RCP | Rule Change Panel

Draft Rule Change Report: Amending the Minimum STEM Price definition and determination (RC_2019_05)

Standard Rule Change Process

13 March 2020

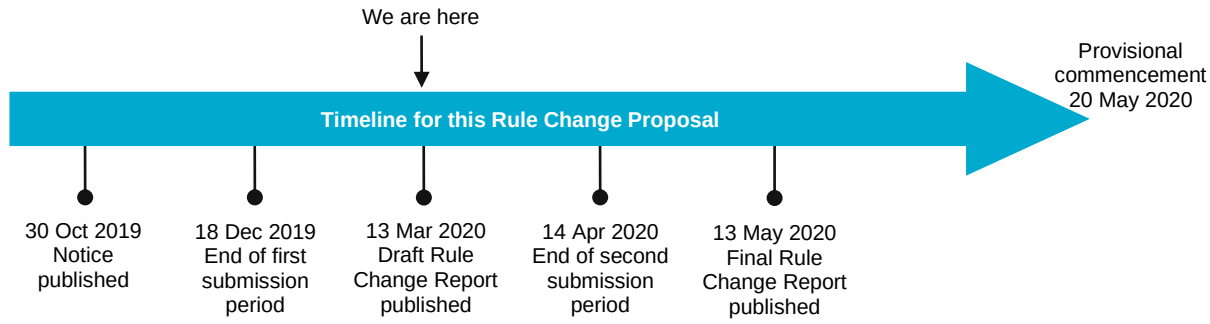
Contents

1. Rule Change Process and Timeline

On 25 October 2019, Synergy submitted a Rule Change Proposal titled “Amending the Minimum STEM Price definition and determination (RC_2019_05)”.

The Minimum STEM Price represents the price floor for the Short Term Energy Market (**STEM**) and the Balancing Market. The current Market Rules fix the Minimum STEM Price at −$1,000/MWh. This Rule Change Proposal seeks to make the Minimum STEM Price subject to an annual review in line with the relevant price ceilings (Maximum STEM Price and Alternative Maximum STEM Price) and to change the Minimum STEM Price to -$200/MWh until the first review of the Minimum STEM Price is complete.

This proposal is being processed using the Standard Rule Change Process described in section 2.7 of the Market Rules. The key dates for progressing this Rule Change Proposal are:



This Draft Rule Change Report is drafted on the basis that the reader has read all the related documents, including the Rule Change Proposal and the first period submissions. All documents related to this Rule Change Proposal can be found on the Rule Change Panel’s website at Rule Change: RC_2019_05 – Economic Regulation Authority Western Australia.

2. The Rule Change Panel’s Draft Decision

The Rule Change Panel’s draft decision is to accept the Rule Change Proposal in a modified form, as outlined in section 6.3 and detailed in Appendix C of this report.

2.1 Reason for the Rule Change Panel’s Draft Decision

The Rule Change Panel has made its draft decision on the basis that the Amending Rules, as amended following the first submission period will:

- ensure the Minimum STEM Price is fit for purpose under changing market conditions;
- limit the costs for reviewing the Minimum STEM Price; and
- allow the Market Rules to better achieve Market Objective (a) and are consistent with the remaining Market Objectives.

Additional detail outlining the analysis behind the Rule Change Panel’s decision is outlined in section 6 of this report.

2.2 Proposed Commencement

The Amending Rules are proposed to commence at **8:00 AM** on **20 May 2020.** The commencement date is subject to change in the Final Rule Change Report.

3. Call for Second Round Submissions

The Rule Change Panel invites interested stakeholders to make submissions on this Draft Rule Change Report.

The Rule Change Panel seeks feedback on all aspects of the Draft Rule Change Report to assist the Rule Change Panel with its assessment of the proposal. However, the Rule Change Panel would like stakeholders to comment in particular on the following aspects of the Draft Rule Change Report:

- the proposed mechanism to allow AEMO to determine that the Minimum STEM Price is appropriate and does not need to be newly determined in a given year, as discussed in section 6.1.3 of this report;
- the proposal to set the Minimum STEM Price to be the price that is lower than 90% of the prices determined under the scenario outcomes, as discussed in section 6.1.3 of this report;[1] and
- the methodology and guiding principles that AEMO must follow when determining the Minimum STEM Price, as discussed in section 6.1.3 of this report.

The Rule Change Panel notes that AEMO's preliminary cost estimate of up to $300,000 for each review, where AEMO must determine a new Minimum STEM Price, may not justify the benefit of including the Minimum STEM Price in the Energy Price Limits review. Therefore, the Rule Change Panel specifically asks stakeholders to comment on the costs and benefits of reviewing the Minimum STEM Price. The Rule Change Panel notes that AEMO will refine its cost estimate after the publication of the Draft Rule change Report. In particular, the Rule Change Panel seeks stakeholders' views on:

- whether the cost for the reviews, as estimated by AEMO (see section 6.6.1), justify the benefits of including the Minimum STEM Price in the annual review of the Energy Price Limits; and
- the level of costs stakeholders consider would justify the benefits of annually reviewing the Minimum STEM Price.

The submission period is 20 Business Days from the Draft Rule Change Report publication date. Submissions must be delivered to the RCP Secretariat by **5:00 PM** on **Tuesday 14 April 2020**.

The Rule Change Panel prefers to receive submissions by email, using the submission form available at: https://www.erawa.com.au/rule-change-panel/make-a-rule-change-submission sent to support@rcpwa.com.au.

Submissions may also be sent to the Rule Change Panel by post, addressed to:

[1] The Rule Change Panel proposes that AEMO must model the price at which the Facility with the highest decommitment cost per MW minimum generation for credible scenarios.

Rule Change Panel
Attn: Executive Officer
C/o Economic Regulation Authority
PO Box 8469
PERTH BC WA 6849

4. Proposed Amendments

4.1 The Rule Change Proposal

Synergy's Rule Change Proposal seeks to:

- amend the definition of the Minimum STEM Price from −$1,000/MWh to a value that is determined "based on AEMO's estimate of the highest price that would induce all generators absent of non-market-related externalities to decommit";[2]
- expand the annual review and approval process for the values of the Maximum STEM Price and Alternative Maximum STEM Price to include review and approval of the value of the Minimum STEM Price;[3] and
- set the Minimum STEM Price to −$200/MWh until a new value is determined and approved through the expanded annual review process.

Synergy contends that the displacement of scheduled generation by renewable generation will soon render the Minimum STEM Price unfit for purpose and that leaving it unchanged will:

- result in excessive and unacceptable financial losses for Market Generators that have generating plant in service at times of low scheduled load and/or that are obliged to have generating plant in service for no other reason than to provide Ancillary Services; and
- deliver a perverse retirement and augmentation pricing signal.

Synergy considers that the excessive losses may have a profound impact on short-term and long-term decision making in the market, adding considerable and unnecessary cost to the system.

Synergy considers that the Minimum STEM Price does not provide the most efficient outcome for the Wholesale Electricity Market (**WEM**), because:

- in being fixed (at −$1,000/MWh), it is not responsive to changes in technology, costs and market conditions; and
- in being arbitrary, it does not reflect a level that explicitly relates to the cost of supply.

Synergy suggests introducing an interim Minimum STEM Price of −$200/MWh as soon as possible to avoid adverse outcomes prior to the implementation of the proposed review process.

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2 Synergy defines 'non-market-related externalities' as considerations associated with using generation plant for purposes other than providing energy to the electricity market (e.g. steam revenue derived by a cogeneration facility).

3 As a result, the methodology for setting the Minimum STEM Price would be included in the Economic Regulation Authority's (**ERA**) five-yearly review of the methodology for setting the Benchmark Reserve Capacity Price and the Energy Price Limits.

4.2 The Rule Change Panel's Initial Assessment of the Proposal

The Rule Change Panel has decided to progress this Rule Change Proposal on the basis that stakeholders should be given an opportunity to consider the Rule Change Proposal and provide submissions through the rule change process.

5. Consultation

5.1 The Market Advisory Committee

The Rule Change Proposal was discussed at the 13 November 2019 Market Advisory Committee (**MAC**) meeting.[4] A summary of the key points discussed at this meeting regarding this Rule Change Proposal is provided below. The minutes of the discussion are available on the Rule Change Panel's website.

Regarding whether the Minimum STEM Price is inefficient

- Mr Daniel Kurz (Market Generator) and Mr Andrew Stevens (Market Generator) considered that the Minimum STEM Price exposes Market Generators to significantly higher risk than the Maximum STEM Price because of the asymmetry of the two price limits.
- Mr Martin Maticka (AEMO) noted that most generators were not required to bid at the Minimum STEM Price and there is not much differentiation between the offers at the floor.
- There was some discussion about reasons why Market Generators were bidding at the Minimum STEM Price, the following potential reasons were mentioned:
    - Ancillary Service Providers must bid the respective quantities at the Minimum STEM Price;
    - Non-Scheduled generators that are non-balancing active must bid their expected generation at the Minimum STEM Price;
    - Market Generators may price quantities subject to Bilateral Contracts at the Minimum STEM Price;
    - Market Generators could have an incentive to price Intermittent Generators at the Minimum STEM Price if they are backed by power purchase agreements were the payment for the energy generated is unrelated to the Balancing Price; and
    - Market Generators may bid quantities at the Minimum STEM Price to avoid the decommitment of the respective units for short periods of time as these units were not physically capable of recommitting shortly after decommitting.
- Mr Maticka considered that the issue had two parts and asked which problem RC_2019_05 was trying to solve:
    - One issue was how to compensate LFAS providers exposed to negative prices during times of low demand. This issue might not be solved by changing the Minimum STEM Price but could be solved through other measures.

[4] The Rule Change Panel convened a special MAC meeting to discuss this Rule Change Proposal because it had not previously been discussed with the MAC and the next scheduled MAC meeting would have been too close to the end of the first submission period to inform Rule Participants' development of submissions.

- The other issue was how to achieve a commercial delineation to decide which plant to decommit at different points of demand. Mr Maticka noted that some Market Generators were bidding their Intermittent Generators at −$1,000/MWh, but that it would only become important to decide which plant to decommit if there was a system security issue and that the tiebreak rule would otherwise be used.
  Mr Maticka noted that there was not much visibility about which plants would have to decommit if it came to the tiebreak, as the selection of which plant to decommit was random.

- Mr Patrick Peake (Market Customer) supported Mr Maticka's suggestion that the issue of how to compensate Ancillary Services Providers exposed to negative prices during times of low demand might be better addressed through other measures.
- Mr Stevens raised concerns that the risk for providers of Ancillary Services to be exposed to the Minimum STEM Price could lead to:
  - massive losses for providers of Ancillary Services; and
  - incredible high LFAS costs.
- Mr Dean Sharafi (AEMO in its capacity as System Management) noted that the price for Ancillary Services should value the service properly and that including such a big exposure in the forward pricing would not send the right incentives. Ancillary Service Providers would either have to include this risk in their prices or pull out of the Ancillary Services market if they could. Mr Sharafi agreed that this risk needs to be addressed but noted that there might be other ways to do so.
- Mr Dominic Regnard (Synergy) considered that the key question was to find an appropriate floor price for the energy market and that exposure for Ancillary Service Providers was a consequential issue.

Regarding the annual review and appropriate level of the Minimum STEM Price

- Mr Sharafi agreed that it would be appropriate to regularly review the Minimum STEM Price as is common practice in other markets. Mr Sharafi noted that the fundamental concepts of the market were changing, so a fixed Minimum STEM Price is not fit for purpose.
- Mr Stevens noted that he considered that the current risk for Market Generators could translate into a system security issue and that he supports a review of the floor price.
- There was some discussion about the appropriate level of the Minimum STEM Price. The following points were raised:
  - Mr Kurz noted that before 2012, the Minimum STEM Price was the negative of the Maximum STEM Price and was changed to −$1,000/MWh when the Balancing Market was introduced. Mr Kurz considered that the market had changed since then and that the Minimum STEM Price was never really intended to set the Balancing Price.
  - Mr Maticka noted that a Minimum STEM Price that is too high could lead to an increase in quantities bid at the floor. This would increase the likelihood that coal fired power plants will be asked to decommit if the price reaches the floor because the tiebreak rule randomly selects which of two identically priced quantities will be dispatched.

- Mr Kurz noted that there was a big gap in the Balancing Merit Order between around −$250/MWh and the Minimum STEM Price and if the Minimum STEM Price was set at a level below this gap, the outcome would be the same in terms of delineation while reducing the risk for generators.
- Mr Regnard noted that the intention of RC_2019_05 was to reduce the exposure for Market Generators during incidents where the Balancing Price reached the floor, without increasing the occurrence of those incidents.
- Mr Stevens noted that while there were some benefits for Market Customers being paid $1,000/MWh for their consumption, the Market Generators should not be exposed to this risk in such a small market. Mr Stevens considered that the whole point of the Reserve Capacity Market was to underpin investment while putting a narrow band around the energy price.
- Mr Peake noted that the heavy investment in solar and wind generation had significantly reduced the Reserve Capacity Price and that the Reserve Capacity Price should also be reviewed if the Minimum STEM Price would be reviewed.
- Mr Chris McDonagh (Market Generator) noted that a review could lead to an even lower Minimum STEM Price as a plant would have to recover its decommitment and start-up costs in a single Trading Interval and therefore a price of −$1,000/MWh would not be incentive to decommit. Mr McDonough considered that the issue was a market design issue and not related to the actual price in the Trading Interval.
- Mr Kurz suggested setting two levels of Minimum STEM Price for different Facility types (like the maximum STEM Price and the Alternative Maximum STEM Price).

Regarding market power

- Ms Laura Koziol (RCP Support) asked for feedback on whether an obligation could be introduced to not bid below decommitment costs in case of Market Power.
- Mr Stevens noted that with the current forecasting issues and price volatility it would be impossible to know if one would set the price at the time of bidding, which would make such an obligation impractical.

Regarding the principles to determine the Minimum STEM Price

- Mr Maticka considered that the Market Rules should:
  - be very clear about how AEMO was supposed to determine the Minimum STEM Price;
  - be more prescriptive than providing principles because principles could be interpreted in many ways; and
  - outline the purpose of the Minimum STEM Price (i.e. if it is to manage the risk of exposure or if it is to provide for delineation of plants to come off) as this might affect the methodology.
- Mr Mark Katsikandarakis (AEMO) suggested that the Minimum STEM Price should be prescribed in the same detail as the Maximum STEM Price.

Regarding non-balancing active Facilities

- Ms Jenny Laidlaw (RCP Support) asked what should happen to non-balancing active Facilities that were currently obliged to bid at the floor.

- Mr Stevens noted that it might be a good idea to make those Facilities decommit at a certain price but that this would result in implementation costs for these Facilities.

5.2 Submissions Received During the First Submission Period

The first submission period for this Rule Change Proposal was held between 30 October 2019 and 18 December 2019. The Rule Change Panel received submissions from AEMO, Alinta Energy, Bluewaters, NewGen Power Kwinana (**NewGen**), Perth Energy and Synergy.

Although the Rule Change Panel has summarised the submissions in accordance with clause 2.7.7 of the Market Rules, the Rule Change Panel has reviewed the submissions in their entirety and considered each matter raised by the Rule Participants in making its draft decision on this Rule Change Proposal.

5.2.1 Processing of the Rule Change Proposal

Perth Energy considered that the Rule Change Proposal should not be progressed further at this stage because it considered that:

- the Balancing Price reaching the Minimum STEM Price does not indicate that there is a problem with the determination of the Minimum STEM Price;
- the current Minimum STEM Price of −$1,000/MWh meets the requirements of a price floor, and any arbitrary alternative is unlikely to meet these requirements; and
- the provision of energy and Ancillary Services are currently conflated, and while they should be decoupled, it is clear this cannot be done effectively ahead of the delivery of the Energy Transformation Strategy.

Synergy reaffirmed the urgency to address the issues raised in the Rule Change Proposal now, not as part of the Government's Energy Transformation Strategy, which will be effective post 1 October 2022. Synergy expects that the number of Trading Intervals in which the Balancing Market clears at the Minimum STEM Price will increase well before 1 October 2022, which will place an unnecessary and costly burden on Market Generators.

5.2.2 Problem with current Minimum STEM Price

Bluewaters and NewGen considered that the Minimum STEM Price in its current state is unfit for purpose. The price of -$1,000/MWh is arbitrary and does not reflect any generators' operational expectation of decommitment costs and therefore has led to perverse market bidding behaviour.

Perth Energy considered that the Rule Change Proposal has not identified a problem with the Minimum STEM Price itself but with the bidding behaviour amongst the Market Generators bidding at the Minimum STEM Price.

5.2.3 Effect on Ancillary Services

Bluewaters and NewGen noted that the risk that the Minimum STEM Price exposes providers of Ancillary Services to is disproportionate to the revenue associated with the provision of energy and Ancillary Services.

Synergy reiterated the concern that a Minimum STEM Price of −$1,000/MWh unnecessarily increases the cost of providing Ancillary Services and that these costs will need to be recovered from all Market Participants.

AEMO considered that it is unclear how a higher Minimum STEM Price will help alleviate the concern about Facilities being in service only for the purpose of providing Ancillary Services.

5.2.4 Reviewing the Minimum STEM Price

AEMO supported the inclusion of a review of the Minimum STEM Price as part of the Energy Price Limits Review. However, AEMO suggested that whether a regular review is warranted, and its frequency, should be further considered as the Rule Change Proposal is refined.

Alinta Energy also supported the review of the Minimum STEM Price to ensure that it is effective and continues to serve its purpose considering that the market has changed since the balancing mechanism was introduced.

Perth Energy considered that while it may be more accurate to annually determine a Minimum STEM Price, it is not the price floor, but rather the bidding behaviour of Market Generators that should change. Perth Energy recommended that the current Minimum STEM Price of −$1,000/MWh remains until such time as a price floor can be calculated that more accurately reflects the value of being dispatched under the new market arrangements.

5.2.5 Principles for Determining the Minimum STEM Price

Alinta Energy considered that the Minimum STEM Price should be set at a level that allows the market, through the value being placed on dispatch, to determine which generators remain dispatched during periods of excess generation.

Alinta Energy noted that the reviews of the Minimum STEM Price should:

- ensure that it is set at a level which will allow the market to clear in most circumstances; and
- not create substantial risks which threaten the overall stability and integrity of the market.

Alinta Energy noted that, in reviewing the Minimum STEM Price, the following should be considered when contemplating altering the Minimum STEM Price:

- Has there been a significant change in the number and frequency of Trading Intervals where the Balancing Market has been, or has approached, the level of the Minimum STEM Price?
- Have there been significant changes in the generation fleet, such that average generator cycling costs have changed significantly?

Perth Energy agreed with the Reliability Panel's definition, as quoted by Synergy, that the market floor price "should be set at a level that does not interfere with generators being able to differentiate themselves according to the value they place on being dispatched by bidding at negative prices during periods of excess generation."

AEMO suggested that the Amending Rules need to provide a level of detail for the calculation of the Minimum STEM Price similar to the Maximum STEM Price and Alternative Maximum STEM Price in clause 6.20.3 and 6.20.7 of the Market Rules.

5.2.6 Introducing an Interim Minimum STEM Price

Bluewaters and NewGen supported the introduction of an interim Minimum STEM Price and suggested that this interim price is set at −$235/MWh, which is the Maximum STEM Price multiplied by −1. Bluewaters and NewGen argue that, from assessment of historical Balancing bids, there appears to be a large gap with no bids between −$200/MWh and the Minimum STEM Price. Therefore, amending the Minimum STEM Price to an interim level that

is marginally below the last bids at −$200/MWh will not change dispatch outcomes but will more proportionally apply risk to committed generators at the Minimum STEM Price.

Synergy reiterated the urgency to introduce an interim Minimum STEM Price prior to 1 October 2022 to not only improve the management of system security, but to minimise long term costs of energy and enable market efficiency by reducing the exposure for Market Generators during incidents where the Balancing Price reaches the floor.

Alinta Energy and Perth Energy explicitly opposed the introduction of an interim Minimum STEM Price at −$200/MWh until a new value is determined. Alinta Energy and Perth Energy do not consider a price of −$200/MWh will allow generators with different cycling costs to differentiate themselves through their negative bids.

Alinta Energy noted that:

- no modelling had been completed to show that -$200/MWh will still meet the purpose of the Minimum STEM Price; and
- a Minimum STEM Price of −$200/MWh will interfere with efficient dispatch outcomes by potentially leading to increasing intervals where the market does not clear without requiring AEMO to intervene via the tiebreak rule.

Perth Energy highlighted that determining a Minimum STEM Price using the method proposed by Synergy could lead to a Minimum STEM Price that is lower than −$1,000/MWh, rather than an increase to −$200/MWh, as proposed for the interim Minimum STEM Price.

AEMO noted that the proposed introduction of an interim Minimum STEM Price at −$200/MWh contradicts the principle that the Minimum STEM Price needs to be sufficiently low to incentivise generators to decommit. AEMO considered that it could be inferred that the current Minimum STEM Price is not low enough to enable price differentiation.

5.2.7 Introduction of an Alternative Minimum STEM Price

Bluewaters and NewGen noted that it cannot be expected that a thermal power plant would be required to de-commit and then re-commit from one interval to the next. Bluewaters and NewGen suggested to utilise a Minimum STEM Price and an alternative Minimum STEM Price with the lower price floor applying to Facilities with a higher cost to cycle, or which are committed for Ancillary Services to limit the exposure of those generators.

Perth Energy noted that delivering a more symmetrical, administrative bidding Energy Price Limits, as proposed in the Rule Change Proposal, would most likely result in the establishment of more than one price floor to account for differences in Facility characteristics. Perth Energy considers that introducing an alternative price floor is an unnecessary and counter-productive administrative change.

5.2.8 Submitters' Assessment of the Proposal against the Wholesale Market Objectives

The assessment by submitting parties as to whether the proposal would better achieve the Wholesale Market Objectives is provided in Table 1.

Table 1: Submissions Comments on the Wholesale Market Objectives

Submitter	Wholesale Market Objective Assessment
AEMO	**Including the Minimum STEM Price in the Energy Price Limits review** In the absence of a clearly defined methodology to calculate the Minimum STEM Price as a part of the annual Energy Price Limits review, AEMO is unable to assess whether this proposed change will better achieve the Wholesale Market Objectives. **Introducing an interim Minimum STEM Price of −$200/MWh until a new value is determined** With respect to the proposed interim change of the Minimum STEM Price to −$200, AEMO considers that this change may not better achieve the Wholesale Market Objectives. Specifically, a higher Minimum STEM Price may not better achieve the Wholesale Market Objectives as: • It may discourage competition (Wholesale Market Objective (b)) as it limits the ability for Market Participants to price differentiate bids in the Balancing Market. • It may result in an economically inefficient outcome (Wholesale Market Objective (a)) as a higher Minimum STEM Price may prevent generators from submitting their minimum generation at a negative price representative of its decommitment costs and, therefore, may result in generators being turned off in circumstances where it may be more economical for the Market Participant to remain generating at lower negative prices. • It may hamper economic efficiency (Wholesale Market Objective (a)), new entry (Wholesale Market Objective (b)), and discourage measures to manage consumption volumes/timing (Wholesale Market Objective (e)) as it may blunt the investment signals for energy storage facilities (low energy price and price variability).
Alinta Energy	**Including the Minimum STEM Price in the Energy Price Limits review** Alinta Energy considers that the proposal to review the Minimum STEM Price would better facilitate the achievement of the Wholesale Market Objectives. A regular review of the Minimum STEM Price will ensure that: • it provides efficient price signals while managing price risk (Wholesale Market Objective (a)); • it promotes efficient dispatch outcomes (Wholesale Market Objective (a)); • it provides signals for the investment of new technologies (Wholesale Market Objective (b)); and • it allows for all technologies to recover their cycling costs (Wholesale Market Objective (c)) **Introducing an interim Minimum STEM Price of −$200/MWh until a new value is determined** Alinta Energy does not consider that the proposal to arbitrarily fix the Minimum STEM Price to −$200/MWh as an interim measure would better facilitate the achievement of the Wholesale Market Objectives:

Submitter	Wholesale Market Objective Assessment
	• Using an interim Minimum STEM Price of −$200/MWh may discriminate between generators if the price is not low enough for large coal units to cover their cycling costs. The Minimum STEM Price should be reviewed to ensure it is low enough for all technologies to be able to recover their cycling costs (Market Objective (c)); and • The interim Minimum STEM Price may induce perverse outcomes as generators bidding at the Minimum STEM Price does not provide the most economical order of dispatch. AEMO may be required to dispatch Out of Merit to avoid a High-Risk State merely because the Balancing Price equals the Minimum STEM Price (Market Objective (a)).
Bluewaters and NewGen	The proposed changes, in any form, will better facilitate Wholesale Market Objective (c). Establishing a Minimum STEM Price which reflects the costs associated with the decommitment of Generators will reduce the significant price risk associated with providing Ancillary Services and energy during low demand periods. The reduction in perceived risk should minimise the long-term cost of electricity supplied to customers through lower risk premiums offered in Generators Ancillary Services Offers and Balancing Submissions.
Perth Energy	There is merit in determining a more accurate market price floor. However, Perth Energy cannot support the progression of the Rule Change Proposal, as we do not consider it minimises the long-term cost of electricity supplied to customers from the SWIS (Wholesale Market Objective (c)) on the following basis: • There is limited evidence of the impact of the likelihood or consequence of the purported “excessive and unacceptable financial losses” caused to Market Generators more broadly, or Synergy specifically. • Any evidence of financial losses provided should also be considered against the benefits of the low cost periods (adjusted to account for the likelihood and consequence of this risk) to retailers, and ultimately WA energy consumers. • The proposed changes will require the support of a cost benefit assessment underpinned by extensive market modelling, which would need to be undertaken by an expert consulting firm before being progressed. The cost of this is unlikely to be outweighed by the benefits achieved in the one or two years that the proposed changes will be in place before being superseded. • The ongoing determination of the Minimum STEM Price (or prices) as part of the Energy Price Limits Review undertaken by the ERA will increase the cost of the annual and five-yearly review processes, thereby increasing the cost of the ongoing administration of the market for Market Participants and ultimately WA energy consumers.

Submitter	Wholesale Market Objective Assessment
	• The impending new co-optimised energy and ancillary services market and dispatch engine to be delivered as part of the Energy Transformation Strategy will reduce any benefits and the required pay-back period to one or two years at the most.
Synergy	Not provided

5.3 The Rule Change Panel's Response to Submissions Received During the First Submission Period

The Rule Change Panel's response to each of the specific issues raised in the first submission period is presented in Appendix A of this report. A more general discussion of the analysis undertaken by the Rule Change Panel on this Rule Change Proposal, which addresses the main issues raised in submissions and the Rule Change Panel's response to these issues, is available in section 6.2 of this report.

5.4 Public Forums and Workshops

The Rule Change Panel did not hold a public forum or workshop for this Rule Change Proposal.

6. The Rule Change Panel's Draft Assessment

In preparing its Draft Rule Change Report, the Rule Change Panel must assess the Rule Change Proposal in light of clauses 2.4.2 and 2.4.3 of the Market Rules.

Clause 2.4.2 of the Market Rules states that the Rule Change Panel "*must not make Amending Rules unless it is satisfied that the Market Rules, as proposed to be amended or replaced, are consistent with the Wholesale Market Objectives*". Additionally, clause 2.4.3 of the Market Rules states that, when deciding whether to make Amending Rules, the Rule Change Panel must have regard to:

- any applicable statement of policy principles the Minister has issued to the Rule Change Panel under clause 2.5.2 of the Market Rules;
- the practicality and cost of implementing the proposal;
- the views expressed in submissions and by the MAC; and
- any technical studies that the Rule Change Panel considers necessary to assist in assessing the Rule Change Proposal.

When making its draft decision, the Rule Change Panel has had regard to each of the matters identified in clauses 2.4.2 and 2.4.3 of the Market Rules, as follows:

- the Rule Change Panel's assessment of the Rule Change Proposal against the Wholesale Market Objectives is available in section 6.4 of this report;
- the Rule Change Panel notes that there has not been any applicable statement of policy principles from the Minister in respect of this Rule Change Proposal;
- the Rule Change Panel's assessment of the practicality and cost of implementing the Rule Change Proposal is available in section 6.6 of this report;

- a summary of the views expressed in submissions and by the MAC is available in section 4 of this report. The Rule Change Panel's response to these views is available in section 5.1 and Appendix A of this report; and
- the Rule Change Panel does not believe a technical study in respect of this Rule Change Proposal is required and therefore has not commissioned one.

The Rule Change Panel's assessment is presented in the following sections.

6.1 Assessment of the Proposed Changes

6.1.1 Change of the definition of the Minimum STEM Price

In its Rule Change Proposal, Synergy seeks to replace the current definition of the Minimum STEM Price from a fixed price of −$1,000/MWh to a value to be determined by AEMO that is just sufficient to induce all generators absent of 'non-market-related externalities' to decommit.

Purpose of the Minimum STEM Price

The Rule Change Panel agrees with Synergy that a floor price (i.e. the Minimum STEM Price) should allow Facilities to order themselves in the Balancing Merit Oder so the Facilities that are willing to pay the highest price for generating are dispatched down last. This means that the floor price must be low enough to allow the Facility that is willing to pay the highest price for generating in a single Trading Interval to be separated from other Facilities.

The Rule Change Panel considers that disregarding 'non-market externalities' in the determination of decommitment costs, as proposed by Synergy, would be imprudent because:

- a rational Market Participant should take into account all relevant matters when calculating its decommitment costs, including what Synergy has called a 'non-market externality'; and
- excluding 'non-market externalities' would be against Wholesale Market Objective (c).[5]

The Rule Change Panel also recognises that negative prices in the Balancing Market may affect the cost of Ancillary Services as well as constraint payments. The Rule Change Panel considers that these effects must be considered when setting the floor price.

Efficiency of the current Minimum STEM Price

In its Rule Change Proposal, Synergy considers that the displacement of scheduled generation by renewable generation will soon render the Minimum STEM Price unfit for purpose; and that leaving it unchanged will result in excessive unacceptable financial losses for Market Generators that:

- have generation plant in service at times of low scheduled load; or
- are obliged to have generation plant in service for no other reason than to provide Ancillary Services.

The Rule Change Panel considers that, at times of low system demand, the Balancing Price should allow Market Participants to compete for dispatch of Facilities with high cycling costs

[5] Wholesale Market Objective (c) is:

> to avoid discrimination in that market against particular energy options and technologies, including sustainable energy options and technologies such as those that make use of renewable resources or that reduce overall greenhouse gas emissions;

or where the generation is hedged by the participant's Net Contract Position and/or their own consumption.

The Rule Change Panel notes that participation in the LFAS Market is voluntary for all Market Participants other than Synergy. Providers of LFAS, including Synergy, can and should price into their LFAS bids the risk of being exposed to the Minimum STEM Price during times of low system demand. This should lead to more efficient provision of LFAS. For example, quantities that are not hedged (by the Market Participant's Net Contract Position, other bilateral agreements or its own consumption) should not be incentivised to provide LFAS during times of low system demand. Any issues arising from high LFAS Prices should be addressed through means other than the Minimum STEM Price.

The Rule Change Panel understands that:

- any quantities associated with the provision of LFAS by Synergy (even if Synergy has to provide all LFAS) would be hedged by Synergy's own consumption and Bilateral Contracts and are therefore not exposed to the Balancing Price;[6] and
- most, if not all quantities associated with other Ancillary Services provided by Synergy would also be hedged by Synergy's own consumption and bilateral contracts and not exposed to the Balancing Price.

The Rule Change Panel considers that Synergy should be able to cover its costs for quantities associated with provision of Ancillary Services that are exposed to the Balancing Price. As outlined above, the LFAS market allows Synergy (and other LFAS providers) to account for their exposure to the Balancing Price via their bids into the LFAS market. Further, the Rule Change Panel considers that the current methodology of compensation for other Ancillary Services should account for exposure to the Balancing Price. Any issue with compensation of Ancillary Services should be addressed through means other than the Minimum STEM Price. The Rule Change Panel also notes that the Market Rules allow AEMO to procure Ancillary Services from other Rule Participants to reduce costs to the market (clauses 3.11.8 and 3.11.8A of the Market Rules).

Synergy considers that financial losses from exposure to the Minimum STEM Price may have a profound impact on short-term and long-term investment decisions in the market, adding considerable unnecessary cost to the system.

The Rule Change Panel considers that the Balancing Price should be a signal for short-term and long-term investment decisions such as investments in appropriate flexibility for the operation of Facilities.

Synergy states that the current Minimum STEM Price is arbitrary and is not responsive to changing technology, cost and market conditions. Such a fixed, arbitrary price does not provide the most efficient market outcome for the WEM, which may result in perverse outcomes. For example:

- If it is too low, the price should have no impact on the number of times the Balancing Price becomes negative or the ability of generators to differentiate their Facilities to remain dispatched and avoid the incurrence of cycling costs. However, the difference

[6] The generation associated with the provision of LFAS is the last generation that would be turned down due to low system demand. If system demand was so low that generation providing LFAS would be dispatched down in the Balancing Market, it would cause major issues for system security that could not be addressed through the Minimum STEM Price. Theoretically, it would be possible for Synergy to not have sufficient customers with sufficient consumption during times of low system demand to cover the generation needed to provide all LFAS. However, the Rule Change Panel considers that it may not be appropriate for Synergy to be the default LFAS provider if this were to become a common occurrence.

between the Minimum STEM Price and the greatest cost to decommit a generator adds unnecessarily to the financial risk Market Participants are exposed to.

- If the price is too high, it will limit the ability to differentiate Facilities, resulting in inefficient and undesirable market outcomes such as random determination of dispatch (under the tiebreaker rule[7]) and/or generators receiving technically infeasible dispatch instructions (such as dispatch under minimum generation).

Since the commencement of the Balancing Market in 2012, the Balancing Market has only cleared at the Minimum STEM Price in three Trading Intervals (1:00 PM on 12 October 2019, and 12:00 PM and 1:00 PM on 13 October 2019).

In its submission AEMO noted that the occurrence of these three Trading Interval indicates either that the Minimum STEM Price is not low enough or that Market Participants were unaware of the implications of bidding at the Minimum STEM Price.

AEMO stated in Quarterly Energy Dynamics Q4 2019[8] that, during the three Trading Intervals when the Balancing Price cleared at the Minimum STEM Price, approximately 1,200 MW were offered into the Balancing Market at the Minimum STEM Price, of which:

- 50% were associated with the provision of Ancillary Services,[9] which must be offered at the Minimum STEM Price);
- 46% were associated with Balancing active Facilities, which can be offered at any price; and
- 4% were associated with Balancing non-active Facilities, which must offer at the Minimum STEM Price.[10]

AEMO stated that over the three Trading Intervals when the Balancing Price reached the Minimum STEM Price, a total of 394 MWh were exposed to the Balancing Price. This means that on average around 130 MWh per Trading Interval were settled at the Minimum STEM Price and the rest of energy (on average about 470 MWh) was subject to Bilateral Contracts, the STEM Price or own consumption of the respective Market Participant.

On 4 January 2020, the system demand was even lower than during the Trading Intervals where the Balancing Price cleared at the Minimum STEM Price. However, the Balancing Market did not reach the Minimum STEM price on 4 January 2020 but cleared at −$45/MWh.

The Rule Change Panel considers that, during times of low system demand Market Participants can mitigate the risk of being exposed to the Minimum STEM price by:

- not biding quantities at the Minimum STEM Price where the energy is not hedged by the participant's Net Contract Position and/or own consumption; and

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7 The tiebreaker rule is set out in the Market Procedure: Balancing Market Forecast and is used to order Market Generator offers with the same offer price in the Balancing Merit Order. AEMO is considering changes to the tiebreaker rule which have been discussed at a stakeholder workshop on 3 December 2019 and a WA Procedure Change Working Group meeting on 20 February 2020.

8 The report is published on AEMO's website: https://aemo.com.au/energy-systems/major-publications/quarterly-energy-dynamics-qed.

9 LFAS and other Ancillary Services.

10 Balancing non-active Facilities are Facilities that are under 10MW and do not have the communication and control systems in place to automatically respond to dispatch instructions from AEMO. Market Generators must bid the expected generation of Intermittent Generators that are Balancing non-active at the Minimum STEM price.

- not biding to provide LFAS from Facilities where the generation associated with the provision of LFAS is not hedged by the participant's Net Contract Position and/or own consumption.

The Rule Change Panel considers that, by reaching the Minimum STEM Price, the Balancing Market did exactly what it was supposed to do (i.e. send a signal that too much generation was bid at the Minimum STEM Price). Based on the discussion at the 13 November 2019 MAC meeting, it appears that it was a surprise to most Market Participants when the Balancing Market cleared at the Minimum STEM Price. It also appears, based upon more recent events, such as 4 January 2020 described above, that Market Participants learned from these events and now consider the possibility of reaching the price floor during times of low system demand and bid accordingly.

The Rule Change Panel is of the view that there is no clear evidence that the current Minimum STEM Price is inefficient. The Rule Change Panel's analysis of the Trading Days where the Balancing Price reached the Minimum STEM Price[11] and the discussion at the 13 November MAC meeting suggest that the price at which the generator with the greatest cost to decommit would be financially better off to incur the decommitment cost than to remain committed and generate at the Minimum STEM Price, may be lower than −$1,000/MWh.

The Rule Change Panel considers that the occurrence of bidding into the Balancing Market at the Minimum STEM Price in times of low system demand, by Market Participants that are not fully hedged, is evidence that the Minimum STEM Price might not be low enough to incentivise the desired behaviour (i.e. that Facilities with a high minimum stable level of operation (minimum generation) that are not backed by bilateral contracts should not be offered at the Minimum STEM Price at times of low system demand).

Appropriateness of a Fixed Minimum STEM Price

The Rule Change Panel agrees with Synergy and most of the submissions that the WEM has changed since the introduction of the Balancing Market and that a fixed arbitrary price floor is not responsive to changing technology or market conditions. Therefore, the Rule Change Panel considers that, while the current Minimum STEM does not appear to be distorting market outcomes, this could change over time with further changes in technology or Market Participants' bidding and contracting behaviour.

Therefore, the Rule Change Panel supports replacing the current fixed Minimum STEM Price of −$1,000/MWh with a value to be determined by AEMO, that should represent the price just sufficient to induce all Facilities to decommit. The Rule Change Panel proposes to not explicitly exclude 'non-market externalities' from the determination of the Minimum STEM Price for the reasons outlined at the beginning of this section 6.1.1.

The Rule Change Panel also considers that the Minimum STEM Price is likely to change when there are significant changes in the market, such as changes in technology or major plant retirements, but that these events are not likely to occur on an annual basis. Therefore, the Rule Change Panel proposes to include criteria in the review of the Minimum STEM Price that must be met before AEMO must determine a new Minimum STEM Price. Further detail regarding these criteria and the principles for determining the Minimum STEM Price are provided in section 6.1.3 of this Rule Change Report.

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11 The Rule Change Panel's analysis is based on market data and confidential data, including Balancing Prices, LFAS Prices, Bilateral Positions, STEM outcomes, Meter Data and confidential information on Facility cycling costs.

6.1.2 Including the Minimum STEM Price in AEMO's annual Energy Price Limit Review and the ERA's five-yearly Methodology Review

The current Market Rules set out an annual Energy Price Limits review process that requires:

- AEMO to review the Energy Price Limits (the Maximum STEM Price and Alternative Maximum STEM Price) and to propose revised values to the ERA; and
- the ERA to review whether AEMO has followed the respective methodology for determining the Energy Price Limit values and to approve or reject any revised values.

The Market Rules also set out a process for a five-yearly methodology reviews that requires the ERA to review the methodology for setting the Benchmark Reserve Capacity Price and the Energy Price Limits no later than the fifth anniversary of the completion of the preceding review.

Synergy proposes to include the Minimum STEM Price in the annual review of the Energy Price Limits. Synergy proposes that, in line with the Maximum STEM Price, the appropriateness of the Minimum STEM Price should be reviewed annually to ensure it is performing its function appropriately in the light of changing technologies, Market Rules and cost structures.

Synergy notes that the methodology would then be reviewed every five years, along with the other Energy Price Limits.

In its submission, AEMO suggested that it should be discussed how often the Minimum STEM Price should be reviewed.

The Rule Change Panel supports Synergy's proposal to include the Minimum STEM Price in the review of the Energy Price Limits. However, the determination of a new Minimum STEM Price will likely involve extensive and potentially costly modelling and, as indicated above, the outcome would not likely vary significantly on an annual basis. Therefore, the Rule Change Panel considers that it may not be efficient for AEMO to determine a new Minimum STEM Price on an annual basis. The Rule Change Panel proposes to require AEMO to undertake an annual review of the Minimum STEM Price using the following two-step process, similar to the Reliability Panel's review of the price floor in the National Electricity Market (**NEM**):

(1) AEMO is to determine if the Minimum STEM Price is appropriate based on criteria set out in the Market Rules; and

(2) if AEMO determines in step (1) that the Minimum STEM Price is inappropriate, then AEMO is to review the Minimum STEM Price (i.e. AEMO does not need to undertake step (2) if it finds that the Minimum STEM Price is appropriate at step (1)).

The Rule Change Panel proposes that the outcome of AEMO's review should be subject to review by the ERA. In particular, the ERA should review:

- AEMO's assessment of the appropriateness of the Minimum STEM Price, where AEMO has determined in step (1) that the Minimum STEM Price is appropriate and has not calculated a new Minimum STEM price; and
- AEMO's calculation of a new Minimum STEM Price under step (2), if this step is undertaken (i.e. the ERA does not need to review step (1) if step (2) is undertaken).

The Rule Change Panel notes that it has also received a Rule Change Proposal (RC_2014_05: Reduced Frequency of the Review of the Energy Price Limits and the

Maximum Reserve Capacity Price) that seeks to amend the process and frequency of the review of the Maximum STEM Price and Alternative Maximum STEM Price.

The Rule Change Panel considers that the Energy Price Limits are regulatory instruments and that it may be more appropriate for the independent regulator (the ERA) to undertake the Energy Price Limits reviews than the market operator (AEMO). It may be appropriate to move the obligation and responsibility for reviewing the Energy Price Limits, including the Minimum STEM Price, from AEMO to the ERA, but such a change is outside the scope of this Rule Change Proposal and would be better considered in a separate Rule Change Proposal after the ERA completes its current five-year methodology review.

The Rule Change Panel notes that AEMO is currently undertaking its 2020 review of the Energy Price Limits and that AEMO's 2021 review of the Energy Price Limits would be the first review that includes the Minimum STEM Price.

6.1.3 Principles for determining the Minimum STEM Price.

In its Rule Change Proposal, Synergy suggests that the determination of the Minimum STEM Price should include the following factors:

- the cost to cycle, including start-related fuel and variable operating and maintenance costs for each generating unit;
- the minimum stable level of operation of each generating unit;
- the minimum time each generating unit must remain out of service once decommitted before recommitment is possible; and
- the expected rate of change of system demand during periods of minimum demand.

However, Synergy has not specified in its proposed Amending Rules that AEMO must consider these factors in its review of the Minimum STEM Price.

AEMO noted in its submission that the proposed amendments, as specified in the Rule Change Proposal, do not provide sufficient detail regarding how AEMO is to calculate the Minimum STEM Price. This will likely create challenges in proposing and approving the Minimum STEM Price. AEMO suggests that the proposed amendments need to provide a level of detail for the calculation similar to the Maximum STEM Price and Alternative Maximum STEM Price in clauses 6.20.3 and 6.20.7 of the Market Rules.

The Rule Change Panel agrees that the factors that Synergy suggested in the Rule Change Proposal should be considered in the determination of the Minimum STEM Price. The Rule Change Panel considers that the criteria for setting the Minimum STEM Price should be specified in enough detail to provide appropriate guidance to AEMO and that such specification should be included in the Market Rules to ensure the appropriate level of governance (i.e. so that any changes to these criteria are subject to the Rule Change Process).

Synergy in its proposal and Alinta and Perth Energy in their submissions supported the principles used by the Reliability Panel for determining the floor price in the NEM.

The Rule Change Panel has also considered the process and principles that the Reliability Panel uses to consider the floor price in the NEM. The Rule Change Panel has summarised how wholesale electricity prices are regulated in Australia – see Appendix B of this report.

The Rule Change Panel generally concurs with the Reliability Panel's views on the rationale for the price floor in the NEM and the objectives and criteria for the Reliability Panel's reviews of the price floor, as expressed in its 'Final Report: Reliability standard and settings review

2018' (see Appendix B). The approach taken to setting the price floor in the NEM is consistent with Wholesale Market Objective (a)[12].

The Rule Change Panel considers that the objective of the Minimum STEM Price is to:

- allow the market to clear above the Minimum STEM Price in most circumstances (i.e. allow Market Generators to differentiate themselves at times of excess generation by bidding at negative prices according to the value that they place on being dispatched); and
- limit Market Participants' exposure to prices that could threaten the financial viability of a prudent Market Participant (i.e. limit the financial losses that a Market Generator can incur in a single Trading Interval).[13]

The Rule Change Panel proposes to include these objectives in the Market Rules to provide guidance for AEMO when reviewing the Minimum STEM Price and to the ERA when reviewing the methodology for setting the Minimum STEM Price.

As outlined in section 6.1.1 of this report, the Rule Change Panel proposes to implement AEMO's annual review of the Minimum STEM Price as a two-step process; with the first step for AEMO to determine if the Minimum STEM Price is appropriate and the second step for AEMO to determine the Minimum STEM Price if it concludes that the Minimum STEM Price is not appropriate.

The Rule Change Panel proposes to require AEMO to consider the following when determining whether the Minimum STEM Price is appropriate:

- whether the Balancing Market has cleared at the Minimum STEM Price since the last review of the Minimum STEM Price;
- whether there has been a change in the generation fleet since the last review of the Minimum STEM Price that is likely to result in:
    - the current Minimum STEM Price being materially lower than necessary due to, including but not limited to, an upgrade or retirement of a Facility with high cycling costs; and
    - the current Minimum STEM Price being materially higher than necessary due to, including but not limited to, the increase of cycling costs due to deterioration or aging of an existing plant; and
- whether any Market Participant has notified AEMO that they do not consider the current Minimum STEM Price is appropriate or requested that the Minimum STEM Price be revised or amended.

Where AEMO concludes a new Minimum STEM Price needs to be determined, the determination should aim to find the price at which all Facilities in the SWIS would be better off to decommit if that price was reached during one Trading Interval for most credible

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12 Wholesale Market Objective (a) is:

> To promote the economically efficient, safe and reliable production and supply of electricity and electricity related services in the [SWIS].

13 The proposed objectives for the Minimum STEM Price are consistent with Synergy's statement in its Rule Change Proposal that:

> The Minimum STEM Price should, correspondingly, be calculated to be a negative number that is low enough (but no lower) than the price at which the generator with the greatest cost to decommit, or turn off, would be financially better off to incur the cost of shutting down its plant, rather than remaining in service and delivering at negative prices. In other words, it should represent the price just sufficient to induce all generators absent of non-market-related externalities to decommit.

scenarios. Therefore, the Rule Change Panel considers that the Minimum STEM Price should be based on the decommitment costs of the Facility with the highest decommitment cost per MW of its minimum generation in the SWIS.

The Rule Change Panel notes that:

- where a Facility has a minimum down time (i.e. a period where it must remain out of service after decommitting), any opportunity cost associated with the minimum down time would be part of the Facility's decommitment costs; and
- the Facility with the highest decommitment costs may differ depending on the opportunity costs, which are related to Balancing Prices.

Therefore, the Rule Change Panel considers that the determination of the highest cost to decommit per MW of minimum generation should be based on modelling of different Balancing Market scenarios.

The Rule Change Panel considers that the scenarios modelled should represent scenarios where the Minimum STEM Price is relevant (i.e. when Facilities are competing to stay committed during times of low system demand). The decommitment costs of a Facility with a long minimum down time would be higher for scenarios with high system demand and subsequent high Balancing Prices. However, such scenarios are not relevant for the determination of the Minimum STEM Price because Facilities bidding at or near the Minimum STEM Price would be dispatched during such times.

The Rule Change Panel further considers that the Minimum STEM Price should reflect the Facility's decommitment costs per MW of minimum generation if that price is reached for one Trading Interval. The Minimum STEM Price should not reflect the average decommitment costs for a Facility over the Facility's minimum down time, because such a price in any single Trading Interval would not provide a signal for that Facility to decommit (i.e. a Facility would be better paying this price to generate for one Trading Interval than decommitting).

The Rule Change Panel considers that it would not be prudent to determine the Minimum STEM Price based on the highest decommitment cost per MW of minimum generation of all scenarios modelled. Instead, the Minimum STEM Priced should be based on the decommitment cost that is higher than a set percentage of the scenario outcomes for the highest decommitment costs.

The Rule Change Panel proposes that AEMO should use the following methodology to determine a new Minimum STEM Price:

(1) determine for low system demand scenarios that AEMO deems credible, the price at which the facility with the highest decommitment costs in the SWIS (in this scenario) would reasonably decommit if the Balancing Price clears at this price for a single Trading Interval over the timeframe of the Facility's minimum down time; and

(2) set the Minimum STEM Price to be the price that is lower than 90% of the prices determined under (1).

The Rule Change Panel proposes that, in undertaking this modelling, AEMO must consider the factors that a Market Generator acting reasonably would consider in making a decommitment decision. These factors should include, but not be limited to AEMO's estimate of:

- the cost to decommit and recommit within the timeframe of the Facility's minimum downtime, including start-related fuel and variable operating and maintenance costs for the Facility;

- the minimum generation of the Facility;
- the minimum down time of the Facility;
- any expected losses or gains, opportunity costs and cost savings that result from the decommitment for the duration of the minimum down time of the Facility; and
- any other matters that AEMO deems relevant.

The Rule Change Panel considers that AEMO should not have to make assumptions on the contractual arrangements that a Market Participant may have in place. The Rule Change Panel proposes that AEMO should determine the Minimum STEM Price based on a merchant power station but adjust its determination if a Market Participant provides evidence to AEMO's satisfaction of contractual arrangements that would lead to a lower Minimum STEM Price.

6.1.4 Introducing an interim Minimum STEM Price

Synergy proposed to introduce an interim Minimum STEM Price of −$200/MWh to avoid unacceptable outcomes prior to the implementation of its proposed methodology.

The Rule Change Panel considers that setting the Minimum STEM Price too high would mute the price signals for Facilities to decommit during low system demand situations and would not incentivise any change in bidding behaviour or investment into options that could make thermal power plants more flexible.

As outlined in section 6.1.1 of this report, the Rule change Panel is of the view that there is no clear evidence that the current Minimum STEM Price is inefficient. The Rule Change Panel's analysis as well as the discussion at the 13 November 2019 MAC meeting suggests that the price at which the generator with the greatest cost to decommit would be financially better off to decommit than to remain committed and generate at the Minimum STEM Price, may be lower than −$1,000/MWh. A more fulsome analysis to determine the efficient Minimum STEM Price would require modelling as outlined in section 6.1.3 of this report. The time required to complete this modelling would not enable an interim Minimum STEM Price to be implemented before the next shoulder season. Therefore, the Rule Change Panel considers that it will be more efficient for AEMO to undertake a review in accordance with the proposed process to set the Minimum STEM Price.[14] The Rule Change Panel proposes to leave the Minimum STEM Price at −$1,000/MWh until AEMO completes its first review of the Minimum STEM Price and the ERA approves a price change.

6.1.5 Introducing a Second Price Floor (Alternative Minimum STEM Price)

Bluewaters and NewGen proposed in their submissions to introduce two separate price floors, a lower price floor for Facilities with high minimum generation and a higher price floor for Facilities with low (or no) minimum generation. The Rule Change Panel considers that such an arrangement would be inappropriate and against Market Objective (c).[15] The Rule Change Panel notes that the Market Rules allow AEMO to dispatch Facilities out of merit to

[14] It is anticipated that the shoulder seasons (autumn and spring) will have the lowest system demand because temperatures are mild during these times but output from renewable wind and PV generation can be relatively high. Therefore, the Minimum STEM Price is most likely to have effect in these periods.

[15] Wholesale Market Objective (c) is:

> To avoid discrimination in that market against particular energy options and technologies, including sustainable energy options and technologies such as those that make use of renewable resources or that reduce overall greenhouse gas emissions.

avoid getting into a high-risk state (e.g. if the decommitment of a thermal plant could lead to a high-risk state at any point in time, AEMO can decide to decommit another plant instead).

The Rule Change Panel considers that, while it appears counter intuitive that Intermittent Generators, such as wind farms, are bid at the Minimum STEM Price, it would be unreasonable to prevent a Market Participant from generating if it is willing to pay the Minimum STEM Price or is covering its own consumption or Net Contract Position.

6.2 Additional Related Issues Identified by the Rule Change Panel

6.2.1 Treatment of Non-Balancing Active Intermittent Generators

The Rule Change Panel notes that Market Generators must bid the expected generation quantities for non-balancing active Facilities, which are Intermittent Generators, at the Minimum STEM Price. The Rule Change Panel considers that it would not be efficient to force these Facilities to generate at the Minimum STEM Price when the system demand is so low that there is excess generation. However, the Rule Change Panel considers that changes to the Market Rules are not needed to protect non-balancing active Intermittent Generators because:

- the Market Rules do not require these generators to generate, so the respective Market Participants could avoid the associated losses by deciding not to generate during times of low system demand or likely negative Balancing Prices; and
- the Market Generator can choose to change its Facility into a balancing active Facility (which would come at a cost to the Market Participant for installing the required technology).

6.2.2 Administrative Changes

The Rule Change Panel proposes to make the following administrative changes:

- Clarify that the ERA must review the outcome of AEMO's Energy Price Limit review if no new value is proposed. It is possible for AEMO to undertake an Energy Price Limit review and determine no change to the value of the prices. The current wording of the Market Rules imply that this outcome would not be subject to review by the ERA. The Rule Change Panel considers that the intent is for the ERA to review the outcome of AEMO's determination in any case, so the Rule Change Panel proposes additional changes to clarify this intent.
- Clarify that the Maximum STEM Price and the Alternative Maximum STEM Price apply for the Balancing Market.
- Correct several instances where the Market Rules refer to clauses when referencing a section of the Market Rules.
- Specify a cross reference in clause 6.20.11.
- Amend clause 6.20.7 to align it with standard drafting conventions.

6.3 Additional Amendments to the Proposed Amending Rules

Following the first submission period, the Rule Change Panel has made some additional changes to the proposed Amending Rules. A summary of these additional changes is provided below and are shown in detail in Appendix C of this report.

The Rule Change Panel proposes to amend clause 6.20.4 to define the Minimum STEM Price, similar to the definitions of the other Energy Price Limits and to provide for the transition from the current fixed Minimum STEM Price to the Minimum STEM Price reviewed by AEMO.

The Rule Change Panel proposes to amend clause 6.20.9 to include the Minimum STEM Price in AEMO's annual review of the appropriateness of the Energy Price Limits.

The Rule Change Panel proposes to amend clauses 6.20.6, 6.20.7, 6.20.9 and previously blank clause 6.20.8 and to introduce new clauses 6.20.6A, 6.20.6B, 6.20.8A, 6.20.8B, 6.20.8C, 8.20.8D and 6.20.8E to implement how AEMO must review and determine the Minimum STEM Price as outlined in sections 6.1.3 of this report.

The Rule Change Panel proposes to amend clause 2.26.3 to provide that the ERA must examine whether the Minimum STEM Price meets the objective of the Minimum STEM Price in its five-yearly methodology review.

The Rule Change Panel proposes to amend the definition Minimum STEM Price in the Glossary to reflect the changes to the determination of the Minimum STEM Price and to specify that the Minimum STEM Price represents the floor price for the STEM and the Balancing Market.

The Rule Change Panel proposes to amend clauses 2.26.1, 2.26.2, 6.20.7, 6.20.9, 6.20.9A, 6.20.10 and 6.20.11 to clarify that the ERA must review the outcome of AEMO's Energy Price Limit review if the review determines no change to the value.

The Rule Change Panel proposes to amend clause 2.26.1 to correct a reference to the word clause that references a section of the Market Rules.

The Rule Change Panel proposes to amend clause 6.20.11 to specify a cross-reference.

The Rule Change Panel proposes to amend clause 6.20.7 to align it with standard drafting conventions.

6.4 Wholesale Market Objectives

6.4.1 Amending the Definition of the Minimum STEM Price and Including it in the Annual Energy Price Limits Review

The Rule Change Panel considers that the proposed amendments (as amended by the Rule Change Panel) to the definition of the Minimum STEM Price and its review:

- will promote economic efficiency by ensuring the Minimum STEM Price allows Market Generators to differentiate their plants based on the value of decommitment, which will allow for efficient dispatch of available power plants at times of low system demand, promoting Wholesale Market Objective (a); and
- are consistent with the other Wholesale Market Objectives.

6.4.2 Setting an Interim Minimum STEM Price

The Rule Change Panel considers that setting the Minimum STEM Price to -$200/MWh would not promote economic efficiency (Wholesale Market objective (a)) and would discourage competition (Wholesale Market objective (c)) for the reasons indicated in section 6.1.4 of this report. The proposed interim floor price would not allow Market Generators to differentiate their plants based on the value of decommitment, leaving the dispatch decision in times of low system demand to the tiebreak rule.

The Rule Change Panel considers that setting an appropriate interim Minimum STEM Price would promote economic efficiency (Wholesale Market Objective (a)). However, as outlined in this report, the appropriate Minimum STEM Price may be lower than -$1,000/MWh and modelling would be required to determine this price, so setting a non-arbitrary interim Minimum STEM Price would unnecessarily delay the processing of this Rule Change Proposal.

6.5 Protected Provisions, Reviewable Decisions and Civil Penalties

This Rule Change Proposal does not amend any Protected Provisions, Reviewable Decisions, or civil penalty provisions; nor does the Rule Change Panel consider that any of the proposed new clauses should be civil penalty provisions.

6.6 Practicality and Cost of Implementation

6.6.1 Cost

AEMO indicated in its submission that:

- it will be able to modify the Minimum STEM Price in its market systems at no system cost, assuming that the revised price is of the same order of magnitude; and
- it anticipates that minimal industry acceptance testing will be required.
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The Rule Change Panel has consulted with AEMO on the cost it would incur for including the Minimum STEM Price in its annual review of the Energy Price Limits based on the methodology for determining the Minimum STEM Price proposed in this Draft Rule Change Report.

AEMO estimated that it would not incur any material costs for the first step of the review of the Minimum STEM price (whether the Minimum STEM Price is appropriate) and that it will likely be able to be accommodate these costs in the budget for the current review of the Energy Price Limits.

AEMO has provided a preliminary cost estimate for step two of the review of the Minimum STEM Price (if AEMO had to determine a new Minimum STEM Price) of $70,000 to $300,000. AEMO estimates that the cost for the first time it will have to determine a new Minimum STEM Price would be closer to the upper end of the range and any subsequent determination would be closer to the lower end of the range. AEMO will provide a refined estimate after the publication of the Draft Rule Change Report.

The ERA has provided the following cost estimate to implement the proposed changes, including the modifications made after the first submission period:

- If the annual review of Energy Price Limits was to include a review of the Minimum STEM Price, then the ERA could accommodate this with its current resources. However, the ERA may require technical engineering advice of approximately $100,000 per annum to complement its review.
- If the ERA was tasked with reviewing the principles considered in setting the Minimum STEM Price, then the ERA would need an overall increase of 0.1 FTE per annum (assuming a review every 5 years) plus consultancy costs of approximately $100,000 per review.

Perth Energy stated in its submission that the proposed changes would increase its administrative burden in relation to:

- resourcing required to consider the annual and five-yearly review of an additional administered price (or prices) as part of the Energy Price Limits Review; and
- IT system and process changes associated with the need to (at least annually) change the Minimum STEM Price (or prices).

Bluewaters and NewGen stated in their submissions that they would incur negligible implementation costs.

The other submissions made no statements regarding implementation costs.

The Rule Change Panel's proposal to implement a two-step process to set the Minimum STEM Prices, as indicated in section 6.1.2 of this report, will provide a means to defer the second step of the review in years when the Minimum STEM Price is unlikely to change, which should significantly reduce the costs to implement this Rule Change Proposal as indicated by AEMO, the ERA and Perth Energy.

6.6.2 Practicality

AEMO indicated in its submission that:

- it anticipates that minimal industry acceptance testing will be required; and
- it anticipates that it will be able to incorporate the proposed changes in the next Energy Price Limits review following the commencement of the proposed amendments.

Perth Energy stated in its submission that it would need three months' notice to update the necessary systems and processes to ensure it remained compliant with a revised Minimum STEM Price (or prices).

Bluewaters and NewGen stated in their submissions that their implementation time would be negligible.

The other submissions made no statements regarding implementation time.

6.7 Proposed Commencement

The Amending Rules are proposed to commence at **8:00 AM** on **8 May 2020**. The commencement date is subject to change in the Final Rule Change Report.

7. Amending Rules

The Rule Change Panel has determined to implement the following Amending Rules (~~deleted text~~, added text):

2.26. Economic Regulation Authority Approval of Administered Prices

2.26.1. Where AEMO has proposed a revised value for the Benchmark Reserve Capacity Price in accordance with section 4.16 or ~~a change in the value of one or more~~ completes a review of the Energy Price Limits in accordance with section 6.20, the Economic Regulation Authority must:

(a) review the report provided by AEMO, including all submissions received by AEMO in preparation of the report;

(b) make a decision as to whether or not to approve the revised value for the Benchmark Reserve Capacity Price or any recommended value comprising the Energy Price Limits;

(c) in making its decision, only consider:

i. whether the proposed revised value for the Benchmark Reserve Capacity Price or Energy Price Limit proposed by AEMO reasonably reflects the application of the method and guiding principles described in ~~clauses~~ section 4.16 or 6.20 (as applicable);

ii. whether AEMO has carried out an adequate public consultation process; and

(d) notify AEMO as to whether or not it has approved the revised or recommended value.

2.26.2. Where the Economic Regulation Authority rejects a revised Benchmark Reserve Capacity Price or ~~the~~ an Energy Price Limit~~s~~ proposed~~submitted~~ by AEMO it must give reasons and may direct AEMO to carry out all or part of the review process under section 4.16 or 6.20 (as applicable) again in accordance with any directions or recommendations of the Economic Regulation Authority.

2.26.3. The Economic Regulation Authority must review the methodology for setting the Benchmark Reserve Capacity Price and the Energy Price Limits not later than the fifth anniversary of the first Reserve Capacity Cycle and, subsequently, not later than the fifth anniversary of the completion of the preceding review under this clause 2.26.3. A review must examine:

(a) the level of competition in the market;

(b) the level of market power being exercised and the potential for the exercise of market power;

(c) the effectiveness of the methodology in curbing the use of market power;

(d) historical Reserve Capacity Offers and the proportion of Reserve Capacity Offers with prices equal to the Benchmark Reserve Capacity Price, in the case of Reserve Capacity Cycles up to and including the 2014 Reserve Capacity Cycle;

(dA) historical Reserve Capacity Offers and the proportion of Reserve Capacity Offers with prices equal to 110 percent of the Benchmark Reserve Capacity Price, in the case of Reserve Capacity Cycles from the 2015 Reserve Capacity Cycle up to and including the 2018 Reserve Capacity Cycle;

(dB) historical Reserve Capacity Offers and the proportion of Reserve Capacity Offers with prices equal to 130 percent of the Benchmark Reserve Capacity Price, in the case of Reserve Capacity Cycles from the 2019 Reserve Capacity Cycle onwards;

(e) historical STEM Bids and STEM Offers and the proportion of STEM Bids and Offers with prices equal to the Energy Price Limits;

(f) the appropriateness of the parameters and methodology in section 4.16 and the Market Procedure referred to in clause 4.16.3 for recalculating the Benchmark Reserve Capacity Price;

(g) the appropriateness of the parameters and methodology in section 6.20 for recalculating the Energy Price Limits;

(h) whether the Minimum STEM Price meets the objectives referred to in clause 6.20.8;

~~(h)~~(i) the performance of Reserve Capacity Auctions, STEM Auctions and the Balancing Market in meeting the Wholesale Market Objectives; and

~~(i)~~(j) other matters which the Economic Regulation Authority considers relevant.

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6.20. Energy Price Limits

6.20.1. The Energy Price Limits are:

(a) the Maximum STEM Price;

(b) the Alternative Maximum STEM Price; and

(c) the Minimum STEM Price.

6.20.2. The Maximum STEM Price is the value published on the Market Web Site and revised in accordance with clauses 6.20.6 and 6.20.11.

6.20.3. Subject to clause 6.20.11, the Alternative Maximum STEM Price is to equal:

(a) from 8 AM on September 1, 2006, $480/MWh; and

(b) from 8 AM on the first day of each subsequent month the sum of:

i. $440/MWh multiplied by the amount determined as follows:

1. the average of the Singapore Gas Oil (0.5% sulphur) price, expressed in Australian dollars, for the three months ending immediately before the preceding month as published by the International Energy Agency in its monthly Oil Market Report, or the average of another suitable published price as determined by AEMO, divided by;

2. the average of the Singapore Gas Oil (0.5% sulphur) price, expressed in Australian dollars, for May, June and July 2006 or, if a revised Alternative Maximum STEM Price takes effect in accordance with clause 6.20.11, for the three months ending immediately before the month preceding the month in which the revised Alternative Maximum STEM Price takes effect, as published by the International Energy Agency in its monthly Oil Market Report, or the average of another suitable published price as determined by AEMO; and

ii from 8 AM on September 1, 2006, to 8 AM on 1 September, 2007, $40/MWh, and for each subsequent 12-month period $40/MWh multiplied by the CPI for the June quarter of the relevant 12-month period divided by CPI for the 2006 June quarter or, if a revised Alternative Maximum STEM Price takes effect in accordance with clause 6.20.11, the June quarter of the year in which the revised Alternative Maximum STEM Price takes effect, where CPI is the weighted average of the Consumer Price Index All Groups value of the eight Australian State and Territory capital cities as determined by the Australian Bureau of Statistics;

rounded to the nearest whole dollar, where a half dollar is rounded up, with the exception that from the date and time that a revised Alternative Maximum STEM Price takes effect in accordance with clause 6.20.11, the revised values supersede the values in 6.20.3(b)(i) and 6.20.3(b)(ii), and are to be the values used in calculating the Alternative Maximum STEM Price for each month subsequent to the month in which the revised Alternative Maximum STEM Price takes effect.

6.20.4. ~~[Blank]~~The Minimum STEM Price is:

(a) −$1,000/MWh until the time specified in the notice posted by AEMO under clause 6.20.11(b) following AEMO's first review of the Minimum STEM Price under clause 6.20.6; and

(b) from the time specified in the notice posted by AEMO under clause 6.20.11(b) following AEMO's first review of the Minimum STEM Price under clause 6.20.6, the value published on the Market Web Site and revised in accordance with clauses 6.20.6 and 6.20.11.

6.20.5. [Blank]

6.20.6. AEMO must annually review the appropriateness of the values of the Maximum STEM Price, ~~and~~ Alternative Maximum STEM Price and Minimum STEM Price and: ~~.~~

(a) must recommend revised values for the Maximum STEM Price and the Alternative Maximum STEM Price;

(b) must determine whether the Minimum STEM Price is appropriate, and

(c) must recommend a revised value for the Minimum STEM Price where AEMO determines that the current value of the Minimum STEM Price is not appropriate.

6.20.6A. In reviewing whether the Minimum STEM Price is appropriate under clause 6.20.6(b), AEMO must consider:

(a) any incidents where the Balancing Market has settled at the Minimum STEM Price since the last annual review under clause 6.20.6;

(b) whether there has been a change in the generation fleet in the SWIS since the last annual review under clause 6.20.6 that is likely to result in:

i. the current Minimum STEM Price being materially lower than necessary to achieve the objectives in clause 6.20.8, including but not limited due to an upgrade or the retirement of a Facility with high cycling costs;

ii. the current Minimum STEM Price being materially higher than necessary to achieve the objectives in clause 6.20.8, including but not limited to the increase of cycling costs due to deterioration or aging of an existing plant; and

(c) whether any Market Participant has notified AEMO that they do not consider the current Minimum STEM Price is appropriate or requested the Minimum STEM Price be revised or amended.

6.20.6B. AEMO must not recommend a revised value for the Minimum STEM Price under clause 6.20.7, if it determines the Minimum STEM Price is appropriate under clause 6.20.6(b).

6.20.7. In conducting the review required by clause 6.20.6 AEMO:

(a) ~~may propose revised~~ must recommend values for each of the following:

i. the Maximum STEM Price, ~~where this~~ which is to be based on AEMO's estimate of the short run marginal cost of the highest cost generating works in the SWIS fuelled by natural gas and is to be calculated using the formula in paragraph (b); ~~and~~

ii. the Alternative Maximum STEM Price, ~~where this~~ which is to be based on AEMO's estimate of the short run marginal cost of the highest cost generating works in the SWIS fuelled by distillate and is to be calculated using the formula in paragraph (b); and

iii. subject to clause 6.20.6B, the Minimum STEM Price, which is to be based on AEMO's estimate of the decommitment costs of the Facility with the highest decommitment costs in the SWIS and is to be determined with reference to clause 6.20.8 and in accordance with clauses 6.20.8A and 6.20.8B;

(b) must calculate the Maximum STEM Price or Alternative Maximum STEM Price using the following formula:

(1 + Risk Margin)× (Variable O&M +(Heat Rate × Fuel Cost))/Loss Factor

Where

i. Risk Margin is a measure of uncertainty in the assessment of the mean short run average cost for a 40 MW open cycle gas turbine generating station, expressed as a fraction;

ii. Variable O&M is the mean variable operating and maintenance cost for a 40 MW open cycle gas turbine

generating station, expressed in $/MWh, and includes, but is not limited to, start-up related costs;

iii. Heat Rate is the mean heat rate at minimum capacity for a 40 MW open cycle gas turbine generating station, expressed in GJ/MWh;

iv. Fuel Cost is the mean unit fixed and variable fuel cost for a 40 MW open cycle gas turbine generating station, expressed in $/GJ; and

v. Loss Factor is the marginal loss factor for a 40 MW open cycle gas turbine generating station relative to the Reference Node.

Where AEMO must determine appropriate values for the factors described in paragraphs (i) to (v) as applicable to the Maximum STEM Price and Alternative Maximum STEM Price.

6.20.8. ~~[Blank]~~The objectives of the Minimum STEM Price are to:

(a) facilitate clearance of the Balancing Market without the Balancing Price being equal to the Minimum STEM Price in most circumstances; and

(b) limit Market Participants' exposure to Balancing Prices that could threaten the financial viability of a prudent Market Participant.

6.20.8A. When determining the Minimum STEM Price AEMO must:

(a) determine for credible scenarios of low demand, the price at which the operator of the Facility with the highest decommitment costs per MW of its minimum stable level of operation in the scenario would, acting reasonably, decommit the Facility should the Balancing Price equal or fall below that price for a single Trading Interval; and

(b) determine the Minimum STEM Price to be the price that is lower than 90 percent of the prices determined under clause 6.20.8B(a).

6.20.8B. When determining the decommitment costs of a Facility under clause 6.20.8A, AEMO must consider:

(a) the factors that a Market Generator acting reasonably would consider in making a decommitment decision for the Facility with the highest decommitment cost in the SWIS that is fully exposed to the Balancing Price, including but not limited to:

i. the cost to decommit and recommit within the timeframe specified under clause 6.20.8B(a)(iii), including start-related fuel and variable operating and maintenance costs of the Facility;

ii. the minimum stable level of operation of the Facility;

iii. the minimum time the Facility must remain out of service once decommitted before recommitment is possible;

iv. any expected losses or gains, opportunity costs and cost savings that the Market Generator would incur as a result of decommitment for the duration of the minimum time the Facility must remain out of service; and

(b) any other matters that AEMO deems relevant.

6.20.8C. In determining the decommitment costs of a Facility under clause 6.20.8A, AEMO must, as far as practicable, use actual costs of the relevant Facility with the highest decommitment cost per MW of its minimum stable level of operation in the SWIS.

6.20.8D. A Market Participant may, by the timeframe specified for the close of submissions under clause 6.20.9, provide AEMO with evidence regarding their actual decommitment costs, which information is 'AEMO Confidential' for the purpose of the Market Rules and which AEMO must consider in determining the revised value for the Minimum STEM Price under clause 6.20.7(a)(iii).

6.20.8E. Where a Market Participant provides AEMO with satisfactory evidence under clause 6.20.8B, AEMO must consider the information when determining the revised Minimum STEM Price as far as the information affects AEMO's reasonable estimate of any decommitment costs in the scenarios under clause 6.20.8A(a).

6.20.9. In conducting the review required by clause 6.20.6 AEMO must prepare a draft report describing how it has arrived at ~~a proposed revised~~ the recommended value of ~~an~~ each Energy Price Limit. The draft report must also include, subject to AEMO's obligations of confidentiality, details of how AEMO determined the appropriate values to apply for the factors described in clauses 6.20.7 (b)(i) to (v) and 6.20.8A. AEMO must publish the draft report on the Market Web Site and advertise the report in newspapers widely published in Western Australia and request submissions from all sectors of the Western Australia energy industry, including end-users, within six weeks of the date of publication.

6.20.9A. Prior to ~~proposing a final revised value to an~~ recommending a final value for each of the Energy Price Limits in accordance with clause 6.20.10, AEMO may publish a request for further submissions on the Market Web Site. Where AEMO publishes a request for further submissions in accordance with this clause, it must request submissions from all sectors of the Western Australia energy industry, including end-users.

6.20.10. After considering the submissions on the draft report described in clause 6.20.9, and any submissions received under clause 6.20.9A, AEMO must ~~propose a final revised~~ recommend a final value for ~~any proposed change to an~~ each of the Energy Price Limits and submit those values and its final report, including any submissions received, to the Economic Regulation Authority for approval.

6.20.11. A ~~proposed revised~~ recommended value for any Energy Price Limit replaces the previous value after:

(a) the Economic Regulation Authority has approved that value in accordance with clause 2.26.1; and

(b) AEMO has posted a notice on the Market Web Site of the new value of the applicable Energy Price Limit,

with effect from the time specified in AEMO's notice.

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11. Glossary

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Minimum STEM Price: Means ~~negative $1,000.00 per MWh.~~ the minimum price at which a Market Participant can offer generation in the STEM or the Balancing Market, as determined in accordance with section 6.20.

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Appendix A. Responses to Submissions Received in the First Submission Period

Issue	Submitter	Comment/Issue Raised	Rule Change Panel's Response
Inefficiency of the Current Minimum STEM Price			
1	AEMO	The Rule Change Proposal does not clearly articulate the outcomes of negative clearing prices nor how the proposed changes will address the unintended outcomes raised.	Please refer to section 6.1.1 of this report.
2	AEMO	While a higher Minimum STEM Price will reduce the costs to Market Generators when the Balancing Price is equal to the Minimum STEM Price, it is unclear how a higher Minimum STEM Price will help alleviate the concern about generation facilities being in service only for the purpose of providing Ancillary Services. In addition, the Rule Change Proposal does not explain how the proposed changes to the Minimum STEM Price will address the '*perverse retirement and augmentation price signals.*'	Please refer to section 6.1.1 of this report.
3	Perth Energy	We consider Synergy has not identified a problem with the price floor itself, but has instead identified an issue with bidding behaviour amongst those Market Generators bidding at the price floor. The price floor and ceiling are asymmetric in the WEM. This asymmetry is intentional. While the Maximum STEM Price is set by AEMO and approved by the ERA, the Minimum STEM Price is hard-coded into the WEM Rules. This is because, as the AEMC Reliability Panel stated, and Synergy has subsequently quoted:	The Rule Change Panel agrees that the issue raised by Synergy seems to relate to Market Participant's bidding behaviour and not the level of the Minimum STEM Price. The Rule Change Panel agrees that there is no reason for symmetric floor and ceiling prices in the WEM. The Rule Change Panel agrees that the Minimum STEM Price currently meets the quoted objective. However, the Rule Change Panel considers that if the

Issue	Submitter	Comment/Issue Raised	Rule Change Panel's Response
		"[It] prevents market instability by imposing a negative limit on market prices in any trading interval, while allowing the market to clear during low demand periods." We consider the current price of −$1,000/MWh is achieving this objective.	Minimum STEM Price does not adequately reflect the decommitment cost of the Facility with the highest decommitment costs in the SWIS this could change in future. Further, because quantities associated with the provision of Ancillary Services must be bid at the Minimum STEM Price, the Rule Change Panel considers that the Minimum STEM Price should also limit the financial losses that a Market Generator can incur in a single Trading Interval. Please refer to section 6.1.1 of this report.
4	Bluewaters and NewGen	Bluewaters/NewGen agrees that the Minimum STEM Price in its current state is unfit for purpose. The price of −$1,000/MWh is arbitrary and does not reflect any generator's operational expectation of decommitment costs and therefore has led to perverse market bidding behaviour. Instead of being a price that reflects immediate decommitment costs for a generator, it is being used as a point at which one reasonably expects demand to never hit and therefore somewhere to bid in order to guarantee generation.	The Rule Change Panel does not consider that the current Minimum STEM Price is leading to perverse bidding behaviour. The Rule Change Panel notes that the Minimum STEM Price should reflect the decommitment costs of the Facility with the highest decommitment costs in the SWIS and it is unclear whether the current Minimum STEM Price of −$1,000/MWh reflects those decommitment costs . The Rule Change Panel also notes that there is no price that can guarantee a Facility will generate, as other Facilities can bid at that price. The Rule Change Panel considers that Market Participants that do not want to expose their Facilities to the risk of incurring the Minimum STEM Price can either hedge their position with bilateral contracts or bid above the Minimum STEM Price during times of low demand. Please refer to section 6.1.1 of this report.

Issue	Submitter	Comment/Issue Raised	Rule Change Panel's Response
5	Bluewaters and NewGen	Due to the extended Balancing Gate Closure horizon (to be addressed with RC_2017_02) in the WEM, forecasting error also presents a challenge for generators with regards to the price floor. This error inhibits the ability for generators to respond to Minimum STEM Price events. Forecasting errors such as what occurred on the 13th of October 2019, are likely to continue due to the prevalence of unscheduled generation such as wind and solar PV. This inhibits the ability for generators to react to prices.	The Rule Change Panel agrees that forecasting errors and ex-post pricing make it impossible for Market Participants to be certain of the Balancing Price for any Trading Interval at the time of the relevant Balancing Gate Closure. However, the Rule Change Panel considers that Market Generators can and should assess the risk of the Balancing Price reaching the Minimum STEM Price and should include this risk in their bidding strategy. The risk is inherent to the participation in the WEM and can be mitigated by entering into bilateral contracts or hedging in the STEM. Please refer to section 6.1.1 of this report.
6	Bluewaters and NewGen	During the Trading Intervals where the Balancing Price reached the Minimum STEM Price on 13 October 2019, there was approximately 50% of generation at the floor covering Ancillary Service providers. Whilst Essential System Services (ESS)[16] development is continuing via current market reform, the interim risk that these generators are exposed to is disproportionate to the revenue earnt from energy and Ancillary Services. If the Minimum STEM Price is not addressed and the expectation that Minimum STEM Price events are going to increase in frequency, this risk would be expected to be reflected in Ancillary Services behaviours. This could present a risk that	During the incidents when the Balancing Price cleared at the Minimum STEM Price in October 2019, 435 MW were bid at the Minimum STEM Price that were associated with the provision of 85 MW of LFAS from four different Facilities. During times of low demand, LFAS may be provided more efficiently by fewer Facilities, requiring less minimum generation. The Rule Change Panel considers that it could lead to more efficient provision of LFAS if Market Participants priced the risk of being exposed to the Minimum STEM Price into their LFAS bids. The Rule Change Panel notes that LFAS providers can also hedge their generation associated with the provision of LFAS via Bilateral Contracts and LFAS

16 ESS will include the current Ancillary Services.

Issue	Submitter	Comment/Issue Raised	Rule Change Panel's Response
		insufficient Ancillary Services are available on the network leading to reliability issues for the WEM.	providers (other than Synergy) can decide to not participate in the LFAS Market during times of low demand where they do not have an adequate Net Contract Position. It is unlikely that the risk of the Balancing Price reaching the Minimum STEM Price would result in insufficient Ancillary Services being available because participation in the LFAS Market and the provision of other Ancillary Services is mandatory for Synergy. Please refer to section 3.1.1 of this report.
7	Synergy	AEMO has forecasted an exponential increase in the occurrence of negative pricing from c. 5% in October 2018 to c. 40% of trading intervals by October 2021.[17] As additional large-scale renewables and distributed energy resources (PV growth is currently at 175 MW/year) continue to inundate the market, the variance of load from forecast is expected to increase. The combined effect is likely to have a material impact on the number of intervals at the market floor price. This is expected to occur well before 1 October 2022 and will place unnecessary and costly burden on generators.	Changes to the Minimum STEM Price will not affect the occurrence of negative Balancing Prices (as long as the Minimum STEM Price is negative). The Rule Change Panel considers that incidents where the Balancing Price cleared at the Minimum STEM Price during times of low system demand could be reduced by more considered bidding by Market Participants. Market Generators can mitigate their exposure to the Minimum STEM Price by entering into bilateral contracts or hedging in the STEM. Please refer to section 6.1.1 of this report.
8	Synergy	As the default provider of Ancillary Services in the SWIS, it is likely that Synergy will be expected to provide the majority of these services during periods of	The Rule Change Panel agrees that where Synergy incurs losses for its generation associated with the provision of Ancillary Services that exceeds Synergy's

[17] Synergy refers to AEMO's publication in March 2019 of a document named: 'Integrating Utility-scale Renewables and Distributed Energy Resources in the SWIS'.

Issue	Submitter	Comment/Issue Raised	Rule Change Panel's Response
		low market prices. However, where any generation is in service for the provision of Ancillary Services, a Minimum STEM Price of −$1,000/MWh unnecessarily increases the cost of providing essential services and these costs will need to be recovered from all Market Participants.	bilateral contracts and own consumption, it should be able to seek compensation from the market for these Ancillary Services. The Rule Change Panel considers that the LFAS Market should lead to an efficient outcome for the provision of LFAS. The Rule Change Panel considers that if the provision of other Ancillary Services by Synergy becomes too expensive, AEMO can source those Ancillary Services from other providers under clauses 3.11.8 and 3.11.8A. Please refer to section 6.1.1 of this report.
Review of the Minimum STEM Price			
9	AEMO	AEMO agrees in principle that the determination of the Minimum STEM Price should be reviewed along with the other Energy Price Limits, albeit whether a regular review is warranted and its frequency should be further considered as the Rule Change Proposal is refined.	Please refer to section 6.1.2 of this report.
10	Perth Energy	We consider that while it may be more accurate to annually determine a Minimum STEM Price as the value placed on being dispatched, it is not the price floor, but rather the bidding behaviour of Market Generators that should change. We highlight that the fundamental structure of the various mechanisms in the WEM will inevitably change with the delivery of the Energy Transformation Strategy. Any such determination mechanism and associated administered review process should	The Rule Change Panel considers that the introduction of a Minimum STEM Price review does not interfere with the Energy Transformation Strategy. Please refer to sections 6.1.1 and 6.1.3 of this report.

Issue	Submitter	Comment/Issue Raised	Rule Change Panel's Response
		therefore be considered more holistically as part of the reform process. We recommend the current price floor of −$1,000 remains until such time a price floor can be calculated that more accurately reflects the value of being dispatched under the new market arrangements.	
Principles to Consider when Setting the Minimum STEM Price			
11	AEMO	AEMO notes that the proposed amendments as specified in the Rule Change Proposal do not provide sufficient detail regarding how AEMO is to calculate the Minimum STEM Price. This will likely create challenges in proposing and approving the Minimum STEM Price. AEMO suggests that the proposed amendments need to provide a level of detail for the calculation similar to the Maximum STEM Price and Alternative Maximum STEM Price in clauses 6.20.3 and 6.20.7 of the Market Rules.	Please refer to section 6.1.3 of this report.
12	AEMO	AEMO notes that the five-yearly review of the Energy Price Limits will not undertake the 'development of an appropriate formula for the Minimum STEM Price'[18], rather it will assess the appropriateness of the methodology. AEMO therefore suggests that the Rule Change Proposal should assess the appropriateness and level of detail of the methodology proposed.	Please refer to section 6.1.3 of this report.

[18] See page 6 of the Rule Change Proposal.

Issue	Submitter	Comment/Issue Raised	Rule Change Panel's Response
13	Alinta Energy	In reviewing the Minimum STEM Price the following factors should be considered when contemplating altering the floor price: • Has there been a significant change in the number and frequency of trading intervals where the market has been, or has approached, the level of the Minimum STEM Price? • Has there been significant changes in the generation fleet, such that average generator cycling costs have changed significantly? For example - a significant change in the nature of the generation fleet such that the range of generator cycling costs had decreased could result from the retirement of ageing thermal units. Whereas growth in intermittent generation is likely to increase the frequency of cycling operations of thermal units. Repeated cycling of thermal units may cause deteriorations to plant and lead to increased cost per cycle for some units.	Please refer to section 6.1.3 of this report.
14	Alinta Energy	At times of low demand and excess generation, generators can differentiate themselves according to the value they place on being dispatched by bidding at negative price levels. This allows the market, through the value being placed on being dispatched, to determine which generators remain dispatched during periods of excess generation (to avoid cycling costs) and then what generators are constrained off to maintain demand/supply balance. The market floor	Please refer to sections 6.1.1 and 6.1.3 of this report.

Issue	Submitter	Comment/Issue Raised	Rule Change Panel's Response
		price should be set a level so that it does not interfere with this efficient outcome.	
15	Bluewaters and NewGen	As a broader, logic backed fix, there should be a process to determine actual de-commitment costs that includes expectations of a minimum down time.	Please refer to section 6.1.3 of this report.
16	Perth Energy	Perth Energy agrees with the AEMC Reliability Panel's definition, as quoted by Synergy, that the market floor price "should be set at a level that does not interfere with generators being able to differentiate themselves according to the value they place on being dispatched by bidding at negative prices during periods of excess generation."	Please refer to sections 6.1.1 and 6.1.3 of this report.
Setting of an Interim Minimum STEM Price			
17	AEMO	With the order of decommitment guided by price differentiation, the proposal to raise the Minimum STEM Price in the interim contradicts the principle that the Minimum STEM Price needs to be sufficiently low to incentivise generators to decommit. It could be inferred (from recent events where the Balancing Market cleared at the Minimum STEM Price) that the current Minimum STEM Price is not low enough to enable price differentiation.	Please refer to section 6.1.4 of this report.
18	Alinta Energy	Alinta Energy does not support the proposed transitional approach of setting the Minimum STEM Price to −$200/MWh until a new value is determined because:	Please refer to section 6.1.4 of this report.

Issue	Submitter	Comment/Issue Raised	Rule Change Panel's Response
		• there has been no modelling completed to show −$200/MWh will still meet the purpose of the Minimum STEM Price; and • Alinta Energy does not consider a price of −$200/MWh will allow generators with different cycling costs to differentiate themselves through their negative bids. This will interfere with efficient dispatch outcomes by potentially leading to increasing intervals where the market does not clear and will require AEMO to intervene via the tie break methodology.	
19	Alinta Energy	Alinta Energy considers that using a fixed and arbitrary value of −$200/MWh, as suggested in the proposal, may interfere with efficient dispatch outcomes and result in generators incurring a loss if the Minimum STEM Price is not negative enough to cover cycling costs.	Please refer to section 6.1.4 of this report.
20	Bluewaters and NewGen	Considering the expected increased frequency of negative price events, Bluewaters/NewGen agrees that an interim price should be set at a level where no further bids are captured in the Minimum STEM Price tranche. This will eliminate the comparatively disproportionate risk of prices hitting Minimum STEM Price while maintaining similar market generation outcomes. From assessment of historical Balancing bids, there appears to be a large gap between -$200/MWh and the price floor. Therefore amending the Minimum STEM Price to an interim level that is	The Rule Change Panel notes that there is a gap between −$215/MWh and −$1,000/MWh in the current bids in the Balancing Market (i.e. there are usually no Balancing Submissions with a Balancing Price between −$215/MWh and −$1,000/MWh). However, the Rule Change Panel considers that lifting the Minimum STEM Price to just under this 'gap' would mute the signal the Balancing Price sends when reaching the Minimum STEM Price. At this price, none of the Market Participants that bid quantities at the Minimum STEM Price during the

Issue	Submitter	Comment/Issue Raised	Rule Change Panel's Response
		marginally below the last bids at $200/MWh, say -$235/MWh which is the Maximum STEM Price multiplied by -1, will not change dispatch outcomes but will more proportionally apply risk to committed Generators at the Minimum STEM Price.	incidents where the Balancing Price reached the Minimum STEM Price in October 2019 would have an incentive to change their bidding behaviour, which would most likely increase the occurrence of Minimum STEM Price incidents. Please also refer to section 6.1.4 of this report.
21	Perth Energy	Perth Energy has considered Synergy's transitional price of -$200 and does not consider this would allow Market Generators sufficient ability to differentiate themselves. We highlight that, to meet the requirements of an effective price floor, and using a method such as that proposed by Synergy could decrease the price floor below -$1,000, rather than increase it to -$200 as proposed to be the transitional price by Synergy. This would be counter to Synergy's intention. Perth Energy highlights that, to reflect the price sufficient to induce all generators absent of non-market-related externalities to decommit, the Minimum STEM Price would be set as the cost of the shut-down of the largest, most inflexible coal Facility over the number Trading Intervals it would need to be shut-down for the indication from generators at MAC was that this price would be lower than -$1,000. The opportunity cost to Synergy at maintaining minimum output at a floor price of -$1,000 would in these circumstances create a delta that makes the opportunity cost of shut-down, and warm re-start	Please refer to section 6.1.4 of this report.

Issue	Submitter	Comment/Issue Raised	Rule Change Panel's Response
		greater than the losses incurred - exactly what the floor price is designed to do.	
Introduction of a second (alternative) Minimum STEM Price			
22	Bluewaters and NewGen	It cannot be expected that a thermal power plant would be required to de-commit and then re-commit from one interval to the next. Bluewaters proposes that a permanent way to solve this would be to utilise a Minimum STEM Price and an alternate Minimum STEM Price, aligning it to maximum pricing methodology when determining the Energy Price Limits for the WEM. Similar to the philosophy applied to Alternative Maximum STEM Price (which considers higher fuel costs for generation), Facilities with a higher cost to cycle a plant, or are committed for Ancillary Services, would be able to bid at such a level. This would lead to more efficient overall market outcomes by limiting the exposure of committed Generators that are restricted in their ability to cycle or are providing Ancillary Services to the economic alternative of de-commitment.	The Rule Change Panel agrees that it is problematic that the WEM does not recognise infeasible dispatch (e.g. dispatch below the Facility's minimum generation). However, the Rule Change Panel considers that having two Minimum STEM Prices with the lower price applying to thermal plants, would be against Wholesale Market Objective (c).[19] The Minimum STEM Price serves a different purpose than the Maximum STEM Price and Alternative Maximum STEM Price. The Maximum STEM Price and the Alternative Maximum STEM Price are market power mitigation mechanisms to reduce price risk for consumers, as the Capacity Mechanism already ensures that Market Generators will recover a significant portion of their investment costs. On the other hand, the Minimum STEM Price is intended to minimise financial risk for Market Generators but is not intended to interfere with economic decommitment of generation. Please also refer to section 6.1.5 of this report.

19 Wholesale Market Objective (c) is to avoid discrimination in that market against particular energy options and technologies, including sustainable energy options and technologies such as those that make use of renewable resources or that reduce overall greenhouse gas emissions.

Issue	Submitter	Comment/Issue Raised	Rule Change Panel's Response
23	Perth Energy	To deliver more symmetrical, administered bidding energy price limits as proposed by Synergy, the solution would also likely result in the establishment of more than one price floor to account for differences in Facility characteristics. We therefore consider introducing an alternative transitional fixed and arbitrary price floor, such as proposed by Synergy, is an unnecessary and counter-productive administrative change. Introducing an alternative price floor in the longer-term would potentially provide no more or less benefit to Market Generators and is only likely to reduce the benefits of low-cost energy to WA consumers in the short-term.	Please refer to the Rule Change Panel's response to issue 22 of this table and to section 6.1.5 of this report.

Appendix B. Wholesale Price Regulation in Australia

B.1 Wholesale Price Regulation in the National Electricity Market

Clause 3.9.3C of the National Electricity Law specifies a reliability standard for the NEM.[20] The National Electricity Law also specifies some 'reliability settings' to support the reliability standard. The reliability settings are effectively price caps, as follows:

- **Market price cap:**

  The market prices cap ($/MWh) applies to dispatch prices in the NEM and is analogous to the Maximum STEM Price and Alternative Maximum STEM Price in the WEM. The market price cap limits Market Participants' exposure and is set so that prices over the long term incentivise enough investment in generation and appropriate operational decisions to achieve the reliability standard.

- **Cumulative price threshold:**

  The cumulative price threshold places a limit on Market Participants' exposure to sustained high prices.

- **Administered price cap:**

  The administered price cap is a default price that applies when the cumulative price threshold is exceeded.

- **Market floor price:**

  The market floor price is a negative limit on market prices in any half hour trading interval and is analogous to the Minimum STEM Price in the WEM. The market floor price limits the amount of money a generator can lose in a single half hour, thereby supporting market stability.

The National Electricity Rules require the Reliability Panel to conduct regular reviews of the reliability standard and reliability settings (Reviews). Clause 3.9.3A of the National Electricity Rules specifies the requirements for Reviews which are summarised as follows:

- The Reliability Panel must develop, publish and may amend 'reliability standard and settings guidelines' (**Guidelines**) that set out the principles that the Reliability Panel is to use in its Review; and must consult on the Guidelines.[21]
- The Reliability Panel must conduct a Review every four years, must consult on the Review, and must publish a report recommending the reliability standard and reliability settings that should apply from 1 July in the year commencing 2 years after the year in which the report is published.
- In conducting a Review, the Reliability Panel:
  - must comply with the Guidelines;

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[20] Clause 3.9.3C(a) of the National Electricity Rules states that:

> The reliability standard for generation and inter-regional transmission elements in the national electricity market is a maximum expected unserved energy (USE) in a region of 0.002% of the total energy demanded in that region for a given financial year.

[21] The Reliability Panel's Guidelines for its most recent Review are available at https://www.aemc.gov.au/sites/default/files/2018-04/2016%20Guidelines.PDF.

- must have regard to any terms of reference issued by the Australian Energy Market Commission;
- must have regard to the impact that a change in the reliability settings may have on:
  - spot prices;
  - investment in the NEM;
  - reliability of the power system; and
  - Market Participants;
- must have regard to any value of customer reliability determined by the Australian Energy Regulator; and
- may consider any other matters that the Reliability Panel considers relevant.

- The Reliability Panel may only recommend a change to the market price cap or cumulative price threshold if it considers that the change will:
  - allow the reliability standard to be satisfied without use of AMEO's powers to intervene in the market; and
  - not create risks that threaten the overall reliability of the market.
- If the Reliability Panel is of the view that a decrease in the market prices cap or cumulative price threshold may mean that the reliability standard will not be maintained, then it may only recommend the decrease if it finds other arrangements to maintain the reliability standard.
- The Reliability Panel may only recommend a market price floor that it considers will:
  - allow the market to clear in most circumstances; and
  - not create substantial risks that threaten the overall stability and integrity of the market.

The Reliability Panel published the 'Final Report: Reliability standard and settings review 2018' (**Final Report**) for its most recent Review on 30 April 2018, where it recommended no changes to the reliability settings for the four-year period commencing from 2019.[22]

The Reliability Panel stated on page 4 of the Final Report that the purpose of the reliability standard and settings are to (amongst other things):

- Protect the long-term integrity of the market by limiting the extent to which wholesale prices can rise and fall, to limit market participants' exposure to prices that could threaten the financial viability of a prudent market participant.
- Allow for investment sufficient to provide electricity to the agreed reliability standard (efficient investment).

[22] The Final Report is available at https://www.aemc.gov.au/sites/default/files/2018-04/Reliability%20Panel%20Final%20Report.pdf. The recommended reliability settings were:
- Market price cap: $14,200/MWh
- Cumulative price threshold: $212,800
- Administered price cap: $300/MWh
- Market floor price: -$1,000/MWh

The Reliability Panel indicated on page 9 of the Final Report that it must consider the National Electricity Objective[23] when it undertakes a Review; and that it must be guided by the following general principles, as specified in its Guidelines and in support of the National Electricity Objective:

- allowing efficient price signals while managing price risks (i.e. allow the market to send efficient price signals while limiting price risk exposure for participants);[24]
- delivering a level of reliability consistent with the value placed on that reliability by customers;[25] and
- providing a stable, predictable and flexible regulatory framework.[26]

The Reliability Panel stated on page 36 of the Final Report that the purpose of the market floor price is:

> [To prevent] market instability by imposing a negative limit on market prices in any trading interval, while allowing the market to clear during low demand periods. The market floor price should be set at a level that does not interfere with market generators being able differentiate themselves according to the value that they place on being dispatched by bidding at negative prices during periods of excess generation.

The Reliability Panel noted that, at times of excess generation, generators can differentiate themselves according to the value that they place on being dispatched by bidding at negative prices, and that the market floor price should not be set at a level that interferes with this efficient outcome.

In recommending no change to the market floor price, the Reliability Panel considered:

- the number and frequency of trading intervals where the market price was equal to, or approached, the market floor price;[27]

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[23] The National Electricity Objective is:

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

[24] The Reliability Panel indicated in the Guidelines that reliability settings should:

- allow sufficient scope for competition between buyers and sellers in the market to set efficient prices to achieve the reliability standard over the long run; and
- provide protection from high prices in any given trading interval, and sustained high prices over a defined period, such that market outcomes do not result in inefficient over-investment, overly high financing costs or excessive price risk for all participants.

[25] The Reliability Panel indicated in the Guidelines that the reliability settings should:

- be sufficient to support the level of investment necessary to deliver the reliability standard over the long run; and
- deliver a level of reliability that is commensurate with the value that customers place on that reliability as reflected by measures including AEMO's measure of the value of customer reliability (**VCR**).

[26] The Reliability Panel will exercise its judgement to achieve predictable outcomes, while reflecting significant changes in market conditions, to support efficient investment and operational decisions by participants.

[27] The Reliability Panel found that there had not been a sustained increase in the number of trading intervals in the NEM with low price intervals (below -$900/MWh) as of 2018.

- whether there were any changes in the generation fleet that significantly changed the average generator cycling costs;[28]
- promoting stability and predictability of the market; and
- the effect of the market price on the viability of storage technologies.[29]

Finally, the Reliability Panel also noted on page 141 of the Final Report that the market floor price influences two market behaviours:

- strategic rebidding, where the market floor price becomes the lowest price at which constrained-off generators can rebid capacity to maximise dispatch; and
- the ability of generators with alternative revenue streams to rebid capacity at negative prices to maintain dispatch. [30]

The Reliability Panel noted that these two behaviours result from the interaction of bidding with the market floor price, but that that these behaviours are a function of the existence of the floor price rather than the level of the floor price; and that issues from these behaviours should be addressed via other policy measures, not by changing the level of the floor price.

B.2 Wholesale Price Regulation in the Wholesale Electricity Market

Clause 6.20 of the Market Rules places 'Energy Price Limits' (i.e. price caps) on prices in the STEM. Clause 6.20.1 specifies three Energy Price Limits for the WEM:

(a) the Maximum STEM Price;

(b) the Alternative Maximum STEM Price; and

(c) the Minimum STEM Price.

The Market Rules require AEMO to annually review the Maximum STEM Price and Alternative Maximum STEM Price but fix the Minimum STEM Price at −$1,000/MW.[31] Clause 6.20.7 specifies that AEMO:

- may propose a revised Maximum STEM Price based on its estimate of the short-run marginal cost (**SRMC**) of the highest cost generator in the SWIS fuelled by natural gas;
- may propose a revised Alternative Maximum STEM Price based on its estimate of the SRMC of the highest cost generator in the SWIS fuelled by distillate; and

[28] The Reliability Panel commissioned a consultancy that determined that prices could fall sufficiently low with a -$1,000/MWh market floor price to give an economic signal to every generator in the NEM, including those with the highest cost to cycle. The consultant (EY) found that a large coal fired generator will have the highest start-up and shut-down costs, that these costs are a function of the design of the generators and that these costs have not changed substantially in the NEM.

[29] The Reliability Panel noted that one of the main ways for storage technologies to raise revenue is to arbitrage energy prices between trading intervals with low vs. high prices, and that a higher (less negative) market price floor will limit arbitrage opportunities and create a disincentive for storage technologies.

[30] The Reliability Panel recognised Renewable Energy Certificates and hedge contracts as alternative revenue streams. The Rule Change Panel notes that revenue from thermal energy from cogeneration plants would also be a relevant alternative revenue stream and that the Reliability Panel's views on this issue are equally applicable to cogeneration plants.

[31] AEMO must consult with Rule Participants on the outcome of its review and then may propose a revised Maximum STEM Price and Alternative Maximum STEM Price; and the revised prices will come into effect if they are approved by the ERA.

- must use a specific formula to calculate the Maximum STEM Price and the Alternative Maximum STEM Price based on:
    - a risk margin;
    - the variable operating and maintenance costs of the generator;
    - the heat rate of the generator;
    - the fixed unit and variable fuel costs for the generator; and
    - the generator's loss factor.

Clause 6.20.7 also specifies that AEMO is to base its calculations for the Maximum STEM Price and Alternative Maximum STEM Price on the costs for a 40 MW open cycle gas turbine (**OCGT**). Essentially, the Market Rules use a 40 MW OCGT as a proxy for the highest cost plant on the SWIS because it would have a higher SRMC than the generators currently on the SWIS. Setting the Maximum STEM Price and Alternative Maximum STEM Price based on a 40 MW OCGT will:

- protect the interests of Market Customers that purchase energy in the STEM (and thereby protect the interests of consumers) by limiting STEM prices;
- protect the financial viability of Market Generators by ensuring that the price cap is not below the SRMC of the generators currently on the SWIS;[32] and
- allow generators to compete to generate below this SRMC, thereby providing economic incentives for efficiency.

[32] The Rule Change Panel notes that the financial viability of generators is also impacted by the revenue that they receive from Capacity Credits and Ancillary Services.

Appendix C. Further Amendments to the Proposed Amending Rules

2.26. Economic Regulation Authority Approval of Administered Prices

2.26.1. Where AEMO has proposed a revised value for the Benchmark Reserve Capacity Price in accordance with section 4.16 or ~~a change in the value of one or more~~ completes a review of the Energy Price Limits in accordance with section 6.20, the Economic Regulation Authority must:

(a) review the report provided by AEMO, including all submissions received by AEMO in preparation of the report;

(b) make a decision as to whether or not to approve the revised value for the Benchmark Reserve Capacity Price or any recommended value comprising the Energy Price Limits;

(c) in making its decision, only consider:

i. whether the proposed revised value for the Benchmark Reserve Capacity Price or Energy Price Limit proposed by AEMO reasonably reflects the application of the method and guiding principles described in ~~clauses~~ section 4.16 or 6.20 (as applicable);

ii. whether AEMO has carried out an adequate public consultation process; and

(d) notify AEMO as to whether or not it has approved the revised or recommended value.

2.26.2. Where the Economic Regulation Authority rejects a revised Benchmark Reserve Capacity Price or ~~the~~ an Energy Price Limit~~s~~ proposed~~submitted~~ by AEMO it must give reasons and may direct AEMO to carry out all or part of the review process under section 4.16 or 6.20 (as applicable) again in accordance with any directions or recommendations of the Economic Regulation Authority.

2.26.3. The Economic Regulation Authority must review the methodology for setting the Benchmark Reserve Capacity Price and the Energy Price Limits not later than the fifth anniversary of the first Reserve Capacity Cycle and, subsequently, not later than the fifth anniversary of the completion of the preceding review under this clause 2.26.3. A review must examine:

(a) the level of competition in the market;

(b) the level of market power being exercised and the potential for the exercise of market power;

(c) the effectiveness of the methodology in curbing the use of market power;

(d) historical Reserve Capacity Offers and the proportion of Reserve Capacity Offers with prices equal to the Benchmark Reserve Capacity Price, in the case of Reserve Capacity Cycles up to and including the 2014 Reserve Capacity Cycle;

(dA) historical Reserve Capacity Offers and the proportion of Reserve Capacity Offers with prices equal to 110 percent of the Benchmark Reserve Capacity Price, in the case of Reserve Capacity Cycles from the 2015 Reserve Capacity Cycle up to and including the 2018 Reserve Capacity Cycle;

(dB) historical Reserve Capacity Offers and the proportion of Reserve Capacity Offers with prices equal to 130 percent of the Benchmark Reserve Capacity Price, in the case of Reserve Capacity Cycles from the 2019 Reserve Capacity Cycle onwards;

(e) historical STEM Bids and STEM Offers and the proportion of STEM Bids and Offers with prices equal to the Energy Price Limits;

(f) the appropriateness of the parameters and methodology in section 4.16 and the Market Procedure referred to in clause 4.16.3 for recalculating the Benchmark Reserve Capacity Price;

(g) the appropriateness of the parameters and methodology in section 6.20 for recalculating the Energy Price Limits;

(h) whether the Minimum STEM Price meets the objectives referred to in clause 6.20.8;

~~(h)~~(i) the performance of Reserve Capacity Auctions, STEM Auctions and the Balancing Market in meeting the Wholesale Market Objectives; and

~~(i)~~(j) other matters which the Economic Regulation Authority considers relevant.

…

6.20. Energy Price Limits

…

6.20.4. The Minimum STEM Price is ~~the value published on the Market Web Site and revised in accordance with clauses 6.20.6 and 6.20.11.~~:

(a) −$1,000/MWh until the time specified in the notice posted by AEMO under clause 6.20.11(b) following AEMO's first review of the Minimum STEM Price under clause 6.20.6; and

(b) from the time specified in the notice posted by AEMO under clause 6.20.11(b) following AEMO's first review of the Minimum STEM Price under clause 6.20.6, the value published on the Market Web Site and revised in accordance with clauses 6.20.6 and 6.20.11.

6.20.5. [Blank]

6.20.6. AEMO must annually review the appropriateness of the values of the Maximum STEM Price, Alternative Maximum STEM Price and Minimum STEM Price and:~~.~~

(a) must recommend revised values for the Maximum STEM Price and the Alternative Maximum STEM Price;

(b) must determine whether the Minimum STEM Price is appropriate, and

(c) must recommend a revised value for the Minimum STEM Price where AEMO determines that the current value of the Minimum STEM Price is not appropriate.

6.20.6A. In reviewing whether the Minimum STEM Price is appropriate under clause 6.20.6(b), AEMO must consider:

(a) any incidents where the Balancing Market has settled at the Minimum STEM Price since the last annual review under clause 6.20.6;

(b) whether there has been a change in the generation fleet in the SWIS since the last annual review under clause 6.20.6 that is likely to result in:

i. the current Minimum STEM Price being materially lower than necessary to achieve the objectives in clause 6.20.8, including but not limited due to an upgrade or the retirement of a Facility with high cycling costs;

ii. the current Minimum STEM Price being materially higher than necessary to achieve the objectives in clause 6.20.8, including but not limited to the increase of cycling costs due to deterioration or aging of an existing plant; and

(c) whether any Market Participant has notified AEMO that they do not consider the current Minimum STEM Price is appropriate or requested the Minimum STEM Price be revised or amended.

6.20.6B. AEMO must not recommend a revised value for the Minimum STEM Price under clause 6.20.7, if it determines the Minimum STEM Price is appropriate under clause 6.20.6(b).

6.20.7. In conducting the review required by clause 6.20.6 AEMO:

(a) ~~may propose revised~~ must recommend values for each of the following:

i. the Maximum STEM Price, ~~where this~~ which is to be based on AEMO's estimate of the short run marginal cost of the highest cost generating works in the SWIS fuelled by natural gas and is to be calculated using the formula in paragraph (b);

ii. the Alternative Maximum STEM Price, ~~where this~~ which is to be based on AEMO's estimate of the short run marginal cost of the highest cost generating works in the SWIS fuelled by distillate and is to be calculated using the formula in paragraph (b); and

iii. ~~the Minimum STEM Price, where this is to be based on AEMO's estimate of the highest price that would induce all generators absent of non-market-related externalities to decommit.~~ subject to clause 6.20.6B, the Minimum STEM Price, which is to be based on AEMO's estimate of the decommitment costs of the Facility with the highest decommitment costs in the SWIS and is to be determined with reference to clause 6.20.8 and in accordance with clauses 6.20.8A and 6.20.8B;

(b) must calculate the Maximum STEM Price or Alternative Maximum STEM Price using the following formula:

(1 + Risk Margin)× (Variable O&M +(Heat Rate × Fuel Cost))/Loss Factor

Where

i. Risk Margin is a measure of uncertainty in the assessment of the mean short run average cost for a 40 MW open cycle gas turbine generating station, expressed as a fraction;

ii. Variable O&M is the mean variable operating and maintenance cost for a 40 MW open cycle gas turbine generating station, expressed in $/MWh, and includes, but is not limited to, start-up related costs;

iii. Heat Rate is the mean heat rate at minimum capacity for a 40 MW open cycle gas turbine generating station, expressed in GJ/MWh;

iv. Fuel Cost is the mean unit fixed and variable fuel cost for a 40 MW open cycle gas turbine generating station, expressed in $/GJ; and

v. Loss Factor is the marginal loss factor for a 40 MW open cycle gas turbine generating station relative to the Reference Node.

Where AEMO must determine appropriate values for the factors described in paragraphs (i) to (v) as applicable to the Maximum STEM Price and Alternative Maximum STEM Price.

6.20.8. ~~[Blank]~~The objectives of the Minimum STEM Price are to:

(a) facilitate clearance of the Balancing Market without the Balancing Price being equal to the Minimum STEM Price in most circumstances; and

(b) limit Market Participants' exposure to Balancing Prices that could threaten the financial viability of a prudent Market Participant.

6.20.8A. When determining the Minimum STEM Price AEMO must:

(a) determine for credible scenarios of low demand, the price at which the operator of the Facility with the highest decommitment costs per MW of its minimum stable level of operation in the scenario would, acting reasonably, decommit the Facility should the Balancing Price equal or fall below that price for a single Trading Interval; and

(b) determine the Minimum STEM Price to be the price that is lower than 90 percent of the prices determined under clause 6.20.8B(a).

6.20.8B. When determining the decommitment costs of a Facility under clause 6.20.8A, AEMO must consider:

(a) the factors that a Market Generator acting reasonably would consider in making a decommitment decision for the Facility with the highest decommitment cost in the SWIS that is fully exposed to the Balancing Price, including but not limited to:

i. the cost to decommit and recommit within the timeframe specified under clause 6.20.8B(a)(iii), including start-related fuel and variable operating and maintenance costs of the Facility;

ii. the minimum stable level of operation of the Facility;

iii. the minimum time the Facility must remain out of service once decommitted before recommitment is possible;

iv. any expected losses or gains, opportunity costs and cost savings that the Market Generator would incur as a result of decommitment for the duration of the minimum time the Facility must remain out of service; and

(b) any other matters that AEMO deems relevant.

6.20.8C. In determining the decommitment costs of a Facility under clause 6.20.8A, AEMO must, as far as practicable, use actual costs of the relevant Facility with the highest decommitment cost per MW of its minimum stable level of operation in the SWIS.

6.20.8D. A Market Participant may, by the timeframe specified for the close of submissions under clause 6.20.9, provide AEMO with evidence regarding their actual decommitment costs, which information is 'AEMO Confidential' for the purpose of the Market Rules and which AEMO must consider in determining the revised value for the Minimum STEM Price under clause 6.20.7(a)(iii).

6.20.8E. Where a Market Participant provides AEMO with satisfactory evidence under clause 6.20.8B, AEMO must consider the information when determining the revised Minimum STEM Price as far as the information affects AEMO's reasonable estimate of any decommitment costs in the scenarios under clause 6.20.8A(a).

6.20.9. In conducting the review required by clause 6.20.6 AEMO must prepare a draft report describing how it has arrived at ~~a proposed revised~~ the recommended value of ~~an~~ each Energy Price Limit. The draft report must also include, subject to AEMO's obligations of confidentiality, details of how AEMO determined the appropriate values to apply for the factors described in clauses 6.20.7 (b)(i) to (v) and 6.20.8A. AEMO must publish the draft report on the Market Web Site and advertise the report in newspapers widely published in Western Australia and request submissions from all sectors of the Western Australia energy industry, including end-users, within six weeks of the date of publication.

6.20.9A. Prior to ~~proposing a final revised value to an~~ recommending a final value for each of the Energy Price Limits in accordance with clause 6.20.10, AEMO may publish a request for further submissions on the Market Web Site. Where AEMO publishes a request for further submissions in accordance with this clause, it must request

submissions from all sectors of the Western Australia energy industry, including end-users.

6.20.10. After considering the submissions on the draft report described in clause 6.20.9, and any submissions received under clause 6.20.9A, AEMO must ~~propose a final revised~~ recommend a final value for ~~any proposed change to an~~ each of the Energy Price Limits and submit those values and its final report, including any submissions received, to the Economic Regulation Authority for approval.

6.20.11. A ~~proposed revised~~ recommended value for any Energy Price Limit replaces the previous value after:

(a) the Economic Regulation Authority has approved that value in accordance with clause 2.26.1; and

(b) AEMO has posted a notice on the Market Web Site of the new value of the applicable Energy Price Limit,

with effect from the time specified in AEMO's notice.

…

11. Glossary

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Minimum STEM Price: Means ~~the price determined in accordance with clause 6.20.7 (a) (iii).~~ the minimum price at which a Market Participant can offer generation in the STEM or the Balancing Market, as determined in accordance with section 6.20.

…