AEMC

RULE

Australian Energy Market Commission

RULE DETERMINATION

NATIONAL ELECTRICITY AMENDMENT (COMPENSATION FOR MARKET PARTICIPANTS AFFECTED BY INTERVENTION EVENTS) RULE 2021

PROPONENT
AEMO

2 DECEMBER 2021

INQUIRIES

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Reference: ERC0284

CITATION

AEMC, Compensation for market participants affected by intervention events, Rule determination, 2 December 2021

ABOUT THE AEMC

The AEMC reports to the Council of Australian Governments (COAG) through the COAG Energy Council. We have two functions. We make and amend the national electricity, gas and energy retail rules and conduct independent reviews for the COAG Energy Council.

SUMMARY

1 The Australian Energy Market Commission (AEMC or Commission) has made a more preferable rule which changes the way that compensation is calculated when market participants are dispatched differently as a result of an "AEMO intervention event" which triggers intervention pricing.[1]

2 This follows two rule change requests from the Australian Energy Market Operator (AEMO) to amend the provisions governing compensation for participants affected by intervention events under clause 3.12.2 of the National Electricity Rules (NER). These rule change requests both sought to address the risk that such participants will be under-compensated if they are dispatched differently as a result of an intervention event due to issues with the current compensation framework.

3 The interventions framework

4 The interventions framework in the NER provides AEMO with the tools to intervene in the market for reliability purposes (e.g. in the event of a breach of the reliability standard) or for power system security purposes (e.g. to maintain voltage). Interventions are typically used as a last resort and include, for example, directing a generator to maintain system strength or using emergency reserves through the reliability and emergency reserve trader (RERT).

5 When AEMO intervenes in the market, two separate but related frameworks are triggered: one relates to "intervention pricing" and the other to compensation. Intervention pricing is designed to reduce market distortion by preserving scarcity price signals that would otherwise be muted as a result of the intervention.

6 By contrast, the compensation framework is designed to make sure that directed participants (those who have been directed to provide services) can recover their costs, and participants that are dispatched differently due to an intervention event that triggers intervention pricing are put in the position they would have been in but for the intervention.

7 Intervention pricing

8 When AEMO intervenes in the market by issuing a direction or activating the RERT, it must determine whether intervention pricing should be implemented having regard to a provision known as the "regional reference node (RRN) test".[2]

9 When an intervention is for the purpose of obtaining energy or market ancillary services, intervention pricing is (with some exceptions) used to set prices across the NEM to preserve market scarcity signals that would have existed had the intervention not occurred. Where an intervention is to obtain some other service which is not market-traded (e.g. system strength, voltage control or inertia), intervention pricing will not apply as there is no relevant price signal to preserve.

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1 "AEMO intervention event" is defined in chapter 10 of the NER as an event where the Australian Energy Market Operator (AEMO) intervenes in the market by issuing a direction in accordance with clause 4.8.9 or exercising the reliability and emergency reserve trader (RERT) in accordance with clause 3.20.

2 This test is set out in clause 3.9.3(b) of the NER.

10 AEMO implements intervention pricing by running the national electricity market dispatch engine (NEMDE) twice: once to dispatch the physical market (the "intervention dispatch run") and once to set the price at which the market clears (the "intervention pricing run"). The dispatch run physically dispatches all units (including those directed to provide services) while the intervention pricing run excludes those units directed to provide services. This enables AEMO to estimate the prices for energy and market ancillary services (i.e. frequency control ancillary services (FCAS)) that would have applied but for the intervention.

11 The compensation framework

12 Where AEMO issues a direction, compensation is payable to both directed participants and those participants (i.e. affected participants and market customers with scheduled loads) that are dispatched differently due to the intervention event.[3]

13 An affected participant[4] is entitled to receive from, or required to pay to, AEMO an automatically calculated compensation amount that puts it in the position that it would have been in had the intervention not occurred (providing the absolute value of this amount is greater than $5,000 per intervention event). That is, affected participant compensation is a two-way process.

14 By contrast, market customers with scheduled loads are entitled to receive compensation (again, subject to the $5,000 threshold) but are not required to repay revenue to AEMO. Thus, scheduled load compensation is a one-way process.

15 The amount of compensation payable to such participants is currently calculated by comparing actual generation output or consumption of energy (based on metering data) with an amount that AEMO reasonably determined might have been generated or consumed if the intervention event had not occurred. This amount is based on its dispatch targets in the intervention pricing run.[5]

16 Following this initial, automatic calculation of compensation by AEMO, affected participants and market customers with scheduled loads may seek to have their entitlement or liability redetermined (also subject to a $5,000 claim threshold).

17 The cost of both affected and directed participant compensation is recovered from market participants and consumers, depending on the nature of the service obtained as a result of the intervention event.[6]

18 At present, compensation paid to affected participants and scheduled loads under clause 3.12.2 is limited to changes in energy dispatch targets and hence energy revenue (in the

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3 Clauses 3.15.7 to 3.15.7B and 3.12.2 respectively of the NER.

4 An "Affected Participant" is defined in Chapter 10 of the NER and includes a scheduled generator or scheduled network service provider which was dispatched differently as a result of an AEMO intervention event. The definition also includes "eligible persons", being settlement residue distribution (SRD) unit holders who are entitled to receive an amount from AEMO where there has been a change in flow of a directional interconnector.

5 In practice, AEMO uses a scaling approach to determine the amount that might reasonably have been generated or consumed. This considers actual metering data alongside the targets in the two runs of NEMDE.

6 Where the reason for the intervention event is to address a shortage of energy, compensation costs will be recovered from market customers and hence consumers in the region which benefited from the intervention. Where the reason for the intervention is to address a shortage of FCAS, compensation costs will be recovered in line with the normal process for recovering the cost of the FCAS in question: i.e. from generators, small generation aggregators and/or market customers.

case of generators) or energy costs (in the case of scheduled loads). The compensation framework does not include changes to FCAS enablement targets and hence FCAS revenue for ancillary service providers.

19 The rule change requests

20 On 19 September 2019, AEMO submitted two rule change requests seeking to change the basis on which compensation is calculated for participants affected by intervention events that trigger intervention pricing. These requests address issues identified by the Intervention Pricing Working Group which was established by AEMO in 2017 to assist it in reviewing the intervention pricing methodology.

21 The first rule change request sought to address the potential for under-compensation of affected participants by allowing affected participants to claim additional compensation if they incur loss with respect to FCAS.

22 The second rule change request sought to address the potential for market customers with scheduled loads to be under-compensated as a result of the formula used to calculate compensation for such participants (and in particular, the definition of the formula input "BidP").

23 Given that both rule change requests relate to clause 3.12.2 in the NER, the Commission consolidated the requests and progressed them via a single consultation process and rule. A draft rule determination was published on 24 September 2020 and a directions paper was published on 15 July 2021 to allow for additional consultation on issues raised through stakeholder submissions to the draft determination.

24 Including FCAS in the compensation framework for participants affected by intervention events

25 The Commission has determined to make a more preferable final rule that includes FCAS in the compensation framework in clause 3.12.2. While the AEMO rule change request proposed to enable affected participants to lodge a claim for additional compensation where they have incurred FCAS losses, the more preferable final rule incorporates FCAS into the automatic process for calculating compensation for all participants in respect of their scheduled generators and scheduled loads that have been enabled differently due to an AEMO intervention event. The compensation framework in the final rule provides for energy compensation to be paid to or by affected participants and market customers with scheduled loads, and for FCAS compensation to be paid to or by ancillary service providers.

26 This means that participants will not need to lodge a claim, and that FCAS compensation will be a two-way process. Under this approach, participants will both receive compensation where they are worse off with respect to FCAS revenue and be required to repay revenue gains where they are better off with respect to FCAS revenue. This approach is consistent with the objective of the compensation framework – which is to put the participant in the position it would have been in had the intervention event not occurred.

27 The amount of compensation paid to a market participant will be the sum of the compensation payable with respect to energy for affected participants and market customers

with scheduled loads and any compensation payable with respect to FCAS for ancillary service units. If the value of one form of compensation is positive and the other negative, the net amount of compensation paid will be lower relative to the status quo. If the value of each form of compensation is positive, compensation costs will increase relative to the status quo.

28 The Commission considered whether compensation under clause 3.12.2 should be automatically adjusted to take into account changes in participants' FCAS liabilities (resulting from changes in dispatch targets due to an intervention). In light of the complexity of this calculation, the final rule does not include a provision mandating this process. However, affected participants may lodge an adjustment claim to seek additional compensation if costs are sufficiently material (that is, exceeding the $5,000 threshold).

29 The Commission is mindful of stakeholder concern about increasing compensation costs and has developed some indicative analysis to inform our considerations of what scale of impact the inclusion of FCAS could have on total compensation costs.

30 The Commission notes that, since December 2019 compensation under clause 3.12.2 is only payable in connection with intervention events that trigger intervention pricing, and intervention pricing is only used in connection with the RERT and directions to address a shortage of energy or FCAS. Such events are infrequent compared to the large number of security interventions in recent years.

31 The two-way approach to compensation adopted in the final rule will lower the cost of compensation relative to the approach proposed by AEMO (whereby participants could claim for FCAS losses but would not be required to repay gains).

32 The Commission's analysis of recent intervention events has indicated that FCAS compensation costs for affected participants would likely be small relative to energy compensation costs. Potential FCAS compensation cost impacts would also likely be small when compared with the high cost of FCAS in Q1 2020, which prompted considerable stakeholder concern in response to the consultation paper. It was estimated that including FCAS in the compensation framework in the first quarter of 2020 would add costs accounting for less than one per cent of the total FCAS costs incurred by the market in Q1 2020.[7]

33 The Commission notes that all other compensation frameworks in the NEM include FCAS and considers it appropriate to include FCAS in the compensation framework in clause 3.12.2. This is particularly important at a time when the changing composition of the generation fleet is leading to declining inertia levels and a growing need for frequency services.

34 Accordingly, while the Commission recognises that including FCAS in the compensation framework will have some impact on costs borne by market participants and ultimately consumers, the more preferable final rule is nonetheless in the long-term interests of consumers since it provides an appropriate allocation of risk and supports the ongoing viability of participants providing important services to the market.

35 Changing the energy compensation framework for scheduled loads

7 The first quarter of 2020 is significant as this was when the SA islanding event occurred. The compensation costs associated with this event are likely to represent the upper bound of compensation costs so have been used in this determination as a baseline for assessing costs that may be passed on to consumers.

36 In addition to including FCAS in the compensation framework, the final rule modifies the compensation framework applicable to market customers with scheduled loads.

37 The rule change request submitted by AEMO was designed to address the risk that scheduled loads would be under-compensated as a result of the definition of BidP, an input used in the formula for calculating scheduled load compensation. BidP is currently defined as "the price of the highest priced price band specified in a dispatch bid for the scheduled load in the relevant intervention price trading interval".

38 AEMO proposed to replace this with "the highest priced band the scheduled load is dispatched from", however further analysis revealed that this proposal would not resolve the risk of under-compensation. The Commission's consultation paper explored whether an alternative approach, focusing on the lowest band from which the load is dispatched, would better address the issue identified by AEMO.

39 While several stakeholders supported the AEMC proposal, AGL in its submission to the consultation paper for this rule change suggested that a volume-weighted approach would be preferable. Following further analysis, the Commission determined that a volume-weighted approach was appropriate and the draft rule included a volume-weighted approach to calculating compensation. The final rule also maintains this approach, which treats all bid bands independently of one another. This ensures that compensation will be appropriate regardless of the bidding strategy adopted by the scheduled load (i.e. putting a single MW of capacity into a low or high bid band will not skew the outcome since compensation will be calculated with respect to each band separately and then summed).

40 While the consultation paper explored whether scheduled load compensation should be one-way (as it is currently) or two-way (consistent with affected participant compensation), the Commission has determined that it is appropriate to retain one-way compensation for scheduled loads with respect to energy. This is because scheduled generators and scheduled loads are dispatched differently with respect to energy by NEMDE. Adopting a two-way approach to scheduled load compensation would involve calculating compensation for scheduled loads on a "pay-as-bid" basis, whereas compensation for scheduled generators is calculated based on a "pay-as-cleared" basis. As such, while a two-way approach to scheduled load compensation may appear consistent at face value, further analysis shows that such an approach would introduce inconsistency as to the basis on which compensation is paid.

41 The final rule also makes clear that no compensation will be payable where "QD" (the difference between the amount of energy consumed in the dispatch run and the amount of energy consumed in the intervention pricing run) is negative. This is designed to prevent over-compensation of scheduled loads in anomalous circumstances such as a generator tripping or anomalous intervention pricing outcomes.

42 The Commission acknowledges that the more preferable final rule may increase the quantum of compensation paid to scheduled loads with respect to energy losses. However, the Commission considers that the revised formula more appropriately allocates risk than the current formula. In this regard, the Commission notes that the amount of compensation paid to scheduled loads will serve to reduce the amount they would otherwise be required to pay

for energy as part of the settlement process. In other words, the energy "compensation" for scheduled loads is a financial transfer designed to re-balance the ledger to make good the fact that the scheduled load would otherwise overpay for the energy it consumed during the intervention event due to the application of intervention pricing.

43 As a result, the revised formula reduces the risk that scheduled loads will, under the current framework, pay more than they should for energy consumed during an intervention event that triggers intervention pricing. The Commission considers that this is both important and appropriate given the need for significant investment in scheduled load technology to provide dispatchable capacity and system services as the generation fleet transitions.

44 Other elements of the final rule

45 The final rule also makes other amendments to clause 3.12.2 to improve clarity, consistency and avoid perverse outcomes arising.

46 The objective of the compensation framework is now articulated for all types of participants eligible for compensation (where previously it was only articulated for affected participants), as discussed in the directions paper. The objective is, as far as practicable, to put participants affected by intervention events in the position they would have been in but for the intervention. The approach to calculating compensation in the rule reflects the different ways in which scheduled generators and scheduled loads are dispatched for energy.

47 A new provision has been added to clarify what it means to be affected and eligible for compensation under clause 3.12.2 when an intervention event occurs, as discussed in the directions paper. This states that, where a unit's targets (for energy and/or FCAS) in the dispatch run and intervention pricing run of NEMDE are identical, no compensation is payable.

48 "Double dipping" in the compensation frameworks for directed participants and those dispatched differently in intervention events has also been prevented. Where a participant is registered in two registration categories with respect to the one unit (as is the case for pumped hydro storage and large scale batteries) and a direction has been issued with respect to that unit or RERT has been activated, compensation will be payable under the directed participant framework or RERT payments will be made but compensation will not be paid under clause 3.12.2. This is to avoid confusion (which is evident in recent claims for additional compensation) and the potential for double dipping where a unit is both "directed"/activated and "affected" as a result of an AEMO intervention event.

49 The final rule also includes a new provision to the effect that, if a court finds that a participant compensated under clause 3.12.2 has caused or contributed to the circumstances that led to the intervention event, it is in breach of the Rules. It must also then repay to AEMO any compensation provided to it under clause 3.12.2. This addition is necessary because an AEMO intervention event can arise from the issue of a direction or the exercise of RERT. This new provision will align with existing clauses for compliance with directions and directed participants, but that do not cover RERT, and actions a provision supported by AGL in its submission to the directions paper. A participant under clause 3.12.2 is also required to repay compensation if it has failed to comply with its dispatch instructions, as discussed in

the directions paper. Once the compensation has been repaid to AEMO, AEMO must use reasonable endeavours to redistribute that amount to the relevant market participants who funded the compensation.

50 Finally, the rule requires that AEMO develops a methodology, in consultation with stakeholders, describing how it determines compensation under clause 3.12.2. This will improve the transparency of the compensation framework.

51 Summary of key changes between the draft and final rule

52 The Commission has made some refinements to the draft rule in the process of preparing the final rule.

53 As discussed above, key items added to the rule since the draft determination stage include:

- the objective of the compensation framework in clause 3.12.2 and the test to determine eligibility for compensation.
- provisions discouraging intentionally or recklessly causing or contributing to intervention events, including requirements to repay any compensation back to AEMO if these provisions or existing provisions relating to conformance with dispatch instructions are breached, and
- requirements for AEMO to prepare and consult on a methodology for the compensation framework.

54 In addition, the Commission has reverted a change made in the draft rule to the way in which AEMO calculates compensation. The final rule takes a form similar to the existing Rules, where AEMO considers actual generation/consumption as well as targets in the intervention pricing run and dispatch run of NEMDE. This was discussed in detail in the directions paper.

55 Finally, the Commission has streamlined clause 3.12.2 to aid readability, including through the addition of local definitions and the removal of unnecessary repetition. Consistent with the drafting approach to registration and participation categories in the *Integrating energy storage systems into the NEM* (Integrating storage) rule change, the final form of clause 3.12.2 also separates compensation for ancillary service providers from the calculation of energy compensation for affected participants and market customers with scheduled loads. This achieves the same outcome as the draft rule but takes a different form.

56 Implementation

57 The main elements of the final rule will commence on 1 August 2022 as AEMO will need sufficient time to prepare the methodology and update its internal systems to implement the revised approach to compensating participants under clause 3.12.2.

58 The transitional arrangements and other elements relating to changes made in the *Five minute settlement* rule (5MS) will commence on 9 December 2021. These are discussed in appendix B.

CONTENTS

APPENDICES

TABLES

FIGURES

1 AEMO'S RULE CHANGE REQUESTS

This section outlines:

- the rule change requests received from the Australian Energy Market Operator (AEMO), which are the subject of this determination
- the current compensation arrangements for affected participants and market customers with scheduled loads under clause 3.12.2 of the National Electricity Rules (NER)
- relevant background information, and
- the rule making process.

1.1 The rule change requests

On 19 September 2019, AEMO submitted two rule change requests which concern the amount of compensation payable to affected participants and market customers with scheduled loads under clause 3.12.2 of the NER. Such participants may be eligible for compensation if they are dispatched differently as a result of an AEMO intervention event which triggers intervention pricing.[8] The rule change requests are:

- *Affected participant compensation for FCAS losses*[9] which seeks to include losses related to market ancillary services in the list of factors that can be considered when determining additional compensation claims lodged by affected participants.[10] [11]
- *Compensation for scheduled loads affected by interventions*[12] which seeks to amend the way that compensation is calculated for market customers with scheduled loads that are dispatched differently as a result of an AEMO intervention event.[13]

Both of these rule change requests were based on recommendations made by the Intervention Pricing Working Group (IPWG). More information on the IPWG and other historical interventions work programs is included in appendix C.

Under the NER, an "affected participant" includes a scheduled generator or scheduled network service provider which was dispatched differently as a result of an intervention

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8 An "AEMO intervention event" is defined in chapter 10 of the NER as an event where AEMO intervenes in the market under the Rules by issuing a direction in accordance with clause 4.8.9 or exercising the reliability and emergency reserve trader (RERT). Intervention pricing is designed to preserve scarcity price signals that would otherwise be muted as a result of the intervention. AEMO implements intervention pricing in accordance with clause 3.9.3(b) of the NER when the reason for the intervention is to address a shortage of energy or market ancillary services.

9 AEMO, *Rule change proposal: Additional compensation for FCAS losses*, 19 September 2019. This rule change request is referred to in this determination as "Affected participant compensation for FCAS losses".

10 Market ancillary services are defined as "a service identified in clause 3.11.2(a)". That clause lists the eight frequency control ancillary services (FCAS), namely: fast raise, fast lower, slow raise, slow lower, regulating raise, regulating lower, delayed raise and delayed lower. Market ancillary services are generally referred to in this determination as FCAS. FCAS are used by AEMO to maintain or rebalance the frequency on the power system, at any point in time, close to fifty cycles per second (50 Hz) as required by the NEM frequency operating standards. Further information regarding the eight FCAS markets is provided in Appendix B of the draft determination.

11 The *Fast frequency response market ancillary service* rule determination made on 15 July 2021 introduced two new contingency services: the very fast raise service and the very fast lower service. These services commence in October 2023. They will be integrated into the Rules as two new ancillary services, so will be captured under any new Rules that apply to ancillary services.

12 AEMO, *Rule change proposal: Affected participant compensation for scheduled loads*, 19 September 2019. This rule change request is referred to in this determination as "Compensation for scheduled loads affected by interventions".

13 Scheduled loads are net consumers of electricity that register to participate in the central dispatch and pricing processes operated by AEMO.

event. The definition also includes "eligible persons", being settlement residue distribution (SRD) unit holders who are entitled to receive an amount from AEMO where there has been a change in flow of a directional interconnector. Affected participants are compensated under clause 3.12.2 of the NER.

Market customers with scheduled loads may also be entitled to compensation if the scheduled load is dispatched differently as a result of an intervention event. Such customers are compensated under the same clause but are not defined as affected participants.

Given that both rule change requests concern the amount of compensation payable under clause 3.12.2, the Commission determined that it is appropriate to consolidate the requests and progress them via a single consultation process and rule: the *Compensation for market participants affected by intervention events* rule.[14] Each rule change request is outlined in more detail below.

1.2 Affected participant compensation for FCAS losses

1.2.1 Current arrangements

When an AEMO intervention event triggers intervention pricing, compensation may be payable to those participants that are dispatched differently as a result of the intervention event. This includes both "affected participants" (scheduled generators and scheduled network service providers, as well as eligible persons) and market customers with scheduled loads.

Chapter 10 of the NER defines affected participants as scheduled generators and scheduled network service providers which, (a) were not the subject of a direction or exercise of the reliability and emergency reserve trader (RERT), but had its dispatched quantity affected by that direction or exercise of the RERT; or (b) were the subject of a direction or exercise of the RERT, but had the dispatch quantity of other generating units or services affected by that direction or exercise of the RERT. The definition also includes "eligible persons", being SRD unit holders who are entitled to receive an amount from AEMO where there has been a change in flow of a directional interconnector.

The class of affected participant which is principally relevant to this rule change request is scheduled generators. This is because scheduled generators provide both energy and FCAS, while network service providers and eligible persons do not provide FCAS.

The objective of affected participant compensation is to put the participant in the position it would have been in but for the intervention.[15] Consistent with this, the compensation framework for affected participants is two-way: that is, an affected participant may be entitled to receive compensation from AEMO if it has been dispatched less as a result of an intervention, or may be required to repay additional revenue earned to AEMO if it is dispatched more as a result of an intervention.

14 Referred to in this determination as the "Compensation rule".

15 Clause 3.12.2(a)(1) of the current NER.

To determine the quantum of affected participant compensation, clause 3.12.2(a)(1) states that affected participant compensation shall consider solely the following items listed in clause 3.12.2(j):

- direct costs incurred or avoided by the affected participant as a result of the intervention event, specifically including (but not limited to) fuel costs, incremental maintenance costs and incremental manning costs
- any amounts which the affected participant is entitled to receive under clauses 3.15.6 and 3.15.6A (being the trading amounts payable to market participants in relation to energy and FCAS respectively)
- the published regional reference price (being the price of electricity).

Compensation is calculated by AEMO automatically in the first instance and an affected participant may also submit an adjustment claim if it considers that its entitlement or liability should be redetermined.[16] AEMO calculates compensation by deducting the trading amount that the affected participant *did* receive (as set out in its final statement) from the trading amount that the affected participant *would have* received based on the targets in the intervention pricing run.[17] [18]

When an intervention event brings on additional capacity or reduces demand, the prices produced by the intervention pricing or "what-if" run will generally be higher than those produced by the dispatch run. This is because the what-if run will continue to signal the price associated with the supply demand balance as it was prior to the intervention, while prices in the dispatch run will generally be lower due to the addition of generation capacity or the reduction of demand (due to activation of the RERT).[19]

1.2.2 Rationale for the rule change request

The IPWG identified that this clause currently excludes FCAS prices from the items listed in paragraph (j). As a result, affected participant compensation has, to date, only been paid with respect to changes in energy dispatch targets and thus energy revenue resulting from an intervention event. No compensation is payable where a participant is dispatched differently with respect to FCAS as a result of an intervention. On the one occasion that an affected participant lodged an adjustment claim seeking compensation for FCAS losses, this claim was rejected by the independent expert engaged to determine the claim.[20]

By contrast, other compensation frameworks in the NER allow for compensation to be paid with respect to FCAS. They include the directed participant compensation framework, the

16 Clause 3.12.2(f) of the NER.

17 Clause 3.12.2(c)(1) of the NER.

18 The intervention pricing run does not include the dispatch targets for any directed output, or the effect of the RERT, and thus seeks to establish what the market price would have been "but for" the intervention event. Section 1.4.1 of this final determination and section 1.2.1 of the Compensation draft determination explain this in more detail.

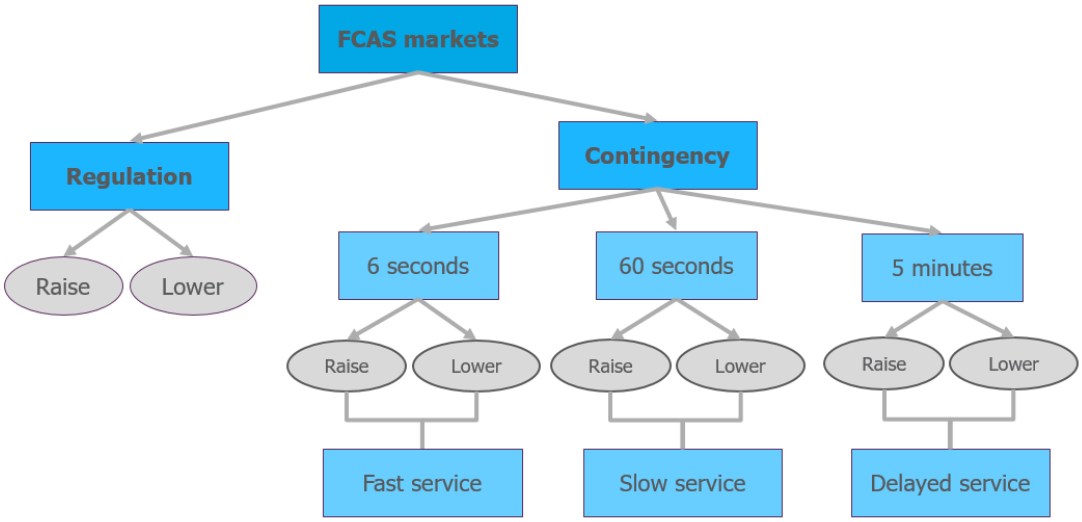
19 This effect is why it is particularly necessary to compensate market customers with scheduled loads for the additional cost they incur when consuming energy during an intervention event which triggers intervention pricing. Scheduled loads will be dispatched based on the (typically lower) prices produced by the dispatch run but settled based on the (typically higher) prices in the intervention pricing run - likely requiring them to consume above their willingness to pay. Compensation for scheduled loads is explored in detail in other sections of this determination.

20 Synergies Economic Consulting Pty Ltd, *Final report on compensation related to directions that occurred on 1 December 2016,* June 2017. Section 1.2.1 and Appendix C of the Compensation draft determination provide more information on this case.

market suspension compensation framework and the administered price period compensation framework. Further detail regarding these frameworks is set out in Appendix D of the Compensation draft determination.

In its rule change request, AEMO sought to address this gap by allowing affected participants to make an adjustment claim to seek compensation with respect to FCAS losses. There are currently eight FCAS markets as shown in Figure 1.1: two for regulation services and six for contingency services.[21]

Figure 1.1: The eight FCAS markets



Source: AEMO, *Settlements guide to ancillary services payment and recovery,* February 2020, p. 6.

Regulation frequency control can be described as the centrally controlled correction of the generation/demand balance in response to minor deviations in load or generation.[22] Regulation raise providers add MW to the system in order to raise the frequency closer to 50 Hz while regulation lower providers take MW out of the system in order to lower the frequency closer to 50 Hz.

Contingency frequency control refers to the correction of the generation/demand balance following a major contingency event such as the loss of a generating unit/major industrial load, or a large transmission element.[23]

AEMO noted that frequency control is becoming more important in the NEM and costs are generally rising each quarter. At the same time, reliance on intervention mechanisms is growing and affected participants' lost FCAS revenue is increasingly likely to become material.

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21 The *Fast frequency response market ancillary service* rule determination made on 15 July 2021 introduced two new contingency services: the very fast raise service and the very fast lower service. These services commence in October 2023. They will be integrated into the Rules as two new ancillary services, so will be captured under any new Rules that apply to ancillary services.

22 AEMO, *Guide to ancillary service markets in the NEM*, April 2015, p. 4.

23 ibid.

As a result, AEMO noted the current compensation rules are unlikely to meet the objective of putting the participant in the position it would have been in but for the intervention.

Accordingly, AEMO considered it appropriate to amend the NER so that affected participants can be compensated if they incur FCAS losses as a result of an intervention event. It considered that this achieves a "fairer outcome" for affected participants that may be negatively impacted by FCAS losses resulting from an intervention event.[24]

1.2.3 Solution proposed in the rule change request

To address this issue, AEMO proposed to include FCAS prices amongst the compensable factors to be considered in determining additional compensation under clause 3.12.2(j).

The rule change request included a proposed rule which adds a new sub paragraph (4) to clause 3.12.2(j). This new sub paragraph would refer to "ancillary service price published pursuant to clause 3.13.4(l)". This would effectively allow affected participants to claim additional compensation when they incur FCAS losses due to an AEMO intervention event that triggers intervention pricing.

Issues arising in connection with the rule change request are further explored in chapter 3

1.3 Compensation for scheduled loads affected by interventions

1.3.1 Current arrangements

As with affected participants, market customers with scheduled loads are entitled to compensation if they are dispatched differently as a result of an intervention event that triggers intervention pricing (and were not the subject of the direction that constituted the intervention event).[25] AEMO calculates compensation automatically in the first instance in accordance with a formula set out in clause 3.12.2(a)(2). A market customer may also lodge a claim for additional compensation with respect to its scheduled load if it considers that the initially calculated compensation was inadequate.[26]

Scheduled load is defined in Chapter 10 of the NER as "a market load which has been classified by AEMO in accordance with Chapter 2 as a scheduled load at the Market Customer's request. Under Chapter 3, a Market Customer may submit dispatch bids in relation to scheduled loads".[27]

Scheduled loads are consumers of electricity that register to participate in the central dispatch and pricing processes operated by AEMO. For the purposes of economic scheduling of electricity to meet demand, scheduled loads are essentially treated on equal terms with scheduled generating units.[28]

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24 AEMO, Rule change proposal, p. 3.
25 Clause 3.12.2(a)(2).
26 NER clause 3.12.2(f).
27 A market load is defined as a load at a connection point classified as a market load in accordance with Chapter 2.
28 AEMO, *Guide to scheduled loads*, p. 4.

To determine the quantum of compensation payable to market customers with scheduled loads which are dispatched differently due to an intervention, AEMO uses the following formula which is set out in clause 3.12.2(a)(2) of the NER:

DC = ((RRP × LF) - BidP) × QD

where

- DC (in dollars) is the amount the market customer is entitled to receive in respect of that scheduled load for the relevant intervention pricing 30-minute period[29]
- RRP (in dollars per MWh) is the regional reference price in the relevant intervention pricing 30-minute period determined in accordance with clause 3.9.3(b)
- LF is the relevant loss factor for the scheduled load's connection point
- BidP (in dollars per MWh) is the price of the highest priced price band specified in a dispatch bid for the scheduled load in the relevant intervention pricing 30-minute period[30]
- QD (in MWh) is the difference between the amount of electricity consumed by the scheduled load during the relevant intervention pricing 30-minute period determined from the metering data and the amount of electricity which AEMO reasonably determines would have been consumed by the scheduled load if the AEMO intervention event had not occurred

provided that if DC is negative for the relevant intervention pricing 30-minute period then the adjustment that the market customer is entitled to claim in respect of that scheduled load for that intervention pricing 30-minute period is zero.

At present, there are relatively few scheduled loads in the NEM: there are three pumped hydro power stations (Wivenhoe, Tumut 3 and Shoalhaven) and nine utility scale batteries (Gannawarra, Hornsdale, Lake Bonney, Ballarat, Bulgana, Wandoan, Victorian Big Battery, Adelaide Desalination Plant and ESCRI - registered as Dalrymple North Battery Energy Storage System).[31] This will likely change as more utility scale batteries are installed and barriers to integrating energy storage systems are addressed (for example, via the Commission's final *Integrating energy storage systems into the NEM* rule, the main elements of which are due to commence on 3 June 2024).

AEMO has advised that, since 2020, compensation has been paid under clause 3.12.2 in respect of scheduled loads in only a small number of intervention events that trigger intervention pricing.[32] As more batteries enter the NEM, more compensation in respect of scheduled loads may be payable under clause 3.12.2.

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29 Prior to the commencement of 5MS, the term "intervention price trading interval" was used in place of the "intervention pricing 30-minute period". As discussed in appendix B, the Compensation rule change reverts the "intervention pricing 30-minute period" back to "intervention price trading interval" wherever it appears in the Rules.

30 Price band is defined in Chapter 10 as "a MW quantity specified in a dispatch bid, dispatch offer or market ancillary service offer as being available for dispatch at a specified price".

31 AEMO, NEM registration and exemption list, available at https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/participate-in-the-market/registration. It is noted that batteries and pumped hydro are required to register as both loads and generators under the current Rules. The *Integrating energy storage systems into the NEM* final rule, the main elements of which commence on 3 June 2024, introduces a new Integrated Resource Provider category for these types of participants.

32 For compensation to be paid in connection with such events, the quantum of compensation must exceed the $5,000 compensation threshold which applies at the participant level across scheduled load units.

1.3.2 Rationale for the rule change request

AEMO was concerned that the current definition of BidP fails to achieve the objective of ensuring that scheduled loads which are dispatched differently due to intervention events are not worse off as a result of the intervention.[33]

In particular, AEMO considered that the current definition of BidP could result in under compensation if the RRP is lower than or equal to the scheduled load's highest priced bid band. It noted in its rule change request that it has not observed instances of compensation for scheduled loads being affected by this rule, and considered this may be due to clause 3.12.2(a)(2) under which market customers with scheduled load are entitled to receive compensation but are not required to repay any amounts to AEMO if they are "better off" as a result of an intervention.[34]

1.3.3 Solution proposed in the rule change request

AEMO's rule change request proposed to change the definition of BidP so it refers to the value of the highest priced band from which the scheduled load is dispatched, rather than to the price of the highest priced price band in the dispatch bid.

AEMO considered that the proposed rule will provide "increased certainty for participants that they will be fairly compensated for actions that support the reliability and security of the power system; and removal of any incentive for participants to avoid or minimise financial losses that may accrue due to interventions, potentially in ways that compromise AEMO's ability to manage the power system".[35]

AEMO acknowledged that the proposed change may increase the quantity of compensation payable by market customers and ultimately by consumers.[36] However, AEMO considered that the impact on compensation costs would be "comparatively minimal" given the small amount of scheduled loads currently in the market. It also considered that "efficient incentives for market participants to support the reliability and security of the power system are in the long-term interests of consumers. Further, AEMO considers that the proposed changes strike a fair balance between the interests of market participants and consumers".[37]

Issues arising in connection with the rule change request are further explored in chapter 4.

1.4 Background

This section describes the current compensation arrangements for affected participants and market customers with scheduled loads under clause 3.12.2 of the NER.

33 This issue was identified and discussed by the AEMO-established Intervention Pricing Working Group.

34 This contrasts with the situation for affected participants which may be eligible to receive compensation from AEMO, or be required to repay additional revenue earned as a result of the intervention.

35 AEMO, Rule change proposal, p. 4.

36 Market customers bear the cost of directed and affected participant compensation associated with directions for energy: clause 3.15.8(a) and (b). For directions to obtain ancillary services, compensation costs are recovered from market customers, market generators and market small generation aggregators: clause 3.15.8(e)-(g).

37 AEMO, Rule change proposal, pp. 3-4.

1.4.1 The interventions framework in the NER

Intervention mechanisms

The interventions framework in the NER allows AEMO to intervene in the market for reliability purposes (e.g. in the event of a forecast breach of the reliability standard) or for power system security purposes (e.g. to maintain system strength levels). Intervention mechanisms are tools that are available to AEMO in circumstances where the market response has been inadequate to maintain a reliable and secure power system, or in response to unexpected events.

Broadly speaking, intervention mechanisms available to AEMO include the RERT[38], directions and instructions.[39] However, an "AEMO intervention event" is defined more narrowly in the NER. Such an event is defined to include exercising the RERT and issuance of directions but excludes instructions. The compensation framework set out in clause 3.12.2 (the focus of this determination) only applies in respect of AEMO intervention events that trigger intervention pricing.

Interventions are typically used as a last resort and their use is governed by a number of principles and processes.[40]

As the energy market transition occurs and the composition of the generation fleet transforms from a small number of large, synchronous units to a large number of smaller, dispersed units that are non-synchronous, this has created increasing challenges for maintaining power system security. In addressing these challenges, AEMO has increasingly relied on intervention mechanisms - particularly to maintain system strength.[41] [42]

In relation to reliability, the NEM historically has largely delivered a high level of reliability but, as the supply/demand balance grows tighter, there have been increasing concerns about reliability. In 2019-20:

- AEMO issued six directions to market participants for reliability purposes,[43] an increase on previous years.[44] In contrast, system security directions were in place across the NEM for approximately 30 per cent of the time in 2019-20.[45]
- The RERT was activated on four occasions, with costs totalling $40.6 million, also an increase on previous years.[46] [47]

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38 Rule 3.20 of the NER.

39 Clause 4.8.9 of the NER.

40 A detailed discussion of the principles and processes associated with intervention mechanisms is set out in chapter 3 of AEMC, *Investigation into intervention mechanisms and system strength in the NEM, Consultation Paper,* 4 April 2019.

41 On 21 October 2021, the Commission made a final rule determination for the Efficient management of system strength on the power system. It is anticipated that these changes will decrease the need for system strength directions, noting that this has a roughly three year implementation timeframe.

42 Further detail on the increasing use of interventions is provided in Section 2.1.3 of the Compensation draft determination using data available at 30 June 2020.

43 Reliability Panel, *2020 Annual market performance review, Final report,* 20 May 2021, p. 51.

44 Only five reliability directions were issued in the period from 2010-11 to 2018-19.

45 Reliability Panel, *2020 Annual market performance review, Final report,* 20 May 2021, p. 113.

46 Reliability Panel, *2020 Annual market performance review, Final report,* 20 May 2021, p. 51.

47 At the time of writing this determination, the RERT has been activated two more times since this data was collected, on 17 December 2020 and 25 May 2021. Total costs across these two events were approximately $700,000.

When AEMO intervenes in the market, two separate but related frameworks may be triggered: one relates to "intervention pricing" and the other to compensation. These are each explored in further detail below.

Intervention pricing

When the purpose of an AEMO intervention event is to address a shortage of energy or FCAS, AEMO is required to implement "intervention pricing". This sets energy and FCAS prices at the level at which AEMO considers they would have been but for the intervention.[48] Intervention pricing is designed to preserve scarcity price signals that would otherwise be muted as a result of the intervention, and so reduce market distortion.

To implement intervention pricing, AEMO performs two dispatch iterations in the national electricity market dispatch engine (NEMDE) – one to dispatch the physical market (the "dispatch run") and one to set the market clearing price (the "intervention pricing run") at the level which AEMO reasonably determines would have applied but for the intervention event.[49]

Compensation framework

By contrast, the compensation framework is designed to make sure that "directed participants" (those who have been directed to provide services) can recover their costs, and "affected participants" (those scheduled generators and scheduled network service providers which are dispatched differently due to an AEMO intervention event which triggers intervention pricing) are put in the position they would have been in but for the intervention. Compensation is also payable to market customers with scheduled loads which are dispatched differently as a result of an AEMO intervention event which triggers intervention pricing.

Directed participants are compensated under clauses 3.15.7, 3.15.7A and 3.15.7B of the NER:

- Directed participants who provide energy and market ancillary services (i.e. frequency control ancillary services or FCAS) are compensated under clause 3.15.7 at the 90th percentile price for the relevant region over the preceding 12 months.
- If necessary, such directed participants may also lodge a claim for additional compensation under clause 3.15.7B if the claims exceeds a compensation threshold of $5,000 per direction.[50]
- Participants who provide services other than energy and market ancillary services are compensated under clause 3.15.7A ("fair payment compensation").

Affected participants and market customers with scheduled loads are compensated under clause 3.12.2 of the NER, subject to a compensation threshold of $5,000 per intervention event.[51]

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48 Clause 3.9.3(b) of the NER.

49 The intervention pricing run will exclude the effects of the RERT on demand and/or exclude any units operating under direction.

50 See clause 3.15.7B(a4) of the NER.

51 That is, if the amount of compensation owing is less than $5,000, then no compensation is payable: see clause 3.12.2(b) of the NER.

Affected participants may be eligible to receive compensation from AEMO, or be required to repay additional revenue to AEMO, so that they are in the position they would have been in but for the intervention. In both cases, the amount owing is net of incurred or avoided direct costs. For example, if an affected participant is dispatched at a higher level due to an intervention, it will be required to repay to AEMO the additional revenue it earned net of the additional direct costs (e.g. fuel costs) it incurred in the course of generating more energy. Conversely, if an affected participant is dispatched less due to an intervention, it will be entitled to receive compensation from AEMO to put it in the position it would have been in but for the intervention. This compensation is net of the direct costs avoided by the participant as a result of generating less energy.

In contrast to the "two-way" approach to compensation for affected participants, market customers with scheduled loads are eligible to receive compensation from AEMO if they are worse off with respect to energy consumption due to an intervention but are not required to repay revenue to AEMO if they consume energy at a price lower than what they were willing to pay.[52]

AEMO automatically determines the amount of compensation owed to or payable by affected participants, and the amount owed to market customers with scheduled loads, by comparing their dispatch targets from the dispatch run (combined with metered output/consumption) and their dispatch targets from the intervention pricing run used for the purposes of intervention pricing. If necessary, participants may also dispute AEMO's compensation calculation by lodging a claim with AEMO under clause 3.12.2(f). This is also subject to a compensation threshold of $5,000 per intervention event.[53]

The cost of compensating both directed participants and those participants affected by a direction to obtain energy is passed through to market customers and thus consumers in the region that benefited from the intervention.[54] Where a direction is for the purpose of obtaining ancillary services, the cost of compensating directed and affected participants will be recovered in accordance with the cost recovery mechanisms applicable to each of the eight ancillary service markets.[55]

1.4.2 The Investigation into intervention mechanisms in the NEM

In response to the increasing use of intervention mechanisms, the Commission undertook an *Investigation into intervention mechanisms and system strength in the NEM* in 2019. The final report of that investigation made a number of recommendations relating to intervention pricing and compensation frameworks.[56] Two of the resulting rule changes have particular importance for this determination and are outlined below. Further information on rule changes implemented following the investigation and other interventions related work programs are outlined in appendix C.

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52 The rationale for "one-way" energy compensation for scheduled loads is explored in detail in section 4.2.2.

53 See clause 3.12.2(i) of the NER.

54 See clause 3.15.8(a) and (b) of the NER.

55 See clause 3.15.8(e) and (f) which in turn refers to the cost recovery formulae for market ancillary services set out in clause 3.15.6A of the NER.

56 AEMC, *Investigation into intervention mechanisms in the NEM, Final Report*, 15 August 2019.

- Changes to the regional reference node test set out in clause 3.9.3 of the NER were made in December 2019. The RRN test is used to determine whether AEMO should implement intervention pricing in connection with an "AEMO intervention event".[57] Under the revised RRN test, intervention pricing is now implemented where an AEMO intervention event is for the purpose of obtaining a service for which there is a market price.[58] Where the purpose of an intervention is to obtain a service for which there is no market price,[59] intervention pricing does not apply. This recognises that, in such circumstances, there is no relevant market price signal to preserve.[60]
- Changes were also made to the circumstances in which compensation is paid to participants dispatched differently as a result of an intervention event. Under the revised approach, such compensation is only payable in circumstances where an AEMO intervention event triggers intervention pricing in accordance with the revised RRN test.[61] This is an important development when considering the matters in this determination, noting that the rule change requests dealt with in this determination were submitted prior to the making of the December 2019 rule. As a result of narrowing the circumstances in which such compensation is payable, the rule changes proposed by AEMO affect a narrower set of intervention events - namely, those which trigger intervention pricing - and will have no impact on security interventions,[62] which are far more common than interventions to address a shortage of energy or FCAS.

1.4.3 Other relevant rule changes

As the NEM rapidly transitions to a market comprising a more diverse and complex mix of participants, multiple interrelated reform processes are under way to facilitate the evolution of regulatory frameworks. Several of these processes have implications for the broader context in which the Commission is progressing the rule changes that are the subject of this determination - including the extent to which interventions will be required in future to maintain system security and reliability. Areas of particular relevance are outlined below. The positions in this final determination have been informed by, and coordinated with, these other processes.

Integrating storage rule change request

The *Integrating energy storage systems into the NEM* (Integrating storage) rule change is particularly relevant to this final determination, such that the timelines for the two rule changes have been aligned.

The Integrating storage rule change was commenced in response to a rule change request received on 23 August 2019 from AEMO. The aim of the rule change request was to better

57 Meaning activation of the RERT or issuance of directions.

58 That is, energy or market ancillary services, or a service which is a direct substitute for these.

59 For example, voltage control or system strength.

60 AEMC, *Application of the regional reference node test to the reliability and emergency reserve trader, Rule determination*, 19 December 2019.

61 AEMC, *Application of compensation in relation to AEMO interventions, Rule determination,* 19 December 2019.

62 In this determination, the phrase "security interventions" refers to those interventions to obtain security services other than FCAS.

facilitate the integration of energy storage and hybrid facilities into the NEM. To achieve this, AEMO proposed defining storage in the Rules and introducing a new registered participant category called the bi-directional resource provider.

The final rule determination,[63] released alongside this Compensation rule determination, is to make a more preferable rule that introduces a new participant category, the Integrated Resource Provider (IRP). This category accommodates storage and hybrid facilities in a way that does not require the introduction of a storage-specific definition in the Rules. The major elements of the Integrating storage rule change will commence on 3 June 2024.

AEMO's submission to the Compensation draft determination (explored in detail in the Compensation directions paper)[64] raised an important consideration with respect to compensating units that can both generate and consume (particularly batteries). Accordingly, the Commission aligned the timelines for both the Compensation and Integrating storage rule changes so that the final determinations and final rules for both have been published on the same day.[65]

Section 5.2.1 and appendix D addresses the interactions with the Integrating storage rule determination in detail.

Wholesale demand response rule change request

On 11 June 2020, the Commission published its final determination and final rule to establish a wholesale demand response mechanism. The precedent set by parts of the *Wholesale demand response mechanism* (WDRM) rule change guided the Commission's consideration of FCAS liabilities in the Compensation rule change.

The final WDRM rule:

- introduces a new market participant category, a demand response service provider (DRSP)
- places obligations on DRSPs that, as much as practicable, replicate those applied to other scheduled participants, for example, similar information provision and scheduling obligations
- sets out a process for having baseline methodologies determined and applied to wholesale demand response units
- provides for DRSPs to be settled in the wholesale market for the wholesale demand response they have provided at the prevailing spot price
- sets out implementation timeframes for the mechanism, with the mechanism having commenced on 24 October 2021.

Following consultation with AEMO and other stakeholders, the final rule incorporates a number of changes designed to reduce implementation costs. While existing systems and processes relating to scheduled loads will be used to facilitate DRSP participation in central

63 See: https://www.aemc.gov.au/rule-changes/integrating-energy-storage-systems-nem

64 AEMC, *Compensation for market participants affected by intervention events, Directions paper*, 15 July 2021.

65 Note that AEMO's rule change requests for the Compensation rule change did not propose amendments to clause 3.12.2 to accommodate bi-directional resource providers or batteries specifically.

dispatch, the Commission has determined that DRSPs should not participate in the systems and processes for FCAS cost recovery and affected participant compensation. This will avoid significant implementation costs for AEMO which would have delivered limited benefit. Similar considerations regarding FCAS liabilities in relation to the rule change requests discussed in this determination are outlined in section 3.2.3.

1.5 The rule making process

This section provides an overview of the rule making process for the final rule - *Compensation for market participants affected by intervention events.*

1.5.1 Consultation paper

On 11 June 2020, the Commission published a notice advising of the consolidation of the two rule change requests submitted by AEMO, and of its commencement of the rule making process and consultation in respect of the consolidated rule change request.[66] A consultation paper identifying specific issues for consultation was also published.[67] Submissions closed on 16 July 2020.

The Commission received ten submissions as part of the first round of consultation. The Commission considered all issues raised by stakeholders in submissions. Issues raised in these submissions were summarised and responded to in the draft rule determination.

1.5.2 Draft determination

On 24 September 2020, the Commission published a draft determination and rule,[68] informed by stakeholder submissions to the consultation paper. The draft rule was a more preferable draft rule that:

1. Incorporated FCAS into the automatic process for calculating compensation for both affected participants and market customers with scheduled loads
2. Introduced a volume-weighted approach to calculating the input BidP for the compensation formula for market customers with scheduled loads
3. Retained the one-way approach to compensating market customers with scheduled loads, and
4. Adopted a target based approach to calculating compensation for both affected participants and market customers with scheduled loads.

The Commission received four submissions to the draft determination and rule (discussed in further detail throughout chapter 3, chapter 4 and chapter 5). The Commission considered all issues raised in submissions, and noted that stakeholders were broadly supportive of the draft rule. AEMO, however, raised an important issue in its submission to the draft determination which warranted a re-assessment of the target based approach in the draft rule (as per point four above).

66 This notice was published under s.95 of the National Electricity Law (NEL).
67 AEMC, *Compensation for market participants affected by intervention events, Consultation paper,* 11 June 2020.
68 AEMC, *Compensation for market participants affected by intervention events, Draft determination,* 24 September 2020

In light of AEMO's submission to the draft determination, the Commission extended the time for making this final determination under s. 107 of the NEL so that additional stakeholder feedback could be sought on a revised approach. The extension of time was also designed to allow the approach to compensation to be coordinated with decisions made under the Integrating storage rule change. Two further time extensions were granted by the Commission under s. 107 of the NEL to reflect extensions to the Integrating storage rule change. The final rule determinations for both rule changes were published on 2 December 2021.

Due to the reasons outlined above (which led to the extensions of the rule change), the Commission did not make a final rule within 12 months of the publication of the notification of the commencement of the rule change process. As such, a notice under s. 108A of the NEL was published, outlining these reasons. The notice is available on the AEMC's website.[69]

1.5.3 Directions paper

A directions paper was released on 15 July 2021, specifically addressing the draft rule's target based approach to calculating compensation (point four in section 1.5.2). The directions paper sought stakeholder feedback on three options to address the issues raised by AEMO's submission to the draft rule. These were:

1. A target based approach to calculating compensation, as set out in the draft rule
2. An approach to calculating compensation based on actual consumption/generation, similar to the existing approach in clause 3.12.2, with some additional clarifications. This was presented as the preferred option of the Commission, and
3. A bespoke claims approach to calculating compensation, where all affected participants and market customers with scheduled loads would have to lodge a claim in order to receive compensation.

The directions paper also sought stakeholder feedback on a proposal to clarify the objective of the compensation framework, and an approach to classifying bi-directional units for the purpose of compensation.

The Commission received five submissions to the directions paper. The Commission considered all issues raised by stakeholders, who were broadly supportive of the Commission's approach.

Submissions to the draft determination and the directions paper informed this determination and the more preferable final rule. The issues raised in both are discussed and responded to throughout chapter 3, chapter 4 and chapter 5 of this final rule determination.

69 See: https://www.aemc.gov.au/sites/default/files/2021-06/ERC0284%20-%20Section%20108A%20notice.pdf

2 FINAL RULE DETERMINATION

This chapter sets out the Commission's final rule determination with a summary of reasons. Chapter 3, chapter 4 and chapter 5 set out additional considerations supporting the Commission's decision.

This chapter outlines:

- the Commission's more preferable rule
- the rule making test for changes to the NER
- the more preferable rule test
- the assessment framework for considering the rule change request
- the Commission's consideration of the more preferable final rule against the national electricity objective.

2.1 The Commission's final rule determination

The Commission's final rule determination is to make a more preferable final rule. The more preferable final rule:

- Incorporates FCAS into the compensation framework in clause 3.12.2 as an automatic, two-way process
- Introduces a volume-weighted approach to calculating the input BidP for the compensation formula for market customers with scheduled loads
- Retains the one-way approach to compensating market customers with scheduled loads
- Clarifies the objective of the compensation framework as it applies to affected participants, market customers with scheduled loads and ancillary service providers
- Inserts a new provision which discourages participants covered by clause 3.12.2 from causing an AEMO intervention event and requires these participants repay compensation if they have breached this provision or have not conformed with their dispatch instructions, and
- Requires AEMO to consult on and publish a methodology detailing how compensation is calculated under clause 3.12.2.

Changes related to 5MS and transitional arrangements and other drafting refinements are also included in the final rule. These are detailed in appendix B and section 5.2.3.

The Commission's reasons for making this final rule determination are set out in section 2.4. Further detail on the final rule is provided in chapter 3, chapter 4 and chapter 5.

Further information on the legal requirements for making this final rule determination is set out in Appendix A.

2.1.1 Compensation for FCAS

The Commission has determined that it is appropriate to include FCAS in the compensation framework in clause 3.12.2 as a two-way, automatic process. This is consistent with the

approach in the draft rule. The current framework is asymmetrical in that it only pays compensation with respect to energy revenue losses/gains and does not compensate participants when they incur FCAS revenue losses/gains. This is not appropriate, particularly given the growing importance of frequency services as the generation fleet undergoes rapid transition and inertia levels fall.

While the Commission has a significant work program underway to ensure that appropriate frameworks are in place to support the provision of required system services, it is also important that compensation frameworks are consistent and support this. Compensation for FCAS, for example, is already a feature of all other compensation frameworks in the NER (for directed participants, market suspension pricing periods and administered price periods) so including FCAS in the compensation framework for participants affected by intervention events creates consistency and recognises the increasing importance of the provision of ancillary services.

2.1.2 Compensation for scheduled loads

AEMO's rule change request sought to redefine the term "BidP" in the formula used to determine compensation for market customers with scheduled loads that are dispatched differently due to an AEMO intervention event which triggers intervention pricing. This request was prompted by concern, identified by AEMO's IPWG, that the current definition of BidP does not meet the objective of ensuring that scheduled loads are not out-of-pocket as a result of an intervention event.

The Commission agrees with AEMO that the current definition of BidP is not appropriate but has determined to make a more preferable final rule which adopts a volume-weighted approach to calculating scheduled load compensation. This approach has regard to all non-zero bid bands, rather than focusing on a single band as suggested by AEMO in its rule change request.

This approach is consistent with the approach in the draft rule. It remains appropriate and important to duly compensate scheduled loads dispatched differently in intervention events that trigger intervention pricing. This is especially so given that scheduled loads (particularly large-scale batteries) are playing an increasingly important role in the NEM, and ongoing investment in such technologies will be important to support power system security as the energy market transitions.

2.1.3 Other elements of the more preferable final rule

The Commission's more preferable final rule also includes some refinements to the draft rule approach. These have been made in response to issues raised in stakeholder submissions to the draft determination and directions paper.

The more preferable final rule reverses a change made in the draft rule such that energy compensation for both affected participants and market customers with scheduled loads is calculated having regard for actual generation/consumption (rather than based solely on targets, as per the approach in the draft rule). This was discussed at length in the directions paper and is similar to the current approach in clause 3.12.2 with some additional

clarifications. The Commission has determined this calculation approach better meets the objective of the compensation framework than the draft rule and avoids over-compensation under clause 3.12.2.

The more preferable final rule also clarifies the objective of the compensation framework. The draft rule provided that affected participants and market customers with scheduled loads are to receive an amount of compensation that would put the participant in the position it would have been in but for the intervention. However, as AEMO noted in response to the draft rule, the different manner in which generators and loads are dispatched in the NEM means that the approach to determining compensation for these participants cannot be precisely the same. Recognising this, the final rule provides that the framework is to achieve this objective "as far as practicable" while acknowledging the different manner in which generators are loads are dispatched for energy (as set out in the different approaches to calculating compensation in (c)(1) and (c)(3) for scheduled generators and scheduled loads respectively).

The final rule also includes a new provision to the effect that, if a court finds that a participant compensated under clause 3.12.2 has caused or contributed to the circumstances that led to the intervention event, it is in breach of the Rules. This new provision aligns with existing clauses for compliance with directions and directed participants, but that do not cover RERT. That participant must also then repay to AEMO any compensation provided to it under clause 3.12.2. A participant under clause 3.12.2 is also required to repay compensation if it has failed to comply with its dispatch instructions, as discussed in the directions paper. Once the compensation has been repaid to AEMO, AEMO must use reasonable endeavours to redistribute that amount to the relevant market participants who funded the compensation.

Finally, the more preferable final rule requires AEMO to prepare a methodology which describes how compensation under clause 3.12.2 is to be calculated. This will provide greater transparency and predictability to participants about how, for example, AEMO calculates compensation having regard for actual compensation/generation without undue prescription in the Rules.

2.2 Rule making test

2.2.1 Achieving the NEO

Under the NEL the Commission may only make a rule if it is satisfied that the rule will, or is likely to, contribute to the achievement of the national electricity objective (NEO).[70] This is the decision-making framework that the Commission must apply.

The NEO is:[71]

> to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:
>
> (a) price, quality, safety, reliability and security of supply of electricity; and

70 Section 88 of the NEL.
71 Section 7 of the NEL.

(b) the reliability, safety and security of the national electricity system.

2.2.2 Making a more preferable rule

Under s. 91A of the NEL, the Commission may make a rule that is different (including materially different) to a proposed rule (a more preferable rule) if it is satisfied that, having regard to the issue or issues raised in the rule change request, the more preferable rule will or is likely to better contribute to the achievement of the NEO.

In this instance, the Commission has made a more preferable rule. The reasons are summarised below.

2.2.3 Making a differential rule

Under the Northern Territory legislation adopting the NEL, the Commission may make a differential rule if, having regard to any relevant MCE statement of policy principles, a different rule will, or is likely to, better contribute to the achievement of the NEO than a uniform rule. A differential rule is a rule that:

- varies in its term as between:
  - the national electricity system, and
  - one or more, or all, of the local electricity systems, or
- does not have effect with respect to one or more of those systems

but is not a jurisdictional derogation, participant derogation or rule that has effect with respect to an adoptive jurisdiction for the purpose of s. 91(8) of the NEL.

As the rule relates to parts of the NER that currently do not apply in the Northern Territory, the Commission has not assessed the rule against the additional elements required by the Northern Territory legislation.[72]

2.3 Assessment framework

In assessing the rule change request against the NEO, the Commission has considered the following principles:

- **Risk allocation** – risk allocation and the accountability for investment and operational decisions should rest with those parties best placed to manage them. Does the proposed approach appropriately allocate risk to those parties best able to manage them?
- **Efficiency** – is the proposed approach efficient in terms of administrative costs to participants? Does it send clear operational and investment signals to participants?
- **Consistency** – do the rules adopt a consistent approach that delivers a cohesive vision for the future power system?

72 From 1 July 2016, the NER, as amended from time to time, apply in the NT, subject to derogations set out in regulations made under the NT legislation adopting the NEL. Under those regulations, only certain parts of the NER have been adopted in the NT. (See the AEMC website for the NER that applies in the NT.) National Electricity (Northern Territory) (National Uniform Legislation) Act 2015.

- **Transparency and predictability** – does the proposed approach provide clear and predictable arrangements for participants affected by interventions, thereby reducing uncertainty?

2.4 Summary of reasons

The more preferable final rule made by the Commission is attached to and published with this final rule determination. The key features of the more preferable final rule are described below and further detail can be found in chapter 3, chapter 4 and chapter 5.

The Commission has assessed the rule change requests against the above principles and has had regard to the issues raised in the rule change requests and during consultation. The Commission is satisfied that the final rule will, or is likely to, better contribute to the achievement of the NEO than the current arrangements, the proposals put forward in AEMO's rule change requests and the draft rule.

The reasons for this are that the final rule:

- more effectively allocates risks
- adopts a more efficient approach to compensation
- promotes consistency, and
- is more transparent and predictable.

The following sections explain each reason in turn.

2.4.1 The final rule more effectively allocates risks

Compensation for FCAS is included as a two-way, automatic process

In December 2019, the Commission made a rule which narrowed the circumstances in which affected participant compensation is payable.[73] As a result, such compensation is no longer payable with respect to security interventions (for example system strength directions). However, it is still payable when an intervention event triggers intervention pricing (that is, when an intervention event is to address a scarcity of energy or FCAS).

In reaching this conclusion, the Commission noted that, when AEMO intervenes due to a scarcity of energy or FCAS, prices will generally be high, providing participants with important revenue-earning opportunities. If a participant is affected by an intervention event during such periods, the Commission considered that it is reasonable to keep such participants "whole" through the payment of affected participant compensation (balanced by the requirement to repay any additional revenue earned). Such an approach was determined to be in the long term interests of consumers as it will support the ongoing viability of participants providing important services to the market.[74]

In considering AEMO's request to include FCAS in the affected participant compensation framework, the Commission remains of the view that compensation under clause 3.12.2 is an

73 AEMC, *Application of compensation in relation to AEMO interventions, Rule determination*, 19 December 2019.

74 AEMC, *Application of compensation in relation to AEMO interventions, Rule determination*, 19 December 2019, pp iv and 37.

important means to keep participants whole if they are dispatched differently due to an intervention event that triggers intervention pricing. Consistent with this view, the Commission considers it appropriate and efficient to include FCAS in the compensation framework.

The Commission considers that adopting a two-way approach to FCAS compensation is consistent with the objective of the compensation framework, which is to put participants in the position they would have been in but for the intervention. Allowing participants to claim compensation for losses but not requiring them to repay gains, as proposed by AEMO, would not put participants in the position they would have been in but for the intervention. Such an approach would leave the affected participant better off at the expense of other market participants and consumers who bear the cost of FCAS compensation. As such it would be contrary to both the NEO and the assessment framework principles of consistency and appropriate risk allocation.

In addition, as noted by the National Irrigators' Council in response to the consultation paper, energy consumers are not at fault when an AEMO intervention event occurs and have no opportunity to avoid the additional cost that is passed through to them after the event.[75] The two-way approach in the final rule, whereby the cost of compensation is net of compensation paid out to affected participants and payments received from affected participants, allocates risk more appropriately than the AEMO proposal.

Scheduled loads are appropriately compensated for energy revenue losses

The more preferable final rule reduces the risk that scheduled loads may be under-compensated for energy revenue losses during intervention events which trigger intervention pricing by amending the formula for calculating scheduled loads and the definition of BidP. The Commission acknowledges that this may increase the quantum of compensation paid to scheduled loads with respect to energy losses. However, the Commission considers that this more appropriately allocates risk than the current formula. The energy compensation for scheduled loads is a financial transfer designed to re-balance the ledger to make good the fact that the scheduled load would otherwise overpay for the energy it consumed during the intervention event due to the application of intervention pricing.

The revised formula also provides that no compensation is payable where "QD" is negative. This avoids the risk of over-compensation in circumstances where a scheduled load trips or where intervention pricing produces anomalous results. This avoids unwarranted costs being passed through to consumers and other market participants. Accordingly, the Commission has determined that the new approach to calculating scheduled load compensation strikes a fair balance between the interests of scheduled loads and those who bear the cost of compensation.[76]

75 National Irrigators' Council, Submission to the consultation paper, p. 1.

76 Where the reason for the intervention event is to address a shortage of energy, compensation costs will be recovered from market customers and hence consumers in the region which benefited from the intervention. Where the reason for the intervention is to address a shortage of FCAS, compensation costs will be recovered in line with the normal process for recovering the cost of the FCAS in question: i.e. from generators, small generation aggregators and market customers.

The final rule corrects potential over-compensation for FCAS providers in respect of energy

As discussed in the directions paper, the draft rule's target-based approach to calculating compensation for affected participants and market customers with scheduled loads was adopted in response to concerns raised by AGL in its submission to the consultation paper. AGL suggested that a participant would be rewarded for not following its dispatch targets if doing so increases the automatic compensation it receives via a calculation approach which has regard for actual metering data.[77] This is a particular concern for batteries, which can both generate and consume and provide significant amounts of regulation FCAS.

AEMO's submission to the draft determination highlighted that a participant may be over-compensated if compensation is based on five-minute energy dispatch targets which may not be followed by the participant (including in instances where the participant is providing FCAS).[78] Over-compensation would be contrary to the NEO by imposing unwarranted costs on consumers. As such, the approach in the more preferable final rule addresses this while also including additional paragraphs to discourage participant non-conformance (thereby addressing the concerns raised by AGL in response to the consultation paper). This is considered to better allocate risks than the approach in the draft rule.

2.4.2 The final rule adopts a more efficient approach to compensation

FCAS compensation is automatic

The automatic calculation of compensation in the final rule promotes efficiency by avoiding the administrative cost to both participants and AEMO of processing individual additional compensation claims (as proposed by AEMO).

Adopting a consistent, two-way approach to compensating participants for energy and FCAS losses/gains in the final rule also supports more efficient market outcomes. This approach will avoid distortionary market signals which could undermine the case for investment in technologies that provide frequency services at a time when the need for such services is growing.

Double dipping is prevented

The more preferable final rule promotes efficiency by removing the potential for two kinds of compensation (directed participant compensation/RERT payments and compensation under clause 3.12.2) to be paid with respect to the one unit for the same intervention price trading interval. Allowing such "double dipping" would impose inefficient costs on consumers.

Non-conformance is discouraged

The draft determination noted that:[79]

> by adopting an approach to compensation that focuses on dispatch targets in both the dispatch run and intervention pricing run, the draft rule ensures that compensation is

77 AGL, Submission to the consultation paper, p. 4.
78 AEMO, Submission to the draft determination, 6 November 2020, p. 4.
79 AEMC, Compensation draft determination, p. 31.

> calculated based on consistent metrics and removes the potential for compensation to be paid to participants which have not followed dispatch targets. Implicitly rewarding such behaviour would not support the efficient functioning of the market.

The more preferable final rule removes the solely target-based approach to compensation referenced in the above quote, which may have passed undue costs onto consumers (as highlighted above). However, the final rule includes additional provisions that seek to discourage non-conformance with dispatch instructions (by requiring participants to repay financial benefits to AEMO if they are found to have been non-conforming). In this way, the final rule preserves the draft rule's aim of calculating compensation in a manner that does not reward non-conformance, recognising that such behaviour is detrimental to the efficient functioning of the market.

Causing or contributing to intervention events is discouraged

The more preferable final rule also includes a new obligation for participants covered by clause 3.12.2 which discourages other types of behaviour that can impact the efficient functioning of the market. The new obligation ensures that these participants do not intentionally or recklessly cause or significantly contribute to the need for an AEMO intervention event, similar to existing clause 4.8.9(c2) which places the same obligation on all market participants but in relation to directions only. If the AER commences proceedings and a court determines that a participant is in breach of this new obligation, that participant must repay the compensation that it received to AEMO. This mirrors a requirement which also already exists for directed participants (see clause 3.15.10C(c)). After receiving the repaid amount, AEMO must use reasonable endeavours to distribute it to the relevant market participants who funded the compensation for that AEMO intervention event.

As well as promoting market efficiency, this also brings the provisions for affected participants more in line with existing provisions for directed participants.

Administrative costs and accuracy are balanced

The directions paper also discussed an alternative approach which would require AEMO to use four-second FCAS data to calculate compensation more accurately. However, this approach would be computationally intensive and costly to administer. The Commission considers that such costs are unwarranted given the relative in-frequency of intervention events that trigger intervention pricing and the small quantum of compensation typically involved. The Commission has determined that having regard for actual generation/consumption as per the preferred approach in the directions paper[80] and the approach adopted in this final rule provides an appropriate balance between accuracy and administrative cost. It is therefore an administratively efficient approach.

80 Section 3.2 of the Compensation directions paper outlined the Commission's preferred option.

2.4.3 The final rule promotes consistency

The approach to calculating compensation is appropriately consistent

To the extent appropriate, the more preferable final rule adopts a consistent compensation approach between scheduled generators and scheduled loads. Consistency is considered particularly important noting that batteries can operate as both scheduled generators and scheduled loads.

- The framework includes energy and FCAS compensation for scheduled generators and scheduled loads. Including FCAS in the affected participant compensation framework (as suggested by AEMO in its rule change request) while failing to address the same issue for other ancillary service providers affected by intervention events - namely market customers with scheduled loads - would create inappropriate inconsistency between the two frameworks. This could have distortionary effects in the market, particularly as some units (for example, batteries) can both generate and consume and provide ancillary services.
- The frameworks adopt an appropriate level of consistency in the calculation of compensation: that is, a two-way approach to energy compensation for affected participants, a one-way approach to energy compensation for scheduled loads, and a two-way approach to FCAS compensation for ancillary service providers (both generators and loads). This reflects the different approach to dispatching scheduled generators and scheduled loads for energy (explored in further detail in section 4.2.2), while acknowledging that scheduled generators and scheduled loads are dispatched in the same way for FCAS.

The objective of the compensation framework is consistent for generators and loads

Clause 3.12.2 currently makes clear the purpose of compensating affected participants but does not include an equivalent statement with respect to market customers with scheduled loads. The final rule promotes consistency by incorporating a compensation objective that applies to all types of participants eligible for compensation (that is, affected participants, market customers and ancillary service providers). The objective of compensation is, as far as practicable, to put the participant in the position it would have been in had the intervention event not occurred, noting that the approach to calculating compensation in the final rule has regard for the different way that scheduled generators and scheduled loads are dispatched for energy.

The final rule aligns with other Commission determinations

AEMO's submission to the Compensation draft determination highlighted the complexities associated with compensating batteries. Accordingly, the Commission aligned the timelines for two rule change requests, such that the approaches adopted in the Integrating storage rule change could be considered in the amendments being made to the compensation framework under clause 3.12.2.

Specifically, the Commission worked with AEMO to analyse how energy compensation was automatically calculated for bi-directional units under the current Rules and how it may be

calculated under the Rules with the changes made in the Integrating storage rule change. The Commission also ensured that the changes made in the Integrating storage final rule could be easily integrated into the Compensation framework to avoid future changes to the form of clause 3.12.2, which may add confusion.

The Commission also determined not to include costs incurred or avoided in the automatic calculation of compensation for FCAS. This is consistent with the Commission's determination in relation to the WDRM rule change request, which had similar regard for balancing administrative costs with benefits.

Finally, incorporating FCAS in the final rule aligns with the Commission's broader work focused on valuing essential system services. FCAS is an important service, particularly when the system is under stress during intervention events that trigger intervention pricing.

2.4.4 The final rule is more transparent and predictable

FCAS compensation is an automatic process

Incorporating the compensation of FCAS losses and gains into the process already used for energy ensures that the operation of the framework is transparent and predictable. Rather than ad hoc additional claims being made by individual participants for FCAS losses and determined by AEMO or an independent expert (as per the AEMO proposal), the process will be predictable and the manner in which compensation is calculated based on clear formulae set out in the Rules (and further described in AEMO's methodology). This will provide greater certainty to participants that they will be duly compensated for providing important services during intervention events, thereby also avoiding potential distortionary market impacts.

Scheduled load compensation for energy is volume-weighted

Adopting a volume-weighted approach to scheduled load energy compensation enhances transparency and predictability. The revised formula means that the value of compensation is predictable and will not change as a result of the structure of a scheduled load's energy dispatch bid. The new formula also formalises the existing practice of AEMO whereby compensation is not paid when the value of QD is negative. In doing so, the more preferable final rule increases transparency with respect to how compensation is to be calculated.

Basis of compensation decisions is more visible

Incorporating a consistent, over-arching objective in the more preferable final rule increases transparency regarding the objective of the framework and the basis upon which AEMO calculates compensation and assesses adjustment claims. The final rule also makes clear when participants are eligible for compensation under clause 3.12.2 - that is, a participant is eligible for compensation in respect of a unit if its targets for energy and/or FCAS differ between the intervention pricing run and dispatch run of NEMDE. This formalises AEMO's existing processes in the Rules (where currently the Rules lack clarity about eligibility for compensation).

The final rule also requires AEMO to develop and publish a methodology in consultation with industry. The Commission considers this will provide further transparency as to how AEMO calculates compensation without being overly prescriptive in the Rules.

3 COMPENSATION FOR FCAS

BOX 1: SUMMARY OF KEY POINTS

This chapter discusses three main components of the Commission's final rule determination that relate to compensation for FCAS. In summary, the Commission has determined that:

- it is appropriate to include FCAS in the compensation framework in clause 3.12.2
- consistent with the objective of the compensation framework, compensation for FCAS should be determined using the same automatic, two-way calculation of compensation that applies to energy revenue losses and gains, and
- the calculation of compensation should not be automatically adjusted to take account of changes to FCAS liabilities (resulting from changes to dispatch targets due to an intervention event).

These components were not the focus of the directions paper and the approach to each is consistent with the approach adopted in the draft rule determination.

3.1 Proponent's view

The AEMO rule change request proposed to include FCAS prices in the compensable items listed in 3.12.2(j) ”so that an affected participant could lodge an adjustment claim in order to seek compensation in relation to FCAS losses. Under this approach, an affected participant would only lodge an adjustment claim in relation to FCAS if it is out of pocket (that is, compensation for FCAS would be "one-way", with no requirement to repay gains).[81]

3.2 Commission's analysis

AEMO's rule change request raised three major considerations (discussed in Section 4 of the draft determination):

1. Should compensation in relation to FCAS be included in clause 3.12.2?
2. How should participants be compensated with respect to FCAS?
3. Should compensation be net of changes in relation to FCAS liabilities?

This section outlines the Commission's analysis of these considerations and the final rule determination.

81 This is reflected in the title of AEMO's rule change request, "Additional compensation for FCAS losses", and the reference on page 3 of the rule change request to participants who are "negatively impacted".

3.2.1 Should participants affected by intervention events be eligible for compensation in relation to FCAS?

The central question in considering the AEMO rule change request is whether to compensate participants for changes in FCAS revenue, as well as changes in energy revenue, resulting from intervention events that trigger intervention pricing.

The compensation framework for interventions reflects, among other things, the outcomes of a review of directions undertaken in 2000 by NEMMCO and NECA.[82] That review concluded that directed participants should receive a "fair payment" that would cover the cost incurred in complying with the direction. It also concluded that "third parties whose market dispatch is affected by direction should also be compensated so that their financial position is unaffected by the direction".[83]

The review was undertaken prior to the introduction of the FCAS markets but noted that markets were being proposed for some ancillary services in the near future.[84] The directions review report noted that there was a need to establish a consistent framework for directions in those other ancillary services sectors.

Clause 3.12.2 sets out the compensation framework for affected participants and scheduled loads which are dispatched differently as a result of an AEMO intervention event. It has formed part of the NER since its commencement in 2005.[85]

Clause 3.12.2 refers to terms such as "dispatch" and "trading amounts", both of which encompass energy *and* FCAS. Clause 3.12.2(j)(2) also refers to clause 3.15.6A (the provision which sets out the formulae used to calculate trading amounts for each of the eight FCAS markets) and so clearly alludes to the existence of the FCAS markets.

However, it does not refer to ancillary service prices, as it does to electricity prices (the regional reference price). The reason for this is not clear.

The issue of how to interpret clause 3.12.2 with respect to FCAS losses was discussed by Synergies Economic Consulting when it declined a claim for additional affected participant compensation to recoup FCAS losses.[86] This unsuccessful claim is referenced by AEMO in its rule change request and discussed in more detail in Appendix C of the draft determination.

Synergies concluded its report with the following comment:[87]

> There is some ambiguity in clause 3.12.2 as to whether it allows for compensation for foregone ancillary services revenue. We conclude that it does not, for the following reasons:

82 These were the predecessors of AEMO and the AEMC.

83 NEMMCO and NECA, *Final Report – Power system directions in the National Electricity Market*, 2000, p. i.

84 The Australian Competition and Consumer Commission authorised changes to the National Electricity Code to establish the eight FCAS markets in 2001, not long after the review of directions was completed.

85 Though prior to 2008 it was numbered differently as clause 3.12.11.

86 Synergies Economic Consulting, *Final report on compensation related to directions that occurred on 1 December 2016*, June 2017.

87 ibid, p. 37.

> - the set of criteria that must be considered and which can solely be considered make no express reference to ancillary services prices but do expressly reference spot market prices in the form of the regional reference price. This indicates that compensation is intended to be confined to foregone energy spot market revenues;
> - in so far as clause 3.12.2 alludes to ancillary services, it does not do so in a way that indicates an intention to allow for the compensation of foregone ancillary services revenue; and
> - the approach that the claimant set out for determining its claim is not confined solely to the factors set out in clause 3.12.2
>
> ... In reaching this determination, we are mindful that there are ambiguities in clause 3.12.2 that we have had to resolve. It is difficult to determine whether the purpose of clause 3.12.2 is to compensate more generally for foregone revenues or, consistent with some other compensation clauses in the NER, to ensure that revenues earned by an Affected Participant are not less than the costs that it incurs. If it is the former, it is difficult to determine whether it refers to all possible sources of foregone revenue.

The final rule amends clause 3.12.2 to include FCAS in the compensation framework, acknowledging the need to make FCAS providers whole in intervention events that trigger intervention pricing. While AEMO's rule change referred to "affected participants", which is a defined term encompassing scheduled generators (as well as scheduled network service providers and "eligible persons"), the Commission also considered whether it was appropriate to compensate other participants eligible for compensation under clause 3.12.2 in relation to FCAS - namely market customers with scheduled loads.

All scheduled generators and scheduled loads (pumped hydro and utility scale batteries) can provide market ancillary services in addition to generating or consuming (or refraining from consuming) energy. Therefore, the Commission has determined that energy *and* FCAS compensation should be available to participants whose scheduled generators and scheduled loads are dispatched differently due to an intervention event that triggers intervention pricing.

Consistent with the drafting approach to registration and participation categories in the Integrating storage rule change, the final form of clause 3.12.2 separates compensation for ancillary service providers from the calculation of energy compensation for affected participants and market customers with scheduled loads.[88] This achieves the same outcome as the draft rule but takes a different form.[89]

88 See Clause 3.12.2(a)(1), (a)(2) and (a)(3) of the final rule.

89 The final Compensation rule separates out those aspects relating to FCAS and deals with FCAS in a separate paragraph (rather than incorporating FCAS into the compensation framework as it applies to affected participants and into the compensation framework as it applies to scheduled loads, as proposed in the draft rule). While the final Compensation rule refers to the defined terms "ancillary service generating unit" and "ancillary service load", the Integrating storage final rule will ultimately replace these terms with a reference to an "ancillary service unit". The form of the final Compensation rule allows the new term in the Integrating storage rule change to be more easily integrated.

Implications of the final rule for participants affected by intervention events

In December 2019, the Commission made a rule which significantly narrowed the circumstances in which compensation under clause 3.12.2 is payable.[90] Compensation is only payable in connection with intervention events which trigger intervention pricing and is no longer payable in connection with security interventions such as system strength directions (which comprise the vast majority of AEMO interventions in recent years).[91]

When the Commission determined to narrow the circumstances when compensation under clause 3.12.2 is payable it considered that interventions to address a shortage of energy or FCAS typically occur during periods when the supply demand balance is tight and spot prices are generally high. As such, being dispatched differently during such periods can impact important revenue-earning opportunities for market participants. This was a factor in the Commission's decision to retain compensation under clause 3.12.2 in respect of such interventions.[92]

This is a relevant factor in considering whether to implement AEMO's proposal to compensate affected participants for changes in FCAS revenue resulting from intervention events that trigger intervention pricing. The Commission notes that, as the generation mix in the NEM changes, inertia levels are falling and the management of frequency is increasingly challenging. In light of this, it is important that market participants that provide frequency services are not disadvantaged by compensation frameworks that were designed at a time when the NEM looked very different (with a generation fleet characterised by high levels of inertia and hence comparatively stable frequency).

Impact of changes on other market participants and consumers

In considering whether to amend clause 3.12.2 to include FCAS, the Commission was cognisant that any additional compensation costs will be passed through to market participants and, ultimately, consumers. The cost to consumers of including FCAS in the compensation framework was a key concern of consumer groups in response to the consultation paper.[93]

The draft determination examined the cost implications of including FCAS in the compensation framework and noted that estimating the impact of the rule change on compensation costs is complex as there are many, often countervailing, factors that need to be taken into account. The compensation cost ultimately passed through to market participants and consumers will be a function of netting off at several levels, including:

- Netting off across different FCAS markets: FCAS compensation in the final rule will be a function of the intervention event's positive and negative impacts on enablement targets for the eight FCAS markets (four markets for services that raise frequency and four

90 AEMC, *Application of compensation in relation to AEMO interventions, Rule determination*, 19 December 2019.

91 Since December 2019, intervention pricing is no longer used when AEMO intervenes in the market to address a system security issue such as inadequate system strength, inertia or voltage control. As such, compensation is no longer payable to participants dispatched differently due to such interventions (consistent with the fact that no compensation is payable where a participant is dispatched differently due to a system security constraint).

92 AEMC, *Application of compensation in relation to AEMO interventions, Rule determination*, 19 December 2019, p. iv.

93 For further detail on stakeholder responses to the consultation paper, refer to the Compensation draft determination, pp. 40-44.

markets for services that lower frequency). Changes in enablement targets and thus revenue for one FCAS market (e.g. a raise service) may be offset by changes in targets and thus revenue for another service (e.g. a lower service).[94] As a result, *net* changes in FCAS revenue may tend to be small (all else being equal) since, for example, increases in enablement of raise services may be offset to some degree by reductions in enablement of lower services and vice versa. Accordingly, the compensation recovery amount (passed through - depending on the nature of the service obtained by the intervention - to generators, small generation aggregators and market customers) can be expected to be lower than would be the case under a "one way" approach to compensation.[95] The "two way" approach to compensation in the final rule is a key difference to the "one way" approach proposed by AEMO, where only FCAS revenue losses would be compensated without the requirement to repay gains.

- Netting off across energy and FCAS: Under the final rule, the compensation ultimately payable to a participant under clause 3.12.2 will be the sum of energy compensation and FCAS compensation. Depending on the value of each, this process may lead to a lower net compensation figure than under current arrangements. For example, a participant may be entitled to receive compensation for lost energy revenue as an affected participant but required to repay FCAS revenue gains (and vice versa). In such circumstances, the net amount of compensation paid would be less than would otherwise be the case. Examples of such effects were observed in the Commission's analysis of changes in energy dispatch and FCAS enablement targets resulting from intervention events, discussed in Section 4 of the draft determination.
- Netting off across a participant's portfolio: As per the current framework, compensation under clause 3.12.2 is netted out across all units owned by a given participant: some units may be better off, some may be worse off due to an intervention and the compensation paid to, or by, the participant takes account of gains and losses across the participant's portfolio.
- Application of the $5,000 threshold: compensation payments to or by participants under clause 3.12.2 are subject to a $5,000 threshold below which compensation is not payable. The principle behind the threshold is to prevent or limit claims for which the processing and determination costs are likely to exceed the compensation payable.

The Commission also notes that AEMO has identified an issue (concerning generators and loads becoming trapped in their FCAS trapeziums) that may impact the accuracy of the intervention pricing run enablement targets which would be used to calculate FCAS compensation.[96] If this problem were to occur and negatively impact the position of a participant compensated under clause 3.12.2, it could seek to lodge an adjustment claim under clause 3.12.2(f). This issue is discussed further in Appendix B.4 of the draft determination. After consultation with the Intervention Pricing Working Group, AEMO has

94 See Appendix B.3 of the draft determination for an explanation of how FCAS bids take the form of the generic "FCAS trapezium".

95 The compensation recovery amount is the sum of the compensation paid by AEMO to directed participants (net of the trading amounts retained by AEMO in accordance with clause 3.15.6(b) of the NER), compensation paid by AEMO to affected participants and market customers with scheduled loads, *net of amounts paid by affected participants to AEMO*, and costs paid by AEMO to independent experts. See clause 3.15.8(a) and (e) of the NER.

96 AEMO, *Intervention pricing methodology, Final report and determination*, September 2018.

developed a solution, however this is yet to be implemented. AEMO has determined that the proposed change to NEMDE should be made "as resources allow".[97]

In addition to the above complexities, the Commission notes that, while the cost of energy (and hence the cost of compensation for energy directions) is recovered entirely from market customers and ultimately consumers,[98] the cost of FCAS (and hence the cost of compensation resulting from FCAS directions) is shared among a variety of participants depending on the nature of the service in question.[99]

- Contingency FCAS costs (and hence the cost of compensation for contingency FCAS directions) are recovered in proportion to the energy consumed or generated by relevant market participants: raise services are recovered from market generators or market small generation aggregators. Lower services are recovered from market customers.[100]
- Regulation FCAS costs (and hence the cost of compensation for regulation FCAS directions) are recovered from participants in accordance with a causer-pays or contribution factor procedure. Under this approach, regulation FCAS costs are recovered from market participants deemed to have "caused" the need for the service, where this is possible to determine from metering. The residual amount of regulation FCAS costs that cannot be allocated to metered "causers" is smeared across all market customers based on energy consumption.[101] [102]

The Commission has reviewed recent AEMO intervention events (both RERT activations and directions for energy or FCAS, including those issued during the SA islanding event in early 2020) to understand how the inclusion of FCAS might change the quantum of compensation paid under clause 3.12.2.

The Commission notes that it is not possible to estimate with any precision how the inclusion of FCAS will impact affected participant compensation costs as that will depend on the frequency and nature of interventions and the circumstances applicable at the time.

Our analysis shows that FCAS compensation amounts could be highly variable but the cost to consumers of compensation for FCAS would likely be a small fraction of the total costs associated with FCAS enablement revenues. Box 2 details this analysis.

97 AEMO, *Intervention pricing methodology, Final report and determination, September 2018,* p. 8.

98 Clause 3.15.8(a) of the NER.

99 Clause 3.15.8(e) of the NER.

100 AEMO, *Settlements guide to ancillary services payment and recovery*, February 2020, p. 7.

101 ibid.

102 The NER currently excludes non-metered generation from the allocation of the residual share of regulation FCAS costs - effectively excluding this class of participant from any regulation cost liability. Under the draft *Primary frequency response incentive arrangements* rule, published on 16 September 2021, non-metered generation would be treated the same as non-metered loads for the purposes of allocating regulation costs and costs for frequency performance payments. Refer to p. 62 of the draft determination for the *Primary frequency response incentive arrangements* rule change.

BOX 2: THE COMMISSION'S ANALYSIS OF ESTIMATED FCAS COMPENSATION COSTS IN RECENT AEMO INTERVENTION EVENTS

The Commission estimated that including FCAS in the compensation framework in the first quarter of 2020 would have added costs accounting for less than one per cent of the total FCAS costs incurred by the market in Q1 2020 (total FCAS costs in Q1 2020 were $227m, due largely to the need to procure FCAS from within SA during the 18 day islanding event: AEMO, *Quarterly Energy Dynamics, Q1 2020*, April 2020, p. 25). In relation to RERT activations, our analysis suggests that affected participant compensation payable for FCAS over the same period would have comprised less than approximately $400,000.

This estimate of $400,000 is not precise due to the netting out effects noted above. For example, in some instances, we observed that the inclusion of FCAS in the compensation framework would have resulted in lower total compensation being paid to an affected participant (since negative FCAS compensation would reduce positive energy compensation).

The approximate figure of $400,000 contrasts with the more than $4.8m paid in energy related affected participant compensation following the January 2020 RERT activations, the majority of which ($4.74m) was paid in connection with the RERT activation in NSW and Victoria on 31 January 2020 (this difference in energy and FCAS compensation reflects that FCAS prices are typically much lower than energy prices). This compensation quantum is considerably higher than previous affected participant compensation payments following RERT activations and reflects that the spot price was at the market price cap for several hours that day.

By contrast with the events of 31 January 2020, no affected participant compensation was paid in relation to the RERT activation in Victoria on 30 November 2017, and $170,000 in compensation was paid in connection with the RERT activation in Victoria and South Australia on 19 January 2018 (AEMO, *Activation of unscheduled reserves for Victoria – 30 November 2017*, May 2018, p. 9, and AEMO, *Activation of unscheduled reserves for Victoria and South Australia – 19 January 2018*, May 2018, p. 9). Affected participant compensation paid in connection with the RERT activation on 24 January 2019 was $3.3m, and on 25 January 2019 was $237,000 (AEMO, *RERT report for 2018-19)*. At the time of this determination, since the SA islanding event, the RERT has been activated only twice - on 17 December 2020 in NSW and 25 May 2021 in QLD. Total compensation costs across both events totalled approximately $32,000 (AEMO, *RERT end of finacial year 2020-21 report,* August 2021, p. 5).

Given the relative cost of energy and FCAS, it is reasonable to expect that FCAS compensation costs associated with such events would be less than the quantum of energy compensation paid to affected participants in connection with these events. It can also be expected that the FCAS compensation costs calculated by the Commission for the South Australian islanding event are outliers and higher than might be expected in future intervention events.

The Commission notes that directions issued in South Australia in early February 2020 also resulted in changes to several participants' FCAS enablement targets (no directions for energy

or FCAS have been issued since February 2020, so this example contains the latest data on which to base cost estimates). While most changes in targets were small, there were instances where the inclusion of FCAS would have had a material impact on the quantum of compensation paid to or by affected participants. However, having regard for the amount of compensation that would be paid to participants under clause 3.12.2, and the amount of compensation that would be paid by participants to AEMO, the net cost of FCAS compensation associated with the directions issued on 1 and 2 February 2020 would have been in the order of more than $220,000 being repaid to AEMO. As such, the inclusion of FCAS in the compensation framework would not, in connection with these intervention events, have increased costs to other market participants and consumers.

A final consideration, as noted above in relation to the impact of FCAS compensation on market participants, is that since December 2019, compensation under clause 3.12.2 is only payable in connection with intervention events to address a shortage of energy or FCAS (i.e. interventions which trigger intervention pricing). Section 1.4.1 noted that, in 2019-20, AEMO issued six directions for reliability to market participants and RERT was activated on four occasions. In contrast, system security directions were in place for approximately 30% of 2019-20.[103]

This is critically important in considering the impact of the rule change request submitted by AEMO because these intervention events are infrequent compared with interventions to maintain system security (e.g. system strength directions which no longer trigger intervention pricing, meaning affected participant compensation is no longer payable in connection with them). This means that the cost implications of including FCAS in the affected participant compensation framework are considerably more limited than they would have been had such compensation still been payable in connection with security interventions.

Further, interventions to address a shortage of energy or FCAS are generally of short duration (e.g. four to six hours) while security interventions can last for several days and in some cases weeks. Accordingly, the quantum of compensation payable in connection with interventions which trigger intervention pricing is likely to be relatively limited.

3.2.2 How should participants affected by intervention events be compensated with respect to FCAS?

The AEMO rule change request proposed amending clause 3.12.2(j) so that an affected participant could lodge an adjustment claim in order to seek compensation in relation to FCAS losses. The proposal did not involve the initial, automatic calculation of compensation that occurs with respect to energy losses and gains resulting from an intervention event. As such, the proposed approach (allowing affected participants to lodge an adjustment claim in relation to FCAS losses) would compensate affected participants which are negatively impacted by an intervention but not address the reverse situation.

103 Reliability Panel, *2020 Annual market performance review, Final report,* 20 May 2021, p. 113.

This raises two issues:

1. Should participants affected by intervention events be required to lodge an adjustment claim if they have suffered loss with respect to FCAS revenue as a result of an intervention event? This would increase administrative costs to both participants and AEMO relative to the approach adopted in relation to energy.[104]
2. This approach means that the participant will only lodge an adjustment claim in relation to FCAS if it is out of pocket.[105]

This in turn raises questions about whether the proposed approach strikes an appropriate balance between the interests of participants affected by intervention events on the one hand and, on the other, market participants and consumers who bear the cost of compensation.[106] Allowing participants to claim compensation for FCAS losses but not requiring them to repay FCAS gains is inconsistent with the objective of the compensation framework[107] and would result in higher compensation costs being passed on to other market participants and consumers.

Accordingly, the Commission's final determination is to incorporate two-way, automatic compensation for FCAS revenue into clause 3.12.2. This is achieved by including a compensation calculation for ancillary service providers in respect of their scheduled ancillary service generating units and loads in clause 3.12.2(a)(3), and including ancillary services prices in the compensable factors in clause 3.12.2(a1) (previously clause 3.12.2(j), as suggested by AEMO in its rule change request). Under this approach, participants do not need to lodge a claim for compensation. Instead, compensation (either payable to or by the participant) is automatically calculated by AEMO based on a comparison of the participant's FCAS enablement targets in the two runs of NEMDE.[108]

This approach was largely supported by stakeholders in response to both the consultation paper and draft determination. Ten submissions were received in response to the consultation paper and most supported the approach of calculating FCAS compensation automatically and on a two-way basis. These are summarised in section 4.2 (pp. 40-44) of the draft determination. Four submissions were received in response to the draft determination. Of these, three supported the approach to FCAS compensation (EnergyAustralia, AGL and PIAC), including AGL specifically indicating its support for

104 If a participant is affected with respect to energy revenue, compensation is in the first instance calculated automatically by AEMO without the participant having to lodge a claim.

105 This is reflected in the AEMO rule change request title, "Additional compensation for FCAS losses", and the reference on page 3 of the rule change request to participants who are "negatively impacted".

106 For directed and affected participant compensation, energy direction compensation costs are passed through to market customers and ultimately to consumers: clause 3.15.10C(a) and (b). However, for ancillary service directions, compensation costs are recovered consistent with the cost recovery approach for the various FCAS markets - that is, from generators, small generation aggregators and market customers: clause 3.15.10C(e) - (g).

107 Articulated for all participants affected by intervention events in clause 3.12.2(a0) of the final rule.

108 Unlike energy compensation, FCAS compensation does not need to account for a participant's actual generation or consumption, as FCAS revenue is based primarily on enablement and not actual performance. A participant's actual performance will be influenced by any FCAS they provide, but this will be reflected in energy compensation amounts, as discussed in detail in section 5.2.1.

comparing dispatch and "what-if" targets to determine affected participant compensation for FCAS.[109] [110]

While AEMO supported the overall intent of the draft rule, it noted that the approach in the draft rule will have greater upfront implementation costs.[111] Further discussions with AEMO have clarified the degree of work involved in implementing the proposed changes. This was addressed in Appendix A of the directions paper (refer to pp. 32-33), where the Commission noted that the upfront costs were likely to be offset by the lower costs due to the netting off of FCAS compensation through a two-way compensation process.

The Commission is satisfied that the automatic, two-way approach to FCAS compensation adopted in the draft rule and confirmed in the final rule is consistent with the objective of the compensation framework and appropriately balances the interests of market participants and consumers. As such, the Commission considers that the final rule will better contribute to achieving the NEO than the solution proposed by AEMO.

3.2.3 Should FCAS liabilities be included in direct costs incurred or avoided?

In accordance with clause 3.12.2(j)(1) (paragraph (a1)(1) in the final rule), AEMO takes into account direct costs incurred or avoided when it calculates compensation. For example, if an affected participant is dispatched less as a result of an intervention, it will be entitled to receive compensation for loss of revenue, net of the direct costs (e.g. fuel costs) it avoided as a result of generating less energy.

Conversely, if an affected participant is dispatched more as a result of an intervention, it will be required to repay to AEMO the additional revenue earned, net of the additional costs it incurred as a result of generating more energy. AEMO estimates avoided or incurred direct costs using short run marginal cost data that is assembled for planning purposes.[112]

AEMO notes in its rule change request that FCAS costs have been rising and the Commission notes that FCAS costs reached record levels in Q1 2020 (see figure B.2 in Appendix B of the draft determination). During the South Australian islanding event in early 2020, high FCAS costs prompted several wind farms to reduce their output to reduce their FCAS liabilities. For example on 12 February 2020, when the South Australian raise 60 second FCAS price spiked to $14,500/MWh for two hours, 11 of 14 online South Australian wind farms self-curtailed output due to high FCAS liabilities.[113] [114]

In the consultation paper, the Commission explored whether compensation under clause 3.12.2 should be calculated net of FCAS costs (liabilities) incurred or avoided, consistent with the approach adopted in relation to energy costs incurred or avoided (fuel, maintenance, staff).

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109 AGL, Submission to the draft determination, p. 1.

110 Submissions are available on the project page here: https://www.aemc.gov.au/rule-changes/compensation-market-participants-affected-intervention-events

111 AEMO, Submission in response to the draft determination, 6 November 2020, pp 2-3.

112 Thus the process is relatively automatic and is not dependent on the specific circumstances of a given intervention event.

113 AEMO, *Quarterly Energy Dynamics, Q1 2020,* April 2020, p. 29.

114 Under the FCAS framework, contingency raise FCAS costs are pro-rated over market generators based on their energy generation in the trading interval.

Such an approach would be in line with the reality that many providers of FCAS contingency in particular also have to pay for that service, as the FCAS contingency recovery mechanism is based on the total energy generated in the trading interval. Accordingly, this cost forms part of the short run cost of operating the unit, similar to the cost of fuel.

In considering whether FCAS liabilities should be taken into account in determining the quantum of compensation under clause 3.12.2, it is appropriate to consider whether the additional cost and complexity of taking this into account as part of the automatic calculation of compensation is warranted. The consultation paper noted that it may be more efficient to allow affected participants to lodge an adjustment claim under clause 3.12.2(f) when exceptional circumstances, such as those during the recent SA islanding event, impact their FCAS liability in a material way.[115]

In submissions to the consultation paper, several stakeholders expressed support for automatically calculating FCAS compensation net of FCAS costs (liabilities) incurred or avoided, or allowing affected participants to lodge claims if it was not cost effective for AEMO to do this.

The Commission's draft determination concluded that it would not be efficient to incorporate FCAS liability adjustments as part of the automatic calculation of affected participant compensation.[116] This was due to two factors:

- The data used for the purpose of taking into account other direct costs (e.g. fuel costs) incurred or avoided by affected generators is static (being drawn from the data set that underpins the Integrated System Plan). By contrast, the data used to calculate FCAS liabilities is dynamic: it changes to reflect not only the varying costs of FCAS over time, but also the changing causer pays contribution factors which determine how the cost of regulation FCAS is apportioned to market participants.
- The data currently used to calculate compensation under clause 3.12.2 is drawn from the market management system , while the data needed to calculate FCAS liabilities sits outside the market management system. Combining the two systems to recalculate liabilities automatically would be complex and, during normal operating conditions, would likely have limited impact on the compensation payable to or by affected participants.

AEMO expressed support for this approach in its submission to the draft determination while other stakeholders did not comment on this aspect of the draft rule.[117]

Accordingly, the position in the final rule is unchanged: AEMO is not required to take into account changes in FCAS liabilities when determining the quantum of energy and FCAS compensation payable to or by participants affected by intervention events. However, existing paragraphs (f) and (j) (now (a1) in the final rule) in clause 3.12.2 allow participants to lodge

115 This administrative cost and complexity was a factor in the Commission's final determination and rule to establish a demand response mechanism - AEMC, *Wholesale demand response mechanism, Rule determination,* 11 June 2020. The Commission determined that, to reduce the cost of implementing the demand response mechanism, FCAS costs would not be recovered from demand response service providers. This decision was informed by advice from AEMO that implementing this would be costly and would provide limited benefits. Similar factors have informed consideration of this issue in relation to participants affected by intervention events.

116 Refer to Section 4.3.6 of the Compensation draft determination (pp. 49-51).

117 AEMO, Submission to the draft determination, p. 3.

an adjustment claim if they consider that their compensation (or liability to repay revenue) should be redetermined. While paragraph (a1) refers to direct costs such as fuel costs, incremental maintenance and manning costs, this list of factors is inclusive rather than exhaustive.[118]

As such, a participant entitled to compensation under clause 3.12.2 can seek an adjustment having regard to the items set out in paragraph (a1), namely: direct costs incurred or avoided as a result of the AEMO intervention event, any amounts which the participant is entitled to receive under clauses 3.15.6 and 3.15.6A, the regional reference price, and ancillary service prices.

The final rule also allows market customers with scheduled loads to submit an adjustment claim for the items listed in (a1), adding symmetry between generators (compensated as affected participants) and loads (compensated differently to affected participants with respect to energy under the compensation framework). This contrasts with the current rule, where the calculation of compensation for scheduled loads does not allow AEMO to take into account costs incurred or avoided, which could result in over-compensation or under-compensation.

Given that intervention events which trigger intervention pricing are generally of short duration (e.g. four to six hours), the Commission does not anticipate that scheduled loads (as distinct from affected participants) would often experience changes in FCAS liabilities which exceed the $5,000 threshold. As such, the ability to lodge a claim to recoup increased FCAS liabilities (without a corresponding obligation to repay reductions in FCAS liabilities) is not expected to result in significant additional compensation costs being passed through to other market participants and consumers.

3.3 Conclusions

Having regard to the issues explored throughout the rule change process, feedback from stakeholders, further analysis, the NEO and assessment framework, the Commission has determined that it is appropriate to include FCAS in the compensation framework in clause 3.12.2 but not in the manner proposed by AEMO. The more preferable final rule instead incorporates FCAS compensation as an automatic, two-way calculation, consistent with the approach to compensating affected participants with respect to energy revenue losses and gains. This is consistent with the approach in the draft rule.

The Commission considers that adopting a two-way approach to FCAS compensation is consistent with appropriate risk allocation and the objective of the compensation framework which is to put participants in the position they would have been in but for the intervention.

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118 Directed participants already lodge additional compensation claims to recoup the cost of FCAS liabilities resulting from the provision of services under direction. The provision of the NER under which such claims are made (clause 3.15.7B(a3)) is similarly worded to clause 3.12.2(j) (now paragraph (a1) in the final rule). See, for example, IES, *AEMO Directions to participants in South Australia in March 2020, Final determination report*, 28 August 2020, p. 56. Having regard for this example, it would be open to an affected participant to lodge an adjustment claim if changes to its dispatch targets resulted in a material change in its FCAS liabilities (noting that an adjustment claim can only be lodged if it exceeds the $5,000 compensation threshold). Given that intervention events which trigger intervention pricing are generally of short duration (e.g. four to six hours), the Commission does not anticipate that affected participants (as distinct from directed participants) would often experience changes in FCAS liabilities which would exceed the $5,000 threshold.

Simply allowing participants to claim compensation for losses, but not requiring them to repay gains, would not put participants in the position they would have been in but for the intervention. Such an approach would leave the affected participant better off at the expense of other market participants and consumers who bear the cost of FCAS compensation. As noted by the National Irrigators' Council in its response to the consultation paper,[119] energy consumers are not at fault when an AEMO intervention event occurs and have no opportunity to avoid the additional cost that is passed through to them after the event. Therefore, the more preferable final rule better meets the NEO and the assessment framework principles of consistency and appropriate risk allocation.

The final rule also promotes efficiency by avoiding the administrative cost to both participants and AEMO of processing individual adjustment claims. Adopting a consistent approach to the compensation of energy and FCAS will avoid distortionary market signals which could undermine the case for investment in technologies that provide frequency services at a time when the need for such services is growing.

Incorporating the compensation of FCAS losses and gains into the process already used for energy (with some adjustments) ensures that the operation of the framework is transparent and predictable. Rather than ad hoc adjustment claims being made by individual participants (as per the AEMO proposal), the process will be predictable and the manner in which compensation is calculated based on clear formulae. By contrast, the manner in which adjustment claims are processed is not based on a formulaic approach. Instead, this is a matter for AEMO (or, for larger claims, an independent expert) to determine on a case by case basis.

While the approach to FCAS in the final rule is consistent with the approach in the draft rule, the final rule adopts a slightly different approach to the structure of clause 3.12.2. In particular, the draft rule included FCAS compensation in the compensation payable to or by affected participants and market customers with scheduled loads. By contrast, the final rule refers to ancillary services providers, regardless of whether they generate or consume energy (i.e. no distinction is drawn between an affected participant providing FCAS and a scheduled load providing FCAS). In this way, compensation for changes in FCAS enablement targets will be calculated consistently for all providers of FCAS. This revised approach does not change the approach to calculating compensation in the draft rule; it simply enables the compensation framework under clause 3.12.2 to align with changes to the NER to be made by the Integrating storage rule change.

The Commission concludes that the more preferable final rule will better contribute to the achievement of the NEO.

119 National Irrigators' Council, Submission to the consultation paper, p. 1.

4 COMPENSATION FOR SCHEDULED LOADS AFFECTED BY INTERVENTIONS

BOX 3: SUMMARY OF KEY POINTS

This chapter discusses two main components of the Commission's final rule determination related to compensation for scheduled loads:

- The formula for scheduled load compensation should be amended so that it is based on a volume-weighted approach across scheduled load bid bands, and
- Scheduled load compensation with respect to energy costs should continue to be a one-way process, such that no compensation will be payable by scheduled loads to AEMO with respect to energy.

Each of these is consistent with the approach adopted in the draft rule determination.

4.1 Proponent's view

AEMO's rule change request proposed to amend the definition of BidP, an input in the formula used to calculate compensation for scheduled loads which are dispatched differently as a result of an intervention event to address a shortage of energy or FCAS (i.e. an intervention event which triggers intervention pricing). In particular, AEMO proposed to replace the current definition of BidP ("the price of the highest priced price band specified in a dispatch bid for the scheduled load in the relevant intervention price trading interval") with a new definition ("the highest priced band the scheduled load is dispatched from").[120]

4.2 Commission's analysis

AEMO's rule change request raised two major considerations (discussed in Section 5 of the draft determination):

1. Should the definition of BidP be amended as proposed by AEMO?
2. Should energy compensation for scheduled loads be one-way or two-way?

This section outlines the Commission's analysis of these considerations and the final rule determination.

4.2.1 Should the definition of BidP be amended as proposed by AEMO?

As discussed in section 1.3.1, the formula used to determine compensation for scheduled loads affected by interventions is:

120 AEMO, *Rule change proposal: Affected participant compensation for scheduled loads*, 19 September 2019, p. 4.

Compensation per trading interval = ((RRP[121]x LF[122])) - BidP) x QD[123]

This is set out in Clause 3.12.2(a)(2) of the current Rules. The Commission agreed with AEMO that there is a need to examine this provision, consistent with AEMO's objective of ensuring that scheduled loads are not under-compensated where they are dispatched differently due to an intervention event. However, it is not clear that the solution proposed by AEMO will achieve this objective.

To understand this, it is important to understand how scheduled loads are dispatched in the NEM and, in particular, how their treatment differs to that of generators. This is detailed in Box 4.

BOX 4: HOW SCHEDULED LOADS ARE DISPATCHED IN THE NEM

Clause 3.8.1(a) of the NER requires AEMO to operate a central dispatch process to dispatch scheduled generating units, semi-scheduled generating units, scheduled loads, scheduled network services and market ancillary services in order to balance power system supply and demand, using its reasonable endeavours to maintain power system security in accordance with Chapter 4 and to *maximise the value of spot market trading on the basis of dispatch offers and dispatch bids*.

Clause 3.8.1(b) provides that the central dispatch process should aim to *maximise the value of spot market trading* i.e. to *maximise the value of dispatched load* based on dispatch bids less the combined cost of dispatched generation based on generation dispatch offers, dispatched network services based on network dispatch offers, and dispatched market ancillary services based on market ancillary service offers. The value of dispatched load equals (dispatched load x dispatch bid band price, as referred to regional reference node) summed for all scheduled loads: AEMO, *Guide to scheduled loads,* p.9.

Maximising the value of spot market trading is known as the objective function of NEMDE. It is expressed as being subject to dispatch offers, dispatch bids and market ancillary service offers, as well as a list of network constraints, power system security requirements and other factors set out in clause 3.8.1(b) sub-paragraphs (1) to (12).

Clause 3.8.7 of the NER covers the structure of dispatch bids. A market participant must submit a scheduled load's maximum capacity in ten price bands in the daily energy bid. Each price band associates a quantity of electricity consumption at the load's local connection point with a local price for the scheduling of that quantity of electricity. Each band price represents the maximum market clearing price that the market participant is willing to pay before decreasing the electricity consumption of their scheduled load by up to the MW increment in that band for the specified trading interval.

121 Regional reference price.

122 Applicable loss factor.

123 The difference between the amount of electricity consumed by the scheduled load during the relevant intervention price 30-minute period determined from the metering data and the amount of electricity which AEMO reasonably determines would have been consumed by the scheduled load if the AEMO intervention event had not occurred.

Under clause 3.8.7(h) of the NER, all band prices for scheduled loads (when referred to the relevant regional reference node via their transmission loss factor) must be less than or equal to the market price cap; and greater than or equal to the market floor price.

A market participant may register a scheduled load to provide FCAS. Once a market participant has registered a scheduled load for any of these FCAS, the market participant must submit a daily FCAS offer for that service, in a similar format to energy market dispatch bids. The FCAS offer band price is the price (in $/MWh) that the market participant is willing to accept in return for enabling the amount of FCAS MW response within that FCAS offer band. In other words, unlike energy, scheduled loads and generators bid FCAS in the same manner.

In accordance with NEMDE's objective function (and noting that this is subject to network constraints, power system security requirements and other factors set out in clause 3.8.1):

- generators are dispatched in order from least cost to highest cost until available generation is sufficient to meet demand. By contrast, scheduled loads are dispatched in descending order of price (i.e. those with the highest willingness to pay are dispatched first).
- the energy and FCAS bands of scheduled loads and scheduled generating units are jointly scheduled to determine the least cost/greatest value way of satisfying both the energy demand and FCAS requirements for all regions.

As the price bands of scheduled loads can be marginally or partially dispatched by the NEMDE solver algorithm, bands so dispatched are able to set the market price (either energy or any FCAS) for a trading interval.

For a scheduled load to be dispatched, the bid band price must be higher than the regional reference price (spot price). If the bid band price is lower than the spot price, the load will not be dispatched because the spot price was not low enough to justify consumption in those bands.

While generation output increases as the spot price rises, scheduled load consumption increases as the spot price falls. The total amount of energy consumed changes based on the level at which scheduled loads are dispatched. By contrast, if a generator changes its position, the amount of demand does not change. A sample scheduled load dispatch bid structure and worked example are set out in Appendix E of the draft determination.

Source: AEMC and AEMO, *Guide to scheduled loads*.

Given that scheduled loads are dispatched in descending order of price (i.e. those with the highest willingness to pay are dispatched first), it follows that whenever a scheduled load is dispatched, the "value of the highest priced band the scheduled load is dispatched from" (the amendment proposed by AEMO) *is* the "highest price band specified in a dispatch bid" (the definition of BidP currently in the Rules) for that scheduled load. This means that changing the Rules in the manner proposed would not change the compensation outcome and achieve AEMO's desired objective of avoiding under-compensation.

How should BidP be defined?

The objective of the compensation framework in clause 3.12.2 is to put participants (whether in respect of their loads, generators or ancillary service units) in the position they would have been in had the intervention not occurred. This objective is currently articulated in clause 3.12.2(a)(1) in relation to affected participants but is not replicated in clause 3.12.2(a)(2) with respect to scheduled loads. The Commission has determined that clause 3.12.2 should apply the objective to both affected participants and scheduled loads. Accordingly, the final rule includes an over-arching objective that applies to all participants eligible for compensation under clause 3.12.2 (this is discussed in further detail in section 5.2.2).

For scheduled generators (defined as affected participants), the way that compensation is calculated for energy revenue is not set out in a formula, as it is for scheduled loads. Nonetheless, the effect of the current provisions (and the final rule) in clause 3.12.2(c)(1) can be expressed as follows.

DC = RRP x QD

where

- DC is the amount of compensation to be paid
- RRP is the intervention price (i.e. the price yielded by the intervention pricing run)
- QD is the difference between the amount of energy that would have been generated but for the intervention and the amount of energy actually generated.

The value of DC can be positive or negative. If it is positive, compensation is payable by AEMO to the participant (net of direct costs avoided by the participant as a result of generating less energy); if it is negative, the participant is required to repay the additional revenue earned to AEMO (net of direct costs incurred in the course of generating more energy).

Note that in the case of generators, no adjustment is made according to the generator's bids.

In the case of scheduled loads, the Commission has determined that energy compensation should be calculated based on the following broad approach (leaving aside loss factors for the moment):

DC = (RRP - BidP) x QD

where

- DC is the amount of compensation to be paid
- BidP is the value of the band from which the load is dispatched
- RRP is the intervention price
- QD is the energy consumed by the load based on metering data less the amount of energy that the load would have consumed based on dispatch targets in the intervention pricing run (i.e. what it would have consumed but for the intervention).

As can be seen, the difference between the scheduled generator and affected participant formulas is BidP, an input that is designed to reflect the value of the load that was (or was not) consumed as a result of the intervention.

Currently, BidP is defined as "the price of the highest priced *price band* specified in a *dispatch bid* for the *scheduled load* in the relevant *intervention price trading interval".* Importantly, this definition focuses on a single band and, in particular, the highest band from which a scheduled load will be dispatched. When a scheduled load is dispatched, the first band to be dispatched will of necessity be the highest band in the load's dispatch bid.

The Commission has determined that, in contrast to the current approach (and to AEMO's proposed approach), scheduled load compensation should be calculated based on a volume-weighted approach that treats all bid bands independently of one another. That is, there should be no difference between the total compensation paid to three loads each with a bid in one bid band, and a single load with equivalent bids in three bid bands. The volume-weighted approach was a suggestion put forward by AGL in its submission to the consultation paper.[124]

In addition, the Commission has determined that only those values for DC which are positive should be included in the calculation of compensation (explained further below).

Accordingly, the final rule includes the following formula:[125] [126]

$$DC = \Sigma b \epsilon B \max(0,((RRP \times LF) - BidP_b) \times QD_b)$$

Where:

- DC (in dollars) is the amount the Market Customer is entitled to receive for the consumption of energy in respect of that scheduled load for the relevant intervention price trading interval;
- $\Sigma b \epsilon B$ represents the sum over each price band "b" in the set of all non-zero price bands for the scheduled load "B".
- max(0,x) represents the maximum of the two values 0 and x.
- RRP (in dollars per MWh) is the regional reference price in the relevant intervention price trading interval determined in accordance with clause 3.9.3(b);
- LF where the scheduled load's connection point is a transmission connection point, is the relevant intra-regional loss factor at that connection point or where the scheduled load's connection point is a distribution network connection point, is the product of the distribution loss factor at that connection point multiplied by the

124 AGL, Submission to the consultation paper, p. 3.

125 Clause 3.12.2(d) of the final rule. Note that in the formula, max (0,x) is equal to x whenever x is positive and 0 whenever x is negative. This effectively sets any negative DC to zero. In relation to the definition of QD_b, the amount of electricity consumed by the scheduled load, and the amount which AEMO reasonably determines would have been consumed by the scheduled load, are determined by AEMO based on metering data and the intervention pricing run respectively.

126 Note that the definition of QD_b in the final rule refers to "the amount of energy consumed...**less** the amount of energy which AEMO reasonably determines...". The use of "less" replaces the word "difference" in the current and draft rule definitions of QD_b. This is in response to comments from AEMO in its submission to the draft rule, which suggested the use of "difference" was ambiguous. Stanwell supported the use of "less" on p. 2 of its submission to the directions paper.

relevant intra-regional loss factor at the transmission connection point to which it is assigned;

- b represents each price band in the set of all non-zero price bands, "B", for the scheduled load in the relevant intervention price trading interval.
- $BidP_b$ (in dollars per MWh) is the price offered by the scheduled load in the price band "b" in the relevant intervention price trading interval;
- QD_b (in MWh) is the amount of energy consumed by the scheduled load in that price band during the relevant intervention price trading interval (based on metering data) less the amount of energy which AEMO reasonably determines would have been consumed by the scheduled load in that price band during the relevant intervention price trading interval if the AEMO intervention event had not occurred (based on the estimated level of dispatch determined through the intervention pricing run),

provided that if QD_b is negative for the relevant intervention price trading interval, then the amount that the Market Customer is entitled to in respect of that scheduled load for that intervention price trading interval is zero.

The treatment of loads in the final rule is somewhat different to the treatment of generators for reasons set out below.

Suppose that:

- a load of 100 MW is bid in at $1,000/MWh,
- due to an intervention event, the dispatch run price is $500/MWh but the intervention price is $10,000/MWh.

In this case, the load of 50MWh[127] will be dispatched (because the bid price of $1,000/MWh is higher than the dispatch run price of $500/MWh) but the market will clear based on the intervention pricing run price, not the dispatch run price. Accordingly, the scheduled load will be required to pay $10,000/MWh, leading to a total cost of $500,000, even though it was only willing to pay $50,000.

This means that the scheduled load has overpaid in the amount of $450,000. It follows that to make the participant whole, compensation needs to be paid back to the scheduled load in the amount of $450,000. This financial transfer re-balances the ledger to make good the fact that the scheduled load has overpaid as a result of the application of intervention pricing. In other words, the compensation accounts for the fact that the scheduled load was dispatched (in the dispatch run) even though it would not have chosen to be dispatched at the price yielded by the intervention pricing run. As such, this adjustment protects scheduled loads from unwarranted over-payment.

This approach can be expressed as:

DC = ($10,000 per MWh - $1,000 per MWh) x (50MWh - 0MWh).

127 Being 100MW of load dispatched for thirty minutes. While five-minute settlement has now commenced, this example uses a 30-minute period for simplicity.

Note that because the load derives value from being dispatched, which we assume to be BidP (i.e. its willingness to pay in $ per MWh), compensation is not payable for the whole value paid by the load (i.e. $500,000). Paying the full amount would constitute over-compensation.

How does this volume-weighted approach differ from the current Rules?

Under the current Rules, if a load bids in multiple bands, BidP is the price of the highest priced price band. It follows that even if just a single MW is placed in a high band, BidP is assumed to be equal to that value for all bands**.** The effect of this is to make affected participant compensation for scheduled loads negative (and so treated as zero) most of the time. This is clearly the wrong approach, because it does not follow the principle of putting the scheduled load in the position that it would have been in but for the intervention.

The consultation paper suggested that it may be more appropriate to calculate compensation based on the value of the lowest band from which the load is dispatched.[128] Section 5.6 of the draft determination (pp. 60-64) explores stakeholder comments on the consultation paper in detail.

However, further analysis showed that focusing on a single bid band would allow a participant to maximise the amount of compensation it received through the structure of its bids. For example, by putting 1 MW into the lowest bid band possible that would be dispatched (being a bid band with a value just above the spot price as determined through the dispatch run), a participant could be paid the maximum possible compensation.

AGL in its submission to the consultation paper, suggested that a volume-weighted approach could be adopted, which informed the approach in the draft rule.[129] As noted in section 1.5.2, four stakeholders responded to the draft determination (AEMO, AGL, EnergyAustralia and PIAC). Stakeholders generally supported the draft rule's approach to compensating market customers with scheduled loads and each stakeholder supported the volume-weighted approach to calculating $BidP_b$. PIAC specifically noted that they considered the volume-weighted method was likely to better meet the interest of consumers.[130]

The approach adopted in the final rule is to calculate compensation with respect to each band separately and then sum these amounts. This will remove the potential for participants to skew compensation outcomes by putting a single MW of capacity into a low or high bid band. This removes the risk that unwarranted compensation costs could be passed through to market participants and consumers and is consistent with the draft rule approach.

The Commission considers that the volume-weighted approach adopted in the final rule strikes a fair balance between the interest of scheduled loads and of those market participants and consumers who bear the cost of compensation.[131] The approach ensures

128 AEMC, *Compensation for market participants affected by intervention events, Consultation paper*, 11 June 2020, p. 39.

129 AGL, Submission to the consultation paper, p. 3.

130 PIAC, Submission to the draft determination, p. 2.

131 The issue of which parties bear the cost of compensation will depend on the nature of the intervention that gave rise to the payment of compensation under clause 3.12.2. If the intervention comprised a RERT activation or direction to address a shortage of energy, compensation costs will be passed through to market customers and ultimately consumers. If the intervention comprised a direction to address a shortage of FCAS, compensation costs will be recovered in the same manner as the original service the subject of the direction.

that compensation will be appropriate regardless of the bidding strategy adopted by the scheduled load.

4.2.2 Should compensation for energy be one-way or two-way for scheduled loads?

AEMO stated in its rule change request that scheduled loads are entitled to receive compensation but are not required to repay any amounts to AEMO.[132] By contrast, affected participants (scheduled generators, scheduled network service providers and eligible persons) that are dispatched differently as a result of an intervention may either receive compensation (if they are worse off due to the intervention) or be required to repay revenue to AEMO (if they are better off).[133]

This reflects the objective of affected participant compensation as articulated in the current clause 3.12.2(a)(1): i.e. an affected participant is entitled to receive from AEMO, or must pay to AEMO, an amount that will put the affected participant in the position that the affected participant would have been in had the intervention event not occurred.

No compensation is payable where DC is negative

The consultation paper asked whether the two-way compensation approach that applies to scheduled generators should also apply to scheduled *loads*. Several stakeholders submitting to the consultation paper (CS Energy, ERM Power, EnergyAustralia) supported this view while others did not (AGL and Tesla). The Commission undertook further analysis on the basis of which it determined that a two-way approach to energy compensation is not appropriate for scheduled loads.

The Commission considered how to treat a situation where DC (the value of compensation) is negative. Consider a simplified version of the formula for energy compensation for scheduled loads in clause 3.12.2(d) of the final rule:

$$DC = (RRP - BidP_b) \times QD_b$$

Where:

- DC (in dollars) is the amount the Market Customer is entitled to receive for the consumption of energy in respect of that scheduled load for the relevant intervention price trading interval;
- RRP (in dollars per MWh) is the regional reference price in the relevant intervention price trading interval determined in accordance with clause 3.9.3(b);
- $BidP_b$ (in dollars per MWh) is the price offered by the scheduled load in the price band "b" in the relevant intervention price trading interval;
- QD_b (in MWh) is the amount of energy consumed by the scheduled load in that price band during the relevant intervention price trading interval (based on metering data) less the amount of energy which AEMO reasonably determines would have been consumed by the scheduled load in that price band during the

132 AEMO, Rule change proposal, p. 3
133 Clause 3.12.2(a)(1).

> relevant intervention price trading interval if the AEMO intervention event had not occurred (based on the estimated level of dispatch determined through the intervention pricing run),

For DC to be negative in the above formula, the value of the price band from which the load is dispatched ($BidP_b$ – e.g. $10,000) would need to be higher than the spot price (RRP – e.g. $2,000). Alternatively, the value of QD_b (the difference between the energy actually consumed in that bid band and the amount that would have been consumed but for the intervention) would need to be negative - an issue that is discussed further below.

Suppose to begin with that QD_b is positive. Note that QD_b will be positive where the energy actually consumed in that bid band is greater than the amount of energy that would have been consumed but for the intervention. This will typically be the case because the dispatch run price will generally be lower than the intervention price, and scheduled load consumption increases as the spot price falls.

Now suppose that there is a price band for which (RRP - $BidP_b$) is negative: that is, the price the load is willing to pay (e.g. $1,000/MWh) exceeds the price at which the load was actually dispatched (e.g. $200/MWh). Should compensation be payable by the scheduled load to AEMO in this circumstance?

The Commission considers that compensation should not be payable by the scheduled load to AEMO in this situation. The formula in question was not designed to apply in circumstances where (RRP - $BidP_b$) is negative. To apply such a formula would effectively be saying that scheduled loads should pay back as compensation the surplus that they derived from consuming electricity, which is effectively a "pay-as-bid" approach to determining compensation. By contrast, compensation for scheduled generators is based not on how the generators bid but on how they are cleared (i.e. a "pay-as-cleared" rather than a "pay-as-bid" approach).

The Commission has determined that compensation should not be payable for consuming energy at a price that is lower than a scheduled load would have been willing to pay for it. In effect, the question "what compensation is payable by a load that consumes more energy than it otherwise would have, at a price it is willing to pay?" yields the answer "none".

Accordingly, the Commission has determined that adopting a two-way approach to energy compensation for scheduled loads would not be appropriate and would create perverse outcomes for scheduled loads. This approach is consistent with the detailed submission from AGL in response to the consultation paper which noted that it could not think of a scenario in which it would be appropriate to require scheduled loads to repay revenue to AEMO. The draft rule gave effect to this position by retaining the current provision stating that, where the value of DC is negative, it will be set to zero (meaning no compensation is payable by the scheduled load to AEMO). The final rule adopts a slightly different approach to the draft rule (discussed further below) but the underpinning rationale remains the same.

No compensation is payable where QD_b is negative

The Commission's draft determination also adopted the position that, where QD_b is negative, no compensation should be payable. This approach is confirmed in this final determination, because, for QD_b to be negative, a scheduled load must consume more energy in the intervention pricing run than in the dispatch run. This will only happen in circumstances where the price difference is also negative: i.e. the intervention price is lower than the dispatch run price.

The question of whether compensation should be payable when QD_b is negative hinges on what it means for QD_b to be negative. Suppose that:

- the intervention price is $100/MWh and the dispatch run price is $300/MWh.
- a load of 100 MW is bid to be dispatched at $200/MWh, and so is not dispatched in the dispatch run, but would have been dispatched in the intervention price run
- so the load is not dispatched even though it should have been, leading to a loss of ($100 x 50 MWh= $5,000).

Such outcomes are anomalous and generally occur due to, for example, constraints binding in unintended ways in the intervention pricing run.[134] A negative value for QD_b will be associated with a negative value for (RRP- $BidP_b$). Multiplying these two negative values will produce a positive value for DC. Nonetheless, the Commission has determined that compensation should not be payable where QD_b is negative.

This is consistent with AEMO's current practice when it calculates compensation for scheduled loads. It is also consistent with the submission from AGL to the consultation paper, which noted that scheduled loads could be over-compensated when QD_b is negative. For example, if a scheduled load trips, its consumption in the dispatch run will fall to zero but remain the same in the intervention pricing run until the scheduled load rebids. Paying compensation to the scheduled load in such circumstances is not warranted and would unnecessarily increase costs to consumers.

The Commission concludes that symmetry between generators and loads is not appropriate with respect to energy compensation due to the different manner in which generators and loads are dispatched for energy. As such, the formula in clause 3.12.2(d) of the final rule ensures that compensation is not payable when QD_b is negative. However, as discussed in chapter 3, a consistent two-way approach has been adopted in relation to compensation for FCAS gains and losses because generators and loads are dispatched in the same way with respect to FCAS.

Refinements to draft clause 3.12.2(d) in the final rule

For the reasons outlined above, the Commission remains of the view that energy compensation for scheduled loads should be one-way rather than two-way. However, the

134 Intervention pricing is designed to preserve scarcity price signals which would otherwise be muted as a result of an intervention event. Normally, the intervention price is higher than the dispatch run price. This is because the intervention pricing run excludes units which have been directed on and/or the dampening effect of the RERT on demand. As such, the supply demand balance in the intervention pricing run remains "tight" and prices high, compared with the situation in the dispatch run where the supply demand balance is less tight and prices are lower.

Commission has determined that a refinement to the formula as set out in the draft rule is warranted in light of analysis completed for the Commission by Endgame Economics.

Specifically, the final paragraph in draft rule clause 3.12.2(d) stated:

> provided that if DC or $QD_b$is negative for the relevant intervention price trading interval, then the adjustment that the Market Customer is entitled to in respect of that scheduled load for that intervention price trading interval is zero.

While the formula itself has not changed between the draft rule and final rule, the final rule removes the reference to "negative DC" such that the final paragraph in final rule clause 3.12.2(d) reads:

> provided that if QD_b is negative for the relevant intervention price trading interval, then the amount that the Market Customer is entitled to in accordance with this paragraph in respect of that scheduled load for that intervention price trading interval is zero.

This change has been made because the reference to "negative DC" is superfluous. This is because the formula includes a maxima:

> $DC = \Sigma b \epsilon B \max(0,((RRP \times LF) - BidP_b) \times QD_b)$

The effect of this is that DC in the relevant bid band is equal to the larger of 0 or ((RRP × LF) - BidPb) × QD_b). Accordingly, DC can never be negative (its lowest value will be zero), therefore the reference to "negative DC" in this section of the clause is not required. As stated above, this does not change the policy intent or operation of the formula, just removes a superfluous statement from the Rules.

4.3 Conclusions

Having regard to the issues explored throughout the rule change process, feedback from stakeholders, further analysis, the NEO and assessment framework, the Commission has broadly retained the approach in the draft rule (differences are highlighted in detail in chapter 5). The more preferable final rule amends the definition of BidP and adopts a volume-weighted approach to calculating compensation for scheduled loads. This better addresses AEMO's concern in its rule change request (that the current approach to compensating scheduled loads could lead to under-compensation) and better meets the objective of the compensation framework (to put participants in the position they would have been in but for the intervention event). Accordingly, the Commission considers the more preferable final rule better meets the NEO than AEMO's proposal.

The amended formula also retains the one-way approach to compensating market customers with scheduled loads for energy revenue losses.[135] While the formula for affected participants

135 The final Compensation rule also makes changes to other parts of the Rules to reflect that energy compensation for market customers is one-way. These changes remove any reference to a payment *by* market customers *to* AEMO pursuant to clause 3.12.2 wherever this occurs (clauses 3.15.8, 3.15.9 and 3.15.10C).

(scheduled generators and scheduled network services) requires that compensation may be paid by AEMO or to AEMO, the one-way approach to compensating scheduled loads for energy is appropriate due to the different way that scheduled generators and scheduled loads are dispatched for energy. The method for calculating energy compensation for scheduled generators and scheduled loads in clause 3.12.2(c)(1) and (c)(3) respectively of the final rule reflects this difference.

5 OTHER ELEMENTS OF THE FINAL RULE

BOX 5: SUMMARY OF KEY POINTS

This chapter discusses three main components of the Commission's final rule determination:

- Compensation for energy revenue for affected participants and scheduled loads should be calculated based on actual generation or consumption (consistent with Option 2 in the directions paper). This differs from the approach in the draft rule, which focused solely on the targets in the dispatch and intervention pricing runs.
- The objective of the compensation framework should be set out in an overarching provision which applies to all participants eligible for compensation under clause 3.12.2. This is consistent with the policy intent described in the draft determination (to increase consistency between affected participants and scheduled loads) but adopts a different approach to the draft rule. The approach in the final rule is aligned with the approach proposed in the directions paper.
- AEMO will prepare a methodology which describes the approach to calculating compensation under clause 3.12.2. This was not discussed in the draft determination or directions paper but has been adopted in response to stakeholder comments.

5.1 Proponent's view and stakeholder views

AEMO's rule change request did not propose to change the manner in which it calculates compensation under clause 3.12.2, beyond including FCAS in the compensation framework for affected participants and amending the definition of BidP in the formula used to determine scheduled load compensation. However, throughout the rule change process, stakeholders highlighted the potential for perverse incentives to arise due to the way compensation is calculated and a general lack of transparency with respect to how compensation is calculated by AEMO.

5.2 Commission's analysis

AEMO's rule change request and stakeholder comments raised three further considerations with respect to the application of the compensation frameworks under clause 3.12.2:

1. Does the approach to calculating compensation create perverse incentives?
2. Is there a need for greater transparency as to how compensation is calculated?
3. Is there a need to clarify the objective of the compensation framework?

This section outlines the Commission's analysis of these considerations and final determination.

5.2.1 Does the approach to calculating compensation create perverse incentives?

In response to feedback from stakeholders throughout the rule change process, the Commission analysed the potential for the compensation framework to create perverse incentives. The Commission's final determination is to retain elements of the approach in the current Rules however additional paragraphs have been included to deter gaming of the compensation framework.

Current clause 3.12.2 requires AEMO to calculate compensation by taking the actual amount generated or consumed into account.

- For affected participants, compensation is determined by estimating the (energy) trading amount that the participant would have received but for the intervention event and then deducting the trading amount actually received (based on the participant's final settlement).[136]
- For scheduled loads, as discussed in chapter 4, compensation is calculated using a formula which includes the following key inputs:[137]
    a. QD (MWh): the difference between the amount of electricity consumed (based on metering data) and the amount of electricity which AEMO reasonably determines would have been consumed by the scheduled load if the AEMO intervention event had not occurred
    b. RRP (in dollars per MWh): the regional reference price in the relevant intervention price trading interval, and
    c. BidP (in dollars per MWh): the price of the highest priced price band specified in a dispatch bid for the scheduled load in the relevant intervention price trading interval.

AGL's submission to the consultation paper noted that having regard for actual output/consumption can reward a participant for not following its dispatch targets if doing so will increase the compensation it receives.[138] [139] In response to AGL's submission, the draft determination proposed to change the method for calculating compensation such that AEMO would compare a participant's intervention dispatch run targets with its intervention pricing run targets, but not have regard for the actual amount generated or consumed. The focus on dispatch targets rather than actual consumption/generation aimed to reduce the incentive for a participant to operate its plant in a way that increased the amount of automatic compensation received. It also introduced greater transparency and predictability into the compensation frameworks as the calculation was based on consistent metrics and made clear when a participant was "affected" (that is, if the targets in the two runs of NEMDE were the same, no compensation would be payable).

However, AEMO's submission to the draft determination highlighted that the approach in the draft rule could create different perverse incentives. Specifically, AEMO was concerned that

136 Clause 3.12.2(c)(1) of the current NER.
137 Clause 3.12.2(a)(2) of the current NER.
138 AGL, Submission to the consultation paper, p. 4.
139 Refer to Section 4.2 and Section 5.6 of the draft determination (pp. 40-44 and pp. 60-64) for further detail on responses from other stakeholders to the consultation paper.

the approach in the draft rule could result in over-compensating a scheduled load which does not follow its five-minute energy dispatch targets:[140]

> AEMO considers that a situation may arise where an intervention occurs and a scheduled load does not follow its dispatch instructions. This is most likely to occur where the intervention price is significantly above the price at which the scheduled load expected to be dispatched. In this situation a scheduled load (particularly a battery which does not actually need the energy for an end use) could decide not to consume energy so would incur no actual pool purchase costs and yet it would still receive automatic compensation via this formula. In effect, it can make a profit out of not following dispatch instructions.
>
> However, the assessment of whether or not a scheduled load has followed its dispatch instructions is highly problematic, particularly for a battery which is also likely to be dispatched to provide regulation FCAS services. AEMO has provided a comparison of batteries' performance against their target in Appendix A of this submission which shows that there can be significant variations from the energy target. Further investigation of some of the largest deviations reveals that they were providing regulation FCAS at this time. In some instances the regulation FCAS requirement was greater than their load dispatch such that they ended up generating rather than consuming.

Appendix D provides more detail on how batteries operate in the NEM.

Using actual generation/consumption to calculate compensation for energy

The directions paper[141] explored the implications of AEMO's submission and the calculation of compensation in more detail.

In practice, under the current Rules, AEMO calculates compensation for affected participants and scheduled loads using a combination of actual generation output or consumption (determined from settlement quality metering data) and a participant's dispatch targets from the intervention pricing run and the dispatch run of NEMDE. The targets from the intervention pricing run and dispatch run are used to "scale" the actual generation or consumption of the unit to assist AEMO to determine what would have occurred if the AEMO intervention event had not occurred.

The scaling technique accounts for the disconnect between the point at which a dispatch target is received by a generator (or load) and the point at which the generator (or load) is metered, accounting for auxiliary load. For example, a generating unit may receive an energy target of 100MW from NEMDE but only 90MW is sent out (and paid for via energy revenue) due to auxiliary load consumption behind the meter at a level of 10MW. Calculating compensation based on the 100MW target would result in over-compensation, hence the need to scale the generating unit's actual output.

140 AEMO, Submission to the draft determination, p.4.

141 AEMC, *Compensation for market participants affected by intervention events, Directions Paper*, 15 July 2021.

In addition, this scaling has the practical effect of acknowledging some movements of units (such as batteries) away from their energy targets due to the provision of system services such as FCAS. This may avoid over-compensation of these units under the automatic compensation framework, thereby aligning with the NEO.

Under normal operating conditions, the actual generation/consumption of a unit providing energy and FCAS will be a function of its five-minute energy targets and any energy generated/consumed to provide FCAS/follow its automatic generation control (AGC) signals.[142] In addition, the FCAS it provides will be a function of its enablement band (based on its FCAS enablement targets for each FCAS). Where a unit is generating energy in the course of providing raise FCAS, it will earn revenue for its actual generation of energy based on the energy spot price and also earn revenue for its FCAS enablement based on the ancillary service prices. When a unit is consuming energy in the course of providing lower FCAS, it will earn revenue for its FCAS enablement based on ancillary service prices, net of the cost of consuming energy (based on the energy spot price - which may be positive or negative).[143]

Section 3.2 of the directions paper (pp. 13-16) discussed the difficulty of accurately calculating compensation where a scheduled generator or scheduled load provides both energy and FCAS. For example, identifying whether a unit's consumption or generation is in response to five-minute energy targets or FCAS instructions/AGC signals would be a computationally intense exercise using four-second data. The Commission expressed the view that the significant costs of doing this as part of the automatic compensation calculations would not be warranted. This view was supported by Tesla in its submission to the directions paper.[144]

The Commission recognises that, while the intervention pricing run provides a counterfactual set of energy dispatch targets that enables the calculation of compensation for losses or gains in energy revenue, there is no counterfactual for the four-second regulation FCAS instructions or for the automatic provision of contingency FCAS. That is, there is no way of determining what FCAS would actually have been needed (as distinct from enabled) but for the intervention event and thus the extent to which a given participant would conform with or depart from its energy targets. Acknowledging this, the Commission considers that AEMO's current approach to scaling is an appropriate way to estimate, as far as practicable, what would have occurred but for the intervention and so calculate the compensation required to put the participant in the position it would have been in had the intervention not occurred.

Appendix D.3 also provides further detail through worked examples on the Commission's analysis of the approach to calculating compensation based on actual consumption. Specifically, appendix D.3.3 (worked example 3) details analysis conducted by Endgame Economics which concluded that accounting for actual consumption in the calculation of

142 The AGC calculates how much additional generation or consumption is required, or how much generation or consumption needs to be reduced, to correct deviations in frequency. It will automatically adjust the electricity production target for the generator or load enabled for regulation FCAS to correct the frequency deviation through signals issued every four seconds.

143 As discussed in chapter 3, the Commission has determined to amend clause 3.12.2 to also provide compensation where an intervention event changes a participant's FCAS enablement revenues.

144 Tesla, Submission to the directions paper, p. 1.

compensation does not lead to a systematic gaming incentive, whereas other alternative approaches (such as a target-based approach) may. This was used to determine that an actuals-based approach to calculating compensation best aligns with the NEO.

As such, the Commission has determined that compensation with respect to energy should be calculated based on changes in five-minute energy targets accounting for actual generation or consumption (which may include some movements due to FCAS provision). This differs from the approach in the draft rule which focused solely on the dispatch run and intervention pricing run targets, and was supported by stakeholders in responses to the directions paper. The approach in the final rule, which is consistent with AEMO's current practice, will better achieve the framework's objective of putting the participant in the position it would have been in but for the intervention event without imposing undue administrative costs on consumers.[145]

Which compensation framework should apply to bi-directional units?

When considering how to address the issues identified by AEMO, the Commission investigated how bi-directional resource units, particularly those providing both energy and FCAS, may be compensated under clause 3.12.2. The bi-directional nature of units becomes relevant when considering which compensation framework (affected participant or market customer with scheduled load) to apply in each trading interval. Applying the appropriate framework is important given the two-way approach to compensating affected participants with respect to energy which contrasts with the one-way approach to compensating market customers with scheduled loads (again, with respect to energy).

To determine the appropriate approach in the final rule, the Commission was mindful to balance accuracy (such that these units would be duly compensated for providing important frequency control services) with the administrative cost of implementing the compensation framework and the need to discourage gaming (which undermines the efficiency of market arrangements).

AEMO currently uses the two categories (scheduled generator and scheduled load) under which a battery is registered for the purpose of determining which compensation framework/s to apply in a trading interval (affected participant or scheduled load). For example, if a bi-directional unit is dispatched to generate but actually consumes (i.e. its net performance over the five-minute interval is opposite to the energy target issued to it), the unit would be classified for compensation purposes as an affected participant for its energy generation (since it would not have a dispatch target on its load side on which to base compensation).

The directions paper noted that AEMO's current approach to calculating compensation (which is retained under the final rule) does not unnecessarily accommodate the full extent of movement of these units away from targets. It stated:[146]

145 Note that a participant also has the opportunity to lodge an additional compensation claim under clause 3.12.2(f) if it determines it has made a loss.

146 Directions paper, p. 15.

> In particular, where a unit's actual performance differs from its MW target so significantly that it switches from the mode of operation reflected in its five-minute energy target (e.g. to generate) to the alternate mode (e.g. consuming), the unit's actual consumption is effectively set to zero for the purpose of calculating its energy compensation. This is considered appropriate as the primary service being provided by the unit is FCAS rather than energy.

Appendix D.3 includes some simplified worked examples to demonstrate AEMO's scaling technique and its application to bi-directional units, which informed the Commission's thinking.[147]

Clarifying compensation for bi-directional units in the Rules

In the directions paper, the Commission also considered that there was some ambiguity as to how bi-directional units were compensated in intervention events. To address this, the Commission proposed to:[148]

> include a new paragraph in clause 3.12.2 which would provide guidance on which framework applies in certain scenarios. This could provide that, where a unit is capable of operating as both a scheduled generator and a scheduled load, the choice of applicable compensation framework will be based on the MW target issued to the unit by NEMDE in a given intervention price trading interval, notwithstanding that unit's actual performance over the interval.
>
> ...the principle could also specify that, where a unit's dispatch target in the dispatch run is 0MW, the choice of applicable compensation framework will have regard for the target in the intervention pricing run.

This approach is currently used by AEMO for bi-directional units registered as both a scheduled generator and scheduled load and can be expressed more simply as:

- If the dispatch run target is positive, use the affected participant framework;
- If the dispatch run target is negative, use the scheduled load framework;
- If the dispatch run target is 0MW, look at the intervention pricing run target and apply the same test.

The Commission considered this approach would be appropriate for a broad range of cases but sought stakeholder feedback, noting that the complex issues arising in practice during intervention events may be broader than those explored. The Commission also considered how this approach would apply to a battery that participates in dispatch as a single unit, as was proposed in the Integrating storage draft determination and has been adopted in the final Integrating storage determination.[149] Currently, batteries must register in two categories

147 AEMO's methodology discussed in section 5.2.3 will also describe how compensation is calculated. Stakeholders will have an additional opportunity to engage with AEMO regarding the methodology during its development.

148 Directions paper, p. 28.

149 See AEMC, *Integrating energy storage systems into the NEM, Rule determination*, 2 December 2021.

- as a scheduled generator and a scheduled load - and dispatch instructions are issued to either the scheduled generator side or scheduled load side of the battery.

There was a mixed response from stakeholders to including the target-based approach for bi-directional resource units in the Rules.

- Stanwell supported the target-based approach to classifying bi-directional units for the purpose of compensation but did not comment on the need for further prescription in the Rules[150]
- AEMO[151] and Shell Energy[152] supported transparency in the Rules however suggested that less prescription was better due to the potential for perverse outcomes, and
- AGL suggested guidance is only required where the choice of framework is not immediately evident.[153]

In its submission to the directions paper, Shell Energy put forward a scenario where the proposal for classifying bi-directional units would not be appropriate for a battery that participates in dispatch as a single unit. This scenario was when a battery was issued a MW target in the dispatch run to consume and a MW target in the intervention pricing run to generate.[154]

Endgame Economics was engaged to assist the Commission with its deliberations and analysed this scenario in more detail. Appendix D.3.4 includes a simplified worked example to illustrate the issue identified by Shell Energy and Endgame Economics' analysis.

Endgame Economics observed that the proposal in the directions paper could lead to systematic under-compensation for a battery that participates in dispatch as a single unit when an intervention event causes the unit to switch from generating to consuming (as noted in Shell Energy's first example). While this may mean that less compensation is payable and less costs are imposed on consumers, Endgame Economics noted that the system is under high stress during intervention events. It recommended that such units be made whole with respect to their energy generation/consumption since to do otherwise may skew the incentives applicable to participants operating during these events.[155]

The Commission accepts Endgame Economics' analysis and has determined not to prescribe the directions paper approach to classifying units for compensation purposes in the final Compensation rule. Doing so would preclude AEMO from making bi-directional units that participate in dispatch as a single unit whole (and would therefore need to be amended when the final Integrating storage rule commences). The Commission agrees with submissions from Shell Energy and AEMO to the directions paper, which stated that the objective of the compensation framework, articulated in clause 3.12.2(a0) of the final rule, should provide

150 Stanwell, Submission to the directions paper, p. 2.

151 AEMO, Submission to the directions paper, p. 3.

152 Shell Energy, Submission to the directions paper, p. 3.

153 AGL, Submission to the directions paper, p. 3.

154 Shell Energy, Submission to the directions paper, Example 2, p. 3.

155 Endgame Economics also commented on the materiality of the issue and noted that the scenario raised by Shell Energy - where a battery receives a "generation" intervention pricing run target and a "consumption" dispatch target in the one trading interval - has not occurred in the past. However, analysis of bid data for the Ganawarra battery during the Victorian RERT event on 31 January 2020 showed that it is possible for this scenario to occur.

sufficient guidance to AEMO without the need for extra prescription on this matter, which could result in perverse outcomes such as those identified in Shell Energy's worked examples.[156]

In addition, while the approach proposed in the directions paper was intended to add transparency, other provisions in the final rule will help achieve this, particularly the methodology to be developed by AEMO (discussed in section 5.2.3).[157]

Repayment of compensation

As discussed above, the final rule refers to actual generation/consumption in the formulas used to calculate compensation (rather than focusing solely on targets, as in the draft rule). This avoids over-compensation of scheduled loads as identified by AEMO in its submission to the draft determination. However, as noted in the directions paper, the risk identified by AGL in its submission to the consultation paper remains. That is, there remains a risk, when compensation is calculated by reference to actual output or consumption, that compensation can effectively reward a participant for not following its target.[158]

The Commission notes that failing to comply with a dispatch instruction could constitute a breach of clause 4.9.8(a).[159] [160] However, in this regard, the Commission notes that a participant may validly move away from its MW dispatch target to the extent necessary to provide primary frequency response or FCAS.

To deter non-compliance with dispatch instructions and safeguard against the risks identified by AGL and AEMO, the Commission has included a new subparagraph in the final rule (clause 3.12.2(r)). It states that, if a court determines that a participant has breached clause 4.9.8(a), then that participant must repay compensation, plus interest, to AEMO.[161]

This clause 3.12.2(r) also requires that compensation be repaid to AEMO if a participant is found to have contributed to the reason for an intervention event which triggers intervention pricing. While not addressed in the directions paper, this was suggested by AGL in its submission to the directions paper.[162] This particular provision refers to another new paragraph, (q), which states that a participant compensated under clause 3.12.2 must not, whether intentionally or recklessly, cause or significantly contribute to the circumstances causing an intervention event that triggers intervention pricing. This mirrors existing clause 4.8.9(c2), which prohibits participants from contributing to the need for a direction to be issued. An AEMO intervention event can arise from the issue of a direction or the exercise of RERT but the existing provisions do not cover RERT. Therefore, the addition of this new

156 Shell Energy, Submission to the directions paper, p. 3.

157 When the Integrating storage rule commences, AEMO will be required to include the scheduled bidirectional unit in the methodology as the Integrating storage rule inserts this term into the relevant subparagraphs of clause 3.12.2.

158 AEMC, Directions paper, p. 16.

159 Clause 4.9.8(a) of the NER is a tier 1 civil penalty provision and states "a Registered Participant must comply with a dispatch instruction given to it by AEMO unless to do so would, in the Registered Participant's reasonable opinion, be a hazard to public safety or materially risk damaging equipment".

160 The term "dispatch instruction" is defined in Chapter 10 of the NER as an instruction given to a registered participant under clauses 4.9.2 (scheduled and semi-scheduled generators), 4.9.2A (scheduled network service providers), 4.9.3 (scheduled loads), and 4.9.3A (ancillary service providers in relation to ancillary service generating units or ancillary service loads).

161 This was drafted to be broadly consistent with the existing provisions for directed participants in Clause 3.15.10C(c).

162 AGL, Submission to the directions paper, p. 3.

provision creates internal consistency between the treatment of participants with respect to directions and RERT.

The introduction of this new paragraph (q) was also required to give the Australian Energy Regulator (AER) a basis on which to bring court proceedings such that participants found by a court to have contributed to intervention events will be required to repay compensation. Once the compensation has been repaid to AEMO, AEMO must use reasonable endeavours to redistribute that amount to the relevant market participants who funded the compensation.

Intervention events which trigger intervention pricing, while necessary to maintain reliability or security in some circumstances, can be costly to consumers. Consistent with the equivalent clause for directions (4.8.9(c2)), the Commission considers that a participant should not have the benefit of compensation where it has contributed to the need for AEMO to issue a direction that triggers intervention pricing or to activate the RERT.

For both of these new clauses, the Commission also considered the amount to be repaid to AEMO and that a gross repayment approach may be appropriate. The Commission's deliberations are illustrated in Box 6.

BOX 6: REPAYMENT OF COMPENSATION

The Commission determined that it may be appropriate for a participant in breach of these new rules to repay an amount greater than what it originally received as compensation (a gross compensation amount). This is because the compensation amount received by a participant will be the net of the compensation calculated for each of its scheduled generators, scheduled loads or ancillary service units (as applicable). In relation to penalising non-conformance, the following example illustrates why repaying a gross compensation amount may be more appropriate.

Take an affected participant with two scheduled generators in its portfolio: Generator A and Generator B.

- Generator A is dispatched less due to the intervention event and is eligible to receive $100 from AEMO.
- Generator B is dispatched more and has to pay $60 back to AEMO.

In this case, the net compensation payable by AEMO to the participant would be ($100-$60) = $40.

However, after this has been paid, a court determines that the generator did not follow its MW target (for example, it may have generated at a higher level than the target in order to receive high spots prices and, in so doing, caused an over-frequency issue).

- A net approach to compensation repayment would require the participant to repay $40 only to AEMO. In this case, the participant would still be better off (receiving $60 in compensation), which the Commission does not consider appropriate due to the need to discourage gaming.

- A gross approach to compensation repayment would require the participant to repay $120, reflecting the $100 amount that would have been received from AEMO for Generator A, plus the $60 amount that should have been repaid to AEMO for Generator B, less the $40 already repaid to AEMO.

The final rule does not adopt a gross repayment approach because the Commission is not able to make a rule to this effect (that is, requiring an amount of compensation to be repaid which is greater than the net amount originally paid to the participant) without classifying the new paragraphs as civil penalty provisions.[163] As such, the appropriate amount of compensation to be repaid will be a matter which the court may determine and paragraph (r) specifies only the repayment of the amount paid by AEMO to the offending participant (plus interest).

The court may reasonably determine that the Commission's preferred approach to repayment (illustrated by the example in Box 6) is appropriate and require a participant to repay a greater amount than was originally paid by AEMO to the participant. AEMO will then use reasonable endeavours to re-distribute funds to the market participants from whom the compensation costs were originally recovered (as per clause 3.12.2(s)).[164]

The rationale for this clause was based on existing clause 4.8.9(c2), which requires participants to repay directed participant compensation if they contribute to the need for a direction. Under clause 3.15.10C(c), AEMO must then return the repaid compensation to the participants who originally funded the compensation by applying the cost recovery formulas in clause 3.15.8 'mutatis mutandis' (in reverse, with necessary changes to the cost recovery provisions). This approach has not been adopted for this new paragraph in clause 3.12.2 as there are practical difficulties returning the exact amounts to market customers if the 30-week settlement resolution period has passed. Since a court's determination under the new paragraph in clause 3.12.2 is likely to take greater than 30-weeks, a reasonable endeavours clause has been adopted here for returning the compensation amounts to participants. This avoids imposing on AEMO inefficient administrative costs, which would be contrary to the NEO, associated with the process of returning funds to participants. The Commission is unable to adjust the equivalent provisions in clause 3.15.10C(c) to also account for this as it is not within the scope of this rule change.

Double dipping

Finally, the more preferable final rule retains a new paragraph (b1) proposed in the draft rule which provides that a participant is not entitled to compensation under clause 3.12.2 with respect to scheduled plant for an intervention price trading interval if AEMO is required to pay compensation under clauses 3.15.7, 3.15.7A or 3.15.7B with respect to that scheduled plant

163 Such provisions can only be included in the rules following consultation with stakeholders and hence cannot be included at this stage of the rule change process. In any case, the Commission notes that equivalent provisions related to directed participants are not classified as civil penalty provisions.

164 If the court adopts the Commission's gross compensation approach, any additional amounts would be distributed elsewhere at the court's discretion.

and intervention price trading interval. This removes the possibility for market participants to be compensated twice (double dipping), once as a directed participant or RERT provider[165] and once under the clause 3.12.2 framework.

This is designed to prevent a situation where a participant registered in two registration categories with respect to the one unit (e.g. a large scale battery that is both a scheduled generator and scheduled load) is eligible for two types of compensation with respect to that unit and intervention event. For example, AEMO could issue a direction to a battery's generation side to provide MW and/or FCAS raise services. AEMO would compensate the generator for its services in accordance with clause 3.15.7 and, if need be, pay additional compensation under clause 3.15.7B.

The load side, however, could say that it was not the subject of the direction but it was dispatched differently as a result of the direction and is thus entitled to compensation under clause 3.12.2 as a market customer with scheduled load for its loss of revenue. Such a situation would result in additional compensation costs being passed through to other market participants and consumers and would be contrary to the NEO. This same situation may also arise in relation to a RERT activation.

As discussed in more detail in the draft determination (section 5.7.5), there have already been instances where a directed participant has sought compensation under clause 3.12.2, in addition to that provided to the directed participant under clause 3.15.7A. In doing so, the participant referred to clause 3.15.7B(a3)(7).

Clause 3.15.7B(a3) sets out the kinds of additional net direct costs for which a directed participant can claim additional compensation under clause 3.15.7B if it is still out of pocket. Costs listed in clause 3.15.7B(a3) include fuel costs, incremental maintenance and staffing costs, maintenance acceleration or delay costs, and other costs incurred to enable the unit to comply with the direction.

In contrast to these categories of costs, clause 3.15.7B(a3)(7) refers to "any compensation which the Directed Participant receives or could have obtained by taking reasonable steps in connection with the relevant generating unit or scheduled network services being available". The reference to compensation received or able to be obtained means that this is not a "cost" as such, unlike the items listed in the preceding subparagraphs. It is not clear what subparagraph (7) is intended to achieve but it is evident that directed participants are seeking to rely on this clause in order to claim affected participant compensation.

The Commission has determined that this uncertainty should be resolved and that, where a participant is registered in two registration categories with respect to a single unit, they should not be able to obtain both directed participant compensation and compensation under clause 3.12.2. To address this, the Commission has determined that compensation will not be

165 The reference to RERT was not included in paragraph (b1) in the draft rule however has been added for the final rule for the same reasons as outlined here. AEMO intervention events include both directions and RERT so the Commission considers clause 3.12.2 should cover both where appropriate.

available under clause 3.12.2 where it is already being paid with respect to a given unit under the directed participant compensation framework.[166]

Given the inclusion of subparagraph (b1), the final rule also deletes clause 3.15.7B(a3)(7) as it is no longer required and its retention would likely result in ongoing confusion as to its role and meaning.

The Commission considers that these changes better achieve the NEO, create transparency and predictability, and reduce the potential for confusion as to the manner in which compensation should be calculated.

5.2.2 Is there a need to clarify the objective of the compensation framework?

The current rule articulates the objective of the compensation framework for affected participants (clause 3.12.2(a)(1)) but does not include an equivalent objective for scheduled loads.

In the draft rule, the Commission proposed to amend the wording of clause 3.12.2(a)(2) to replicate, in the provision relating to scheduled loads, the objective of the compensation framework as set out in current clause 3.12.2(a)(1) which deals with affected participants. However, AEMO noted in its submission to the draft rule that this appeared to be inconsistent with the formula for scheduled load compensation, specifically the one-way approach to compensating scheduled loads for energy revenue losses.

While AEMO suggested that the description of the objective be removed, the Commission considers that such purposive descriptions are useful. As such, the Commission has added a new, over-arching paragraph in clause 3.12.2(a0) of the final rule (and removed the description of the objective for scheduled loads in clause 3.12.2(a)(2) of the draft rule):

> The objective of the compensation framework established by this clause is, as far as practicable, to put Affected Participants, Market Customers and Ancillary Service Providers entitled to compensation in the position they would have been in, had the AEMO intervention event not occurred.

Including the objective as an overarching principle in the Rules improves the clarity of the intent of clause 3.12.2. It also promotes consistency of approach with respect to all participants eligible for compensation - where the current rule only articulates the objective with respect to affected participants. This provides a more concrete guide to AEMO, independent experts and participants when making and determining compensation claims.[167]

5.2.3 Should the application of the compensation framework be more transparent?

In developing the final rule, the Commission considered the need to provide greater clarity for market participants on how AEMO implements clause 3.12.2. Several stakeholders noted

166 That framework allows directed participants to seek compensation for loss of revenue, and this is essentially the same calculation as would be made under clause 3.12.2.

167 The use of "as far as practicable" in the objective is intended to acknowledge the trade-offs explored in section 5.2.1, for example, the trade-off between administrative cost and accuracy. This will also serve as guidance to AEMO when preparing and consulting on the methodology (discussed in section 5.2.3).

there is a lack of transparency in the compensation framework and independent consultants engaged to assess compensation claims (such as Synergies Economic Consulting in the example discussed in section 3.2.1) have identified ambiguities. Shell Energy specifically noted that AEMO's scaling approach (discussed in the directions paper but not included in the Rules) lacks transparency and has not been the subject of consultation with stakeholders.[168] [169] A lack of transparency can lead to unwarranted compensation adjustment claims, which have to be prepared by market participants and processed by AEMO and/or independent experts, passing undue costs onto consumers.[170]

However, as noted in section 5.2 of the directions paper (p. 29), the Commission is mindful that the number of complex issues arising in practice during intervention events may be broader than just those anticipated in the directions paper and this determination. Intervention events and intervention pricing may involve complex scenarios. Being overly prescriptive for the sake of transparency may prove too limiting and in fact run counter to the objective of the compensation framework in some cases.[171]

Compensation methodology

To balance the need for transparency against the risks of prescription, the final rule includes those components of the compensation framework that should be prescribed to ensure undue costs are not passed onto consumers. For those that require greater clarity but where a high degree of prescription is not helpful, clause 3.12.2(n) of the final rule requires AEMO to prepare a methodology. The methodology will be guided by the objective of the compensation framework and must describe how AEMO:

- Calculates compensation for energy and FCAS revenue gains/losses, including how actual generation and consumption is accounted for
- Aggregates compensation amounts to a participant level and applies the $5,000 threshold, and
- Takes into account the items in paragraph (a1) (formerly paragraph (j)), as appropriate, including a unit's short run marginal costs (fuel, incremental maintenance, staff), the regional reference price and ancillary service prices.

A methodology was not discussed in the draft rule or the directions paper, however, the Commission considers that this approach best meets the concerns raised by stakeholders throughout the rule change process.

Stakeholder engagement on the methodology

The Commission considers that stakeholders should be involved in the development of and amendments to the compensation methodology. Accordingly, the final rule requires that

168 Shell Energy, Submission to the directions paper, p. 2.

169 AEMO also noted in its submission to the draft determination (p. 3), that it did not consider the draft rule would materially improve the transparency of the compensation framework. The Commission considers that the amendments made in the final rule do improve transparency.

170 The draft rule attempted to prevent gaming of the compensation process and also addressed some of these ambiguities by using the target-based approach to calculating compensation, however, this has been removed in the final rule for the reasons discussed in section 5.2.1.

171 This stance was supported by Shell Energy and AEMO in submissions to the directions paper.

AEMO amends the methodology in accordance with the Rules consultation procedure, as set out in clause 8.9.

However, in light of the extensive consultation undertaken for this rule change process and the engagement required currently for other market reform processes, the initial methodology will only require one round of consultation by AEMO (on a draft methodology). This is set out in a transitional arrangement. The final methodology must be in place by the commencement date of the new Rule (on 1 August 2022). The commencement date allows time for AEMO to develop and consult on the methodology, and update its systems.

No compensation where a unit has matching dispatch and intervention run targets

The final rule includes a new paragraph to clarify when a participant is "affected" and compensation is payable under clause 3.12.2. This reflects a proposal that was set out in the directions paper.[172]

In its submission to the consultation paper, AGL stated that, "if the targets are identical in the two NEMDE runs then any compensation paid though the application of metering data may be rewarding the participant for not following targets".[173] This was a factor that informed the Commission's approach in the draft determination (i.e. calculating compensation based on targets alone, without regard for actual generation output or consumption).

To determine if compensation is payable with respect to changes in energy revenue or costs, AEMO compares the unit's dispatch run and intervention pricing run MW targets. If the targets match, no compensation is payable under clause 3.12.2. Clause 3.12.2(b2) of the final rule formalises this approach to remove the potential for perverse incentives (as highlighted in the AGL submission) and increase clarity and predictability in the Rules. The final rule also includes this same test for compensating ancillary service providers, such that if a unit's FCAS enablement quantities for each FCAS match in the two runs of NEMDE, no compensation is payable.[174]

New definitions included

To increase clarity in the rules, new local definitions are introduced and used in this paragraph (b2). In particular,

- "intervention dispatch run" is defined as "the central dispatch process used to dispatch Market Participants in an intervention price trading interval". In other words, this is the run of NEMDE which is used to dispatch the physical market when AEMO implements intervention pricing (including any units which have been directed and the dampening effect on demand of the RERT).

172 Refer to Section 3.2.1 of the directions paper, p. 15.

173 AGL, Submission to the consultation paper, p.4.

174 Note that the final rule includes separate tests for energy ((b2)(1)) and ancillary services ((b2)(2)). This acknowledges the different revenue streams for FCAS. FCAS is primarily paid for based on enablement (not provision), but a participant will also receive generation revenue/pay to consume at the energy spot price in the course of providing FCAS. A participant may be entitled to receive/repay compensation in respect of a unit if its five-minute energy targets differ in the two runs of NEMDE and/or its FCAS enablement quantities change in the two runs of NEMDE - that is, if a unit has matching dispatch targets for energy, but its enablement quantity has changed, it may still be eligible for compensation for the change in the enablement quantity, and vice versa).

- "intervention pricing run" is defined as "the process used under clause 3.9.3(b) to set the spot price and ancillary service price for an intervention price trading interval". In other words, and consistent with the definitions in AEMO's Intervention pricing methodology, this refers to the run of NEMDE which is used to set prices when AEMO intervenes in the market in response to a shortage of energy or FCAS. This run excludes any units which have been directed, and the effect of the RERT on demand, and is used to determine what the spot and ancillary service prices would have been but for the intervention.

Including these definitions in clause 3.12.2 increases transparency and certainty as to how compensation is to be calculated. This removes the potential for compensation claims to be lodged based on other approaches to calculating compensation.[175]

Other points of clarification

The final rule also makes some points of clarification in clause 3.12.2 to avoid uncertainty. This includes amending paragraph (i) to make clear that the value of adjustment claims must exceed $5,000. The revised wording in the final rule is consistent with the approach in equivalent clause 3.15.7B(a4), relating to directed participant additional compensation claims, and the original aim of the threshold (being to discourage immaterial claims where the value of the claim would be less than the cost to AEMO of determining the claim).[176]

The final rule also deletes paragraph (h) in the current rules which provides that "if an Affected Participant or Market Customer does not deliver to AEMO a written submission in accordance with paragraph (f) it shall cease to have an entitlement to compensation under this clause 3.12.2". The provision refers to written submissions made under paragraph (f). That paragraph allows participants to lodge a written submission (adjustment claim) if they consider that their entitlement needs to be redetermined. However, the provision has the anomalous effect that, if an adjustment claim is not lodged in the time permitted, the entitlement to compensation ceases: not just the entitlement to lodge an adjustment claim but the entitlement to compensation more generally under clause 3.12.2. This is clearly not the intent. To address this anomaly, the final rule removes paragraph (h) and instead makes clear that adjustment claims must be lodged within 15 business days of receipt of the relevant notice from AEMO (see clause 3.12.2(g)(4) in the final rule).

The final rule also makes a number of other refinements to aid readability, as set out in the Commission's drafting philosophy.[177] These include:

- improving the clarity of clause 3.12.2 by adopting a drafting approach which incorporates sub-headings and organises the clauses in a simpler and more logical way. This assists the reader in navigating the compensation framework

175 For example, Synergies noted, in the course of determining an affected participant adjustment claim, that the rules do no make clear which participants are "affected" and how the difference in dispatch level is to be calculated. Synergies adopted a different approach to AEMO in determining this claim. See section 4.3.7 in the draft determination.

176 See AEMC, *Investigation into intervention mechanisms and system strength in the NEM, Consultation paper*, April 2019, p. 94. As discussed in that paper, the origin of the threshold was in a Review of Directions by NEMMCO and NECA in 2000. The report of that review stated at p. 30: "Payment should only be made where the value at stake is sufficient to justify the significant administrative outlays in determining compensation. We propose that consideration only be given to payment claims with a value exceeding $5,000 to each individual party, with amounts less than this deemed immaterial given the costs of settling claims."

177 AEMC, *Rule Drafting Philosophy*, 8 October 2020.

- removing unnecessary repetition and combining references within provisions so that those provisions are as concise as possible, for example, replacing the defined terms "Referred Affected Participants" and "Referred Market Customers" with a single definition of "Referred Participants"
- making certain global definitions local definitions where they only relate to one particular clause in the rules, for example, the term "adjustment claim" is defined locally in clause 3.12.2(a00), and
- aligning the drafting approach taken to incorporate FCAS into the automatic compensation framework in clause 3.12.2 with the approach in the Integrating storage rule, which consolidates clauses in Chapter 2 that relate to ancillary services. The changes to the structure of the final rule will provide consistency with the changes to be made in the Integrating storage rule (specifically, replacing the terms "ancillary service generating unit" and "ancillary service load" with "ancillary service unit"). This change is discussed in further detail in section 3.2.1. As a result, a number of consequential amendments are also required to other provisions in the Rules that refer to clause 3.12.2 to refer to ancillary service providers, for example, the cost recovery provisions in clause 3.15.8.

5.3 Conclusions

Having regard to the issues explored throughout the rule change process, feedback from stakeholders, further analysis, the NEO and assessment framework, the Commission has broadly adopted the approach outlined in the directions paper for the other elements addressed in this section, with some additional clarifications.

The more preferable final rule retains the approach in the current rules to calculating compensation based on actual generation or consumption. This better aligns with the objective of the compensation framework than the draft rule and avoids over-compensation in the case where a unit intentionally deviates from its targets, better meeting the NEO.

Due to the risks of participant gaming, the Commission has also supplemented this approach with additional provisions requiring the repayment of compensation for non-conformance. Participants are also required to repay compensation if a court determines that they intentionally or recklessly caused or significantly contributed to the need for an AEMO intervention event. Both of these activities may compromise system security and should be discouraged.

In addition, the more preferable final rule better articulates the objective of the compensation framework with respect to all participants eligible for compensation. This increases clarity and provides guidance to market participants, AEMO and independent experts, decreasing unwarranted compensation claims that place undue costs on consumers. Clarification is also provided in the final rule as to what it means to be "affected" (that is, if a unit's targets are matching in the intervention pricing run and dispatch run of NEMDE, no compensation is payable).

Finally, AEMO is required under the more preferable final rule to prepare a methodology. The Commission has determined that this approach adds transparency while also avoiding potentially counterproductive levels of prescription in the Rules.

ABBREVIATIONS

5MS	Five minute settlement
AEMC or Commission	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AGC	Automatic generation control
DRSP	Demand response service provider
FCAS	Frequency control ancillary services
Hz	Hertz
IPWG	Intervention pricing working group
IRP	Integrated resource provider
MCE	Ministerial Council on Energy
MW	Mega-watts
NEL	National Electricity Law
NEM	National electricity market
NEMDE	NEM dispatch engine
NEO	National electricity objective
NER or Rules	National Electricity Rules
RERT	Reliability and emergency reserve trader
RRN	Regional reference node
RRP	Regional reference price
SRD	Settlement residue distribution
WDRM	Wholesale demand response mechanism

A LEGAL REQUIREMENTS UNDER THE NEL

This appendix sets out the relevant legal requirements under the NEL for the AEMC to make this final rule determination.

A.1 Final rule determination

In accordance with s. 102 of the NEL the Commission has made this final rule determination in relation to the rules proposed by AEMO.

The Commission's reasons for making this final rule determination are set out in section 2.4.

A copy of the more preferable final rule is attached to and published with this final rule determination. Its key features are described in section 2.1.

A.2 Power to make the rule

The Commission is satisfied that the more preferable final rule falls within the subject matter about which the Commission may make rules. The more preferable final rule rule falls within s. 34(1)(a)(i) and (iii) of the NEL as it relates to regulating the operation of the national electricity market and the activities of persons participating in the national electricity market.

A.3 Commission's considerations

In assessing the rule change request the Commission considered:

- its powers under the NEL to make the rule
- the rule change request
- submissions received in response to the consultation paper and draft determination
- the Commission's analysis as to the ways in which the proposed rule will or is likely to, contribute to the NEO
- submissions received in response to the directions paper.

There is no relevant Ministerial Council on Energy (MCE) statement of policy principles for this rule change request.[178]

The Commission may only make a rule that has effect with respect to an adoptive jurisdiction if satisfied that the proposed rule is compatible with the proper performance of AEMO's declared network functions.[179] The more preferable final rule is compatible with AEMO's declared network functions because it is unrelated to them and therefore it does not affect the performance of those functions.

178 Under s. 33 of the NEL the AEMC must have regard to any relevant MCE statement of policy principles in making a rule. The MCE is referenced in the AEMC's governing legislation and is a legally enduring body comprising the Federal, State and Territory Ministers responsible for energy. On 1 July 2011, the MCE was amalgamated with the Ministerial Council on Mineral and Petroleum Resources. The amalgamated council is now called the ministerial forum of Energy Ministers.

179 Section 91(8) of the NEL.

A.4 Civil penalties

The Commission cannot create new civil penalty provisions. However, it may recommend to the COAG Energy Council that new or existing provisions of the NER be classified as civil penalty provisions.

The Commission's final more preferable rule amends clause 3.15.8(b) of the NER. This paragraph is currently classified as a tier 3 civil penalty provision under NER Schedule 1 of the National Electricity (South Australia) Regulations.

The Commission considers that clause 3.15.8(b) should continue to be classified as a civil penalty provision and has consulted with the AER, who supports this recommendation. The Commission therefore does not propose to recommend any change to its classification to the COAG Energy Council.

A.5 Conduct provisions

The Commission cannot create new conduct provisions. However, it may recommend to the ministerial forum of Energy Ministers that new or existing provisions of the NER be classified as conduct provisions.

The final rule does not amend any rules that are currently classified as conduct provisions under the NEL or National Electricity (South Australia) Regulations. The Commission does not propose to recommend to the COAG Energy Council that any of the proposed amendments made by the final rule be classified as conduct provisions.

B TRANSITIONAL ARRANGEMENTS AND OTHER CHANGES RELATED TO 5MS

B.1 Transitional arrangements

The main elements of the final rule will not commence immediately as AEMO will need sufficient time to revise the systems used to calculate compensation under clause 3.12.2 and to develop the methodology. These elements will commence on 1 August 2022.

The final rule also includes transitional provisions relating to AEMO's initial methodology and the relevant rules that would apply if an intervention event which triggers intervention pricing is ongoing at the time the rule commences.

In developing the initial methodology, AEMO is not required to comply with the Rules consultation procedures. Instead, AEMO must publish a draft of the methodology on its website to allow for submissions from the public, before finalising and publishing the methodology. The initial methodology must be published by 1 August 2022. This approach was adopted given the extensive consultation that has occurred as part of this rule change process and the nature of the issues to be covered in the methodology. It will allow for effective stakeholder engagement with respect to the content of the methodology but AEMO will not be required to publish an issues paper prior to publishing the draft methodology. This will reduce the demands on AEMO and stakeholders while still facilitating adequate engagement.

If an AEMO intervention event which triggers intervention pricing is ongoing at the time that the substantive provisions of the final rule commence, the rule will not take effect until such time as that intervention event has concluded. This would avoid a situation where participants affected by an intervention event are subject to two different compensation frameworks with respect to the one intervention event. The transitional provisions also clarify that if an AEMO intervention event occurs (and concludes) prior to commencement of the rule, compensation for participants affected by that event will be determined under clauses 3.12.2 and 3.12.3 as they existed prior to commencement of the rule. This would avoid any uncertainty as to the manner in which compensation should be determined when the process of determining compensation is ongoing at the time the rule commences.

B.2 Changes related to 5MS

The final rule includes a schedule which will commence on 9 December 2021. This schedule substitutes "intervention pricing 30-minute period" with "intervention price trading interval", to bring the compensation framework in clause 3.12.2 into alignment with settlement on a five-minute basis - as it was previously intended. This was discussed in Section 3.1.3 of the draft determination (p. 27).

The *Five minute settlement* (5MS) rule commenced on 1 October 2021 and replaced "intervention price trading interval" with "intervention pricing 30-minute period" wherever it occurred in clauses 3.12.2, 3.12.3, 3.15.8 and the chapter 10 definition of "Affected

Participant".[180] The Application of compensation in relation to AEMO interventions rule, which commenced after the Five minute settlement rule, then reinstated the term "intervention price trading interval", but as a five-minute interval.[181] [182]

As a result of those two rules, there is an inconsistency as settlement occurs on a five-minute basis but the compensation framework is applied on a 30-minute basis. The final rule clarifies that the compensation framework under clause 3.12.2 is intended to be applied on a five-minute basis, to align with the 5MS rule.

Additionally, clause 3.15.10C sets out requirements for information to be included in a final statement in which one or more intervention pricing 30-minute periods occurred. The *Intervention compensation and settlement processes* rule aligned the settlement timetable with the timetable for compensation by referring to an "intervention price trading interval".[183] However, the 5MS rule then replaced "intervention price trading interval" with "intervention pricing 30-minute period".

Given that the compensation frameworks will apply on a five-minute trading interval basis, the final Compensation rule (the subject of this determination) substitutes "intervention pricing 30-minute period" with "intervention price trading interval", which preserves the intent of the *Intervention compensation and settlement processes* rule by aligning the settlement timetable with the timetable for compensation. As a result, the final rule also removes the defined term "intervention pricing 30-minute period".

180 National Electricity Amendment (Five minute settlement) Rule 2017 No. 15.

181 National Electricity Amendment (Application of compensation in relation to AEMO interventions) Rule 2019 No. 13.

182 This was the rule which narrowed the application of the compensation framework under clause 3.12.2, such that compensation is only payable with interventions which trigger intervention pricing: that is, only in connection with interventions which respond to a shortage of energy or FCAS.

183 National Electricity Amendment (Intervention compensation and settlement processes) Rule 2019 No. 5.

C PAST INTERVENTIONS WORK PROGRAMS

C.1 The Intervention pricing working group (IPWG)

The application of intervention pricing has on some occasions resulted in anomalous and unexpected pricing outcomes. One such instance occurred on 9 February 2017 when a direction in South Australia resulted in prices in Queensland and NSW reaching the market price cap at a time when such an outcome might not otherwise be expected.[184]

This incident prompted AEMO to initiate a review of the intervention pricing methodology. To this end, it commissioned a report from SW Advisory and Endgame Economics to review the implementation of intervention pricing and make recommendations to address issues arising.[185] It also established the IPWG to review the report and consider whether changes to the intervention pricing methodology and intervention framework more broadly should be made.

The IPWG comprised representatives of market bodies and industry. It met five times between November 2017 and May 2018 and identified a number of issues. It also proposed several rule changes, four of which have already been actioned.

- On 30 May 2019, the Commission made a final determination and rule which streamlines the cost recovery process by aligning the timetables for compensation and settlement following an intervention. The rule also extended the deadline for participants to make additional compensation claims following an intervention, allowing participants more time to assess the impact of intervention events.[186] Both changes were recommended by the IPWG.
- Two further IPWG recommendations were progressed as part of the Commission's Investigation into intervention mechanisms in the NEM, discussed below. These related to intervention pricing and the $5,000 threshold applicable to directed and affected participant compensation.

The IPWG made two further recommendations which are the focus of this determination:

1. changing the manner in which compensation is calculated for market customers with scheduled loads which are dispatched differently as a result of an intervention event
2. including FCAS losses in the list of factors that can be considered when determining additional compensation claims by affected participants.

C.2 The Investigation into intervention mechanisms in the NEM

In response to the increasing use of intervention mechanisms, the Commission commenced a review with the release of a consultation paper in April 2019, titled *Investigation into intervention mechanisms and system strength in the NEM*.[187]

184 AEMO, *NEM Event – Direction to South Australia Generator – 9 February 2017*, July 2017, p. 15.
185 SW Advisory and Endgame Economics, *Review of Intervention Pricing - Final Report prepared for AEMO*, 4 October 2017.
186 AEMC, *Intervention compensation and settlement processes, Rule determination*, 30 May 2019.
187 AEMC, *Investigation into intervention mechanisms and system strength in the NEM, Consultation paper,* 4 April 2019.

The consultation paper examined a number of issues relating to intervention mechanisms, including intervention pricing, compensation for directed and affected participants, mandatory restrictions, counteractions, the hierarchy of intervention mechanisms and price setting during RERT events. A final report was published in August 2019, with the Commission noting that further consultation would be undertaken when recommended rule change requests were submitted.[188]

A number of recommendations in the *Interventions investigation final report* have already been actioned. These include the following rule changes, three of which were made on 19 December 2019, two of which were made on 10 September 2020 and one of which was made on 17 December 2020. The first two rule changes below have particular importance for this determination.

- Changes to the regional reference node test set out in clause 3.9.3 of the NER were made in December 2019. The RRN test is used to determine whether AEMO should implement intervention pricing in connection with an "AEMO intervention event".[189] Under the revised RRN test, intervention pricing is now implemented where an AEMO intervention event is for the purpose of obtaining a service for which there is a market price.[190] Where the purpose of an intervention is to obtain a service for which there is no market price,[191] intervention pricing does not apply. This recognises that, in such circumstances, there is no relevant market price signal to preserve.[192]
- Changes were also made to the circumstances in which compensation is paid to participants dispatched differently as a result of an intervention event. Under the revised approach, such compensation is only payable in circumstances where an AEMO intervention event triggers intervention pricing in accordance with the revised RRN test.[193] This is an important development when considering the matters in this determination, noting that the rule change requests dealt with in this determination were submitted prior to the making of the December 2019 rule. As a result of narrowing the circumstances in which such compensation is payable, the rule changes proposed by AEMO affect a narrower set of intervention events - namely, those which trigger intervention pricing - and will have no impact on security interventions[194], which are far more common than interventions to address a shortage of energy or FCAS.
- As part of the same package of rule changes, the compensation threshold applicable to compensation payable to directed participants and affected participants was also amended. Under the revised approach, the $5,000 compensation threshold applies per intervention event rather than per trading interval (as was previously the case). This

188 AEMC, *Investigation into intervention mechanisms in the NEM, Final report*, August 2019. The final report is referred to in this determination as the *Interventions investigation final report*.

189 Meaning activation of the RERT or issuance of directions.

190 That is, energy or market ancillary services, or a service which is a direct substitute for these.

191 For example, voltage control or system strength.

192 AEMC, *Application of the regional reference node test to the reliability and emergency reserve trader, Rule determination*, 19 December 2019.

193 AEMC, *Application of compensation in relation to AEMO interventions, Rule determination,* 19 December 2019.

194 In this determination, the phrase "security interventions" refers to those interventions to obtain security services other than FCAS.

minimises the potential for directed and affected participants to incur loss as a result of AEMO intervention events.[195]

- On 10 September 2020, the Commission made a final rule to change three elements of the interventions framework in the NER. In particular, the rule:
  - removed the mandatory restrictions framework set out in rule 3.12A of the NER
  - removed the requirement on AEMO to use "counteractions" in order to confine the impact of an intervention event to a single region and, if possible, a single participant
  - formalised the arrangements for apportioning and recovering compensation costs following RERT activations, thereby addressing a gap in the NER.[196]
- Also on 10 September 2020, the Commission made a final rule to remove the intervention hierarchy set out in clause 3.8.14. This prescriptive hierarchy required AEMO, during conditions of supply scarcity, to activate the RERT first and then if necessary issue directions or clause 4.8.9 instructions. The Commission determined that this could result in higher than necessary costs to consumers and should be replaced with a principle of using the intervention mechanism, or combination of mechanisms, that is effective while minimising direct and indirect costs.[197]
- On 17 December 2020, the Commission made a final rule and determination to amend compensation arrangements in the National Electricity Rules (NER) for participants directed to provide services other than energy and market ancillary services (referred to as "other compensable services" in the final rule). The final rule reduces administrative burden on AEMO and registered participants by amending the compensation framework for other compensable services from two steps to one step.[198]

195 AEMC, *Threshold for participant compensation following market intervention, Rule determination*, 19 December 2019.

196 AEMC, *Changes to intervention mechanisms, Rule determination,* 10 September 2020.

197 AEMC, *Removal of intervention hierarchy, Rule determination*, 10 September 2020.

198 AEMC, *Compensation following directions for services other than energy and market ancillary services, Rule determination*, 17 December 2020.

D COMPENSATION FOR BI-DIRECTIONAL UNITS

D.1 How batteries operate in the NEM

In the NEM currently, a battery must be registered as both a market generator (scheduled generator) and a market customer (scheduled load). It will therefore participate in the central dispatch process via an offer to generate electricity and a bid to consume electricity. The unit may also register as a market ancillary service provider. A battery provides energy and FCAS offers for the generation side and the load side, with 10 price-quantity pairs set out for each offer.[199]

If a battery has made a dispatch offer for sent out energy in relation to its plant and also made an ancillary service offer in relation to the same plant for FCAS, NEMDE will first co-optimise the two types of offers. A dispatch instruction will then be issued which takes into account both the energy and FCAS offers and creates the energy target and the FCAS enablement band. The unit may or may not be dispatched for regulation or contingency FCAS within that enablement band in the corresponding dispatch interval.[200]

Batteries can respond to price signals and change from discharging (generating) to charging (consuming) in very short timeframes. As such, batteries have the ability to perform arbitrage in the energy market – quickly switching to discharge during high wholesale price events and charge during low price events – to take advantage of periods of high price volatility.

Batteries are also well suited to provide frequency response services by increasing generation or load in response to supply-demand imbalances.

Batteries are a significant provider of regulation FCAS, which is delivered via a control system called the automatic generation control (AGC). The AGC calculates how much additional generation or consumption is required, or how much generation or consumption needs to be reduced, to correct deviations in frequency. It will automatically adjust the electricity production target for the generator or load enabled for regulation FCAS to correct the frequency deviation through signals issued every four seconds.[201]

For batteries in particular, the unit may be enabled for more regulation FCAS than its energy dispatch bid. For example, a unit may be dispatched at 0MW but enabled for 10MW of raise regulation FCAS. Once enabled, a battery will respond automatically to frequency deviations, even if that response takes the unit away from meeting its five-minute dispatch target. The provision of contingency FCAS and primary frequency response can also cause a battery to deviate from its five-minute dispatch target.

D.2 Summary of relevant changes in the Integrating storage final rule

The Integrating storage final rule was published on the same day as this final determination.[202] It creates a new participant category, the IRP, to accommodate a variety of

199 AEMC, *Integrating energy storage systems into the NEM, Consultation paper*, August 2020, p. 50.
200 AEMO, *Guide to ancillary services in the national electricity market*, April 2015, p.10.
201 AEMO, *Power system requirements*, July 2020, p. 21.
202 See: https://www.aemc.gov.au/rule-changes/integrating-energy-storage-systems-nem

participants with bi-directional energy flows. This includes grid-scale storage, hybrids and aggregators of small generation and storage units.

Introducing the IRP registration category:

- enables storage and hybrids to register and participate in a single registration category rather than under two different categories
- enables batteries to participate in dispatch as a single unit, facilitated by a new term in the Rules — the "bidirectional unit". These units submit 20 price bid bands for energy (that is, 10 for the load side and 10 for the generation side of the bidirectional unit) and 10 price bid bands for each ancillary service.

These changes in particular have been considered in the analysis undertaken by the Commission as part of the Compensation rule change, to ensure that the rules remain fit-for-purpose into the future.

D.3 Worked example calculations for bi-directional units

The following simplified worked examples demonstrate how AEMO considers actual generation/consumption when calculating the estimated amount of energy that might have been generated or consumed had the intervention event not occurred. This is a factor in the automatic calculation of energy compensation under the current clause 3.12.2 and this approach is expected to continue under the approach set out in the final rule (supported by, and subject to development of, the new methodology).

These examples are for illustrative purposes only based on conversations between AEMO and Commission staff in the process of preparing the final rule. They do not cover all conceivable scenarios and serve only to show how actual energy generation and consumption may be accounted for, without considering other factors such as the regional reference price or the value of bids (BidP).[203]

As discussed in section 5.2.1, under the current Rules, AEMO calculates compensation for affected participants and scheduled loads using a combination of actual generation output or consumption (determined from settlement quality metering data) and a participant's dispatch targets from the intervention pricing run and the dispatch run of NEMDE. The targets from the intervention pricing run and dispatch run are used to "scale" the actual generation or consumption of the unit to assist AEMO to determine what would have occurred if the AEMO intervention event had not occurred.

The scaling technique accounts for the disconnect between the point at which a dispatch target is received by a generator (or load) and the point at which the generator (or load) is metered, accounting for auxiliary load. In addition, this scaling has the practical effect of acknowledging some movements of units (such as batteries) away from their targets due to

203 Intervention events and intervention pricing are complex, therefore these examples may not represent the approach used by AEMO under clause 3.12.2 to date in all instances. While the final Compensation rule does not fundamentally differ in its approach to calculating compensation for energy, these examples also may not represent the final approach used by AEMO - which will be developed in accordance with the objective of the compensation framework and in consultation with stakeholders as per the methodology requirements set out in clause 3.12.2(n) and (o) of the final Compensation rule.

the provision of system services such as FCAS. This may avoid over-compensation of these units under the automatic compensation framework, aligning with the NEO.

D.3.1 Worked example 1: The battery generates over its MW dispatch target

A battery's **generation** side is dispatched in accordance with the following targets during an intervention price trading interval:

Table D.1: Trading interval targets and metered generation

	DISPATCH RUN	INTERVENTION PRICING RUN
Energy target (MW) (generation)	20	30
Raise regulation enabled (MW)	20	20
Lower regulation enabled (MW)	0	0
Actual metered generation (MWh)	25	

Source: AEMC

Note: To simplify the conversion between MW and MWh for this example, the dispatch and trading interval length is one hour. This means that the units "MW" and "MWh" are effectively equivalent.

Energy compensation

Looking first at the targets, the battery's energy dispatch run target (what it is physically dispatched for) is different to the intervention pricing run target (what it would have been dispatched for had the intervention event not occurred). This means the battery may be entitled to energy compensation (as per the test in clause 3.12.2(b2)(1) of the final rule).

In the dispatch run, it is dispatched for less than in the intervention pricing run (what it would have been dispatched at). Logically, it may be able to receive compensation for its lost generation revenue (net of avoided short run costs). Based on the dispatch run target alone, over the trading interval (one hour in this example) the battery would generate 20MWh. Based on the intervention pricing run target, it would have generated 30MWh had the intervention event not occurred. The draft determination approach to calculating compensation based on targets would take the difference between 20MWh and 30MWh into account for the purpose of compensation.

However, in the process of providing raise regulation FCAS to the system, the battery actually generates 25MWh of energy over the interval. This means that it is more appropriate to consider the 25MWh amount alongside the 20MWh amount, as the 20MWh amount is not reflective of what was actually generated. As the final rule allows AEMO to take the actual

amount generated into account where the draft rule did not, this will avoid over-compensating the unit.

AEMO's current practice is to scale the 25MWh amount with respect to the targets in the dispatch run and intervention pricing run to estimate what the battery would have generated had the intervention event not occurred. Considering all targets and actual generation is appropriate as there is no perfect counter-factual for what actually may have been generated during an intervention event. (The relationship between the dispatch run target and the intervention pricing run target, together with actual generation/consumption, is the only metric available to guide AEMO's estimation. This is because there is no counterfactual for what FCAS would actually have been provided - as distinct from enabled - during the intervention, and what impact this would have had on actual generation/consumption.) This will then be considered to estimate the trading amount referred to in clause 3.12.2(c)(1)(ii). Other factors, such as the factors set out in paragraph (a1), will also be considered to calculate the compensation (if any) payable by or to AEMO in respect of that unit, to meet the objective of the compensation framework.[204]

FCAS compensation

Under the final rule (but not in the current Rules), a participant may be entitled to compensation for FCAS losses, or be required to repay revenue for FCAS gains, resulting from an intervention event that triggers intervention pricing.

In the above example, the battery's FCAS enablement quantity in the dispatch run (what it is physically dispatched for) is the same as its enablement quantity in the intervention pricing run (what it would have been dispatched for had the intervention event not occurred). This means the battery will not be entitled to compensation for its FCAS enablement (as per the test in clause 3.12.2(b2)(2) of the final rule).

While the battery did generate energy in the process of providing raise regulation FCAS to the system, it will have been paid in respect of its enablement quantity based on the intervention price for the relevant ancillary service, as per normal settlement procedures.[205] No further FCAS compensation is payable in this instance.

D.3.2 Worked example 2: The battery consumes less than its MW dispatch target

A battery's **load** side is dispatched in accordance with the following targets during an intervention price trading interval:

204 Subject to any other units in the participant's portfolio, the $5,000 threshold for compensation at a participant level in clause 3.12.2(b) and any other factors that AEMO may take into account under the Rules.

205 If a participant considers they have been materially under-compensated with respect to FCAS, an additional compensation claim may be made under clause 3.12.2(f).

Table D.2: **Trading interval targets and metered consumption**

	DISPATCH RUN	INTERVENTION PRICING RUN
Energy target (MW) (consumption)	20	10
Raise regulation enabled (MW)	20	20
Lower regulation enabled (MW)	0	0
Actual metered consumption (MWh)	15	

Source: AEMC
Note: To simplify the conversion between MW and MWh for this example, the dispatch and trading interval length is one hour. This means that the unit's "MW" and "MWh" are effectively equivalent.

Energy compensation

Looking first at the targets, the battery's energy dispatch run target (what it is physically dispatched for) is different to the intervention pricing run target (what it would have been dispatched for had the intervention event not occurred). This means the battery may be entitled to energy compensation (as per the test in clause 3.12.2(b2)(1) of the final rule).

In the dispatch run, it is dispatched to consume more than in the intervention pricing run (what it would have been dispatched to consume). Logically, it may be able to receive compensation for the additional energy it has paid to consume. Based on the dispatch run target alone, the battery consumed 20MWh over the trading interval (one hour in this example). Based on the intervention pricing run target, it would have consumed only 10MWh had the intervention event not occurred. The draft determination approach to calculating compensation based on targets would take the difference between 20MWh and 10MWh into account to determine the compensation payable to the participant in respect of that unit.

However, in the process of providing raise regulation FCAS to the system, the battery's net consumption is 15MWh over the interval. This means that it is more appropriate to consider the 15MWh amount alongside the 20MWh amount, as the 20MWh amount is not reflective of what was actually consumed. As the final rule allows AEMO to take the actual amount generated or consumed into account where the draft rule did not, this will avoid over-compensating the unit.

AEMO's current practice is to scale the 15MWh amount with respect to the targets in the dispatch run and intervention pricing run to estimate what the battery would have consumed had the intervention event not occurred. Considering all targets and actual consumption is appropriate as there is no perfect counter-factual for a unit's actual performance during an intervention event. This will then be considered along with other factors as part of calculating compensation for the load in clause 3.12.2(d).

FCAS compensation

The battery's FCAS enablement quantity in the dispatch run (what it is physically dispatched for) is the same as its enablement in the intervention pricing run (what it would have been dispatched for had the intervention event not occurred). This means the battery will not be entitled to compensation for its FCAS enablement (as per the test in clause 3.12.2(b2)(2) of the final rule).

While the battery did actually reduce its consumption in the process of providing raise regulation FCAS to the system, it will have been paid in respect of its enablement quantity based on the intervention price for the relevant ancillary service, as per normal settlement procedures.[206]

D.3.3 Worked example 3: The battery consumes more than its MW dispatch target

A battery's **load** side is dispatched in accordance with the following targets during an intervention price trading interval:

Table D.3: **Trading interval targets and metered generation**

	DISPATCH RUN	INTERVENTION PRICING RUN
Energy target (MW) (consumption)	20	10
Raise regulation enabled (MW)	0	0
Lower regulation enabled (MW)	20	20
Actual metered consumption (MWh)	25	

Source: AEMC
Note: To simplify the conversion between MW and MWh for this example, the dispatch and trading interval length is one hour. This means that the unit's "MW" and "MWh" are effectively equivalent.

Energy compensation

Looking first at the targets, the battery's energy dispatch run target (what it is physically dispatched for) is different to the intervention pricing run target (what it would have been dispatched for had the intervention event not occurred). This means the battery may be entitled to energy compensation (as per the test in clause 3.12.2(b2)(1) of the final rule).

In the dispatch run, it is dispatched to consume more than in the intervention pricing run (what it would have been dispatched to consume). Logically, it may be able to receive

206 If a participant considers they have been materially under-compensated with respect to FCAS, an additional compensation claim may be made under clause 3.12.2(f).

compensation for the additional energy it has paid to consume. Based on the dispatch run target alone, over the trading interval (one hour in this example) the battery consumed 20MWh. Based on the intervention pricing run target, it would have consumed only 10MWh had the intervention event not occurred. The draft determination approach to calculating compensation based on targets would take the difference between 20MWh and 10MWh into account to determine the compensation payable to the participant in respect of that unit.

However, in the process of providing lower regulation FCAS to the system, the battery actually consumes 25MWh of energy over the interval. AEMO's current practice is to scale the 25MWh amount with respect to the targets in the dispatch run and intervention pricing run to estimate what the battery would have generated had the intervention event not occurred.

The Commission considered whether taking this 25MWh consumption amount into account may over-compensate the unit in this scenario. In the course of preparing the final determination, consideration was given to a capping approach to prevent over-compensation in certain scenarios, including this one. This approach would cap compensation amounts by reference to the 20MW dispatch target in the dispatch run.

Endgame Economics was engaged to assist the Commission with its deliberations, including in relation to this scenario and the capping approach. It identified that including a capping approach in the Rules could create similar perverse incentives to those identified by AGL and AEMO in their submissions (as explored in detail in the directions paper and discussed in section 5.2.1 of this determination).

Loads generally do not want to "over-consume" during intervention events (which are typically characterised by high prices) due to declining willingness to pay. Capping available compensation by reference to the energy dispatch target could lead to a situation where the load is incentivised to bid a smaller amount of lower FCAS into the market and consume less power (i.e. provide less lower FCAS) in real time in order to keep its total consumption below the dispatch target and avoid further losses. This reflects that both its FCAS enablement revenue and its energy cost contribute to its decision to offer capacity into the FCAS markets.

The system is typically under stress during intervention events and it is important that the compensation framework not create any signals that would discourage participants from offering and/or providing system services at such times. Further, as AEMO discussed in its submission to the draft determination, it is difficult to determine when a participant is departing from its energy target due to the provision of FCAS, or for other reasons. Endgame Economics suggested that the risk to system security of non-conformance with dispatch instructions may exceed any compensation cost implications. Endgame Economics also concluded that accounting for actual consumption in the calculation of compensation did not lead to a systematic gaming incentive.

The Commission has considered Endgame Economics' conclusions alongside other relevant factors to determine the approach that best aligns with the NEO. Relevant factors include:

- The netting-off of positive and negative compensation amounts for a given unit and across a participant's portfolio, and the $5,000 threshold for compensation may reduce

the compensation amount ultimately payable to a participant (as explored in section 3.2.1)

- The administrative costs to AEMO of accounting for a number of discrete scenarios in the automatic compensation framework is likely to outweigh the compensation ultimately payable (as explored in section 5.2.1), and
- The risks of participant non-conformance in other scenarios (as explored in the example put forward by AEMO in its submission to the draft determination and the other worked examples in this appendix), and
- There is no perfect counter-factual for what actually may have been generated or consumed during an intervention event (as identified above).

In light of these factors, the Commission considers that it is preferable for AEMO to account for actual consumption in determining compensation, and not to include a cap on dispatch in the Rules as this could create perverse incentives.

FCAS compensation

The battery's FCAS enablement quantity in the dispatch run (what it is physically dispatched for) is the same as its enablement quantity in the intervention pricing run (what it would have been dispatched for had the intervention event not occurred). This means the battery will not be entitled to compensation for its FCAS enablement (as per the test in clause 3.12.2(b2)(2) of the final rule).

While the battery did actually consume in the process of providing lower regulation FCAS to the system, it will have been paid in respect of its enablement quantity based on the intervention price for the relevant ancillary service, as per normal settlement procedures as per normal settlement procedures.[207]

D.3.4 Worked example 4: The battery is predominantly providing regulation FCAS and, in doing so, switches from consuming to generating

This example demonstrates the case highlighted by AEMO in its submission to the draft determination.

A battery's **load** side is dispatched in accordance with the following targets during an intervention price trading interval:

Table D.4: **Trading interval targets and metered generation**

	DISPATCH RUN	INTERVENTION PRICING RUN
Energy target (MW) (consumption)	5	1
Raise regulation enabled	20	20

207 If a participant considers they have been materially under-compensated with respect to FCAS, an additional compensation claim may be made under clause 3.12.2(f).

	DISPATCH RUN	INTERVENTION PRICING RUN
(MW)		
Lower regulation enabled (MW)	0	0
Actual metered **generation** (MWh)	15	

Source: AEMC

Note: To simplify the conversion between MW and MWh for this example, the dispatch and trading interval length is one hour. This means that the units "MW" and "MWh" are effectively equivalent.

Energy compensation

Looking first at the targets, the battery's energy dispatch run target (what it is physically dispatched for) is different to the intervention pricing run target (what it would have been dispatched for had the intervention event not occurred). This means the battery may be liable to repay energy compensation (as per the test in clause 3.12.2(b2)(1) of the final rule).

In the dispatch run, it is dispatched to consume more than in the intervention pricing run (what it would have been dispatched to consume). Logically, it may be able to receive compensation for the additional energy it has paid to consume. Based on the dispatch run target alone, over the trading interval (one hour in this example) the battery consumed 5MWh. Based on the intervention pricing run target, it would have consumed only 1MWh had the intervention event not occurred. The draft determination approach to calculating compensation based on targets would take the difference between 5MWh and 1MWh into account to determine the compensation payable to the participant in respect of that unit.

However, in the process of providing raise regulation FCAS to the system, the battery actually **generates** 15MWh of energy over the interval. This means that it is more appropriate to consider the 15MWh amount generated than the 5MWh consumption target, as the 5MWh target is not reflective of what actually happened. As the final rule allows AEMO to take the actual amount generated into account where the draft rule did not, this will avoid compensating the unit for consuming when it has actually already been paid to generate.

The 15MWh amount will be set to zero (as it appears on the load side of the unit) for the purpose of estimating what the battery may have consumed had the intervention event not occurred. As discussed in section 5.2.1 (and the directions paper, pp. 14-15), this is considered appropriate as the primary service being provided by the unit is FCAS rather than energy. Market participants are paid for FCAS through their enablement revenue (as below) and will be paid the intervention spot price for what is generated.

FCAS compensation

The battery's FCAS enablement quantity in the dispatch run (what it is physically dispatched for) is the same as its enablement quantity in the intervention pricing run (what it would

have been dispatched for had the intervention event not occurred). This means the battery will not be entitled to compensation for its FCAS enablement (as per the test in clause 3.12.2(b2)(2) of the final rule).

While the battery did actually generate energy in the process of providing raise regulation FCAS to the system, it will have been paid in respect of its enablement quantity based on the intervention price for the relevant ancillary service, as per normal settlement procedures.[208]

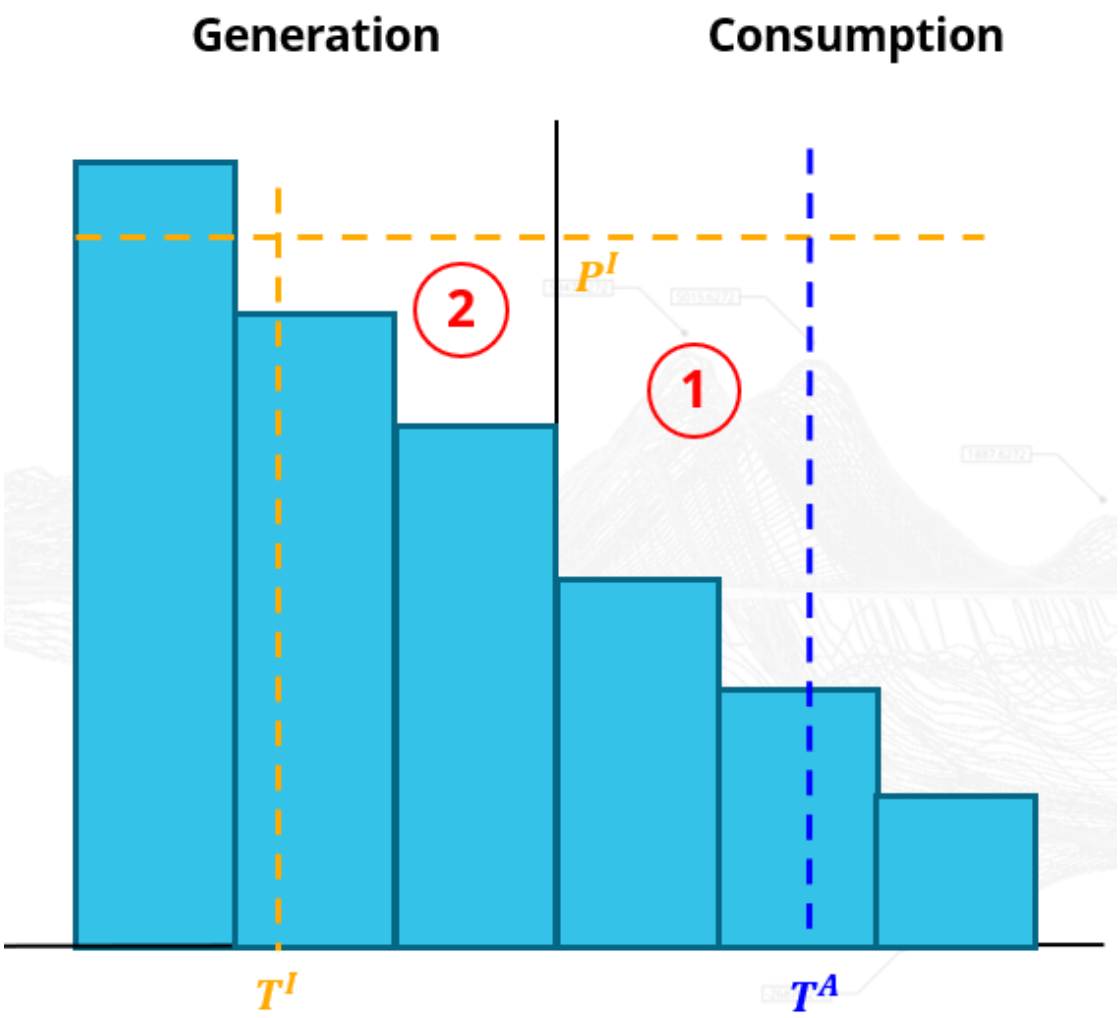
D.4 Analysis of the target-based approach to classifying units for compensation purposes

The following simplified example illustrates why under-compensation for energy could have resulted if the rules were to adopt the directions paper approach to classifying bi-directional units for compensation purposes (outlined in section 5.2.1).

Take a battery that is issued a dispatch run target (T^A) to consume 5MW and an intervention pricing run target (T^I) to generate 5MW. This is illustrated in Figure D.1. In this case, the Commission considers the battery may reasonably be entitled to compensation for the forgone generation (2) and the additional consumption (1).

208 If a participant considers they have been materially under-compensated with respect to FCAS, an additional compensation claim may be made under clause 3.12.2(f).

Figure D.1: Dispatch targets on generator and load sides of a battery



Source: Endgame Economics
Note: T^I is the intervention price run target, T^A is the dispatch target, P^I is the intervention price.

Under the approach proposed in the directions paper:

- For a battery that participates in dispatch as a single unit, the dispatch target of -5MW (that is, consume 5MW) would be used to determine that the applicable compensation framework is the scheduled load framework. The participant would only be compensated for consumption-related loss due to RRP>BidP_b (i.e., the white trapezoidal area to the right of the Y-axis indicated by (1)). The participant, however, is still worse off as its forgone profit from the generation side (the trapezoidal area to the left of the Y-axis indicated by (2)) is not compensated.

- For a battery that is both a scheduled generator and scheduled load:
  - The load side would see a dispatch target to consume 5MW and an intervention pricing run target of 0MW. The loss indicated by (1) could be accounted for using the scheduled load framework.
  - The generator side would see a dispatch target of 0MW and an intervention pricing run target of 5MW (consumption). The loss indicated by (2) could be accounted for using the affected participant framework.

In practice, as outlined above, AEMO also considers actual generation/consumption in the calculation of compensation. This will impact the amount ultimately payable to the participant in respect of the battery's loss/gains on the generation and load side. Accounting for actual outcomes is necessary due to the reasons outlined in section 5.2.1, noting also the need to balance administrative costs with accuracy, and that clause 3.12.2(f) allows a participant to make an adjustment claim if it considers it is still out of pocket.