input. However the AEMC itself should be the body that contemplates the economic issues and ultimately recommends a market design.

Question 14: Section 5.6.1 – PROCUREMENT ARRANGEMENTS FOR NARROW BAND PFR SERVICES

In relation to the discussion of potential procurement arrangements for narrow band PFR services in section 5.6.1:

- What are stakeholders’ views on three options identified for further consideration?
 - a. Existing market ancillary service arrangements
 - b. New market ancillary service arrangements
 - c. New incentive-based arrangements for voluntary provision
- Are there any other options that would be preferable?

The AEC laid out its view on long-term procurement arrangements in its 22 September 2020 supplementary submission. It favoured two options of most promise for further study: (a) an explicit purchase of a quantity of narrow-band PFR similar to existing FCAS designs in a new FCAS market and (b) voluntary incentive-based provision.

Question 15: Section 5.6.2 – PROCUREMENT ARRANGEMENTS FOR NARROW BAND PFR SERVICES

What are stakeholders’ views on the arrangements for the pricing of PFR as described in section 5.6.2?

The AEC laid out its view on long-term procurement arrangements in its 22 September 2020 supplementary submission. With respect to the discussion in this section:

- The settlement mechanisms for “Double sided causer pays” (DSCP) and “Frequency response deviation pricing” (FRDP) are similar, the major difference in the schemes being the source of the frequency term. DSCP uses raw frequency whereas FRDP uses AEMO’s “Frequency Indicator”,

	<p>which includes a lag in the raw frequency signal in the order of tens of seconds. The latter is appropriate for the AGC based Regulation services which have a natural time delay in the order of a few tens of seconds. However in PFR we are desirous of acting within individual seconds, for which a direct frequency signal is appropriate.</p> <p>Furthermore, raw frequency is also the signal that governors will respond to: this is in fact the definition of PFR. Hence it would seem incorrect to base the incentive payment on another signal that we don't expect to be followed.</p> <ul style="list-style-type: none"> For the Regulated pricing option, the AEC and some of its members had expressed interested in this at the time of the making of the Mandatory PFR rule, however reading more recent summaries of the outcomes of the Norwegian experience has caused AEC to lose favour. It is also our understanding from that material that Norway is contemplating moving away from this model.
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Question 16: Section 5.6.3 – ALLOCATION OF COSTS FOR NARROW BAND PFR

<p>What are stakeholder's views on the allocation of costs for narrow band PFR services as described in section 5.6.3?</p> <p>Do stakeholders agree that the any additional costs for narrow band PFR be allocated through the existing causer pays procedure for the allocation of regulation costs (or a revised version as described in section 5.9)?</p>	<p>The DSCP and deviation pricing options are internally self-funding.</p> <p>For the non-self-funded options, allocating costs according to the existing regulation costs seems the best option.</p>
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Question 17: Section 5.7 – PATHWAYS FOR ENDURING PFR ARRANGEMENTS

<p>In relation to the pathways for enduring PFR arrangements set out in section 5.7:</p> <ul style="list-style-type: none"> What are stakeholders' views on the enduring PFR pathways? Do stakeholders agree with the Commission's preliminary preference for pathway two? (the widening of the PFCB and the introduction of market arrangements for narrow band PFR) 	<p>The AEC presented its view on a preferred pathway in its 22 September 2020 supplementary submission which ultimately concluded, like the AEMC, toward pathway two.</p> <p>However that pathway was founded on a Mandatory PFR requirement being a last-resort backstop only for non-credible contingencies. This implies a very wide deadband, and we recommended approximately ± 0.50 Hz. There was no suggestion that it could be as narrow as ± 0.15 Hz which would result in use of Mandatory PFR for credible contingencies: which the AEC considers is a role for markets. The AEC also does not agree that any amount beyond ± 0.15 Hz should be "subject to AEMO advice on the operational viability of this setting".</p>
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Question 18: Section 5.8 – FUTURE REVIEW OF THE FOS

What are stakeholders' views of the Commission's proposed approach towards a future review of the FOS as part of the development of enduring PFR arrangements?

The AEC has for some years recommended that the NOFB FOS be updated as it is clearly inconsistent with AEMO's views as to what is a satisfactory frequency performance. The AEC unsuccessfully argued this in the 2017-19 FOS review¹ and wrote to the Reliability Panel in 2020 to urgently resolve the consistency², also without success.

The proposal to bookend the PFR line of work with a FOS review seems intended to simply document the expected frequency achievements of the new design. This is inconsistent with the intended role of the Reliability Panel. Instead the process should begin with the Reliability Panel determining the desired frequency performance outcomes, derived from a balance of system security and cost. The role of the AEMC is then to work back from that desired outcome toward what mechanisms are necessary to deliver it, on occasion calling upon AEMO's technical expertise as to the implementation of the designs.

Question 19: Section 5.9 – REFORMS TO THE NER RELATING TO COST ALLOCATION FOR REGULATION SERVICES – CAUSER PAYS

In relation to the proposed reforms to the NER relating to the allocation of regulation costs, set out in section 5.9:

- What are stakeholders' views on the proposal to allocate regulation costs on the basis of performance against system frequency as opposed to Frequency indicator (FI)?
- What are stakeholders' views on the proposal to align the sample and application periods for determination of causer pays factors and shorten the application period to 5 minutes, in line with the NEM dispatch interval?
- What are stakeholders' views on the removal or shortening of the ten-day notice period for causer pays contribution factors?
- What are stakeholders' views on AEMO's proposal to pre-calculate seven sets of contribution factors including local contribution factors?
- What are stakeholders' views of AEMO proposal to include non-metered generation in the residual component for allocation of regulation costs?

This section 5.9 appears somewhat extraneous to the two matters being contemplated within the rest of the Discussion Paper. The discussion also appears to propose reforms to both the NER and AEMO procedures. The AEC questions whether they belong with this rule change or should instead be considered within a dedicated exercise into the detailed mechanics of Regulation cost recovery. The Paper notes some of the reforms being drawn from the recommendations of AEMO's 2018 consultation on the causer-pays procedure. In the AEC's mind, it is AEMO's role to put forward any consequential rule changes from that.

- The AEC is not in a position to comment on whether changing the single-sided causer pays frequency source from FI to raw system frequency is beneficial, this is a question deserving of technical expertise.

The AEC assumes the difference to settlements will be marginal, however it would be beneficial if this could be investigated through some historical re-calculations. AEC also supports publication of FI whether or not the change is made.

- The current approach of four-week averaging and 10 day notice seeks to broadly recognise how well causers perform on average over time rather than link current payments to actual performance. This was introduced in order to provide AEMO greater time to prepare the factors and to provide some stability for payers. The Paper mentions it has given rise to unintended incentives without explaining what these are: the AEC is unaware of this and invites more clarity.

¹ <https://www.aemc.gov.au/sites/default/files/2018-04/Australian%20Energy%20Council.PDF>

² <https://www.energycouncil.com.au/media/18727/panel-letter-to-aec-future-review-of-the-fos-6-october-2020.pdf>

The Paper refers to the AEC recommending transactions be based on a 4-second measurement. This is a misunderstanding: it was raised purely in the context of DSCP, where it is an essential feature. In proposing DSCP for further analysis, the AEC did **not** recommend any change to the cost allocation of Regulation Services. It would be acceptable to operate DSCP on a four-second basis whilst single-sided causer pays regulation continued on a four-week basis.

- The use of multiple factors to recover local requirements is supported.
- The explicit recovery of costs from non-metered generation is supported.