

Review of the Gas Market Parameters for the DWGM and STTM

Final Determination

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Australian Energy Market Operator Ltd ABN 94 072 010 327

Explanatory statement and consultation notice

Rule 492 of the National Gas Rules (NGR, or Rules) requires AEMO to conduct a review of market parameter settings in the Short Term Trading Market (STTM). While there is no mandated review of the market parameters in the Declared Wholesale Gas Market (DWGM), AEMO is taking the opportunity to also review the DWGM market parameters in conjunction with the STTM parameter review as the Gas Market Parameter Review (Review).

AEMO is required to review the STTM market parameters in accordance with the standard consultative procedure set out in rule 8 of the NGR and produce a final report setting out the outcomes of its review by 1 March 2023.

AEMO's final determination

AEMO's final determination is that the STTM and DWGM market parameters are appropriate and should remain unchanged.

Modelling undertaken by Market Reform Pty Ltd¹ (Market Reform) shows that the current STTM and DWGM parameter settings are sufficient to allow revenue recovery for new investments, and provide adequate protection for market participants in the STTM and DWGM.

The tightening supply and demand conditions over the studied period showed that the current DWGM market parameter settings provide adequate risk protection to market participants buying gas.

STTM and DWGM market parameters should remain unchanged until the next scheduled review by the Australian Energy Market Commission (AEMC) of the National Electricity Market (NEM) parameters or until such time as AEMO forms the view that an additional Review should be undertaken.

AEMO has split this Review into modelled parameters (where the parameters could be more effective, or could be subject to changes in cost structure) and reviewed parameters (where the parameters are unlikely to become more effective, or were not subject to significant changes in cost structure).

Table 1 Gas market parameters remain unchanged

Market parameters	STTM	Regulatory reference	DWGM	Regulatory reference	Assessment methodology
Market price cap (STTM)/Value of lost load (DWGM)	\$400/GJ	NGR 364 – See MPC definition	\$800/GJ	NGR 200 – see VoLL definition	Modelled parameter
Minimum market price (STTM)/Minimum bid price (DWGM)	\$0/GJ	NGR 364 – See MMP definition	\$0/GJ	NGR209(5)(a) – see minimum bid price of \$0/GJ.	Reviewed parameter
Administered price cap (APC)	\$40/GJ	NGR 364 – see APC definition	\$40/GJ	Administered Pricing Procedures	Modelled parameter
Cumulative price threshold (CPT)	\$440/GJ	NGR 364 – see CPT definition	\$1400/GJ	Administered Pricing Procedures	Modelled parameter
CPT horizon (STTM)/Cumulative price period (DWGM)	7 days	NGR 364 – see CPT Horizon definition	35 consecutive scheduling intervals (7 Days)	Administered Pricing Procedures	Reviewed parameter

¹ Market Reform, Gas Market Parameters Review 2022: Final Recommendations Report, at <https://www.aemo.com.au/consultations/current-and-closed-consultations/gas-market-parameter-review-2022>.

Modelled parameters assessment

The modelled parameters for this Review are the market price caps, the administered price caps, and the cumulative price threshold. The main driver for modelling is that there have been sustained increases to underlying market prices in both the STTM and the DWGM.

AEMO appointed Market Reform to carry out the modelling work for this Review. Its modelling approach is a scenario-based analysis of each market's economic efficiency for a range of scenarios, market parameter values and market participant types. The scenarios cover extreme events in each market, and input data is modified for different years within the study period. Each scenario includes a sensitivity analysis to check the outcome for variations in input data.

The modelling allowed for identification of sets of well performing and robust market parameters that informed the need for change and provided the basis for recommendations for change.

Reviewed parameters assessment

The reviewed parameters for this Review are the cumulative price horizon/period and the minimum market price. These parameters are well established, and were considered unlikely to require change.

AEMO sought submissions from interested parties to confirm that these parameters were unlikely to become more effective or be subject to significant changes in cost structure in any way.

Consultation process

AEMO consulted the Gas Wholesale Consultative Forum (GWCF) forum concerning the Review at the March 2022 and June 2022 GWCF meetings, noting the Review had to start after the AEMC's NEM Reliability Panel review, which was published on 1 September 2022.

A consultation paper published on 8 September 2022 sought submissions on the approach to the Review. Eleven submissions were received from interested parties, and are available on the reviews page on AEMO's website².

A Review workshop was held on 8 September 2022, where AEMO and Market Reform presented more details on the modelling methodology.

AEMO published the final methodology on 2 November 2022, taking on board submissions from participants. This final methodology was used in modelling the parameters.

AEMO published its Draft Determination on 1 December 2022 and held a Review workshop on 6 December 2022, where AEMO and Market Reform presented more details on the modelling outcomes and draft recommendations.

AEMO received five submissions from participants on the draft recommendations, which were broadly supportive of the draft recommendations.

This Final Determination, taking on board participants' submissions to the draft recommendations, completes AEMO's consultation on the Review.

Next steps

AEMO's Review does not propose any changes to the STTM and DWGM market parameters.

² At <https://www.aemo.com.au/consultations/current-and-closed-consultations/gas-market-parameter-review-2022>.

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1. Gas Market Parameters Review

The Gas Market Parameters Review provides a review of the market parameters used in the operation of the Victorian DWGM and the STTM operating in the Sydney, Adelaide and Brisbane demand hubs.

1.1. Scope of the Gas Market Parameters Review

The outcome of this process is to provide a recommendation on the value of the DWGM and STTM market parameters. The following table provides information on the current DWGM and STTM market parameters.

Table 2 Current gas market parameters

Market parameters	STTM	Regulatory reference	DWGM	Regulatory reference	Assessment methodology
Market price cap (STTM)/Value of lost load (DWGM)	\$400/GJ	NGR 364 – See MPC definition	\$800/GJ	NGR 200 – see VoLL definition	Modelled parameter
Minimum market price (STTM)/Minimum bid price (DWGM)	\$0/GJ	NGR 364 – See MMP definition	\$0/GJ	NGR209(5)(a) – see minimum bid price of \$0/GJ.	Reviewed parameter
Administered price cap (APC)	\$40/GJ	NGR 364 – see APC definition	\$40/GJ	Administered Pricing Procedures	Modelled parameter
Cumulative price threshold (CPT)	\$440/GJ	NGR 364 – see CPT definition	\$1400/GJ	Administered Pricing Procedures	Modelled parameter
CPT horizon (STTM)/Cumulative price period (DWGM)	7 days	NGR 364 – see CPT Horizon definition	35 consecutive scheduling intervals (7 Days)	Administered Pricing Procedures	Reviewed parameter

There are two other parameters that currently operate in the STTM:

- Market operator service (MOS) cost cap – currently set at \$50/gigajoule (GJ), the MOS cost cap is the maximum price for MOS increase and decrease offers covering the MOS service component of market settlements. The MOS cost cap must be sufficient to cover the cost of holding capacity, while limiting MOS costs on the market.
- Settlement surplus cap – currently set at \$0.14/GJ, the settlement surplus cap is the maximum settlement surplus payment rate to be allocated based on deviations.

The MOS cost cap and the settlement surplus cap are not required to be reviewed.

1.2. NGR requirements

AEMO is required to undertake a review of the STTM market parameters under rule 492(1)(g) of the NGR no later than six months after the completion of the AEMC’s reliability standard and settings review under clause 3.9.3A of the National Electricity Rules (NER) which was completed on 1 September 2022. Therefore this Review must be completed by 1 March 2023.

There is no rule requirement for the review of the DWGM market parameters, however, AEMO has undertaken a review of the DWGM market parameters in conjunction with the STTM market parameters.

1.3. Meeting the National Gas Objective

Within the specific requirements of the NGR applicable to this proposal, AEMO will seek to make a determination that is consistent with the National Gas Objective (NGO) and, where considering options, to select the one best aligned with the NGO.

The NGO is expressed in section 23 of the National Gas Law (NGL) as:

The objective of this Law is to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.

AEMO considers that the NGO is best met by the efficient operation of the STTM and DWGM. AEMO has assessed the STTM and DWGM gas market parameters via a modelling approach using relevant scenarios that can be expected to occur in the next five years.

1.4. Matters under consultation

The matters for this consultation are:

- The market parameters to be reviewed without modelling by AEMO, which include:
 - Minimum market price (STTM)/Minimum bid price (DWGM).
 - CPT horizon (STTM)/Cumulative price period (DWGM).
- The market parameters to be reviewed using the modelling methodology proposed by Market Reform in the Review, which include:
 - Market price cap (STTM)/Value of lost load (VoLL) (DWGM).
 - Administered price cap (APC) (STTM/DWGM).
 - Cumulative price threshold horizon (STTM)/Cumulative price period (DWGM).

1.5. Standard consultation approach

The Review is being undertaken, as required by rule 8 of the NGR, using the standard consultative procedure process, which required AEMO to follow the steps listed in Table 3.

Table 3 Consultation procedure process

Consultation Stage	Date
Review Workshop – Draft Methodology*	5 September 2022 (completed)
Notice of Consultation	15 September 2022 (completed)
Submissions on Consultation Notice due**	10 October 2022 (completed)
Draft Decision on GMPR Recommendations	1 December 2022 (completed)
Review Workshop – Draft Recommendations*	6 December 2022 (completed)
Submissions on Draft Decision due	19 January 2023 (completed)
Final Decision on GMPR Recommendations	16 February 2023 (completed)

* The workshops are not required by the Rules but are hosted by AEMO using the GWCF contact list. Additional attendees may request to be involved in a process.

** Adjusted from 7 October to 10 October to account for the additional public holiday for National Day of Mourning for Her Majesty the Queen on 22 September 2022.

1.6. Process following the review

If AEMO made a recommendation to amend gas market parameters as part of this Review, additional consultation would be required to change the specific regulatory instrument (the Rules or Procedure) by:

- AEMC, to implement a change to the market parameters listed in the Rules.
- AEMO, to implement a change to the market parameters defined in the Wholesale Market Procedures.

AEMO has proposed no changes to the gas market parameters as part of this Review. Participants raised the following issues through the review consultation:

- An administered price cap trigger for multiple markets; and
- A review of the cumulative price calculation methodology.

These issues were out of scope of the Review and require further investigation if changes are to be implemented. AEMO will include these items for discussion with participants via the GWCF.

2. Background

2.1. AEMO's facilitated wholesale gas markets

AEMO operates the following wholesale gas markets:

- DWGM in Victoria in which AEMO is both the transmission system operator and market operator.
- STTM hubs at Sydney, Adelaide and Brisbane where AEMO is the market operator.
- Gas Supply Hub (GSH) at various locations where AEMO operates a gas trading exchange.
- Shippers on the contract carriage pipelines, outside of the Victorian Declared Transmission System, can trade pipeline capacity using AEMO's Pipeline Capacity Trading service where Shippers can buy and sell firm pipeline capacity for a range of future gas days. Shippers can also purchase, via AEMO's Day Ahead Auction service, firm but unominated pipeline capacity for the next gas day to transport gas.

AEMO also operates the National Gas Services Bulletin Board in which AEMO aggregates data collected from Bulletin Board reporting entities (such as gas transmission pipeline operators, gas production and storage facilities) onto a single platform to provide transparency on gas production and flows across the interconnected Eastern Australian gas transmission system.

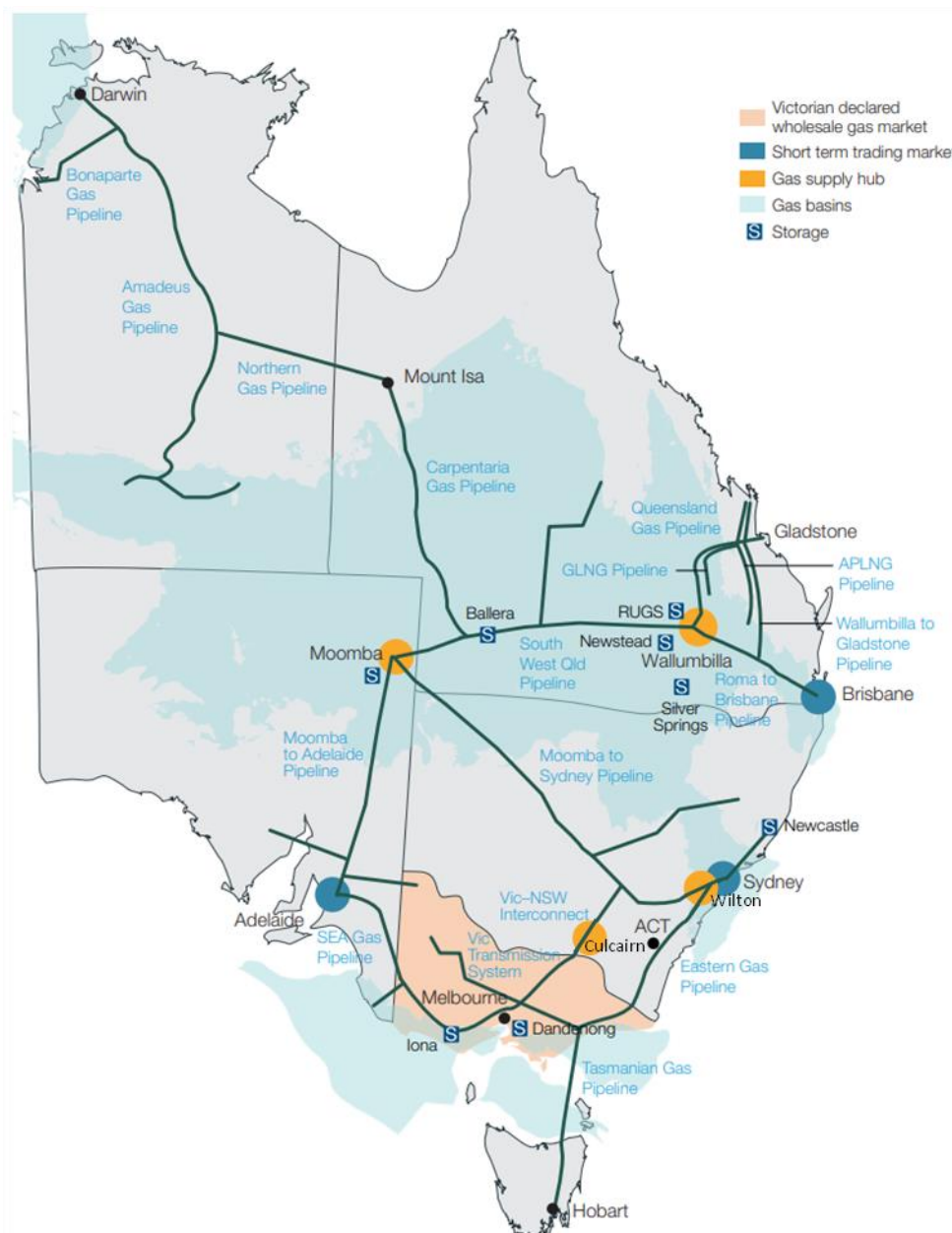
There is a gas contract market which operates across eastern Australia where Shippers purchase Gas Supply Agreements (commodity) and Gas Transportation Agreements (pipeline capacity) in order to flow gas to meet end use customers' gas demand outside of AEMO's facilitated gas markets.

This Review only covers a review of market parameters for the DWGM and STTM markets under Part 19 and Part 20 of the Rules.

The GSH has no equivalent to the STTM and DWGM's administered pricing and cumulative price threshold mechanisms as it has no native demand that must withdraw gas at the hub. The GSH operates similar to the Australian Stock Exchange with participants entering bids to buy and sell gas. As there is no native demand the market design does not include the concept of administrative prices to protect end users.

The Eastern Australian gas transmission system and the location of these markets can be seen in Figure 1.

Figure 1 Location of AEMO’s facilitated gas markets



2.2. Previous Gas Market Parameters Reviews

2.2.1. 2018 Gas Market Parameters Review

The 2018 Review consultation approach:

- AEMO reviewed the parameters for the:
 - STTM cumulative price period/DWGM cumulative price threshold horizon;
 - STTM minimum market price/DWGM minimum bid price.
- Market Reform was hired to assess the modelled parameter for:
 - STTM market price cap (MPC)/DWGM value of lost load (VoLL);

- STTM and DWGM administered price cap;
- STTM and DWGM cumulative price threshold.

Market Reform’s approach was to model the market’s economic efficiency for a range of market parameter values across a number of scenarios. The primary difference between the 2018 review and 2022 review is the range of scenarios covered, as developed in consultation with participants, to meet the requirements of today’s gas market.

This Review recommended the DWGM cumulative price threshold be reduced from \$1,800 to \$1,400. The values are detailed below.

Table 4 Gas market parameters recommended in 2018 Review

Market parameters	STTM	Regulatory reference	DWGM	Regulatory reference
Market price cap (STTM)/Value of lost load (DWGM)	\$400/GJ	NGR 364 – See MPC definition	\$800/GJ	NGR 200 – see VoLL definition
Minimum market price (STTM)/Minimum bid price (DWGM)	\$0/GJ	NGR 364 – See MMP definition	\$0/GJ	NGR209(5)(a) – see minimum bid price of \$0/GJ.
Administered price cap (APC)	\$40/GJ	NGR 364 – see APC definition	\$40/GJ	Administered Pricing Procedures
Cumulative price threshold (CPT)	\$440	NGR 364 – see CPT definition	\$1400	Administered Pricing Procedures
CPT horizon (STTM)/Cumulative price period (DWGM)	7 days	NGR 364 – see CPT Horizon definition	35 consecutive scheduling intervals (7 Days)	Administered Pricing Procedures

2.2.2. 2013 Gas Market Parameters Review

The 2013 Review consultation³ approach was focused on a review of the DWGM cumulative price threshold.

In consultation with the GWCF, AEMO developed a set of principles to guide the analysis and findings of the Review. AEMO also sought approval for a modelling approach, and for associated assumptions and input data to inform the analysis. AEMO developed two models for the Review:

- A liquefied natural gas (LNG) revenue sufficiency model to determine a lower constraint value for the CPT. This sought to ensure that CPT recommendations did not deny the reasonable recovery of the fixed and variable costs of LNG capacity and use; and
- A retailer impact model to assess the effectiveness of alternative test settings for the CPT mechanism in mitigating wholesale market price risk from a range of agreed CPT Event scenarios. AEMO used this model to identify levels of residual risk that may be excessive or unmanageable, therefore guiding recommendations for the CPT.

AEMO also compared the risk mitigation power of current settings of the CPT mechanisms in each of the DWGM, the STTM and the NEM.

The 2013 Review recommended the cumulative price threshold be reduced from \$3,700 to \$1,800. The values are detailed below.

³ DWGM CPT Review 2013 – Final Report, AEMO, 16 September 2013.

Table 5 Gas market parameters recommended in 2013 Review

Market parameters	STTM	Regulatory reference	DWGM	Regulatory reference
Market price cap (STTM)/Value of lost load (DWGM)	\$400/GJ	NGR 364 – See MPC definition	\$800/GJ	NGR 200 – see VoLL definition
Minimum market price (STTM)/Minimum bid price (DWGM)	\$0/GJ	NGR 364 – See MMP definition	\$0/GJ	NGR209(5)(a) – see minimum bid price of \$0/GJ.
Administered price cap (APC)	\$40/GJ	NGR 364 – see APC definition	\$40/GJ	Administered Pricing Procedures
Cumulative price threshold (CPT)	\$440/GJ	NGR 364 – see CPT definition	\$1800/GJ	Administered Pricing Procedures
CPT horizon (STTM)/Cumulative price period (DWGM)	7 days	NGR 364 – see CPT Horizon definition	35 consecutive scheduling intervals (7 Days)	Administered Pricing Procedures

3. Assessment of market parameters

The following section discusses:

- The market parameters to be reviewed without modelling by AEMO (the AEMO reviewed parameters), which include:
 - Minimum market price (STTM)/Minimum bid price (DWGM).
 - CPT horizon (STTM)/Cumulative price period (DWGM).
- The market parameters to be reviewed using the modelling methodology undertaken by Market Reform (the modelled parameters), which include:
 - Market price cap (STTM)/Value of lost load (VoLL) (DWGM).
 - Administered price cap (APC) (STTM/DWGM).
 - Cumulative price thresholds (STTM)/Cumulative price period (DWGM).

3.1. AEMO reviewed parameters

As discussed in the review workshop, AEMO has undertaken the assessment of the reviewed parameters using the same methodology as applied in the 2018 Review.

3.1.1. Minimum market price (STTM)/Minimum bid price (DWGM)

Purpose of minimum market price

This parameter determines the MMP for a gas day. The key principles in setting the minimum market price are:

- No shipper should want to supply the spot market at a price less than MMP; and
- The MMP should be set sufficiently low as to not constrain a schedule.

Previous reviews

The initial review of the STTM market parameters during the STTM Establishment Project concluded that:

“...a commercial or operational requirement for a negative minimum market price may not exist. Without a demonstrated need to bid below \$0/GJ there appears little justification for setting a minimum market price below this level.”⁴

Although not specifically modelled in previous reviews of the DWGM, the circumstances applying to the STTM are directly applicable to the DWGM.

Treatment of minimum market price in the NEM

The NEM includes a negative minimum market price to allow negatively priced offers to give greater certainty of dispatch, thus avoiding stopping and starting generators for short periods. Gas injections are treated as being uniform for:

⁴ STTM Market Settings Analysis, June 2009, Report to VENCORP by McLennan Magasanik Associates.

- The balance of the gas day in the DWGM; and
- For a full gas day in the STTM.

Scheduling periods in gas are significantly longer than the five minute NEM dispatch interval. It is therefore unlikely that the NEM's incentive for generators to offer short periods at negative prices in the NEM will be replicated in gas markets.

Are current minimum market prices effective?

From 1 January 2017 until 31 December 2022, there have only been seven instances (representing 0.06% of current days schedule run during this period) where a DWGM market price has cleared at \$0/GJ. There were no \$0/GJ ex ante and ex post prices in the STTM during the period.

Table 6 Number of zero dollar per GJ price events

Year	DWGM 6:00 AM	DWGM 10:00 AM	DWGM 2:00 PM	DWGM 6:00 PM	DWGM 10:00 PM	STTM Ex Ante	STTM Ex Post
2017	0	0	0	0	1	0	0
2018	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0
2021*	0	0	0	0	2	0	0
2022**	0	0	1	1	2	0	0
Total	0	0	1	1	5	0	0

* An error was detected in the Draft Determination that attributed one \$0/GJ price event to 2022 instead of 2021.

** These events occurred at 10:00 PM 22 September 2022, 2:00 PM 23 September 2022 and 24 September 2022 during the Queen's Memorial Day (22 September 2022) and Grand Final Day (23 September 2022) longweekend combined with gas demand being lower than forecast and Culcairn maintenance causing a constraint preventing export.

The STTM ex ante price accounts for the majority of trading in the STTM hubs. The STTM ex post price (and the deviation price) primarily serve as the price for deviations.

The DWGM 6:00 AM schedule accounts for the majority of imbalance payments for a gas day. The intraday schedules after 6:00 AM in the DWGM can have a small quantity of gas traded but prices at these schedules are typically used for deviation pricing.

Request for participant views on current minimum market prices

AEMO's assessment is that the setting for a \$0/GJ minimum market price is effective. Only 0.06% of DWGM schedules and no STTM schedules in the period assessed have resulted in the minimum market price occurring.

AEMO consider the STTM minimum market Price and DWGM minimum bid price of \$0/GJ remain appropriate.

3.1.2. Participant submission to AEMO's Draft Determination

No submissions were received in response to AEMO's Draft Determination concerning this assessment.

3.1.3. AEMO's Final Determination

AEMO recommends the following STTM and DWGM market parameters remain unchanged:

Final Determination 1 – No change to the minimum market price/minimum bid price

- the minimum market price in STTM; and
- the minimum bid price in DWGM remains at \$0/GJ.

3.1.4. CPT horizon (STTM)/Cumulative price period (DWGM)

Purpose of the CPT horizon (CPTH)/Cumulative price period (CPP)

The primary purpose of the CPT is to cap price risks over a period of time. The CPTH/ CPP sets the period of time for which prices are accumulated. It is aligned across the DWGM (35 consecutive scheduling intervals (ie seven days)) and STTM at seven gas days, which corresponds with the seven days (2,016 trading intervals⁵) used in the NEM's CPT.

Treatment of the CPT horizon in current Reliability Panel review

This was changed from 336 30-minute trading intervals (seven days) to 2,016 five-minute trading intervals (seven days) with the introduction of five-minute settlement as noted in the NEM Reliability Panel Final Report⁶. There was no further consideration of the NEM CPT horizon in the Final Report.

Submissions on suitability of the current CPT horizon

AEMO's initial assessment is that having the settings for STTM CPT Horizon and DWGM CPP are effective at seven consecutive gas days in the STTM and 35 consecutive scheduling intervals (7 days) in the DWGM are consistent with other markets.

Therefore AEMO considers the STTM CPT Horizon and DWGM CPP remain appropriate.

3.1.5. Participant submission to AEMO's Draft Determination

No submissions were received in regards to the STTM and DWGM cumulative price period.

3.1.6. AEMO's Final Determination

AEMO recommends the following STTM and DWGM market parameters remain unchanged:

Final determination 2 – No change to CPT horizon/cumulative price period

- The STTM CPT Horizon should remain at seven days.
- The DWGM Cumulative Price Period should remain at 35 scheduling intervals (seven days).

⁵ This was changed from 336 30-minute trading intervals to 2,016 five-minute trading intervals with the introduction of five-minute settlement on 1 October 2021. See Australian Energy Market Commission, Schedule of reliability settings, 25 February 2021 and National Electricity Amendment (Five Minute Settlement) Rule 2017 No. 15, cl 3.14.2.

⁶ AEMC, Final Report 2022 Review of the Reliability Standard and Settings, 1 September 2022, at <https://www.aemc.gov.au/market-reviews-advice/2022-reliability-standard-and-settings-review>.

3.2. Modelled parameters

3.2.1. Participant submission to AEMO's Draft Determination

Origin Energy considers that the cumulative price threshold in the DWGM and STTM should be increased. Origin Energy requested further consideration be given to the acceptable risk limits applied through the parameter review.

AEMO notes that the methodology has already been consulted on in the first stage of the Review and that it would not be appropriate to further review the acceptable risk limits outlined in the methodology at this stage of the consultation.

AEMO also notes that the AER and EnergyAustralia suggested the cumulative price threshold of the DWGM and STTM should be aligned. This is discussed further in Section 5.4.

3.2.2. Market Reform's final recommendation

Market Reform's final report⁷ is included as Attachment A. The report responds to submissions from participants in response to the Draft Determination.

3.2.3. AEMO's Final Determination

AEMO has accepted Market Reform's recommendation on the STTM and DWGM market parameters, noting the existing market parameters are appropriate as they are protecting the profitability of market participants while also allowing for an investment incentive.

AEMO recommends the following STTM and DWGM market parameters remain unchanged:

Final Determination 3 – No change to the STTM market price cap/DWGM VoLL

- The market price cap in the STTM \$400/GJ
- The value of VoLL in the DWGM \$800/GJ

Final Determination 4 – No change to the STTM and DWGM administered price cap

- The administered price cap in the STTM \$40/GJ.
- The administered price cap in the DWGM \$40/GJ.

Final Determination 5 – No change to the STTM and DWGM cumulative price threshold

- The cumulative price threshold in the STTM remains at \$440
- The cumulative price threshold in the DWGM VoLL remains at \$1,400

⁷ Market Reform, Gas Market Parameters Review 2022: Final Recommendations Report, at <https://www.aemo.com.au/consultations/current-and-closed-consultations/gas-market-parameter-review-2022>.

4. Overview of the consultation to date

An outline of the consultation has been published on AEMO's consultation webpage⁸.

4.1. Stage 1 of consultation – determination of Gas Market Parameters Review methodology

4.1.1. GWCF consultation

AEMO consulted the GWCF concerning the Review at the March 2022 and June 2022 GWCF meetings, noting the Review had to start after the AEMC's NEM Reliability Panel review and be completed six months after the NEM review was completed. AEMO reported that the Review would focus on price caps, cumulative price period, CPT horizon and the minimum market price.

4.1.2. Gas Market Parameters Workshop #1 – Draft methodology

On 8 September 2022, AEMO held a workshop with the GWCF concerning the methodology to be used in undertaking the Review. At the workshop, Market Reform presented its proposed methodology for undertaking the Review.

4.1.3. Initiation of consultation on assessment methodology

On 14 September 2022, AEMO began the formal consultation on the Review with the publication of Market Reform's Draft Consultation Report⁹ along with the GWCF Presentation¹⁰ on the Gas Market Parameters Review from 8 September 2022.

AEMO invited submissions on the proposed methodology by 10 October 2022¹¹. AEMO published the 11 submissions¹² received from participants on 17 October 2022.

4.1.4. Publication of final assessment methodology

AEMO published an updated Market Reform Final Consultation Report¹³ on 2 November 2022 which took on board participants' submissions from 10 October 2022.

This methodology was used by Market Reform to perform modelling of the appropriate gas market parameter recommendations.

⁸ At <https://www.aemo.com.au/consultations/current-and-closed-consultations/gas-market-parameter-review-2022>.

⁹ Market Reform, Gas Market Parameters Review 2022 Draft Consultation Report, 5 September 2022, at <https://www.aemo.com.au/consultations/current-and-closed-consultations/gas-market-parameter-review-2022>.

¹⁰ Market Reform, Gas Market Parameters Review 2022 presentation, 8 September 2022, at <https://www.aemo.com.au/consultations/current-and-closed-consultations/gas-market-parameter-review-2022>.

¹¹ The initial submission was required by 7 October 2022 but was extended due to the additional public holiday for the Queen's Memorial on 22 September 2022.

¹² At <https://www.aemo.com.au/consultations/current-and-closed-consultations/gas-market-parameter-review-2022>.

¹³ Market Reform, Gas Market Parameters Review 2022 Final Consultation Report, 26 October 2022, at <https://www.aemo.com.au/consultations/current-and-closed-consultations/gas-market-parameter-review-2022>.

4.2. Stage 2 of consultation – determination of market parameters

4.2.1. Draft Determination on gas market parameters

AEMO published the Draft Determination¹⁴ on the gas market parameter recommendations on 1 December 2022.

4.2.2. Submissions in response to Draft Determination

AEMO received five submissions¹⁵ in response to the Draft Determination on gas market parameter recommendations published on 1 December 2022.

4.2.3. Final Determination on gas market parameters

AEMO published this document detailing the final gas market parameter recommendations on 16 February 2023.

¹⁴ AEMO, Review of the Gas Market Parameters for the DWGM and STTM Draft Determination, 1 December 2022, at <https://www.aemo.com.au/consultations/current-and-closed-consultations/gas-market-parameter-review-2022>.

¹⁵ See <https://www.aemo.com.au/consultations/current-and-closed-consultations/gas-market-parameter-review-2022>.

5. Issues raised in submissions

AEMO noted the following issues in its draft determination:

- Single parameter review process for NEM, STTM and DWGM parameters.
- Future consultations on the gas market parameters.
- Alignment of parameters across the STTM and DWGM.

Participant submissions in response to the draft determination identified the following issues:

- Shell Energy and the Australian Energy Council (AEC) both suggested that the calculation of the cumulative price could be improved by using a weighted average market price.
- EnergyAustralia and AER both raised concerns about the operation of the proposed new administered price cap having appropriate principles for the application and removal of the administered price period.

5.1. Single parameter review process for NEM, STTM and DWGM parameters

Participants raised concerns that the NEM Reliability Panel review and the DWGM and STTM Gas Market Parameters Review should be carried out by a single review panel due to the interrelated nature of these markets.

EnergyAustralia and the AER both raised, in response to the Draft Determination, that in future gas market parameters should be determined in parallel with the NEM parameters.

Market Reform has stated that alignment of reviews for the NEM, STTM and DWGM would be logical, whether through a single review, or a process of aligning the reviews to be concurrent and interacting.¹⁶

AEMO notes this is a policy issue which could be considered by the AEMC. Participants are able to raise a rule change request with the AEMC via the AEMC's rule change process if this outcome is considered desirable.

AEMO will fulfill its functions under NGR 492 to assess the STTM market parameters and is voluntarily reviewing the DWGM market parameters.

5.2. Future consultations on the gas market parameters

AEMO notes participants have raised concerns with the Review consultation being undertaken by AEMO. In particular, AEMO notes the following concerns:

- AEMO's only consultation, prior to beginning the formal consultation process, was with the GWCF and not more broadly with AEMO's other consultative forums such as the consumer forum.
- The consultation effectively only proposed the 2018 methodology for participants' consideration. AEMO notes this was due to the 2013 and 2018 Gas Market Parameters Reviews being non-controversial.

¹⁶ Market Reform, Gas Market Parameters Review 2022: Final Recommendations Report, pg 71 at <https://www.aemo.com.au/consultations/current-and-closed-consultations/gas-market-parameter-review-2022>.

AEMO notes EnergyAustralia's submission which stated:

Our expectation is that the next scheduled review of gas market parameters will be in view of an established pricing intervention and investment framework, as well as a more formalised reliability framework. This might include consideration of risk aversion (as recommended by the Reliability Panel). If this is adopted as a reflection of customer preferences it should be within the scope of any gas market price settings review.

AEMO notes there are a number of wide-ranging east coast gas system reforms being developed for eastern Australia. These reforms, expected to be implemented in two tranches, may potentially alter participants' views of gas supply risk and therefore influence future reviews.

AEMO considers it will be appropriate to separately consult on the market parameter assessment methodology, prior to commencing the next Review.

5.3. Alignment of parameters across the STTM and DWGM

5.3.1. Participant submissions to AEMO's Draft Determination

AEMO's Draft Determination considered that the different market designs for the STTM and DWGM result in it being more challenging to allow for the alignment of market parameters. Therefore an alignment of parameters such as the market price cap and the cumulative price threshold could not be achieved.

Submissions from participants raised the following points:

- The AER stated a preference for the cumulative price threshold setting in the STTM and DWGM to be aligned.
- The AEC stated that it still considers it preferable to align the parameters across the markets as closely as possible, instead of creating an additional trigger mechanism as proposed in the Draft Determination. The AEC proposed the cumulative price calculation be changed to use a traded quantity weighted cumulative price calculation instead; this is discussed in Section 5.4.
- EnergyAustralia noted the infeasibility of setting uniform values of the price cap/VoLL and CPT across the STTM and DWGM, primarily because of different scheduling due to fundamental market design elements, but said some consideration should be given to the longer-term prospects and benefits of aligning the operation of the STTM and DWGM.
- Origin Energy's preference was to set administered price parameters at an efficient level to balance participant risk while supporting market operations and investment signals, which Origin considered could be achieved by increasing the DWGM CPT to improve alignment with the STTM.
- Shell Energy remained concerned by the inconsistency between the CPT setting in the DWGM in Victoria and the STTMs in the other states. Shell considered that by not removing, or at least reducing, this inconsistency, the potential for inefficient market outcomes like those observed during winter 2022 remain. Shell proposed the cumulative price calculation be changed to use a traded quantity weighted cumulative price calculation instead; this is discussed in Section 5.4.

5.3.2. Market Reform's final recommendation

Market Reform has detailed the differences in the markets, which were discussed in AEMO's Draft Determination. Market Reform's assessment determined that the range of parameters over which the main decline in efficiency happens is greater for the DWGM than the STTM. This means parameters

need to be more restrictive for the STTM to show significant decreases in efficiency than is the case for the DWGM¹⁷.

5.3.3. Final Determination

AEMO notes that participants are still concerned about the alignment of gas market parameters between the STTM and DWGM. Participant submissions have not proposed a viable option for proceeding with a change to the cumulative price threshold of the DWGM and STTM. AEMO notes that Shell and AEC's concerns are more focused on the calculation of the cumulative price (discussed in section 5.4) and the proposed new administered price cap for multiple markets (discussed in section 5.5).

AEMO considers that the market design differences do not make it appropriate to align the STTM and DWGM gas market parameters at this time.

5.4. Calculation of the cumulative price

AEMO notes that Shell and the AEC raised altering the calculation of the DWGM CPT calculation to use a weighted average price.

AEMO has reviewed the calculation of the cumulative price in other markets:

- NEM – the cumulative price is calculated as the sum of market prices determined over the last 2,016 five-minute trading intervals.
- DWGM – the cumulative price is calculated as the sum of marginal prices (being the highest bid price scheduled in a scheduling interval) determined over the last 35 scheduling intervals.
- STTM – the cumulative price is calculated as the sum of the ex ante, ex post and contingency gas price that has been calculated for the gas day.

The move to a volume weighted cumulative price calculation would make the cumulative price calculation for the DWGM inconsistent with the STTM and the NEM.

Market Reform considered the proposed change to the cumulative price calculation, to use the volume weighted cumulative price, may substantially increase the market price risk to market participants from both surprise demand or supply source issues causing deviation price risk¹⁸.

AEMO considers that Market Reform is correct in that there is a higher potential market risk for participants from adopting a new calculation methodology for the cumulative price. To maintain consistency in the operation of the CPT for the STTM and DWGM, AEMO considers that the proposal would need to be assessed for both markets.

AEMO considers that this specific issue is related to, but beyond the scope of, the Gas Market Parameters Review. As it could potentially have a significant change to market price risk, AEMO considers that such a change should be investigated and developed in consultation with the GWCF.

¹⁷ Market Reform, Gas Market Parameters Review 2022: Final Recommendations Report, pg 79-80 at <https://www.aemo.com.au/consultations/current-and-closed-consultations/gas-market-parameter-review-2022>.

¹⁸ Market Reform, Gas Market Parameters Review 2022: Final Recommendations Report, pg 71 at <https://www.aemo.com.au/consultations/current-and-closed-consultations/gas-market-parameter-review-2022>.

5.5. New administered price state for multiple markets

AEMO's Draft Determination was to recommend the value of the STTM and DWGM market parameters.

The proposal of creating a new administered price state for multiple markets, while raised in the Draft Determination, would require additional investigation and development before it could be considered appropriate to raise a Rule and Procedure change.

AEMO notes that some participants have provided views on the principles to underpin the function of a new administered price cap for multiple markets and others have expressed concerns of the impact on multiple markets.

AEMO appreciates the comments from participants concerning the proposed new administered price state for multiple markets. As raised by participants, AEMO considers there is value in considering the development of the new administered price state in conjunction with the consideration of a weighted cumulative price calculation for the DWGM and STTM.

AEMO considers that, due to the complexity and feasibility of the proposed new administered price state for multiple markets, it should be investigated and developed in consultation with GWCF before any Rule or Procedure change consultation is begun.

6. Next steps

AEMO considers that, in line with Market Reform’s recommendations, the existing DWGM and STTM market parameters remain appropriate.

AEMO will separately consult on the market parameter assessment methodology, prior to commencing the next Review.

Participants raised, in their submissions, the following issues for investigation and development:

- The proposed new administered price cap trigger for multiple markets; and
- A review of the cumulative price calculation methodology.

AEMO will include these items for discussion with participants via the GWCF.

Appendix A. Market Reform – Final Report

Market Reform, Gas Market Parameters Review 2022: Final Recommendations Report at <https://www.aemo.com.au/consultations/current-and-closed-consultations/gas-market-parameter-review-2022>

Appendix B. Participant submissions in response to Draft Determination

The following issues were raised in submissions. All submissions have been published on AEMO's consultation page.

Participant	Issue	AEMO response
Australian Energy Council (AEC)	The AEC is broadly supportive of the Draft's decision to not change the gas market parameters for the DWGM and STTMs and acknowledges the inclusion of initial stakeholder feedback in the Draft. Nevertheless, the AEC still considers that aligning the parameters across the markets as close as possible instead of creating an additional trigger mechanism as proposed in the Draft is preferable.	Noted.
Australian Energy Council (AEC)	<p>The AEC has observed that there is currently a flaw in how the DWGM CPT is calculated. The current method employs a time weighted average price to calculate the CPT which can at times result in an inaccurate measure of the price at which most of the gas settled at across a day. This is because the great majority of the gas traded in the DWGM is settled in the first trading interval (i.e., 6am) and subsequent trading intervals are only for deviations in gas required relative to the previous interval. The AER in its submission also observed this anomaly and suggested the use of a volume weighted price for DWGM CPT calculation.</p> <p>The use of a volume weighted price for DWGM CPT calculation would also better align this market with the STTMs because these markets are settled based on one daily price in contrast to the five prices in the DWGM. Furthermore, as discussed above it should negate the need for the Draft's proposal of a new APC trigger event. Accordingly the AEC recommends that a volume weighted price is used for CPT calculation in the DWGM.</p>	Noted. AEMO notes both the STTM and DWGM do not weight the prices used in the cumulative price calculation.
Australian Energy Regulator (AER)	The AER's previous submission stated a preference for the Cumulative Price Threshold (CPT) setting in the STTMs and DWGM to be aligned (changed) for the improvement of spot market functionality during administered pricing periods. AEMO's Draft Determination was for all gas market parameters to remain unchanged. The AER notes this is in part based on Market Reform's (AEMO's consultant) finding that the different market designs of the STTM (scheduled once) and DWGM (scheduled 5 times for each day) make it challenging to align parameters across the STTMs and the DWGM.	Noted.
Australian Energy Regulator (AER)	AEMO's proposed new [administered price cap for multiple markets] trigger could effectively lower the CPT in the STTMs. In winter 2022 during a time of high and volatile prices, the DWGM was administered (based on CPT) prior to the STTMs. This was due to the differences in the CPT trigger – an average price of approximately \$63/GJ is required to reach the CPT in the STTM where only \$40/GJ in Victoria is required. AEMO's new additional trigger proposal is that following the DWGM CPT being triggered, a decision could be made to administer one or more of the STTMs. The effect of this proposal could be to effectively cap the price in STTMs, based on (Victorian) average prices of \$40/GJ. The AER highlights this appears to be an indirect way of changing existing (STTM) parameters and asks AEMO to consider any potential and unintended effects of the new trigger in further detail.	Noted.
Australian Energy Regulator (AER)	If possible AEMO's Final Determination should consider the workability of the recommended approach to adjust the CPT in other market(s) on an event basis and subject to criteria. The proposed trigger may be complex to administer at times when the market is experiencing significant volatility.	Noted.
Australian Energy Regulator (AER)	The AER supports the concurrent review of market parameter setting in the NEM and gas markets due to the interrelated nature of these markets for future reviews.	Noted.
EnergyAustralia	AEMO's draft decision to leave pricing parameters unchanged is prudent. The detailed modelling exercise by Market Reform in relation to risk tolerances and investment incentives does not appear to provide sufficient	Noted.

Participant	Issue	AEMO response
	evidence for change. In addition, price settings in energy markets are highly politicised at present and there is a very high level of uncertainty arising from various government interventions that are still being finalised. The effects of these changes in terms of risk allocation and investment incentives over the medium- to long-term are still unclear but likely to be significant.	
EnergyAustralia	[Market Reform's] report pre-dates government interventions to cap the price of new gas supply contracts and further regulations around participant pricing behaviour. The details of these interventions and their ramifications will still be unknown by the time AEMO must finalise this review. Our expectation is that governments will need to intervene again to overcome heightened investment risk and secure new sources of gas supply. This affects the role of gas market price settings in enabling cost recovery, in the same way that a potential capacity mechanism has overshadowed the Reliability Panel's review of price settings in the NEM. The evolution of an explicit reliability framework around gas supply, to be consulted on over 2023, is also expected to directly affect how pricing parameters are set. For example, if an approach similar to the NEM is adopted, this would involve estimating customers' willingness to pay which would replace AEMO's current reliance on profitability measures for notional participants.	Noted.
EnergyAustralia	As raised in recent stakeholder submissions, gas market parameters should be reviewed either in tandem with or before the Reliability Panel's consideration of NEM parameters. This would require amendments to rule 492(1)(g) of the NGR in relation to the STTM parameter review timing.	Noted.
EnergyAustralia	Rather than a pre-defined set of events, we support a trigger being defined with respect to outcomes arising from a lack of consistent pricing across linked markets. A trigger should therefore reflect the following principles and features: <ul style="list-style-type: none"> once administered pricing is triggered in a market for whatever reason, AEMO may similarly declare the suspension of other markets if it considers this is necessary to return one or more markets to safe or normal operation a preference to avoid this wherever possible and allow markets to continue to clear or reach an administered state by other triggers (including via the CPT) once triggered, a preference to exit as soon as practicable. This could be reinforced with default time limits e.g. as for ROLR events in the DWGM. We also support measures to ensure markets operate within acceptable commercial and technical boundaries, thus avoiding the need for market suspension in the first place. This includes enhancements to reliability assessments for gas, as well as electricity which are subject to current consultation, particularly energy and fuel limits which AEMO is consulting on separately under its NEM reliability guidelines. Procedural amendments could also allow for AEMO directions in one market (e.g. backing off gas generation in the NEM) with the aim of avoiding suspension in another (e.g. in the STTM/DWGM).	Noted. AEMO considers it appropriate to consider these proposals in consultation with the GWCF.
EnergyAustralia	We note the general comments from Market Reform and AEMO around the infeasibility of setting uniform values of the price cap/VoLL and CPT across the STTM and DWGM, primarily because of different scheduling. We accept there are legacy issues leading to different scheduling approaches, and these issues relate to fundamental market design elements. However some consideration should be given to the longer-term prospects and benefits of aligning the operation of the STTM and DWGM.	Noted. AEMO considers it appropriate to consider these proposals in consultation with the GWCF.
Origin Energy	The gas market parameters play a crucial role in limiting risk for market participants, while also supporting efficient market operations and investment decisions. While we generally agree the existing market parameters are broadly fit for purpose in this context, we remain of the view there is a need to increase the level of the CTP in the DWGM to improve alignment with the STTM. <p>As noted in our response to the earlier consultation paper, it is clear gas / electricity markets are becoming more interlinked as the NEM transitions towards higher levels of variable renewable energy (VRE), with price signals across the facilitated gas markets / NEM fundamental in signalling where gas is most valued at any point in time. This in turn impacts</p>	Noted.

Participant	Issue	AEMO response
	participants' allocation of gas across those markets. Gas prices are also now higher on average and more volatile relative to historic levels when the current suite of parameters were determined.	
Origin Energy	<p>The progressive reduction of the DWGM CPT from \$3,700 in 2014 to \$1,400 (currently) has increased the likelihood of the DWGM entering an administered pricing period relative to the STTM (i.e. an average price of \$40/GJ will breach the DWGM CPT, compared with \$63 in the STTM). Should this occur at a time when prevailing prices in the STTM and / or NEM are high, incentives for market participants to supply the DWGM are likely to be reduced. This was evidenced in winter 2022, with the DWGM breaching the CPT for the first time in the history of the market on 30 May 2022 and remaining under administered pricing for a period of two months to 31 July 2022. During this time, security of supply concerns emerged, with price signals incentivising withdrawal of gas from the DWGM for use in other markets.</p> <p>The above issue was considered by Market Reform, who ultimately determined that increasing the DWGM CPT would not be tenable given participant risk limits, which are defined as risk in excess of 500 days lost profit for a 50 per cent hedged demand-side participant.</p>	Noted.
Origin Energy	<p>The Draft Determination also notes Market Reform's suggestion that the issues associated with inter-market flows that may arise when one market is in an administered state earlier than another could be addressed by introducing a supplementary trigger that allows for simultaneous application of administered pricing across two or more markets.</p> <p>We are also not supportive of introducing an additional mechanism to allow for simultaneous capping of markets, noting this could have the unintended impact of more frequent and potentially unnecessary application of administered pricing across the facilitated gas markets. Our preference remains to ensure the administered price parameters are set at an efficient level to balance participant risk while supporting market operations / investment signals, which we consider could be achieved by increasing the DWGM CPT to improve alignment with the STTM.</p>	Noted. AEMO considers it appropriate to consider these proposals in consultation with the GWCF.
Shell Energy	<p>Shell Energy appreciates the rigorous process that AEMO and Market Reform have taken with this review. In particular, the transparency provided, responsiveness to input and feedback regarding stakeholder input has been greatly appreciated. However, we remain concerned by the inconsistency between the CPT setting in the DWGM in Victoria and the STTM in the other states. We consider that by not removing, or at least reducing, this inconsistency the potential for inefficient market outcomes like those observed during Winter 2022 remain. We consider market settings that exacerbate the need for market intervention by AEMO to be suboptimal and an outcome that should be avoided by this review.</p> <p>[Shell Energy's] submission describes a change to the calculation of the CPT in the DWGM that would better align the CPT calculation across all markets. It would also reduce the potential for market inefficiencies due to market intervention.</p>	Noted. AEMO considers it appropriate to consider these proposals in consultation with the GWCF.