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Consultation paper - System services rule changes
Australian Energy Market Commission

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Subject: AEMC, System Services Rule Changes, Consultation Paper, 2 July 2020 (Ref: ERC0290)

To whom it may concern,

We would like to thank you for the opportunity to participate in this consultation process, which we regard as greatly important to the timely, cost-effective development of the National Electricity Market.

As acknowledged in both AEMO's Integrated System Plan and the Federal Government's Technology Investment Roadmap, there is a clear and growing need to expand Australia's fleet of pumped hydro power plants if Australia is to successfully complete the energy transition without sacrifice of reliability or security.

The overall economic case for pumped hydro is likewise extremely strong, with GE's internal analysis demonstrating that the 'peak shaving' services it provides would save electricity consumers hundreds of millions of dollars annually, enabling an economic payback period of less than 5 years in most cases.

Consideration of additional benefits (such as avoided transmission investment and regional job creation) only serve to strengthen the case for investment in pumped hydro.

Despite this positive context and a wealth of potential sites that exceeds our needs by roughly 1000x, many seemingly promising pumped hydro developments have stalled prior to FID. Feedback from investors and developers has primarily attributed this to insufficient size and certainty of the revenue streams available to them.

Our internal analysis supports this conclusion, indicating that current market rules and structures create a misalignment between benefits and costs, in which developers incur 100% of the cost of building their projects, but receive less than 15% of the market benefits their projects create. The remaining >85% of benefits flow as 'positive externalities' to electricity purchasers across the market in the form of lower prices. Ironically, these lower prices erode the arbitrage opportunity for pumped hydro operators, meaning the benefits they create for everyone else come to some degree at the expense of their own profits.

Simplistically, this misalignment could be addressing either or both sides of the cost benefit equation, i.e.:

- Reduce the share of the capex that must be paid by the developers up-front
- Increase the share of benefits captured by the owners during operation

The proposed System Services rule changes have the potential to fall into the second of the categories listed above, if they are correctly designed and implemented. In this regard, we would urge consideration of two overarching principles in assessing the rule changes:

- Favour measures that encourage the entry of new capacity rather than the prolonged operation of existing capacity
    - If the changes are calibrated to incentivise entry of new firming capacity, such as pumped hydro, this will increase competition and reduce cost

    - If instead they act to funnel additional revenues to existing operators, they will act as a barrier to entry for new capacity, increasing cost for consumers
    - As existing coal capacity is ageing and reliability levels are falling, such an approach would also lead to a steady decline in system reliability, as newer, more responsive technologies are discouraged from entering the market by the entrenched revenue streams of the existing operators
- Favour simplicity wherever possible
    - There are already 8 FCAS markets, 3 NSCAS markets, various markets for energy financial derivatives, plus of course the NEM itself
    - Despite this large number of interrelated markets, our customers are telling us that most are not seen as 'bankable', and collectively these many markets still fail to provide sufficient revenue for projects to move ahead
    - However, these many interrelated markets do create tremendous complexity for developers and financiers trying to accurately forecast revenues for their projects. This complexity itself acts as a barrier to entry benefiting established operators at the expense of new entrants, reducing competition and increasing costs for consumers

Outlined below is a summary of our responses to the changes proposed, each of which is elaborated more fully in the response document attached.

- Fast frequency response (FFR)
    - We support the introduction of mechanisms to compensate both FFR and synchronous inertia (as envisaged in the ESB's Post-2025 Market Design work)
    - If one of these is to be prioritized, we believe it should be synchronous inertia
    - This is because no amount of FFR can completely remove the need for inertia, but a sufficient level of synchronous inertia can completely remove the need for FFR
- Operating reserve
    - The proposal as drafted appears to deal only in operating generation reserve
    - By extending it to operating demand reserve as well (i.e. making it a 2-sided market for operating reserve), the proposed mechanism could capture the benefits of the growth in demand response, enabling reserve shortfalls to be more cost-effectively addressed
    - We also note that reserve capacity could be called on to provide system strength, inertia and in some cases FFR as well as energy input or output, so the design of the operating reserve mechanism should ideally allow for these services to be provided as well
- Ramping services
    - The proposed creation of this market seems to be driven by the technical limitations of existing coal capacity
    - Per our first principle, we would argue it is better to encourage the entry of new technology that is better able to succeed in our changing market than to try to adapt the market rules to prop up older technologies that are increasingly unfit for purpose
- Capacity commitment mechanism

- As above, the inability to switch on quickly when needed is primarily a limitation of coal generation, which is set to play an ever-decreasing role in the NEM in the years ahead

- Synchronous services markets
  - An approach that treats synchronous services in a holistic way makes a lot of sense
  - For instance, it would be cheaper from a holistic perspective to build a synchronous storage plant that provides storage and system strength across the network than it would be to install a synchronous condenser and a battery at every project
  - Nonetheless, if not carefully implemented, this proposed new market could disproportionally benefit existing coal fired generators, slowing their exit and crowding out the new investment needed to replace them
  - As such, we support this rule change, provided it is worded to favour incoming rather than incumbent generation

- Efficient management of system strength
  - Addressing system strength at the network level should logically be far more cost-effective than addressing it on a project-by-project basis
  - We would argue this logic can be pushed further, as every generation technology can provide a suite of system services and trying to unbundle and silo these will not lead to the optimal overall outcome
  - As such, we believe the underlying logic of this rule change request should be extended to enable an approach that optimises across all relevant system services rather than just system strength in isolation

Should it be possible to do so, we would welcome the opportunity to further discuss any or all of the above matters with the AEMC team, as we see this rule change process as a crucial opportunity to create the market conditions needed for the optimal evolution of the NEM.

Best regards,

Martin Kennedy
Head of Hydropower
Australia, New Zealand & PNG
GE Renewable Energy

AEMC

Consultation paper - System services 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 Consulation paper for the System services rule changes.

The rule changes discussed in the system services consultation paper are:

- AEMO – *Primary frequency response incentive arrangements* (ERC0263)
- Hydro Tasmania — *Synchronous services markets* (ERC0290)
- Infigen Energy — *Operating reserves market* (ERC0295)
- Infigen Energy — *Fast frequency response market ancillary service* (ERC0296)
- TransGrid — *Efficient management of system strength on the power system* (ERC0300)
- Delta Electricity — *Capacity commitment mechanism for system security and reliability services* (ERC0306)
- Delta Electricity — *Introduction of ramping services* (ERC0307)

This template is designed to assist stakeholders provide valuable input on the questions the AEMC has identified in the consultation 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 consultation 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 1 – INTRODUCTION

Question 1: Section 1.2 & 1.3 – Current ESB & AEMO work relating to the rule change requests	
1) What are stakeholders' views on how the rule change processes should be integrated with ESB and AEMO work programs?	There appear to be many interrelated processes underway across the AEMC, AEMO and the ESB, not to mention the UNGI program and the Technology Investment Roadmap. And this is just at Federal level. This proliferation of related but separated activity makes it extremely time consuming and difficult for industry to track, understand and participate in the various processes and consultations. Bringing the various reforms together under a single umbrella would address this. In this model, the various activities underway would become workstreams of a broader overall program, which would provide a 'single source of truth' to which industry could refer. Note: In this spirit of simplification, we wish to acknowledge the effort made by the AEMC in this consultation process to group these related rule change requests into a single point of reference.
2) Are there any additional processes that should be closely considered by the Commission when progressing these rule change requests?	This work by the AEMC clearly needs to be aligned with the Post 2025 Market Design work of the ESB, as well as the Integrated System Plan (ISP) and Renewable Integration Study (RIS) work being done by AEMO. At a broad level, it's important that we have a plan for where we want to get to (AEMO's work, particularly the ISP), but if we don't have the right regulatory & market settings (AEMC and ESB's work), we will not achieve our plan.
Question 2: Section 1.6 – Timetable for the consultation process	
1) Do stakeholders have any comments on the proposed timetable for the system services rule changes?	

CHAPTER 3 – APPROACH

Question 3: Section 3.2 & 3.3 – Three work streams: dispatch, commitment and investment	
1) Do stakeholders agree with the AEMC's approach to grouping the rule changes, at least for initial consideration?	The definition of the work streams appears logical; however: 1. The work streams do not appear to be of equal importance 2. It is not clear to us that the rule changes can be neatly classified in this way, with many – if not all – appearing to impact multiple work streams/time horizons

	Regarding the relative importance: the biggest challenge we hear about from our customers is a lack of signals needed to trigger investment in the dispatchable (or firming) technologies that will provide security and reliability in a system increasingly based on intermittent, asynchronous generation. In other words, the biggest challenge we are hearing about relates to the 'investment' work stream. The other two workstreams are rarely (if ever) mentioned. Regarding the classification of rule changes among these work streams: we note that investment decisions today take account of expectations of the future dispatch and commitment time horizons, making it difficult to see how something classified into the dispatch or commitment workstream would not also impact investment decisions. If we focus specifically on the investment work stream, a key question is: what is the purpose of this work stream? We would argue the it could be roughly described as: *"To create the necessary conditions to trigger timely investment in the lowest cost, most fit-for-purpose technologies needed to provide a secure, reliable electricity system".* If we accept this purpose, the next question should be: *how do we most simply achieve this purpose?* At time of writing, there are already 8 FCAS markets, 3 NSCAS markets, an underlying energy market and various ASX-traded cap and swap markets. These markets are interrelated in complex ways that make it extremely difficult for developers to build reliable revenue forecasts. Against this backdrop of complexity, the goal of achieving the simplest possible solution takes on even greater importance.
2) Do stakeholders believe that Figure 3.1 captures the key issues to be considered for each rule change in each time frame?	
3) Do stakeholders have views on whether/which services should be procured in certain time frames and not others?	We suggest AEMO should advise on this topic, the goal being the lowest cost, reliable & secure electricity system

CHAPTER 4 – ASSESSMENT FRAMEWORK

Question 4: Section 4.2 – The system services objective	
1) Do stakeholders agree with the AEMC's proposed system services objective being used to assess these rule changes? If not, how should it be amended or revised?	As the ISP acknowledges, there is a significant long-term, technical need for additional utility-scale storage in the NEM. However, our customers are telling us they cannot move forward with investments because the revenue streams currently available to them are too small and too uncertain. In our view, the best market and regulation changes will be the ones that most simply unlock this situation, by providing

	the investment signals needed to deliver the technologies AEMO is saying are required for the long-term stable operation of the NEM.
Question 5: Section 4.3 – The planning, procuring, pricing and payment service design framework	
1) Do stakeholders agree with the '4Ps' service design framework being used to assess these rule changes?	In principle this framework makes sense, all the moreso if applied holistically rather than to each system service in isolation.
Question 6: Section 4.4 – Principles for assessment	
1) Do stakeholders agree with the principles proposed for assessing the rule change requests? If not, should any principles be amended, excluded or added?	Per our comments above, we would urge strong focus on the last principle "transparent, predictable and simple". We would also urge a holistic view of the system services to see if the same objective of a stable, cost-effective system, could not be achieved with a simpler set of regulations and markets.

CHAPTER 5 – THE RULE CHANGE REQUESTS

Question 7: Section 5.1 – Infigen – Fast frequency response ancillary service market	
1) What are stakeholders' views on the issues raised by Infigen in its rule change request, Fast frequency response market ancillary service?	
2) Do stakeholders agree with Infigen's view that a change to the NER is required to encourage efficient provision of FFR services in the NEM following contingency events?	As thermal generation retires and the proportion of asynchronous generation increases, new markets need to be introduced to guarantee stable frequency in the system. We would argue that this should include markets for both FFR and synchronous inertia (as comtemplated by the ESB in the Post-2025 Market Design work). If – for whatever reason – one of these two markets is to be advanced ahead of the other, we would argue that inertia should be the higher priority. Our reasoning here is simple: while FFR can reduce the need for inertia, it cannot remove it altogether; whereas sufficient inertia can completely remove the need for FFR.
3) What are stakeholders' views on if there are any other issues or concerns in relation to frequency control in the NEM as levels of synchronous inertia decline?	As frequency control becomes harder with declining synchronous inertia, part of the solution should be to incentivise the market to provide more synchronous inertia.
4) Do stakeholders consider there are alternative solutions that could be considered to improve the frequency control arrangements in the NEM for managing the risk of contingency events as the power system transforms?	Refer above

5) Do stakeholders consider that 5-minute markets for FFR ancillary services likely to be effective and efficient in the global interconnected NEM and on a regional basis?	
6) Do stakeholders consider Infigen's proposal will provide adequate pricing signals to drive efficient investment in FFR capability in the NEM?	
7) What are stakeholders' views on, if introduced, how the costs associated with any new FFR market ancillary services should be allocated?	
8) What do stakeholders consider to be the likely costs associated with establishing two new ancillary service markets for FFR in the NEM?	
9) What are stakeholders' views on how the proposed solution may result in any substantial adverse or unintended consequences in the NEM?	
10) Are there specific issues with FFR that stakeholders think should be addressed in the NER as part of the establishment of markets for FFR services?	
Question 8: Section 5.2 – Infigen – Operating reserves market	
1) Do stakeholders agree with Infigen that tight capacity conditions and increasing uncertainty in market outcomes are problems that an operating reserve would address?	We agree, noting that a 2-way reserve mechanism that incentivises demand-side participation as well as incremental generation would likely lead to more cost-effective outcomes than a 1-sided mechanism that rewards only generating reserve.
2) Are there alternative solutions that could be considered to address tight capacity conditions and increasing uncertainty in market outcomes?	Refer above
3) Do stakeholders consider Infigen's proposal would provide adequate pricing signals to drive efficient use of and investment in operating reserve services now and in the future?	
4) How do stakeholders think separate operating reserves arrangements would affect available capacity in the spot, contracts and FCAS markets now and in the future?	
5) How do stakeholders think separate operating reserves arrangements would affect prices in the spot, contracts and FCAS markets now and in the future?	
6) How could the design of an operating reserve market (e.g. criteria for eligible capacity) best support competitive outcomes both in the operating reserves market but also energy and FCAS markets?	
7) What are the factors that should be considered when seeking to set and procure efficient levels of operating reserve?	

8) Would Infigen's proposed operating reserve market result in any substantial adverse or unintended consequences in the NEM?	
9) What are the costs associated with establishing an operating reserve market in the NEM? If introduced, how should these costs be allocated?	
10) What kind of incentive/penalty arrangements would be necessary to be confident the operating reserves procured are available when needed?	
Question 9: Section 5.3 – Delta Electricity – Introduction of ramping services	
1) Do stakeholders agree with Delta that price volatility that occurs when dispatchable generators ramp through their energy bid stacks in response to predictable, daily, high rates of change from solar ramping up and down is a problem that needs addressing?	This is a problem today, but it is also one that should be addressed by the operating reserve market contemplated by the ESB
2) Do stakeholders think that a new raise and lower 30-minute FCAS would address the price volatility at these times? Are there alternatives that could be considered to address this problem?	Refer above
3) Do stakeholders consider Delta's proposal would provide adequate pricing signals to drive more efficient use of and investment in ramping services thanks existing price signals and information provided through the PASA and pre-dispatch processes?	
4) How do stakeholders think a separate 30 minute ramping product would affect available capacity in the spot, contracts and FCAS markets now and in the future?	
5) How do stakeholders think a separate 30 minute ramping product would affect prices in the spot, contracts and FCAS markets, now and in the future?	
6) How could the design of a ramping FCAS product (e.g. criteria for eligible capacity) support competitive outcomes in both energy and FCAS markets?	
7) What are the factors that should be considered when seeking to set and procure efficient levels of ramping services?	
8) Would Delta's proposed new 30-minute raise and lower FCAS products result in any substantial adverse or unintended consequences in the NEM?	We are concerned that this rule change could artificially delay the exit from the NEM of increasingly unreliable and inflexible coal-fired power plants. Their delayed exit would, in turn, crowd out investment in the more flexible technologies that we will ultimately need in the longer term and does not appear to be consistent with the notion of 'technology neutrality'.

9) What are the costs associated with establishing new 30-minute raise and lower FCAS products in the NEM? If introduced, how should these costs be allocated?	
10) What kind of incentive/penalty arrangements would be necessary to be confident the new 30-minute raise and lower FCAS products procured are available when needed?	
Question 10: Section 5.4 – Delta Electricity – Capacity commitment mechanism for system security and reliability	
1) Do stakeholders agree with Delta that there is an increasing risk that capacity capable of providing reserves or services may not be available at times when the power system may need them to respond to unexpected events because of increasing incentives to de-commit?	This is mainly a challenge for coal, which is relatively slow to switch on/off and ramp up/down. If we make a clear decision to transition our firming/dispatchable capacity to more flexible technologies this problem will no longer exist.
2) Do stakeholders think that a mechanism to commit capacity one day ahead of time would deliver the reserves or services needed? Are there alternatives that could be considered to address this problem?	
3) Do stakeholders consider Delta's proposal would provide adequate pricing signals to drive more efficient use of and investment in reserves and system services?	
4) How do stakeholders think Delta's capacity commitment payment would affect available capacity in the spot, contracts and FCAS markets now and in the future?	
5) How do stakeholders think Delta's capacity commitment mechanism would affect prices in the spot, contracts and FCAS markets now and in the future?	
6) How would a capacity commitment mechanism and payment affect entry, exit and competition in the NEM over the short and long term?	As outlined above, creating new markets specifically to compensate for the technical limitations of an ageing and retiring technology is not in the long-term interests of anyone except the current owners of those technologies. It would slow the exit of coal and delay the entry of cheaper, more flexible, less polluting alternatives.
7) What are the factors that should be considered when deciding how much capacity to commit ahead of time?	
8) Would Delta's proposed capacity commitment mechanism result in any substantial adverse or unintended consequences in the NEM?	Refer above
9) What are the costs associated with establishing a capacity commitment mechanism in the NEM? If introduced, how should these costs be allocated?	
10) What kind of incentive/penalty arrangements would be necessary to be confident that the committed capacity would be available throughout the commitment period and/or when called upon?	

Question 11: Section 5.5 – Hydro Tasmania – Synchronous services markets	
1) Do stakeholders consider this rule change proposal presents a viable model for the provision synchronous services? a) Could this proposed model be used to provide the essential levels of system strength (and / or inertia and voltage control) needed to maintain security and the stable operation of non-synchronous generation? b) Could this proposed model be used to provide levels of system strength (and / or inertia and voltage control) above the essential level required for security?	An approach such as this, which treats the different synchronous services in a holistic way, seems simpler (and hence preferable) to the alternatives outlined in this consultation.
2) Do stakeholders consider that the creation of a synchronous services market could have any adverse impacts on other markets in the NEM? If so, what are these impacts?	We would urge for the implementation of such a change to be done in such as way that existing coal-fired generators are not benefiting at the expense of newer, cleaner alternatives that are otherwise waiting to come into the market.
3) Would the proposed model set out in the rule change request efficiently price and allocate costs for synchronous services in the NEM?	
4) Do stakeholders consider the model set out in the rule change request to be capable of sending price signals sufficient to encourage new investment in synchronous capacity?	This is not currently clear to us, but it is absolutely essential that any new market mechanisms introduced are calibrated to accelerate the entry of the technologies we will need in future, not delay the exit of older technologies that are no longer fit for purpose.
5) Do stakeholders consider the rule change provides an appropriate incentive mechanism for existing synchronous generators to make operational decisions to provide synchronous services?	
6) Do stakeholders consider the rule change provides the appropriate locational signals for the provision of synchronous generators to provide synchronous services?	
7) What do stakeholders see as the primary opportunities / limitations of the mechanism as proposed by Hydro Tasmania?	
8) Would the model proposed in the rule change request enable effective competition in the market for the provision of synchronous services?	
9) What suggestions do stakeholders have in relation to the first order changes that would be required in NEMDE to facilitate this proposal and any second order changes that may be required as a result of this rule change proposals' implementation?	
Question 12: Section 5.6 – TransGrid – Efficient management of system strength on the power system	

1) Do stakeholders consider that TransGrid's approach addresses all issues related to system strength currently experienced in the NEM?	The approach of individual developers trying to meet system strength or frequency needs by installing synchronous condensors at their projects is sub-optimal and costly at the overall system level. As such, we welcome the consideration of a systems perspective, which would avoid the overbuild of synchronous condensors that looms under the current framework. However, synchronous generators like pumped hydro could also provide these services to the grid, being capable of operating in synchronous condenser mode even when they aren't pumping or generating. As such, we would welcome an approach that enables synchronous generators to more easily provide system strength services to TNSPs, which would lead to an even more cost-effective and optimal solution than the approach proposed by TransGrid.
2) Do stakeholders consider that a system strength planning standard met by TNSPs would effectively and pro-actively deliver adequate system strength?	
3) Do stakeholders consider TransGrid's proposal will provide useful and timely locational and financial signals to new entrants?	
4) Do stakeholders agree that the 'do no harm' obligations should be removed? a) If so, do stakeholders consider an alternative mechanism is required to regulate or incentivise the minimisation of a new connecting generator's impact on the local network and proximate plant?	
5) What are stakeholder's views regarding generators' being required to make a financial contribution for provision of system strength services?	We support this, noting that it would ideally work both ways, enabling synchronous generators that improve system strength to be compensated for this.
6) Would stakeholders be supportive of the ownership of existing private system strength assets being transferred to TNSPs, as suggested in TransGrid's rule change request?	
7) Would the proposed, TNSP-led solution to system strength result in any adverse or unintended consequences for market participants in the NEM?	

CHAPTER 6 – SYSTEM STRENGTH

Question 13: Section 6.1 – Evolving the regulatory definition of system strength	
1) Do stakeholders consider that the AEMC's working description of the effects of system strength, and related problem description of system strength and its components accurately represents all elements of system strength, as experienced in the NEM?	

2) If not, are there other components of system strength that the AEMC should include?	
3) What measures might be used to define system strength? Is fault level the only measure that can be used practically, or are other measures available?	
Question 14: Section 6.2 – Mechanisms to provide system strength above the essential levels that are necessary for security	
1) Do stakeholders consider the centrally coordinated model, as proposed by TransGrid, is the preferable option for providing system strength above the essential levels required for secure operation?	
2) Do stakeholders consider the decentralised, market-based model proposed by HydroTasmania to be the preferable option for providing system strength above the essential levels required for secure operation?	
3) Could a hybrid of these models be used to deliver system strength above the essential level?	Our main concern is that our technology can provide system strength, but our customers are not currently paid to do so. This impacts their business cases and (in part) prevents projects from going-ahead. Anything that addresses this issue would be an improvement; something that does so in the simplest possible way would be ideal.
4) What do stakeholders perceive to be each model's strengths and weaknesses?	
5) Do stakeholders consider there are other, alternative models for delivering system strength above the minimum levels required for secure operation?	
6) What do stakeholders perceive to be the biggest benefits and risks to introducing a mechanism to deliver system strength above the minimum levels required for secure operation?	

CHAPTER 7 – OPERATING RESERVE SERVICE

Question 15: Section 7.1 – Requirement for a dedicated in-market reserve service, mechanism or market	
1) What do stakeholders see as the key drivers or changes in the NEM that could be addressed by introducing an explicit in-market reserve arrangement?	An operating reserve of synchronous capacity, able to enter the market quickly, could address many of the system challenges identified, enabling rapid injection of energy, system strength, inertia and frequency control services
2) Do stakeholders' think there is a need for an explicit in-market reserve arrangement in the NEM. If yes, do stakeholders consider the need to be permanent or transitional?	It depends a lot on what other changes are made, but an operating reserve mechanism could certainly be part of the solution.

3) How would an explicit in-market reserve mechanism or market impact stakeholders? What would be the key benefits and costs? Would it effect stakeholders' operational or investment decisions?	
4) Do stakeholders see there to be an explicit need for a capacity commitment mechanism as proposed by Delta? Do stakeholders see this as a separate need to an in-market reserve service?	There appears to be no need for the capacity commitment mechanism if there is an effective operating reserve mechanism
Question 16: Section 7.2 – Achieving security and reliability using dedicated in-market reserves	
1) Do stakeholders have views on whether an in-market reserve market or mechanism should solve primarily for reliability outcomes and security outcomes second? Or can this be more effectively co-optimised?	The concept of an operating reserve is generally raised in relation to the energy market – having sufficient capacity in reserve to inject power at short notice if there is a sudden drop in supply or a sudden increase in demand. However, there is no reason the operating reserve approach could not be applied to other ancillary and system services markets as well. Again, our first concern is that any changes made provide the investment signals our customers need; our second concern is that any changes made address the first concern in the simplest, most holistic way possible. We also note the potential for reserve markets to be designed in a 2-sided manner, to allow flexible load to participate as well as flexible generation. This should have the effect of increasing competition in the market and hence reducing the cost at which these services are provided.
2) How do stakeholders see an explicit in-market reserve market or mechanism interacting with the existing NEM reliability framework? What are the policy design priorities for a new operating reserves arrangement that would deliver the reliability needs of the power system?	
3) How do stakeholders see an explicit in-market reserve market or mechanism interacting with the existing NEM security framework? What are the policy design priorities for a new in-market reserve market or mechanism that would deliver the security needs of the power system?	

CHAPTER 8 – FREQUENCY CONTROL

Question 17: Section 8.1 – Reforms related to the provision of synchronous inertia	
1) Do stakeholders consider that the issues relating to declining levels of synchronous inertia have been adequately and accurately described?	We believe many of the challenges – declining inertia, less stable frequency, declining system strength are all real issues in their own rights. However, we also note that simply by bringing more

	synchronous capacity into the system, it would be possible to address these 3 issues simultaneously, without the need for creating and operating new markets. Doing so with synchronous storage capacity would have the additional benefit of improving reliability by enabling the bulk storage of energy when supply exceeds demand, as is increasingly the case in many parts of the NEM.
2) Are there any other issues related to the provision of synchronous inertia that have not been adequately described?	
3) What are stakeholders' views on the approach to considering the interaction between FFR and inertia in the NEM?	As outlined above, a mechanism to ensure adequate levels of synchronous inertia should be considered alongside the introduction of a mechanism for FFR.
Question 18: Section 8.2 – Reforms related to frequency control during normal operation	
1) Do stakeholders consider that the issues relating to frequency control during normal operation have been adequately and accurately described?	
2) Are there any other issues related to frequency control during normal operation that have not been adequately described?	
3) What are stakeholders' views on the proposed approach to reforming the process for the allocation of the costs of regulation services (Causer pays)?	
4) Is the level of specification of regulation services in the NER fit for purpose as the power system transforms?	
Question 19: Section 8.3 – Reforms related to frequency control following contingency events	
1) Do stakeholders consider that the issues relating to frequency control following contingency events have been adequately and accurately described?	
2) Are there any other issues related to frequency control following contingency events that have not been adequately described?	
3) What are stakeholders' views on the best way to address the challenges to managing system frequency following contingency events, including reforms to value and reward FFR?	We believe both inertia and FFR need to be part of this solution and both should be valued/rewarded.
4) Is the level of specification for contingency services in the NER fit for purpose as the power system transforms?	

CHAPTER 9 – INTERACTIONS BETWEEN SYSTEM SERVICES

Question 20: Section 9.1 Technological and temporal issues for system service provision	
1) What are stakeholders' views on how the arrangements for system services can be developed, to best utilise the capability of both established, as well as new and emerging technologies?	Attention needs to be paid to ensure the creation of new markets has the primary effect of encouraging new players and technologies to enter, rather than entrenching the positions of incumbent players and technologies that are increasingly unfit for purpose. These markets should also be calibrated to provide the investment signals needed for the NEM to transition its generation fleet towards the long-term optimum, which will likely look very different to the generation fleet we have today. To the extent possible, a holistic approach should be taken, to ensure the solution we arrive at is the simplest of the available alternatives and the most cost-effective at a 'whole of system' level.
2) Do stakeholders have any initial thoughts on how the arrangements for system services can be best coordinated over dispatch, commitment and investment time frames?	
Question 21: Section 9.2 – Aheadness and commitment	
1) Do stakeholders agree with the characterisation of arrangements for aheadness and commitment, including the potential benefits?	
2) What are stakeholders' views on the potential downsides of introducing arrangements for commitment of capability ahead of dispatch?	
3) Are there alternative arrangements that can reduce the increasing uncertainty associated with power system operation in the NEM?	
Question 22: Section 9.3 – Cost recovery arrangements	
1) What are stakeholders' views on the appropriate approach to cost recovery for each of the system services discussed in this paper?	
2) In each case, how can the cost recovery arrangements be developed to lower the overall costs of the NEM?	We believe an integrated approach, that recognises that the underlying services required can be provided simply by building a suitably located fleet of large-scale synchronous storage plants would be simpler and cheaper than the creation of many different markets. If an integrated approach of this kind is not possible, and individual markets are created for the various system services, then one of two approaches seems generally most efficient: - Causer pays: where there is a clear 'causer' of a network issue, that must be addressed by purchase of one of the system services, then a 'causer pays' framework appears logical

	- Beneficiary pays: where there are no clear 'causers', then it makes sense that the costs are borne by those who benefit
Question 23: Section 9.4 – Implementation considerations	
1) What are the challenges or implications associated with implementing proposed arrangements discussed in this paper?	
2) What are stakeholders' views on the prioritisation or staging of the reforms to address the issues discussed in this paper?	