2020 BIENNIAL REVIEW INTO LIQUIDITY IN WHOLESALE AND GAS PIPELINE TRADING MARKETS

DRAFT REPORT

GPR0007
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AEMC

SUMMARY

In this draft report, the Australian Energy Market Commission (AEMC or Commission) has found that liquidity has grown in a number of Australia's wholesale gas and pipeline capacity trading markets over the last two years.

In particular the Wallumbilla gas supply hub (GSH) has shown significant liquidity growth with positive indicators across quantitative and qualitative metrics.

The Short Term Trading Market (STTM) in Sydney, Brisbane and Adelaide, and Victoria's declared wholesale gas market (DWGM) are established, compulsory markets. They continue to enjoy relatively higher levels of liquidity and stakeholder confidence, with less significant growth in liquidity.

Significant trading has been slow to develop on the Moomba GSH.

A liquid market exists when no single transaction is likely to move the price excessively; individual trades can be easily executed; there is an ability to trade large volumes in a short period of time; and the market can recover towards its natural equilibrium after being exposed to a shock.

Improving liquidity leads to a more efficient market, which supports outcomes where gas is supplied to those consumers who value it the highest, at the lowest possible cost, over time. Growth in trading liquidity requires the creation of a self-reinforcing cycle that encourages both the demand and supply side of the market to participate.

The COAG Energy Council has made a number of reforms to encourage liquidity in gas markets, including a number based on the recommendations the AEMC's 2016 *East Coast Wholesale Gas Markets and Pipeline Frameworks Review*.[1]

The day-ahead auction (DAA) of contracted but un-nominated transportation capacity, which began in March 2019, appears to have contributed to liquidity growth in capacity and wholesale markets, though its use has not been consistent across all relevant pipelines. The capacity trading platform (CTP) however, which complements the DAA and was introduced at the same time, has not yet been significantly utilised.

We note that a number of regulatory changes to gas markets are still too recent to thoroughly assess their effectiveness and that others are yet to be implemented. As such the Commission considers it is too early to consider further major reforms. However, feedback from surveys and interviews on areas for improvement is noted for stakeholder comment and further consideration in the final report.

The AEMC's findings are based on a draft assessment of quantitative (see Table 1) and qualitative metrics of liquidity. The AEMC is restricted to publicly available quantitative data. As such the focus for analysis is limited to specific facilitated markets where data is available, rather than on the market overall. The AEMC notes the important role of bilateral or over the counter (OTC) markets and long-term gas and transportation contracts in gas markets.

The AEMC assessed qualitative metrics via a survey of market participants and one on one interviews.

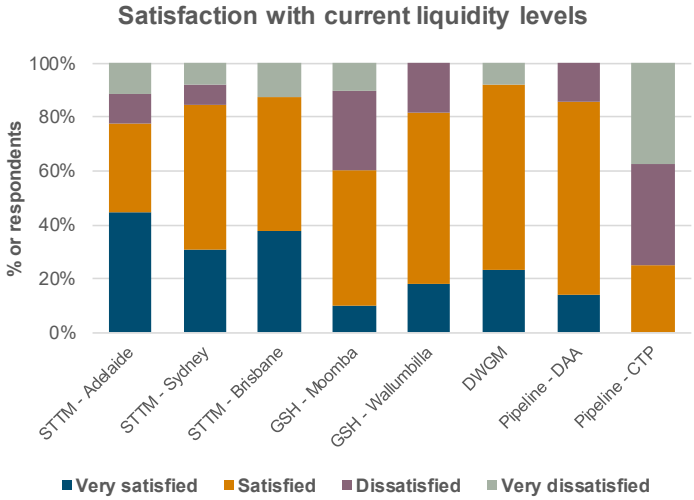


Table 1: Overview of trends in liquidity metrics by facilitated market (2019 v 2017)

	Metric	Trend and/or threshold	Wallumbilla GSH	Moomba GSH	DWGM	Sydney STTM	Adelaide STTM	Brisbane STTM	Day-ahead auction
1	Traded volumes	Should be increasing	●	●	●	●	●	●	●
2	Churn rate	Should be increasing	●	●	n/a	n/a	n/a	n/a	n/a
3	Bid-offer spreads	Should be narrowing	●	●	n/a	n/a	n/a	n/a	n/a
4	Number of active participants	Should be increasing	●	●	●	●	●	●	●
5	Concentration of trades (buy side)	Should be decreasing	●	n/a	●	●	●	●	n/a
5	Concentration of trades (sell side)	Should be decreasing	●	n/a	●	●	●	●	n/a
6	Number of trades per product	Should be increasing	●	●	n/a	n/a	n/a	n/a	●

● **Trend: Liquidity is increasing** ● **Trend: No significant changes / flat** ● **Trend: Liquidity is decreasing**

Note: The metrics are indicators of the trend in the particular facilitated market, but should not be considered in isolation of other evidence. They are reflective of the products traded on the particular facilitated market and not necessarily overall liquidity in the gas market.

Scope of the review

This is the second *Biennial review into liquidity in wholesale and gas pipeline trading markets* following on from the baseline set in 2018.

The terms of reference provided by the COAG Energy Council requires the AEMC to:

- monitor changes in liquidity in the gas markets
- report on the effectiveness of reforms implemented
- identify the need for any further reforms, if appropriate.

The markets to be examined cover the wholesale gas and pipeline capacity trading markets on the east coast of Australia. There are three separate spot markets for gas operating – GSHs (in Wallumbilla and Moomba), the STTMs (in Sydney, Brisbane and Adelaide), and Victoria's DWGM. The three spot markets operate under different sets of rules, do not interact with each other directly, and have different purposes.

The AEMC is also expected to monitor developments in the Northern Territory and Western Australia, where it is relevant to do so.

Role of the review

The role of the gas market liquidity review is to take a longer term view of how liquidity is developing and the impact of reforms. It builds on the AEMC's work for the 2016 *Eastern Australian Wholesale Gas Market and Pipelines Framework Review* and 2017 *Review of the Victorian Declared Wholesale Gas Market*.

The Australian Energy Regulator (AER) and Australian Energy Market Operator (AEMO) publish liquidity metrics and analysis which have informed this review.

The analysis contained in interim reports of the Australian Competition and Consumer Commission's (ACCC's) gas inquiry 2017-2025 have also informed our review. The ACCC's inquiry has a broad scope covering prices and supply issues, where as the AEMC's review is focussed specifically on liquidity.

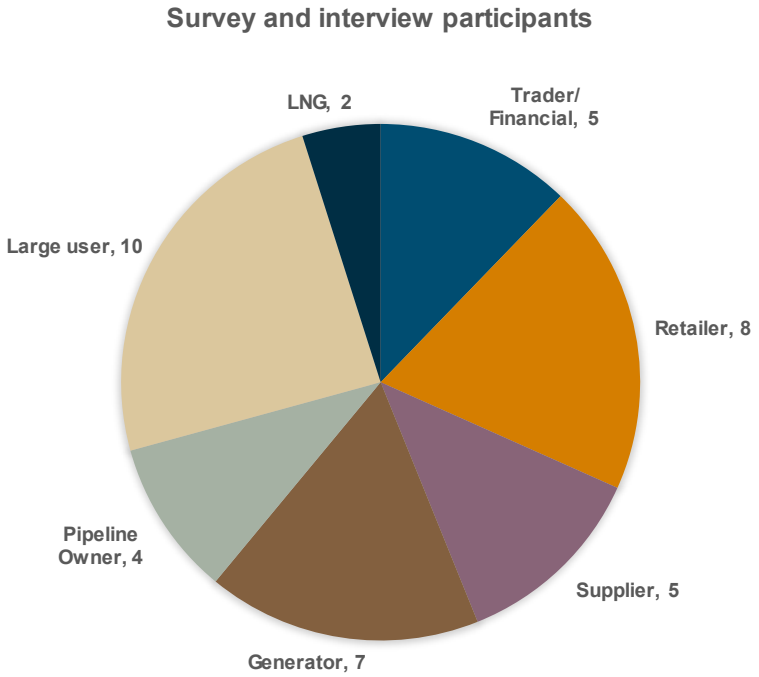
Methodology

The AEMC used both quantitative and qualitative metrics in the analysis of liquidity in the gas markets.

The AEMC is restricted to publicly available quantitative data. The quantitative metrics do not examine bilateral or over the counter markets and the long-term gas and transportation contracts that underpins much of the market as insufficient data is available publicly. As such the focus for analysis is limited to specific facilitated markets, rather than on the market overall.

The AEMC assessed qualitative metrics via a survey of market participants and follow-up interviews. Survey responses were received from 26 gas industry participants and one on one interviews were then conducted with 20 participants.

For Western Australia and Northern Territory, we note that there is very limited publicly available data. Hence for both jurisdictions the AEMC has more heavily relied on the qualitative survey results.



Note: One participant can be included in more than one category. Please refer to table 11 in the Appendix for a complete list of companies that participated in survey and/or interviews.

Impact of the COVID-19 pandemic

Most surveys and interviews occurred in early March when there was limited information on the impacts of the COVID-19 pandemic.

The pandemic may affect the assessment of liquidity in a number of ways. The economic effects of the pandemic may affect domestic and international demand, prices and the confidence of market participants in gas markets and views on the future development of liquidity.

This review however provides a useful analysis of liquidity at a point prior to any large impacts of the pandemic. The 2022 review will be able to assess the effects of the pandemic from this baseline.

The Commission's view that it is too early to consider further major reforms at this time is reinforced by industry personnel constraints due to the pandemic.

Submissions invited

Submissions on this draft report are invited by **14 May 2020** via the AEMC website.

Context

Structural change

The gas industry on the east coast of Australia has undergone a structural change over the last decade.

Largely isolated point-to-point pipelines have evolved into an interconnected network, supporting a series of increasingly interlinked markets.

This transformation was accelerated by the Queensland-based liquefied natural gas (LNG) export industry driving a large increase in demand and linking east coast gas prices to international prices, which introduced additional sources of volatility.

Historically, natural gas on the east coast has been traded through long-term bilateral gas supply agreements. These contracts have traditionally covered periods of 15 to 20 years in order to underwrite investments in capital intensive, long-lived assets.

In this relatively stable environment, the role of facilitated gas markets was mostly to manage daily imbalances in a transparent and competitive manner.

While bilateral contracts will remain a fixture of the east coast market, more flexible and sophisticated means of managing gas portfolios are increasingly important to participants.

With greater price and demand volatility now a feature of gas markets, greater flexibility in how gas is bought and sold outside of gas supply agreements and new approaches to managing spot price volatility risk are required.

For example, options to take advantage of short-term availability of pipeline capacity and gas supply, as well changes in price, can lead to more efficient market outcomes.

Changes since 2018

Since the 2018 Gas markets liquidity review the competitive dynamics in the gas markets have continued to evolve:

- Following a commitment to the Federal Government in late 2017 to provide gas to the domestic market on reasonable terms, the LNG producers in Queensland increased domestic supply.
- The Northern Gas Pipeline connecting the Northern Territory to the east coast gas market began flowing gas in early 2019.
- In its July 2019 Gas Inquiry report, the ACCC noted a significant shift of the Commercial and Industrial market away from the 'Big 3' retailers to smaller retailers and producers.
- In the 2020 Gas Statement of Opportunities and the Victorian Gas Planning Report, AEMO forecast supply shortfalls by the mid-2020s unless new supply sources are developed.

Regulatory changes and investigations are also impacting on the gas markets:

- In March 2019 AEMO launched the capacity trading platform (CTP) and day-ahead auction (DAA) to provide market participants with greater access to pipeline capacity.
- Restrictions on exploration and fracking have influenced the development of supply – the NT lifted its fracking ban in 2018; Victoria announced it will lift the ban on onshore exploration in 2021, but will continue to ban fracking.
- The ACCC's wide ranging gas inquiry has been extended to 2025. In October 2018, the ACCC began publishing a monthly LNG netback series, which improves information on the link between domestic and international prices.
- In January 2020, the Federal Government and NSW made an agreement to inject an additional 70 petajoules of gas per year into the east coast market.

Findings for the east coast facilitated gas markets

The table on the following slide summarises the Commission's quantitative and qualitative findings for each east coast facilitated market. This report focuses on the change in liquidity over the two-year period between the AEMC's gas market liquidity reviews.

In this draft report, the AEMC has found that liquidity is growing in a number of Australia's wholesale gas and pipeline capacity trading markets, but some markets are not showing signs of liquidity growth.

The Wallumbilla GSH has shown significant liquidity growth with positive indicators across quantitative and qualitative metrics. However significant trading is yet to emerge on the Moomba GSH.

The DWGM and STTMs as compulsory markets continue to enjoy relatively higher levels of liquidity and stakeholder confidence, though are more established and liquidity growth has been less significant than at the Wallumbilla GSH.

The AEMC notes the significant trade at the Wallumbilla GSH with a traded volume of around 26 PJ in 2019, compared with around 26 PJ of net trade in the DWGM, 15 PJ of net trade at the Sydney STTM, 4 PJ at the Adelaide STTM, 1 PJ at the Brisbane STTM and 1 PJ at the Moomba GSH.

While only introduced in 2019, the pipeline capacity DAA appears to have had a substantial effect on the secondary trade of pipeline capacity and contributed to liquidity growth in east coast wholesale gas markets.

Overall the Commission considers that progress is being made towards increased liquidity that can contribute to achieving the COAG Energy Council's gas market vision.

A number of significant reforms are underway in the east coast that could contribute to further liquidity growth, particularly at the gas supply hubs and for pipeline capacity trading, and progress should continue to be monitored.

Table 2: Summary of quantitative and qualitative assessment

MARKET	QUANTITATIVE ASSESSMENT	QUALITATIVE ASSESSMENT
Wallumbilla Gas Supply Hub (operational since 2014)	• Liquidity has improved at the Wallumbilla GSH since the 2018 review, with all quantitative metrics improving except the number of active participants, which was flat. • Volumes traded through the hub continue to increase in both absolute terms and as a proportion of gas flow through the location. • Bid-offer spreads across most products are declining. • However, there has been a trend towards bilateral trades (off-screen trades) as a proportion of total trades.	• Wallumbilla GSH was considered to play a positive role increasing price transparency, market liquidity, and encouraging the development of a forward market. • There was however a lack of confidence in hub pricing especially in forward products due to low levels of liquidity. • General satisfaction for liquidity in the short-term products listed at Wallumbilla.
Moomba Gas Supply Hub (operational since 2016)	• Trade at Moomba has been slow to develop. • While there have been bids and offers for gas at Moomba, few transactions have occurred. • The introduction of the DAA has resulted in an increase in the number of trades in 2019. • Off-screen trades (bilateral) seem to meet participant needs more (more bespoke), and in this case the hub value is not for price discovery but instead for trade execution.	• Significantly lower levels of satisfaction with liquidity and lower expectations for future liquidity than Wallumbilla. • However, the majority of respondents expected they would increase activity levels at Moomba in the next two years.

Table 2: Summary of quantitative and qualitative assessment

MARKET	QUANTITATIVE ASSESSMENT	QUALITATIVE ASSESSMENT
Victorian DWGM (operational since 1999)	• Net traded volumes and active participants have increased. • Highest number of participants of all the facilitated markets. • Relatively high levels of liquidity, though longer-term gas supply agreements traded bilaterally are still the dominant method (by volume) of contracting gas supply.	• General satisfaction with experience participating in the DWGM. • Considered complex, however the survey reported a high level of satisfaction and confidence with DWGM pricing.
Short Term Trading Market (operational since 2010)	• Net traded volumes have increased in Sydney but are flat elsewhere. • Relatively high levels of liquidity, though longer-term gas supply agreements traded bilaterally are still the dominate method (by volume) of contracting gas supply.	• High levels of satisfaction with experience trading in the STTMs, liquidity and confidence in pricing.
Day-ahead auction (operational since 2019)	• There has been significant capacity purchased through the DAA mechanism in various different pipelines, though in some pipelines there has not been a single transaction.	• Very positive about participating in the day-ahead auction of pipeline capacity. • Noted as being in the early stages of its development but considered a good initiative that would assist liquidity in the markets.

Qualitative assessment

Expectations for future liquidity

Survey results show stakeholders to be optimistic that liquidity will either increase or stay about the same in each of the facilitated markets over the next two years.

Stakeholder confidence in future liquidity levels was greatest for the Gas Supply Hubs and DAA. Lower levels of confidence were observed for the CTP and Moomba GSH.

Stakeholders all indicated an intention to either increase or remain at current levels of activity over the next two years across the facilitated markets.

Drivers

Stakeholders identified a number of drivers of facilitated market liquidity in the next two years including:

- additional gas supply and more participants - an increase in physical supply was also noted as not sufficient on its own to increase physical liquidity without a corresponding increase in the number of participants trading
- increased flows from north to south as southern fields decline leading to more spot exposed trading in the DWGM were considered to be a structural driver of liquidity
- further product development, particularly in forward trading on the gas supply hubs.

Barriers

Stakeholders identified barriers to increased facilitated market liquidity in the next two years including:

- the cost of, and ability to obtain pipeline capacity
- the lack of flexibility in tradable products in comparison to bilateral physical contracting.

Physical and financial bilateral contracting

The qualitative assessment also included stakeholder views on, and confidence in, non-facilitated markets including physical and financial markets for gas.

Bilateral physical contracting

Stakeholders had the general view that facilitated markets and bilateral contracting worked together to meet participant needs.

Stakeholders considered liquidity to be growing and were optimistic about future liquidity in bilateral contract markets.

Bilateral physical contracting provided stakeholders with a more flexible means of tailoring contract terms and conditions than provided by standardised facilitated market products.

Financial gas markets

A limited number of stakeholders reported being active in financial gas markets including derivative and ASX futures markets.

Stakeholders considered these markets to be at an early stage of development but were generally positive that participation would grow as liquidity increases over time.

Interviewees reported that derivative market liquidity was growing driven by the publication of AFMA's Cash Settled Gas Trading Addendum (AFMA addendum) in February 2018.[2]

A barrier to the further development of liquidity however was the requirement for an Australian Financial Services License to trade gas derivates, which is something that not all market participants are willing to obtain.

Stakeholders indicated improvement in liquidity in ASX futures trading particularly in the Victorian gas products. Stakeholders were generally positive about the development of liquidity in, and the range of products available on the ASX gas futures market in coming years.

Western Australia and Northern Territory

The Commission has relied on qualitative assessment of gas market conditions and participant confidence in Western Australia (WA) and the Northern Territory.

Western Australia

Stakeholders were positive about liquidity in wholesale gas and pipeline capacity markets in WA, noting that a significant number of suppliers are competing to sell gas and pipeline capacity was available to ship that gas.

Some stakeholders noted the structure of the WA market, with a limited number of large users representing a significant proportion of overall demand, as being suited to a bilateral contracting market.

Issues were however identified with levels of market transparency, and challenges negotiating short-term pipeline capacity, particularly for new market entrants.

Northern Territory

Key interview and survey observations on liquidity conditions in the NT included:

- Liquidity is generally low, especially short and medium term liquidity.
- Pipeline access was considered a major barrier. There is an apparent lack of tradeable pipeline capacity on the Amadeus Gas Pipeline.

Effective market facilitation was considered by some stakeholders as important for liquidity to increase in the NT. A number of stakeholders commented that liquidity was unlikely to increase without an appropriate trading platform, for both commodity and transportation.

Stakeholders did not think the Northern Gas Pipeline (NGP) would have a significant impact on east coast market liquidity, but noted that the commissioning of the NGP has freed up capacity on the South West Queensland pipeline to deliver gas to the southern states.

Have reforms been effective?

We note that the capacity trading reforms were only introduced in March 2019, so the assessment below is preliminary.

Day-ahead auction

The DAA of contracted but un-nominated transportation capacity appears to have contributed to liquidity growth in capacity markets and wholesale gas markets, though its use has varied between pipelines.

Stakeholders considered the DAA had the potential to improve utilisation of pipeline capacity, limit the power of incumbent shippers holding onto large positions in the market, and provide access and the ability to ship gas to new and smaller participants.

Some stakeholders were concerned that the DAA creates incentives for stakeholders to reduce their pipeline contracting levels.

Some also reported an intention to use the DAA more in the future as a means of reducing pipeline transport costs as existing Gas Transport Agreements expire.

Stakeholders also noted that a reduction in contracted pipeline capacity would also reduce opportunities in the DAA as the auction only includes capacity that is contracted but un-nominated.

In addition, capacity secured in the day-ahead auction is not a direct substitute for firm capacity.

Liquidity growth in DAA and the CTP was noted to be closely connected to liquidity in the GSH with uptake of capacity trading opportunities being driven by demand for short-term trading opportunities in the hubs.

Similarly, access to capacity can improve liquidity in the GSH and other wholesale gas markets.

Capacity trading platform

The capacity trading platform has only been used for one trade to date, which took place in February 2020.[3]

A number of barriers to growth in CTP liquidity were put forward by stakeholders including:

- fixed fees associated with use of the platform
- the cheaper alternative of using the DAA
- bilateral contracting options and locational swaps.

While the CTP has not had substantial use to date, most stakeholders remained positive with some considering it too early to evaluate with additional time required for the market to mature.

The Commission notes that the two markets (the CTP and the DAA), as originally recommended by the AEMC, are designed to work in tandem.

Therefore it can be expected that a greater use of the DAA may see less use of the CTP and vice versa.

One potential interpretation of the outcomes of the DAA to date is that there is a surplus of contracted capacity on some pipelines and this is leading to plenty of capacity being available in the auction at low prices.

As participants re-contract this may correct overtime and if auction capacity becomes scarcer then we may see an uptick in CTP activity.

Are further reforms needed?

Reforms underway

A number of significant reform processes are underway, which have the potential to contribute to liquidity growth (see Appendix for a summary).

In particular, the COAG Energy Council is leading the development of a final regulatory impact statement on measures to improve transparency in the gas market and a final decision is expected by mid-2020.

This process follows on from the recommendations of the ACCC-GMRG joint report and the AEMC's Stage 2 Bulletin Board improvements.

Further reforms

We note that a number of regulatory changes to gas markets are still too recent to thoroughly assess their effectiveness and that others are yet to be implemented. As such the Commission considers it is too early to consider further major reforms.

This is reinforced by industry personnel constraints emerging in 2020 due to the COVID-19 pandemic.

However, a number of areas for improvement were suggested by stakeholders in surveys and interview, as noted in Chapter 4, which will be considered further in the final report.

The AEMC has not assessed the merits of these suggestions in this draft report.

Further stakeholders views are invited on these, or other areas for improvement, in submissions to the draft report.

CONTENTS

INTRODUCTION

CHAPTER 1

1. INTRODUCTION

1.1 Background

Recognising ongoing structural changes in the Australian gas market, the Council of Australian Governments Energy Council (the COAG Energy Council) established a set of principles in 2014, referred to as the COAG Energy Council's Vision (the Vision) for Australia's future gas market.

The COAG Energy Council's vision is for:

> *"…the establishment of a liquid wholesale gas market that provides market signals for investment and supply, where responses to those signals are facilitated by a supportive investment and regulatory environment, where trade is focused at a point that best serves the needs of participants, where an efficient reference price is established, and producers, consumers and trading markets are connected to infrastructure that enables participants the opportunity to readily trade between locations and arbitrage trading opportunities."*[4]

In order to achieve a road map for gas market development to allow the Vision to be met, the COAG Energy Council directed the Australian Energy Market Commission (AEMC or Commission) to conduct a review of the gas markets and gas transportation arrangements on the east coast of Australia (the East Coast Review).

In the East Coast Review the AEMC recommended, amongst other things, that the COAG Energy Council task it with reporting to Energy Ministers on a biennial basis on the growth in trading liquidity in the Australian wholesale gas and pipeline capacity trading markets.[5]

On 20 December 2017, the COAG Energy Council provided the AEMC with terms of reference to conduct that biennial review (the review).[6]

1.2 Scope of the review

The terms of reference provided by the COAG Energy Council requires the AEMC to:

- monitor changes in liquidity in the gas markets
- report on the effectiveness of reforms implemented
- identify the need for any further reforms, if appropriate.

The markets that should be examined as part of the biennial review include:

- the facilitated markets, which include the Gas Supply Hub (GSH), the Victorian Declared Wholesale Gas Market (DWGM), the Short Term Trading Market (STTM) and the secondary capacity trading market; and
- any other physical or financial markets that enable participants to trade gas, pipeline capacity or other related services, or to hedge risk, to the extent that information on these markets is publicly available.

These markets cover the wholesale gas and pipeline capacity trading markets on the east coast of Australia. Refer to the appendix for further background on each market.

The AEMC is also expected to monitor developments in the Northern Territory and Western Australia, where it is relevant to do so.

The terms of reference includes a more detailed description of the scope of the review and can be found on the project page.

2018 review

The COAG Energy Council recognised that a number of the reforms set out in the East Coast Review would not be in place when the first biennial review had to be completed. Therefore the first review conducted in 2018 was relatively narrow in scope and focused primarily on:

- the development of the methodology the AEMC would use to monitor the growth in liquidity over time and the information it requires to carry out this monitoring role
- establishing a baseline measure of liquidity that can be used in future reviews to assess the success of the reforms the COAG Energy Council has agreed to implement
- the growth in liquidity that has occurred in the Wallumbilla and Moomba GSHs and the effect that the introduction of Optional Hub Services at Wallumbilla has had on liquidity in this market.

Recent developments

Since the publication of the 2018 review, the capacity trading reforms developed by the Gas Market Reform Group (GMRG)[7] started operations in March 2019.

This included two new secondary capacity trading markets: a capacity trading platform (CTP) and the day-ahead auction (DAA).

Other reports

In addition, from August 2018, the Australian Energy Regulator (AER) started to publish the quantitative indicators developed for the biennial liquidity review on their industry statistics webpage.[8]

We also note that since April 2017 the Australian Competition and Consumer Commission (ACCC) has been directed by the Australian Government to conduct a wide-ranging inquiry into the supply and demand for natural gas in Australia. The ACCC publishes its findings twice a year.[9]

2020 Review

In addition to monitoring the growth in liquidity in each market, the terms of reference also requires the AEMC to consider and report on:

- the effectiveness of the reforms that the COAG Energy Council has agreed to make to the trading markets and whether the reforms are achieving their stated objectives
- the progress that is being made toward achieving the COAG Energy Council's Vision
- any further reforms required to achieve the COAG Energy Council's Vision and/or to otherwise promote the national gas objective (NGO).

This report provides an update on each of the reforms implemented or that are in the pipeline to be implemented around the gas markets in Australia (see Appendix).

We note that a number of changes are still too recent to thoroughly assess their effectiveness and that others are yet to be implemented. Where possible a preliminary assessment of effectiveness and progress towards objectives is provided.

1.3 Review process

In accordance with the terms of reference, the AEMC will publish three reports as part of this review:

- A scoping paper, outlining the approach proposed to be used by the Commission for this review, including the liquidity metrics and the methodology for determining those metrics. The paper was published on 30 January 2020 and we received three submissions, which are discussed in section 2.1. They are available at the AEMC website.
- This draft report, which contains draft results and findings.
- A final report containing the final liquidity metrics and if appropriate, recommendations.

The AEMC will provide the final report to the COAG Energy Council by 30 June 2020. Unless determined otherwise by the Council, the final report will be published on the day of the subsequent COAG Energy Council meeting.

In addition, the AEMC will work collaboratively with other bodies, including the Australian Energy Market Operator (AEMO), the AER and the ACCC.

1.4 Responding to this paper

The AEMC welcomes submissions on any issues related to this draft report, or more broadly, to the review.

The closing date for submissions is **14 May 2020**.

Please get in touch with the project team via our website if you would like to make a submission but have difficulty meeting the closing date due to the impacts of the COVID-19 pandemic.

Submissions should quote project number "GPR0007" and may be lodged online at www.aemc.gov.au

METHODOLOGY AND METRICS

CHAPTER 2

2 . METHODOLOGY AND METRICS

A liquid market is one in which market participants have access to products and can reliably make transactions in a timely way, at a cost-reflective price. We note that liquidity is a broader concept than gas volumes, as adding to the supply of gas may not necessarily result in more gas being traded between different parties.

In determining if liquidity exists in a market, four inter-related characteristics are often examined:[10]

- **Market depth:** where there are bids at different price points and no single buy or sell order is likely to move the market price excessively.

- **Immediacy:** the ability to trade large volumes in a short period of time.

- **Market breadth:** where a large number of bids to purchase and offers to sell are present in the market and small orders tend not to result in a change in price.

- **Resilience:** the ability of the market to recover towards its natural equilibrium after being exposed to a shock.

This review will measure liquidity based on these characteristics.[11]

For each of these characteristics, metrics are chosen that can measure whether that characteristic of liquidity is present on the east coast of Australia, in the wholesale gas and pipeline capacity trading markets (gas markets).

Table 3 provides an overview of the metrics the AEMC included in the analysis of liquidity in the gas market, based on the terms of reference.

The table includes both quantitative and qualitative metrics and provides information on which of the above four inter-related characteristic each metric addresses, how the metric will be constructed, and the expected trend in these metrics over time.

Where appropriate, indicative threshold values are also provided along with the underlying data.

Western Australia and Northern Territory

As noted earlier, the AEMC is also expected to monitor developments in the Northern Territory and Western Australia, where it is relevant to do so and where information is publicly available.

We note that there is very limited publicly available data and therefore limited reporting is possible on the quantitative metrics.

Hence for both jurisdictions the AEMC has more heavily relied on the qualitative survey results.

Table 3: Metrics to monitor liquidity in the gas markets

METRIC	CHARACTERISTIC	DESCRIPTION	TREND AND/OR THRESHOLD	UNDERLYING DATA
1. Traded volumes	Market breadth	Volume of trades in each market over the measurement period	Should be increasing	• Traded volumes
2. Churn rate	Immediacy	Ratio of all traded volumes to demand for the underlying physical product	Should be increasing	• Traded volumes • Throughput of the underlying physical product
3. Bid-offer spreads	Immediacy	The difference between prices on the bid and offer side of the market	Should be narrowing	• Bid prices • Offer prices
4. Number of active participants	Market depth, Market breadth	The number of participants that have actively traded in the markets and the breakdown of the types of participants (e.g. producers, retailers, industrial customers, physical or financial participants)	Increasing to a state where all market participants are actively trading on the facilitated markets	• Number of actively trading participants • Number of participants in each registered category
5. Concentration of trades amongst active participants	Market depth	The proportion of trades accounted for by individual participants	Should be decreasing	• Traded volumes by participant[12] • All traded volumes

Source: AEMC, *2020 Biennial review into liquidity in wholesale gas and pipeline trading markets*, scoping paper, 30 January 2020.

Table 3: Metrics to monitor liquidity in the gas markets

METRIC	CHARACTERISTIC	DESCRIPTION	TREND AND/OR THRESHOLD	UNDERLYING DATA
6. Number of trades per product	Market breadth	The number of traded transactions per product	Should be increasing	• Number of trades by product category
7. Range of products traded	Market breadth	The types of products available to trade, including bilateral products, over the counter products and exchange traded products	Should be increasing	• Types of bilateral or over the counter (OTC) products available • Traded volumes outside the facilitated markets
8. Trades conducted through the facilitated markets vs bilateral and OTC trades	Immediacy	The proportion of trades conducted through the facilitated markets versus trades conducted bilaterally or OTC (to the extent this information is publicly available)	An increasing share of trades through the facilitated markets	• Survey (qualitative)
9. Confidence of market participants	All characteristics	Survey-based measure of market participants' confidence in the trading market and any perceived impediments or barriers to using the markets vis-à-vis entering into bilateral trades	Participants should have increasing confidence and be more willing to engage in hub-based trading	• Survey (qualitative)
10. Market participants perception of future market developments	All characteristics	Survey-based measure of market participants' perceptions of the future state of the market and the potential for further growth in liquidity	Participants should expect more hub-based trading to occur	• Survey (qualitative)

2.1 Submissions to the scoping paper

The AEMC received three submissions to the scoping paper, which are available on our website.

Approach of this liquidity review

Powershop (Meridian Group) generally supported the AEMC's approach to reviewing liquidity, noting that sufficient liquidity facilitates the hedging of a retailer's exposures and promotes fair and representative prices for end consumers.[13]

Shell noted it is a strong supporter of the gas supply hubs, day-ahead auction and short-term capacity trading markets and that it is keen for facilitated trading to grow to increase price transparency, market liquidity and to encourage the development of forward markets.[14]

Facilitated markets v bilateral trading

A common view shared by stakeholders was that bilateral trading also has an important role.

Shell noted that bilateral trading enables the tailoring of products to customers.[15]

Powershop argued that the AEMC should avoid reviewing the individual markets and products (such as commodity and transportation) in isolation where possible, as it may provide an incorrect observation of how liquid the market is.[16]

APA noted that the distinction between markets and facilitated markets may be assumed but it is not explicitly reflected in the scoping paper.[17]

In addition, APA argued that in the context of the gas market those metrics for the facilitated market are in no way indicative of the functioning of the broader gas market and that AEMC should communicate this difference more clearly in future reports.[18]

Effectiveness of reforms / need for further reforms

APA and Shell shared similar views:

- APA strongly supported the AEMC's view that a number of changes are still too recent to thoroughly assess their effectiveness.[19]
- Shell cautioned against making further changes until sufficient time has been given to determine the effectiveness of reforms, and that any further reforms should consider pipeline development and economic regulatory frameworks.[20]

Others

Shell also questioned the role of this review in context of AER and ACCC work.[21]

QUANTITATIVE ASSESSMENT

CHAPTER 3

3. QUANTITATIVE ASSESSMENT

In this chapter we analyse each facilitated gas market separately, with all applicable metrics presented for such market and the relevant analysis.

The Commission is of the view that this will provide a better and more streamlined way to discuss our findings.

The chapter starts with a brief explanation of each of the metrics and how they are calculated. It then contains an assessment for each facilitated market:

- Wallumbilla Gas Supply Hub
- Moomba Gas Supply Hub
- Victorian Declared Wholesale Gas Market
- Short Term Trading Markets
- Day-Ahead Auction.

Explanation of quantitative metrics

Metric 1: Traded volumes

- Traded volumes are the amount of gas (or capacity) that is traded in a market at a location.
- This is expressed either as gigajoules (GJ), terajoules (TJ) or petajoules (PJ) depending on the size of the market under consideration.
- 1 TJ = 1,000 GJ
- 1 PJ = 1,000 TJ
- Higher traded volumes indicates a higher level of liquidity.

Metric 2: Churn rate

- The churn rate is a way of measuring the size of a forward or futures market to the size of the market for the underlying asset. In the case of the Gas Supply Hubs, the churn rate is a calculation of the size of the volumes traded at a hub relative to the total gas flows at that location.
- For example, a churn rate of 0.1 indicates that the volumes traded at the GSH in a period are 0.1 times the total gas flow at that location.
- A higher churn rate indicates a higher level of liquidity.

Explanation of quantitative metrics

Metric 3: Bid-offer spread

- The bid-offer spread is the difference between the highest bid (buy order) and lowest offer (sell order) for a particular product in a market and are expressed as a percentage, which makes it a consistent metric that can be compared even where price levels and price volatility are different across markets.
- A lower bid-offer spread indicates a higher level of liquidity.
- For this review the AEMC has removed the time-weighted dollar amount spreads and retained the percentage spreads. The Commission believes that the dollar spreads can provide a misleading picture by understating the true spread. For example, under the time-weighted methodology a $10/GJ offer and $5/GJ bid available as the lowest spread across the entire 8 hour trading window would yield a time-weighted amount equivalent to $5x8/24 = $1.67.

Metric 4: Number of active participants

- This liquidity metric is expressed through calculating the average yearly activity of registered participants belonging to certain categories. This average activity is calculated as the number of participants that are active in the market (for e.g. by submitting a non-zero quantity bid, an offer or a demand forecast) in each month. This is then averaged over the calendar year.
- In the STTMs 'retailers' refers to retailers who sub-allocate their gas to smaller retailers. 'Retailer/traders' are shippers who are usually retailers or traders who are involved in shipping gas. 'Retailer/industrial' market participants are normally retailers or industrial customers.

Explanation of quantitative metrics

Metric 5: Concentration of trades amongst active participants

- The Herfindahl-Hirschman index (HHI) is a commonly accepted measure of market concentration that is based on market share. The HHI measures the size of firms in relation to the industry.
- Higher HHI scores close to 10,000 indicate a highly concentrated, non-competitive market environment, while those closer to zero indicate a much more competitive market.
- The Australian Competition and Consumer Commission's (ACCC) Merger Guidelines indicate that an HHI above 2,000 is indicative of a concentrated market.

Metric 6: Number of trades per product

- This metric is a count of the number of unique trades per product. This information is useful in addition to volume metrics for assessing liquidity.
- A greater number of trades for a given volume can indicate higher liquidity. For example, five individual trades for 100 GJ indicates higher liquidity than one trade for 500 GJ.
- A higher number of trades per product indicates higher liquidity.

Wallumbilla Gas Supply Hub

3.1 Wallumbilla Gas Supply Hub

Overview

AEMO implemented a Gas Supply Hub (GSH) at Wallumbilla (Queensland) in March 2014, at the request of the COAG Energy Council.

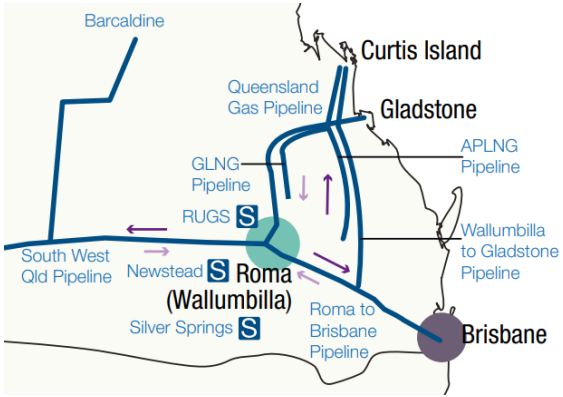
Three critical pipelines — South West Queensland, Roma to Brisbane, and Queensland Gas — along with several smaller transmission pipelines, connect with or near the hub.

The GSH, which is an exchange for the wholesale trading of natural gas, was introduced to enable improved wholesale trading for an east coast gas market affected by significant liquefied natural gas exports in Queensland.

Through an electronic platform, GSH participants can trade standardised, short-term physical gas products at each of the three foundation pipelines (Roma to Brisbane Pipeline, Queensland Gas Pipeline and South West Queensland Pipeline) connecting at Wallumbilla.

AEMO centrally settles transactions, manages prudential requirements and provides reports to assist participants in managing their portfolio and gas delivery obligations.

In March 2017 the three trading locations at Wallumbilla were replaced with a single Wallumbilla location, through what is known as the Optional Hub Services model. A single trading location at Wallumbilla improves market liquidity allowing trading participants across different pipelines to more easily trade with each other.



Source: AEMO

Source: AER, *2018 State of Energy Market report*, p. 181.

3.1 Wallumbilla Gas Supply Hub

Overall assessment of liquidity at the Wallumbilla GSH

The diversity of supply options, contract positions, and participants around Wallumbilla create a natural point of trade.

Liquidity has improved at the Wallumbilla GSH since the 2018 review. Volumes traded through the GSH continue to increase in both absolute terms and as a proportion of gas flow through the location. Bid-offer spreads across most products are declining.

However, there has been a trend towards bilateral trades (off-screen trades) as a proportion of total trades. While by itself this does not imply that liquidity is declining it does suggest that some participants prefer to trade bilaterally which may reduce opportunities to trade for some participants.

2019 was a record volume year for the GSH. Compared to 2018, traded volume increased by 9.6 PJ, an increase of 59 per cent.

The Commission notes that since the GSH is a voluntary hub, it does not represent the overall market in those regions.

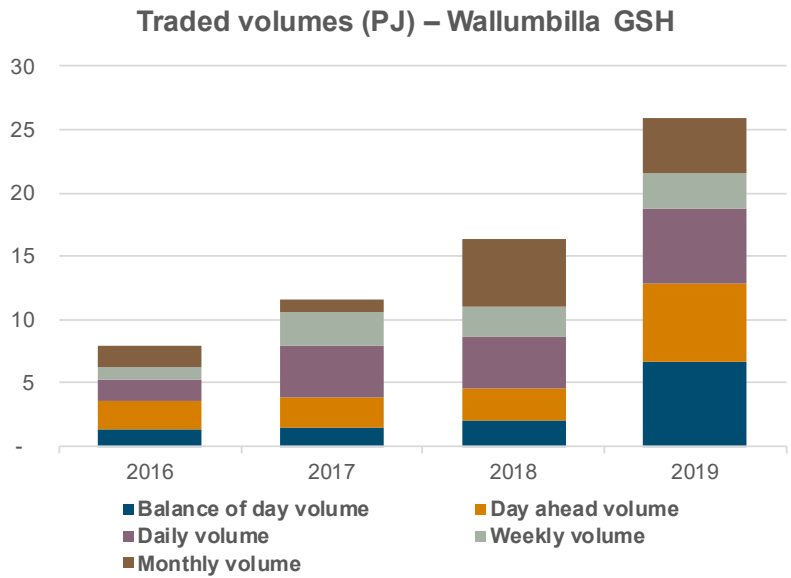
Table 4: Wallumbilla GSH liquidity metrics trends

METRIC	TREND FROM 2017 TO 2019
1. Traded volumes	Increase
2. Churn rate	Increase
3. Bid-offer spreads	Decrease
4. Number of active participants	Flat
5. Concentration of trade (buy side)	Decrease
5. Concentration of trade (sell side)	Decrease
6. Number of trades per product	Significant increase

Note: The metrics are indicators of the trend in the particular facilitated market, but should not be considered in isolation of other evidence. They are reflective of the products traded on the particular facilitated market and not necessarily overall liquidity in the gas market.

3.1 Wallumbilla Gas Supply Hub

Metric 1: Traded volumes



Traded volumes at the Wallumbilla GSH have steadily increased over the past two years.

Total trade in 2019 across all products was 2.2 times the total trade in 2017 and 59 per cent higher than in 2018.

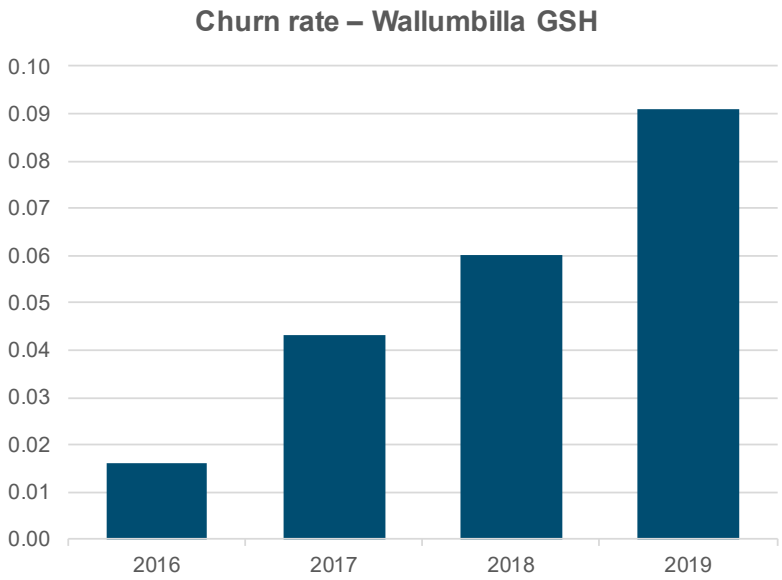
The greatest increase in traded volumes occurred in the balance of day, daily and day-ahead products.

This suggests that participants are increasingly using the hub for their short-term needs.

Across 2018 and 2019 total monthly volumes were also higher than 2016 and 2017.

3.1 Wallumbilla Gas Supply Hub

Metric 2: Churn rates



Churn rates are also increasing for the Wallumbilla hub with GSH traded volumes increasing in size relative to total gas flows at the Wallumbilla location.

This chart shows the average churn rate in each of the past four calendar years.

Due to the availability of data, churn rate calculations start from the fourth calendar quarter of 2016.

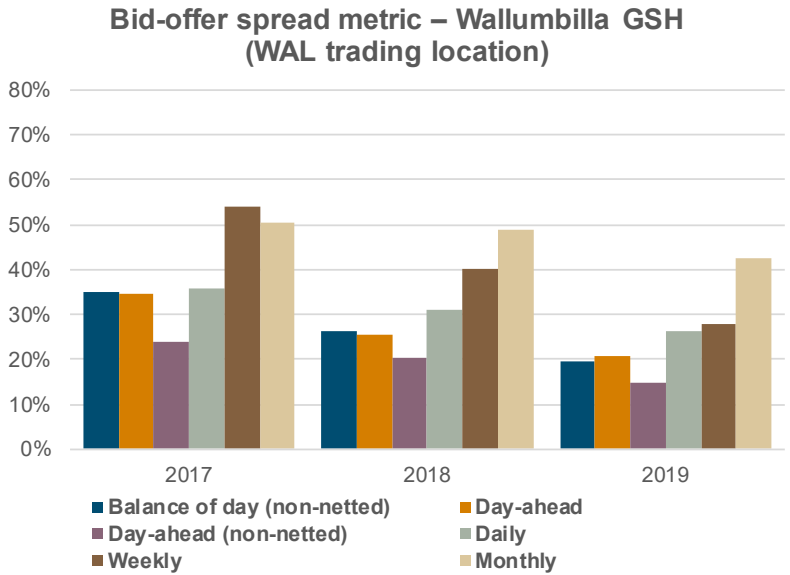
Trade at the Wallumbilla GSH has generally increased relative to total gas flow at the Wallumbilla location, averaging around 0.09 for 2019, up from 0.06 in 2018 and 0.04 in 2017.

The higher churn rate at the Wallumbilla GSH indicates that liquidity is increasing.

3.1 Wallumbilla Gas Supply Hub

Metric 3: Bid-offer spreads

Wallumbilla trading location (WAL)



Note: Non-netted products in the chart above refer to daily trades that are executed after 1pm, and therefore are excluded from the daily netting run.

The bid-offer spread metric shows the difference between offer prices and bid prices divided by bid prices.

This metric shows that the difference between bids and offers has declined since 2017.

The most significant reduction in bid-offer spreads has occurred across the shorter term products which are more frequently traded.

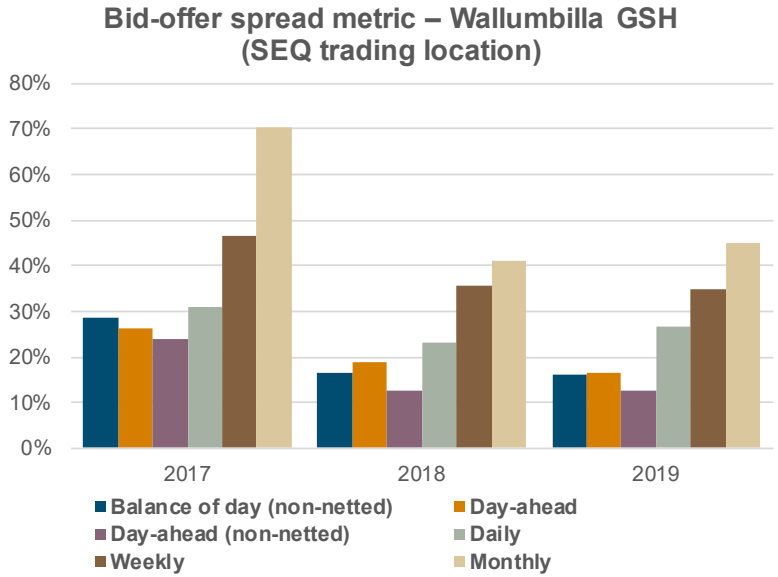
As expected, spreads on non-netted products are close to the spreads for the trades for the same products that are netted.

While spreads have been declining they remain high. The Commission notes that these spreads are for products within a particular market and do not imply that liquidity is low for the east coast markets more generally.

3.1 Wallumbilla Gas Supply Hub

Metric 3: Bid-offer spreads

South East Queensland (SEQ)



Note: Non-netted products in the chart above refer to daily trades that are executed after 1pm, and therefore are excluded from the daily netting run.

Along with the Wallumbilla product a separate South East Queensland (SEQ) product was established to allow virtual delivery within the Roma to Brisbane Pipeline.

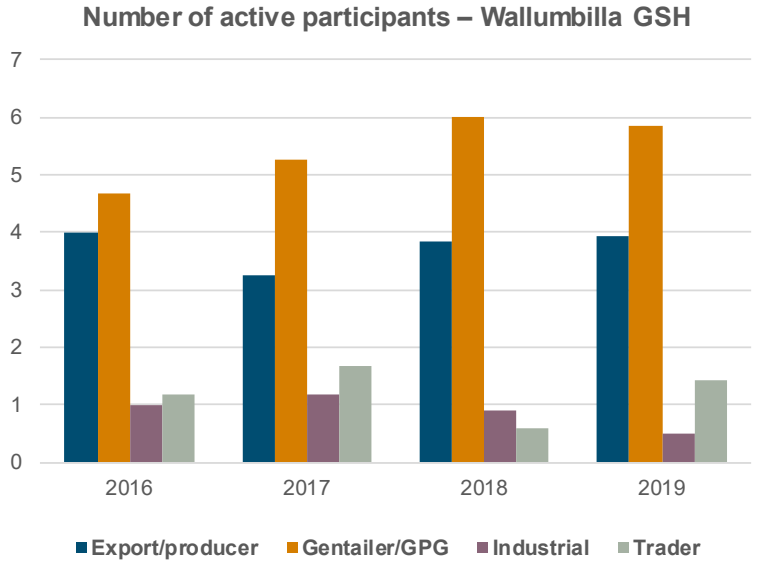
While bid-offer spreads have declined across all products, the spreads on the longer-term weekly and monthly products remain high at the SEQ trading location.

As expected, spreads on non-netted products are close to the spreads for the trades for the same products that are netted.

These metrics indicate that liquidity is improving at the SEQ trading location, particularly among the shorter-term products.

3.1 Wallumbilla Gas Supply Hub

Metric 4: Number of active participants



Note: The number of active participants is calculated as the number of unique trading participants on a monthly basis, averaged over each calendar year.

Active participation at the Wallumbilla GSH has remained largely steady over the past two years.

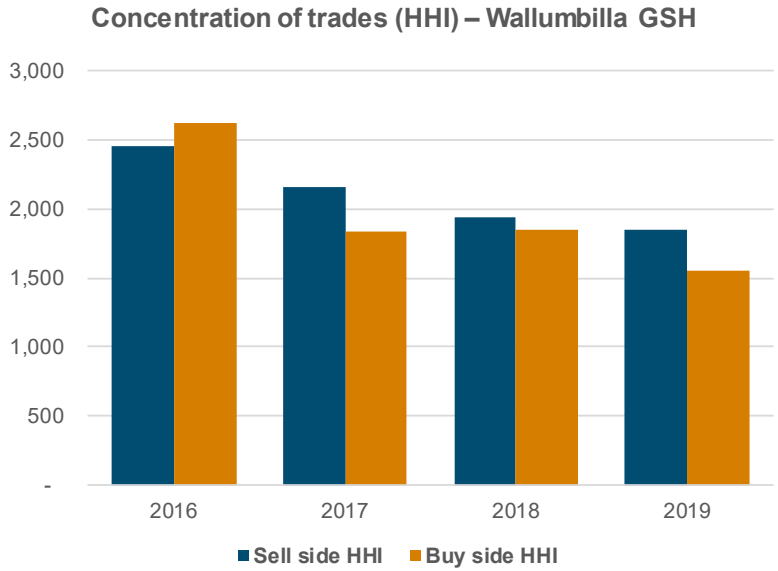
There were an average of 11.7 active participants per month in 2019.

Interviews with individual participants revealed that at least one participant de-registered from the Gas Supply Hub due to the related fees, considering it was not making use of it.

The ACCC also noted in its Gas Inquiry that some C&I customers are securing more of their gas supply through short-term markets (such as the STTMs).[22]

3.1 Wallumbilla Gas Supply Hub

Metric 5: Concentration of trades amongst active participants



The HHI including the buy and sell side has reduced at the Wallumbilla GSH from an average of 1,998 in 2017 to 1,703 in 2019.

In its Merger Guidelines, the ACCC considers that an HHI of over 2,000 indicates high concentration.

Despite the relatively low number of active participants at Wallumbilla, both sell and buy side market concentration were below 2,000 in 2019.[23]

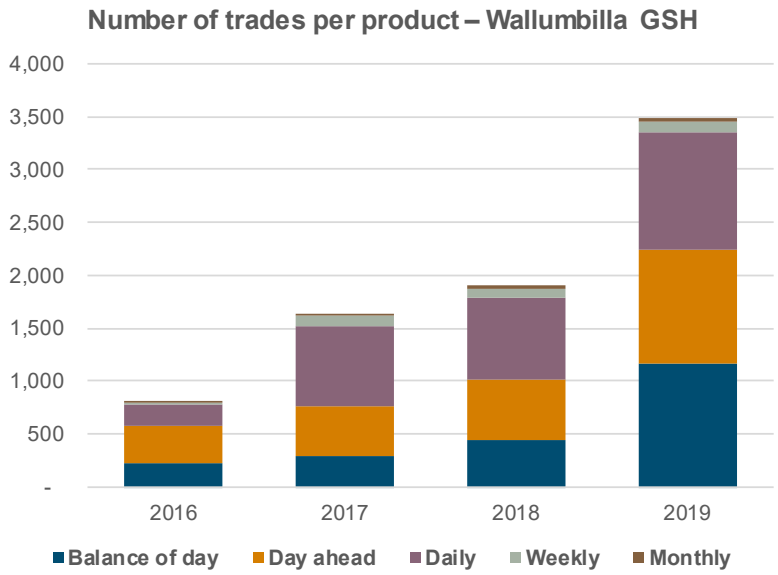
This indicates that trading is becoming less concentrated over time. Decreasing concentration on the GSH at Wallumbilla is a positive sign for liquidity in the market.

The Commission notes that the figures it calculated for each facilitated market relate to the concentration of those markets and those markets only.

Consequently, the HHI values should not be interpreted as indicators of market concentration in the entire gas market.

3.1 Wallumbilla Gas Supply Hub

Metric 6: Number of trades per product



The number of trades per product on the GSH at Wallumbilla has increased across most products since 2017.

Across all products the average number of trades per month increased year-on-year since 2016.

Trades in 2019 increased by 83 per cent compared with 2018.

This significant increase is driven by trade in the balance of day, day-ahead and daily products, suggesting that participants tend to use the GSH at Wallumbilla for their short-term needs.

This is also supported by the relatively few trades in the weekly and monthly products.

3.1 Wallumbilla Gas Supply Hub

On and off-screen trades

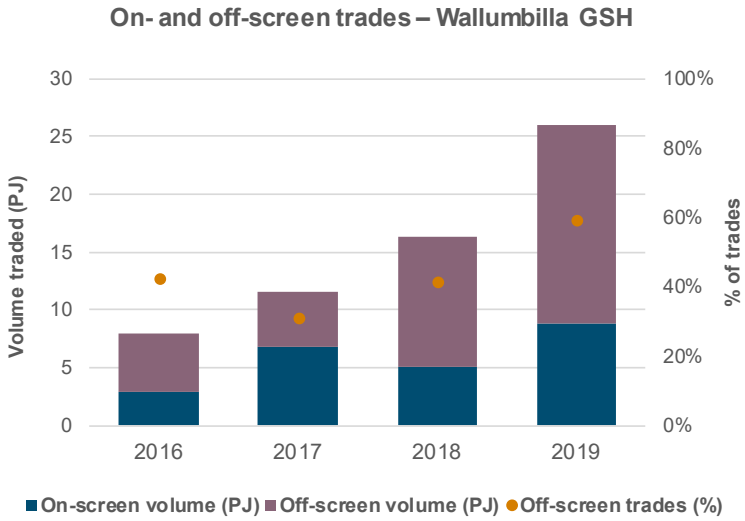
The reporting on the number of on and off-screen trades is not included in the terms of reference. The Commission has included it here as it is relevant to liquidity on the GSHs, but is not applicable to other facilitated gas markets.

Over the past two years the share of on- and off-screen trades has changed with a shift towards off-screen trades, where participants enter into bilateral agreements and just use the exchange to execute the trade.

In 2017, a greater quantity of gas was traded on-screen at 58 per cent of total gas traded. In 2019 on-screen trade fell to 34 per cent.

However, the shift towards off-screen trading is not necessarily a negative indicator for liquidity when considering the whole market. The downside of the increase in the number of off-screen trades means that there is less transparency on the trades executed and that the hub is not being used for price discovery.

There has also been a shift in the number of trades towards off-screen trading. However, the proportion of the number of trades conducted off-screen is lower than that for the gas volume traded. On average, off-screen trades are larger than on-screen trades.



Moomba Gas Supply Hub

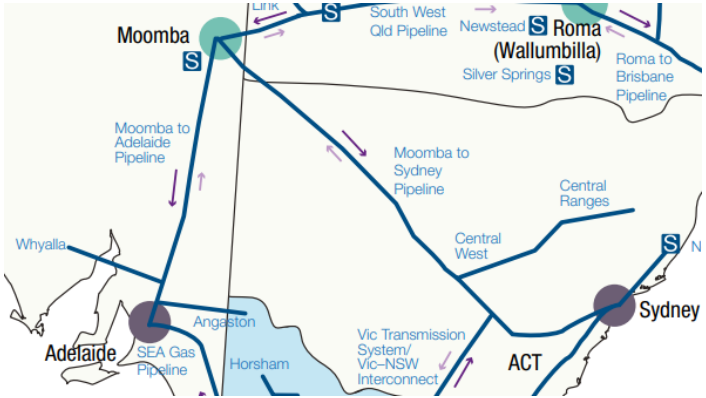
3.2 Moomba Gas Supply Hub

Overview

Established in June 2016, the Moomba Gas Supply Hub enables participants in southern markets to trade under the same market framework and rules as at Wallumbilla.

Similar to Wallumbilla, Moomba is a major junction in the gas supply chain serving eastern Australia.

It facilitates trade on the Moomba to Adelaide Pipeline (MAP) and the Moomba to Sydney Pipeline (MSP).



Source: AER, *2018 State of Energy Market report*, p. 181.

Market concentration

In this review we have not calculated the market concentration index HHI for the years prior to 2019.

There were very few trades in these years (two in 2017 and ten in 2018) so we consider that the HHI does not yet provide much liquidity information for that period.

The buy side HHI value for Moomba Gas Supply Hub in 2019 was 5,763 and the sell side HHI value was 5,881. This indicates a very high degree of market concentration.

3.2 Moomba Gas Supply Hub

Overall assessment of liquidity at the Moomba GSH

Trade at Moomba has been slow to develop. While there have been offers and bids for gas at Moomba, few transactions have occurred.

The first trade was executed on 18 September 2017 for 2TJ of gas.

In Q2 2019, AEMO recorded the first significant volumes traded at Moomba, reaching 1 PJ. This reflected increased participant interest in trading at that location, due to the introduction of the DAA on 1 March 2019.

This has resulted in greater access to pipeline capacity and we can observe participants purchasing both capacity and commodity on the Moomba to Sydney Pipeline.

This increase in trading has resulted in additional participants placing bids and offers at Moomba.

The Commission notes that off-screen trades (bilateral) seem to meet participant needs more (more bespoke), and in this case the hub value is not for price discovery but instead for trade execution.

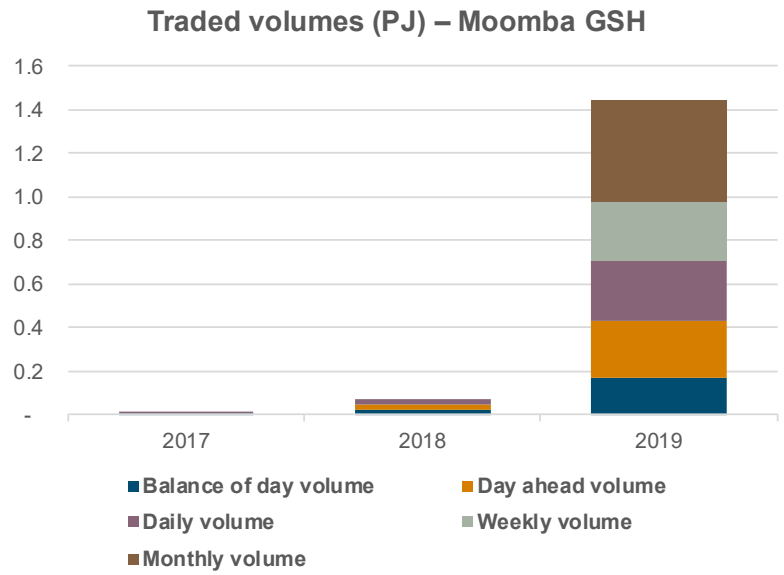
Table 5: Moomba GSH liquidity metrics trends

METRIC	TREND FROM 2017 TO 2019
1. Traded volumes	Increase ●
2. Churn rate	Increase ●
3. Bid-offer spreads	Decrease ●
4. Number of active participants	Increase ●
5. Concentration of trade (buy side)	n/a
5. Concentration of trade (sell side)	n/a
6. Number of trades per product	Increase ●

Note: The metrics are indicators of the trend in the particular facilitated market, but should not be considered in isolation of other evidence. They are reflective of the products traded on the particular facilitated market and not necessarily overall liquidity in the gas market.

3.2 Moomba Gas Supply Hub

Metric 1: Traded volumes



There were very few trades at the Moomba GSH until May 2019 when 755 TJ was traded, mainly in the monthly product (460 TJ).

There were no further trades in the monthly product for the rest of 2019. However, there was continued trade in the other products, at relatively modest levels.

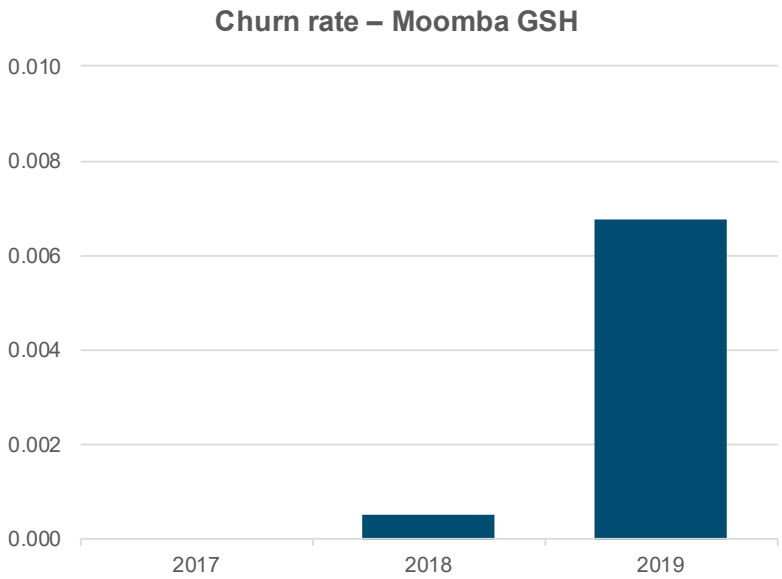
In its Quarterly Energy Dynamics for Q2 2019, AEMO noted that the increased trade from May 2019 reflected increased access to pipeline capacity following the introduction of the day-ahead auction in March 2019.[24]

The commencement of trading at the Moomba GSH indicates an improvement, however volumes remain low.

This has implications for the other metrics at the Moomba GSH as they are based on relatively few trades.

3.2 Moomba Gas Supply Hub

Metric 2: Churn rates



Due to a lack of trades in 2016, and the first two quarters of 2017, no churn rate could be calculated for the Moomba location for those quarters.

While traded quantity on the GSH has increased relative to 2018, it remains very small relative to total gas flows at Moomba.

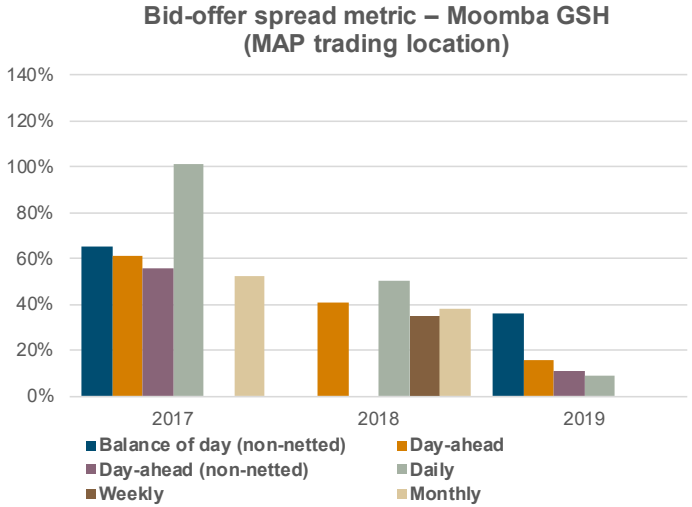
The churn rate at the Moomba GSH only exceeded 0.01 in Q2 2019.

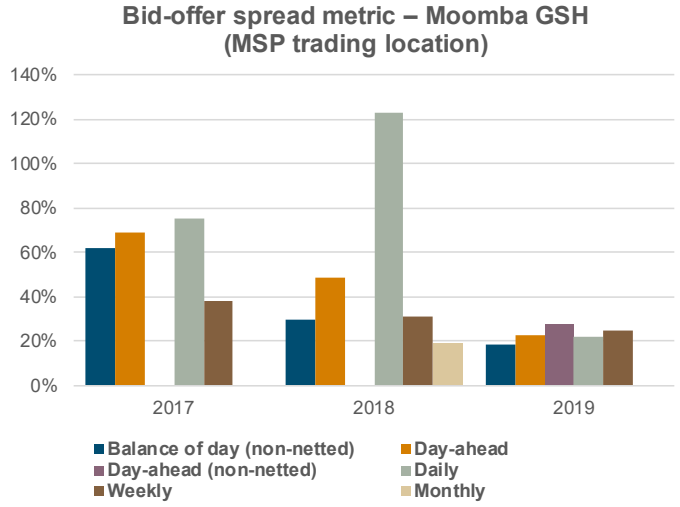
While one expects that more supply and participants should increase the churn rate, it will depend on whether participants consider exchange or bilateral products best meet their risk management needs.

3.2 Moomba Gas Supply Hub

Metric 3: Bid-offer spreads

Bid-offer spreads are calculated separately for the Moomba to Adelaide Pipeline and the Moomba to Sydney Pipeline trading locations. The Commission is of the view that it is too early in the emergence of activity at the Moomba GSH to determine whether bid-offer spreads are declining on the **MAP product.** There are some indications that the bid-offer spreads on the **MSP product** maybe declining, however no firm conclusions can be made at this stage due to the low levels of trade.

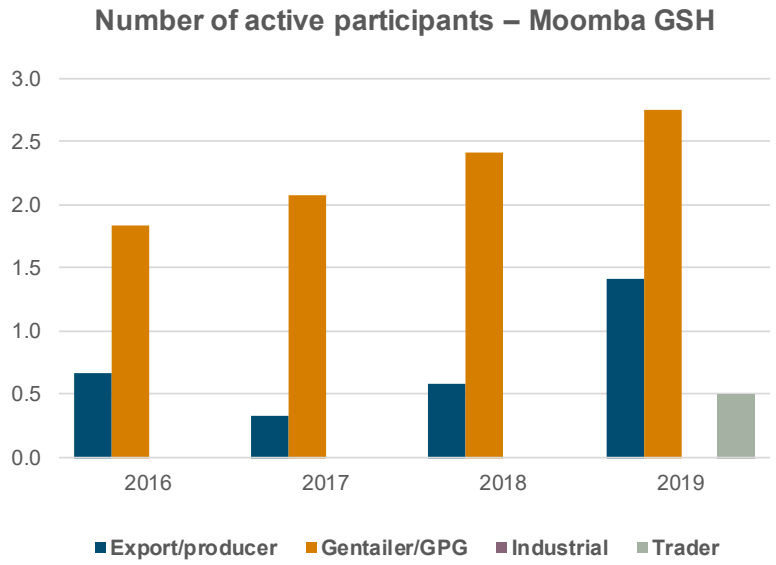




Note: Non-netted products in the charts above refer to daily trades that are executed after 1pm, and therefore are excluded from the daily netting run.

3.2 Moomba Gas Supply Hub

Metric 4: Number of active participants



Note: The number of active participants is calculated as the number of unique trading participants on a monthly basis, averaged over each calendar year.

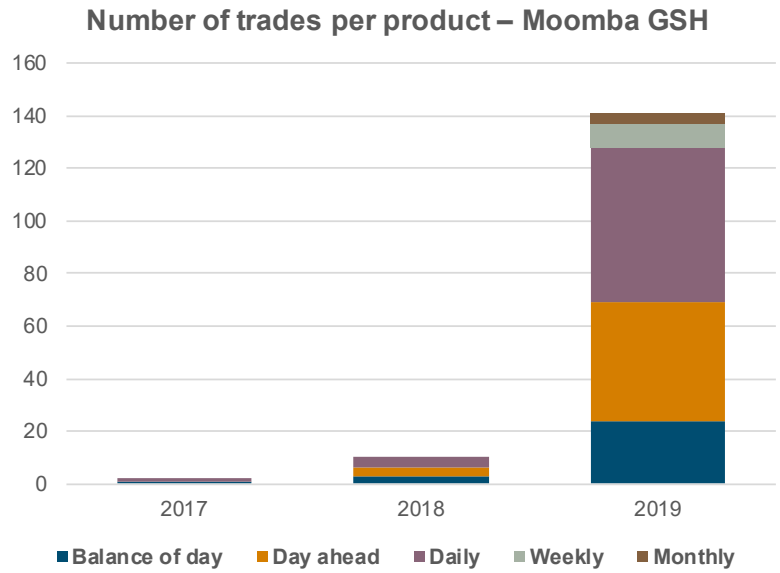
The number of active participants trading on the GSH at Moomba has increased since 2017 but remains low.

In 2019 there has been activity from a trader, which was not seen in the previous years.

The Commission notes that even though the first trade at the Moomba GSH was only executed in 2017, there were bids and offers being made by active participants, and that is why this is the only metric to include 2016 data for the Moomba GSH.

3.2 Moomba Gas Supply Hub

Metric 6: Number of trades per product



There were only two trades on the GSH at Moomba in 2017.

Significant trade began at Moomba in May 2019. As with the Wallumbilla GSH trade is focused in the daily products.

As noted earlier, this is a reflection of increased access to pipeline capacity following the introduction of the day-ahead auction in March 2019.

This indicates an improvement in liquidity at the Moomba GSH since 2017 but the level of trading remains low.

3.2 Moomba Gas Supply Hub

On and off-screen trades

Participants at the Moomba Gas Supply Hub have shown a preference for off-screen trading that is conducted on a bilateral basis between two participants.

While the overall increase in volume traded is a positive sign for liquidity at the Moomba Gas Supply Hub, the sharp increase in off-screen bilateral trades may limit opportunities for some participants to engage in beneficial trades on-screen.

Volume traded

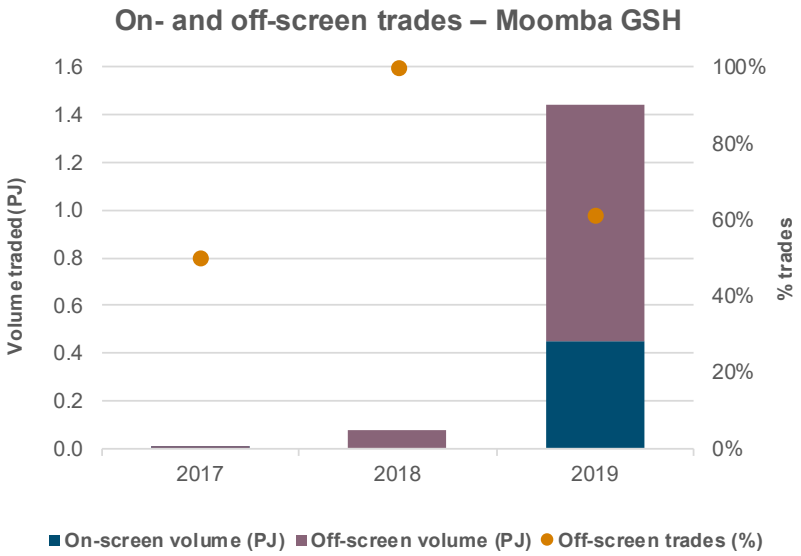
Most of the traded volumes conducted through the Moomba GSH have been off-screen.

This means that participants are trading bilaterally and using the exchange to execute their trades.

There have not been any on-screen trades at the Moomba GSH since August 2019.

Number of trades

Trading was very low prior to 2019 with only two trades in 2017 and 10 trades in 2018. Activity increased in 2019 with 54 on-screen trades and 85 off-screen trades.



Victorian Declared Wholesale Gas Market (DWGM)

3.3 Victorian Declared Wholesale Gas Market

Overview

Established in 1999, the DWGM is a compulsory facilitated gas market that uses a gross pool with an open access (known as market carriage) approach to access the transmission pipeline.

AEMO acts as the market and pipeline operator.

Source: AEMO, *Guide to Victorian Declared Wholesale Gas Market*, p. 6.

All scheduled gas must be offered to and bid from the market.

Otherwise, in the event of a pipeline constraint, the market operator (AEMO) would not have sufficient information to allocate capacity efficiently.

For each schedule, market participants put in bids/offers to buy/sell gas.

Based on these bids and offers and subject to pipeline capacity, AEMO's market clearing engines schedules injections and withdrawals of gas by minimising the cost of supplying the quantity of gas demanded and determines a price for gas.

This in turn provides direction to the operation of the transmission pipeline.

This model is similar to how the National Electricity Market (NEM) operates.

3.3 Victorian Declared Wholesale Gas Market

Overall assessment of liquidity in the DWGM

On average, around 34 participants were active in the Victorian market in 2019.

Net trade volumes are increasing as a proportion of total demand in the DWGM. In 2017 net trade volumes, which exclude self-trades, represented 8 per cent of total withdrawals in the DWGM. In 2019 this increased to 10 per cent.

It is worth noting that from 1 January 2019 Esso and BHP have separately marketed gas produced at Longford under the Gippsland Basin Joint Venture.[25]

Prior to this, gas was sold into the DWGM under one combined gas participant. This change has coincided with increased volumes supplied into the DWGM and Sydney STTM hub from Esso and BHP.

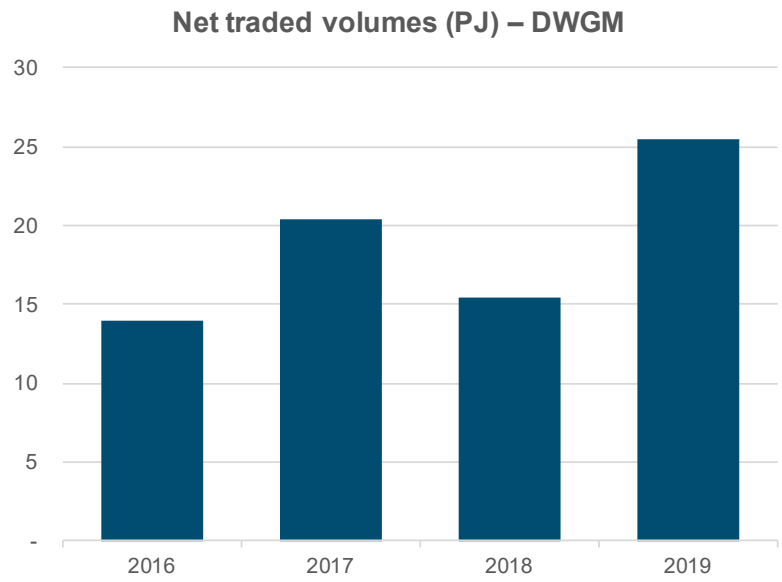
Table 6: DWGM liquidity metrics trends

METRIC	TREND FROM 2017 TO 2019
1. (Net) Traded volumes	Increase ●
2. Churn rate	n/a
3. Bid-offer spreads	n/a
4. Number of active participants	Significant increase ●
5. Concentration of trade (buy side)	Decrease ●
5. Concentration of trade (sell side)	Significant decrease ●
6. Number of trades per product	n/a

Note: The metrics are indicators of the trend in the particular facilitated market, but should not be considered in isolation of other evidence. They are reflective of the products traded on the particular facilitated market and not necessarily overall liquidity in the gas market.

3.3 Victorian Declared Wholesale Gas Market

Metric 1: Traded volumes



The Commission understands that a significant proportion of the volumes that are scheduled through the DWGM are "self-trades", that is, participants place bids and offers in the DWGM auction in order to accommodate previously arranged bilateral trades.

This is a reflection of the bilateral nature of the gas markets and a result of the current market structure.

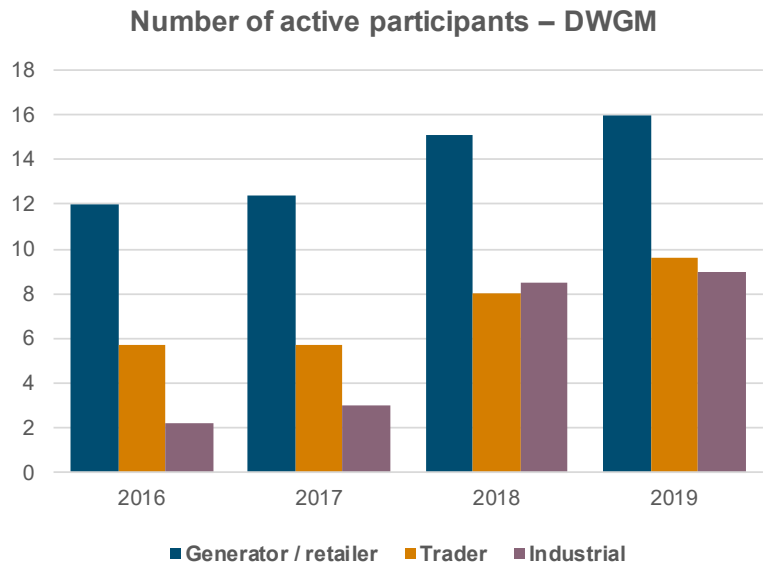
For this metric we have used 'net' traded volumes that exclude self-trades. This gives a better picture of liquidity in the market.

Net traded volumes in the DWGM shows an upward trend, but fell significantly between 2017 and 2018. In 2019 net traded volumes in the DWGM were around 25.5 PJ.

With total withdrawals in the DWGM of around 250 PJ per year, this represents around 10 per cent of the total volume traded in the DWGM.

3.3 Victorian Declared Wholesale Gas Market

Metric 4: Number of active participants



Note: Due to differences in market design, the participant categories in the DWGM are different from the STTMs and the GSHs.

The number of active participants is calculated as the number of unique trading participants (who have submitted a bid, an offer or a demand forecast for at least one schedule for a gas day) on a monthly basis, averaged over each calendar year.

There has been a steady increase in the number of active participants in the Victorian Declared Wholesale Gas Market.

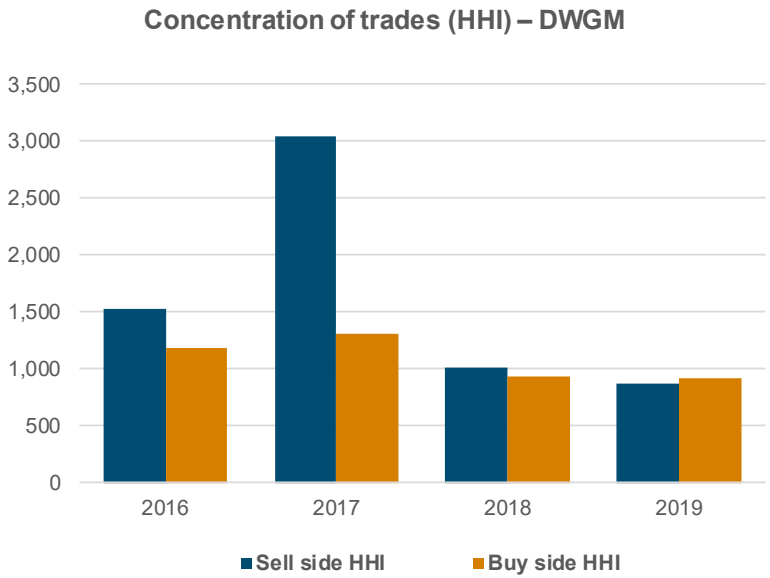
In 2019 there was an average of 16 generator/retailers per month compared with 12 in 2017.

The number of industrial participants increased sharply from 3 in 2017 to 9 in 2019. This reflects an increase in the number of industrial users participating directly in the DWGM instead of through a retailer.

There was a small increase in the number of traders between 2017 and 2019 from an average of 5.8 per month to 9.6 per month.

3.3 Victorian Declared Wholesale Gas Market

Metric 5: Concentration of trades amongst active participants (net traded volumes)



Market concentration decreased significantly on the DWGM sell side from 3,044 in 2017 to 879 in 2019.

It also had a moderate decrease on the buy side from 1,310 in 2017 to 926 in 2019.

Please note that this was calculated based on net traded volumes.

As noted earlier, from 1 January 2019 Esso and BHP have separately marketed gas produced at Longford, which may have contributed to the reduction on the sell side concentration of trades (which is a positive sign).

With the exception of the high sell side concentration for 2017, the DWGM remains one of the least concentrated wholesale gas markets on the east coast of Australia.

The DWGM is also the market that has been in operation the longest, compared to the STTMs and the GSH.

This, and the mandatory nature of the DWGM, may be factors leading to the lower levels of concentration in this market.

Short Term Trading Markets (STTMs)

3.4 Short Term Trading Markets

Overview

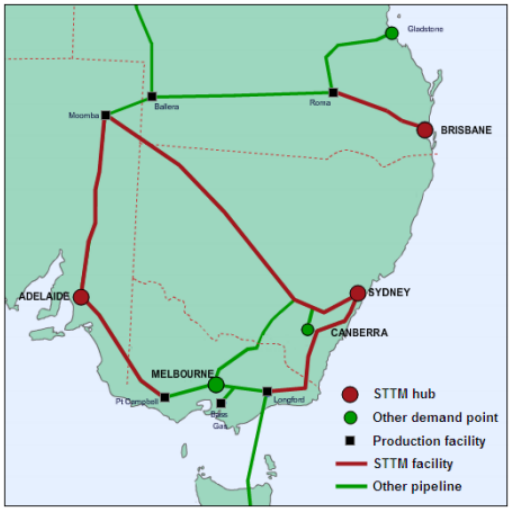
The STTM is a market-based wholesale gas balancing mechanism established at defined gas hubs in Sydney, Adelaide and Brisbane. Each hub is scheduled and settled separately, but all three operate under the same rules.

The Sydney and Adelaide STTMs have been in operation since 2010 and the Brisbane STTM since the end of 2011.

The market runs once a day, on a day-ahead basis, for each hub, and has a floor price of $0 per GJ and a cap of $400 per GJ. It uses bids, offers, and forecasts submitted by participants, and pipeline capacities, to determine schedules for deliveries from the pipelines which ship gas from producers to transmission users and the hubs.

Participants' daily transactions (scheduled trades and unscheduled deviations or variations) are settled at market prices and billed regularly (monthly).

AEMO operates the STTMs but does not operate the physical pipeline or network assets.



Source: AEMO, *Guide to Victorian DWGM*, p. 6.

3.4 Short Term Trading Markets

Overall assessment of liquidity in the STTMs

On average, around 31 participants were active at the Sydney hub in 2019. The Adelaide hub had 18 active participants and the Brisbane hub had 14 active participants.

Net traded volumes are up significantly at the Sydney trading hub, but at Brisbane and Adelaide they are around the same levels as 2016.

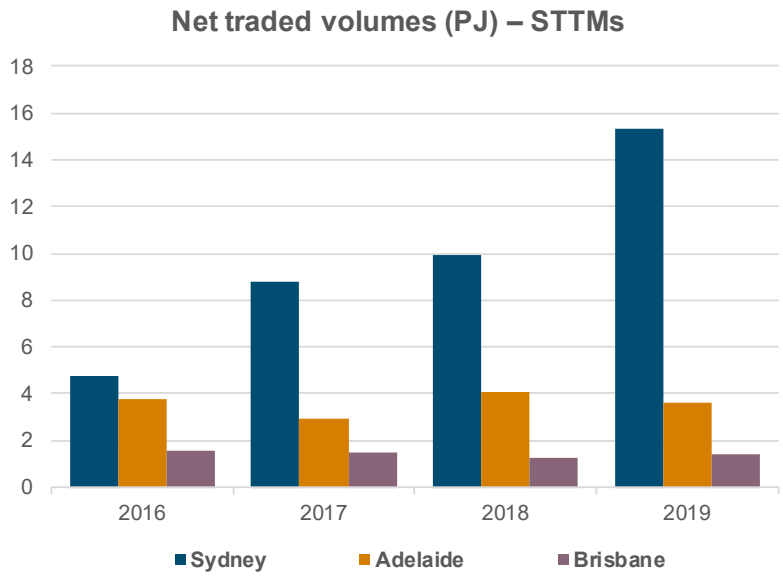
Table 7: STTMs liquidity metrics trends

METRIC	TREND FROM 2017 TO 2019		
	SYDNEY	ADELAIDE	BRISBANE
1. (Net) Traded volumes	Significant increase	Flat	Flat
2. Churn rate	n/a	n/a	n/a
3. Bid-offer spreads	n/a	n/a	n/a
4. Number of active participants	Significant increase	Significant increase	Significant increase
5. Concentration of trade (buy side)	Decrease	Flat	Decrease
5. Concentration of trade (sell side)	Decrease	Decrease	Flat
6. Number of trades per product	n/a	n/a	n/a

Note: The metrics are indicators of the trend in the particular facilitated market, but should not be considered in isolation of other evidence. They are reflective of the products traded on the particular facilitated market and not necessarily overall liquidity in the gas market.

3.4 Short Term Trading Markets

Metric 1: Traded volumes



Traded volumes for the STTMs are calculated separately for the Brisbane, Sydney and Adelaide locations.

As is the case in the DWGM, a significant proportion of the volumes that are scheduled through the STTMs are "self-trades", that is, participants place bids and offers in the STTM auction in order to accommodate previously arranged bilateral trades.

This is a reflection of the bilateral nature of the gas markets and a result of the current market structure.

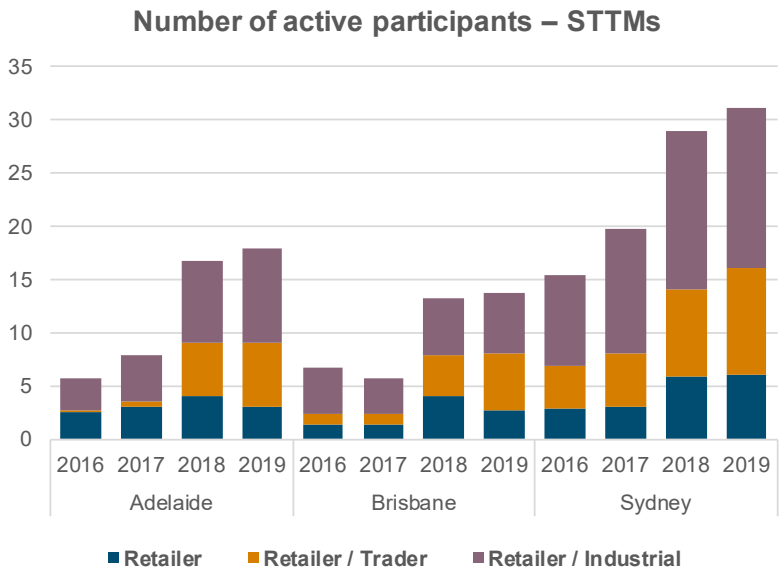
For this metric we have used 'net' traded volumes that exclude self-trades. This gives a better picture of liquidity in the market.

At the Sydney trading location net traded volumes are up significantly year on year, up 74 per cent from 2017 to 2019 to 15.3 PJ. The AER noted in its Wholesale markets Q4 2019 report that this increase is the result of upstream sellers shipping gas to the southern states.[26]

Net trading volumes at the Brisbane and Adelaide STTMs have fluctuated but are around the same levels as 2016.

3.4 Short Term Trading Markets

Metric 4: Number of active participants



Note: An explanation of the different market participant categories is provided in the explanation of metrics in page 36.
The number of active participants is calculated as the number of unique trading participants (who have submitted a bid, an offer or a demand forecast for at least one schedule for a gas day) on a monthly basis, averaged over each calendar year.

There has been a significant increase in the number of active participants in the **Adelaide STTM**. The number of retailer/trader and retailer/industrial market participants increased sharply. However, the number of retailers that sub-allocate to smaller retailers remained fairly flat.

In the **Brisbane STTM** there has also been a significant increase in the number of active participants across all market participant categories between 2017 and 2019. The largest increase was in the retailer/trader category which increased sharply from an average of 1 per month in 2017 to 5.3 in 2019.

Similarly in the **Sydney STTM** there has also been a significant increase in the number of active participants across all categories between 2017 and 2019.

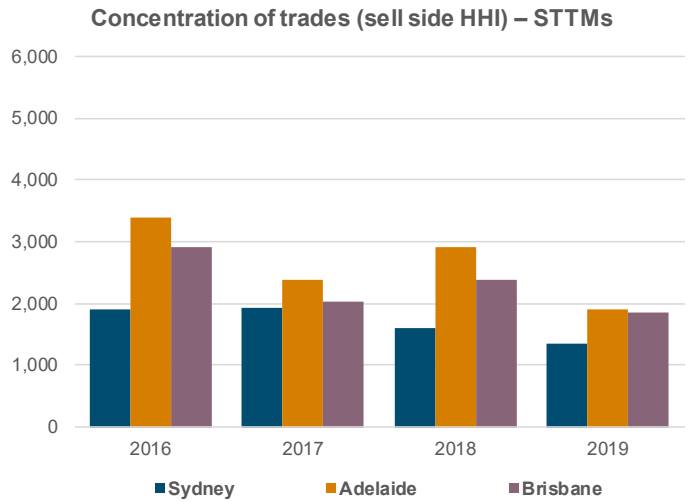
Increasing participation in the STTMs is a positive sign for liquidity.

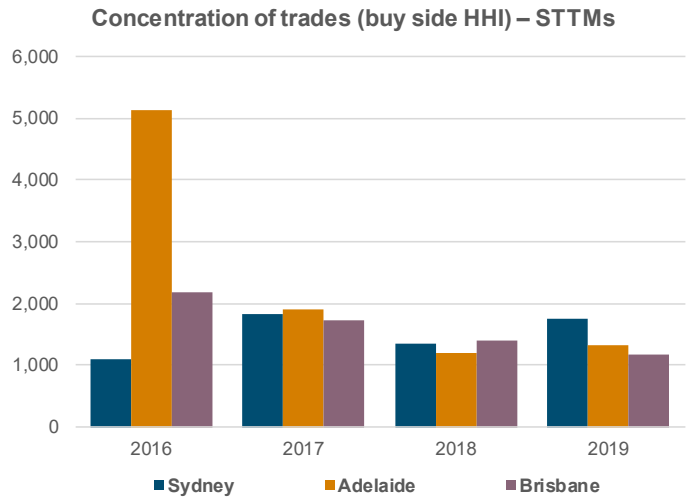
3.4 Short Term Trading Markets

Metric 5: Concentration of trades amongst active participants (net traded volumes)

Concentration on the sell side has decreased on all three STTMs when comparing 2017 and 2019, with the sell side HHI value now sitting below the 2,000 guideline. **Brisbane** saw the smallest reduction in concentration between 2017 and 2019 with an increase in 2018.

Buy side concentration reduced in the **Adelaide** and **Brisbane** STTMs from 2017 to 2019 with the HHI falling by 31 per cent in each market. However, the buy side HHI has remained quite steady in the **Sydney** STTM with a small reduction from 1,834 in 2017 to 1,758 in 2019. Please note that this was calculated based on net traded volumes.





Day-ahead auction

3.5 Day-ahead auction

Overview

The Day-Ahead Auction (DAA) is a centralised auction platform that provides the release of contracted but un-nominated transportation capacity on designated pipelines and compression facilities across eastern Australia.

The auction, facilitated by AEMO, enables transportation facility users to procure residual capacity on a day-ahead basis after nomination cut-off, with a zero reserve price and compressor fuel provided.

The DAA framework applies to all transmission pipelines with a nameplate rating of 10 TJ/day or more that are providing third party access and are used to service more than one shipper.

Participants may bid in to the DAA in order to procure the following services:

- forward haul pipeline services with products offered in both directions on bi-directional pipelines
- interruptible backhaul services
- stand-alone compression services (Moomba, Wallumbilla, Ballera, Iona).

The DAA has been operational since March 2019.

3.5 Day-ahead auction

Overall assessment of liquidity in the DAA

The data available from March to December 2019 show that there has been a significant amount of capacity purchased through the DAA. There are a small number of active participants, but this has grown throughout 2019.

The volume of capacity purchased at auction has mostly occurred in South West Queensland Pipeline and the Moomba to Sydney Pipeline, with transactions also occurring on several other pipelines. However, there are still many pipelines where there has not been a single transaction.

Stakeholders noted through the survey and interviews that the take up of the DAA has been much higher than anticipated.

APA, for example, forecasted that about 62 TJ/day of pipeline capacity would be traded through the DAA and CTP. However, it noted that the actual volumes to date are much higher than that. APA is due to review its charges from July 2020 to reflect updated expectations of traded volume.[27]

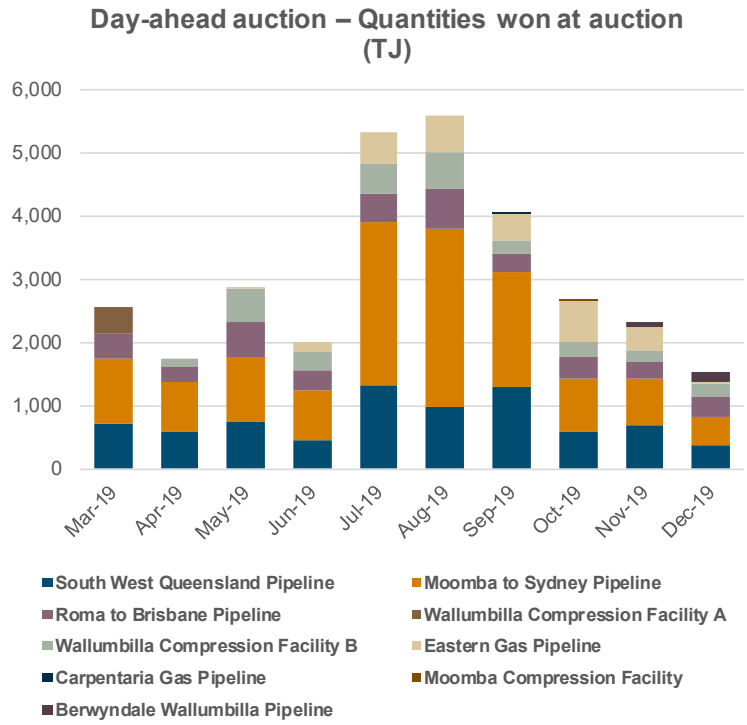
The ACCC found in there most recent gas inquiry report[28] that the DAA appears to have contributed to:

- greater volumes of gas being traded at the Wallumbilla and Moomba trading locations,
- an increase in the number of trades in the Wallumbilla-Moomba spread product (i.e. a swap product between Wallumbilla and Moomba), particularly during winter when the amount of capacity on the SWQP released into the DAA fell,
- a greater level of liquidity in the Sydney STTM and DWGM and a material increase in the net trade volume in these two markets.

The AER has noted in its Q3 2019 Wholesale Markets Quarterly Report that the DAA has resulted in lower prices in NSW and VIC as participants have acquired capacity to take advantage of price differences between Queensland and the southern states.[29]

3.5 Day-ahead auction

Metric 1: Traded volumes



Around 30.6 PJ of gas capacity have been purchased on the DAA since it was established in March 2019. This represents a significant amount of capacity.

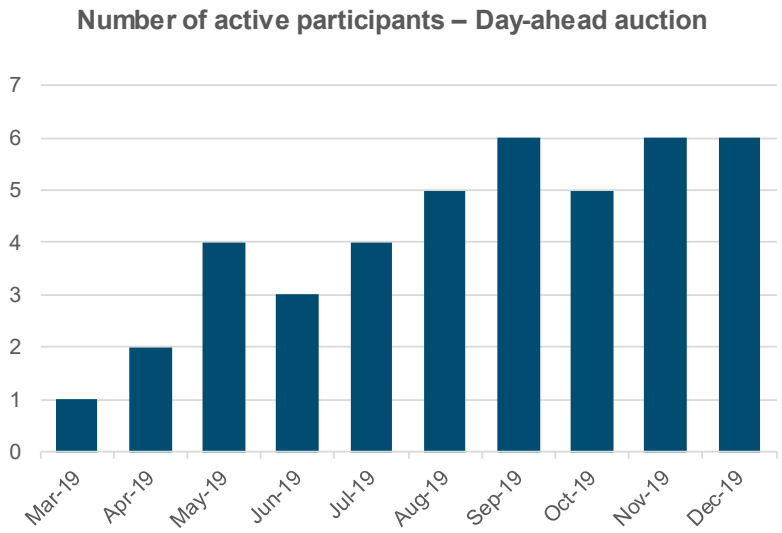
As a point of comparison, total residential and commercial gas demand in NSW was around 48 PJ in 2019.[30]

Much of the capacity purchased has been on the South West Queensland Pipeline and the Moomba to Sydney Pipeline.

This has followed a seasonal pattern with greater transactions occurring during winter when gas demand in Victoria is high.

3.5 Day-ahead auction

Metric 4: Number of active participants



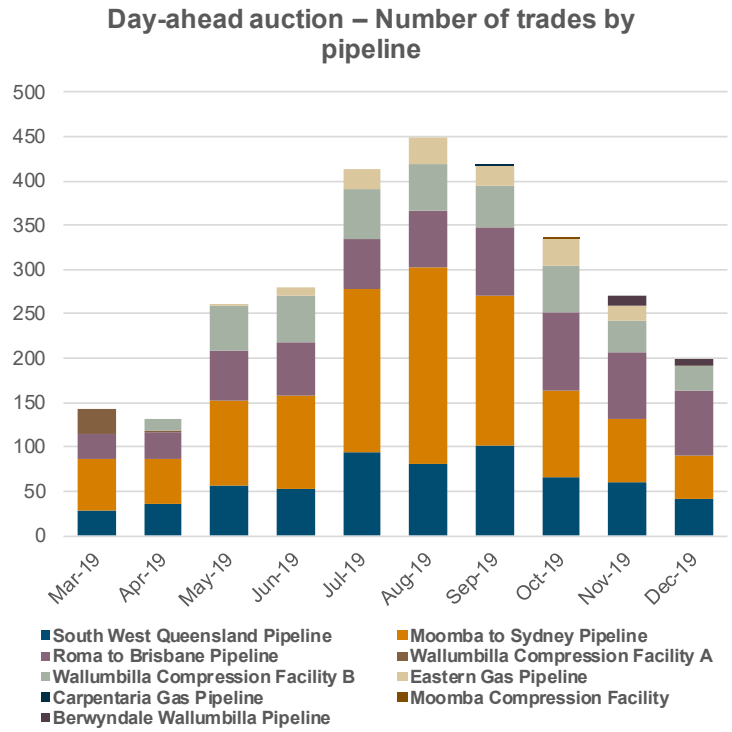
There has been a steady increase in the number of participants actively using the day-ahead auction since operations commenced in March 2019.

Sixteen organisations have registered to participate with eight taking part to date.

As of December 2019 there were six active participants.

3.5 Day-ahead auction

Metric 6: Number of trades per product



There has been a significant number of transactions through the DAA auction.

Activity in the first 10 months of operation has followed a seasonal pattern with a greater number of transactions in winter reflecting higher demand in southern states.

Much of the capacity purchased has been on the Moomba to Sydney Pipeline.

The pipelines most frequently transacted were:

- the Moomba to Sydney Pipeline (1,105 trades)
- the South West Queensland Pipeline (616 trades)
- Roma to Brisbane Pipeline (607 trades)
- the Wallumbilla Compressor facility A (390 trades).

Purchases in the Eastern Gas Pipeline began from late May 2019, and the Carpentaria Gas Pipeline had three transactions in September 2019.

Why the DAA has not been used in some pipelines?

While early indications are positive, the DAA is yet to be used on some key pipelines, as noted by the ACCC in its latest gas inquiry report.[31]

No auction capacity had been procured on any of the facilities below, as at 31 December 2019:

- South Australia: Moomba to Adelaide Pipeline System (MAPS), the PCA Pipeline, the South East South Australian (SESA) Pipeline, the South East Pipeline System (SEPS) and the Iona compression facility.
- Tasmania: the Tasmanian Gas Pipeline (TGP).
- Queensland: the Darling Downs Pipeline (DDP), the Queensland Gas Pipeline (QGP), the Roma Pipeline, the Wallumbilla Gas Pipeline (WGP), the Berwyndale to Wallumbilla Pipeline (BWP) and the Ballera compression facility.
- Victoria: the Vic Hub Pipeline and the Port Campbell to Iona Pipeline (PCI).

The ACCC has found the following factors could be behind the lack of trading in those facilities:[32]

a) The standardisation charges levied by some facility operators may be deterring shippers from entering into the contractual arrangements required to use the capacity procured through the DAA on these facilities.

b) The risk of the auction product being curtailed may be higher on some pipelines (or parts thereof), because of differences in the nature of demand.

c) Some facilities, such as the MAPS, are heavily utilised and, as a consequence, there may be limited auction capacity available in the locations shippers require it, or the risk of curtailment may be higher.

d) Users of some facilities may have contracted all of the capacity they require on a firm basis and may not be in a position to use additional capacity procured in the DAA.

In addition, the ACCC has found that on those pipelines where the standardisation charges are relatively high and there is a greater risk of curtailment, shippers may be using lower cost and lower risk options, such as procuring gas through an STTM or the DWGM, or entering into locational gas swaps.[33]

ACCC recommendation

To address concerns with charges, some stakeholders suggested to the ACCCC that facility operators reduce their fixed charges and/or that consideration be given to amending the cost recovery provisions in the National Gas Rules.

The ACCC recommended that this be examined, either as part of the AEMC's this liquidity review, or the COAG Energy Council's 2021 post implementation review of the reforms.[34]

This issue was not specifically raised with the AEMC through surveys and interviews.

Stakeholder views are invited on this issue in submissions to this draft report and the Commission will consider this further in the final report.

However, any changes to the National Gas Rules would need to be considered further through a dedicated process.

AER operational transportation service agreement compliance review

The AER published at the end of February 2020 the results of its *Operational transportation service agreement compliance review*, as required by rule 635 of the National Gas Rules.[35]

The standard operational transportation service agreements (OTSAs) support the operation of the CTP and the DAA.

The standardisation charging structures vary between transportation service providers, with some opting for fixed charges and others with a combination of fixed and variable charges.

The NGR does not prescribe a particular charging model but rather sets out high-level principles on how the charges should be structured.

The AER noted in its report that it was satisfied that there is nothing at this time to indicate a need for further investigation or enforcement action. In reaching this conclusion, the AER has taken into account the results of this review and the absence of complaints from shippers.

The AER's findings included:

- all the transportation service providers have published OTSAs and charges on their websites
- the standardisation costs reflect the incremental cost of establishing and maintaining the arrangements, and appear reasonable
- although the charging structures vary between transportation service providers, these are unlikely to represent a substantial barrier to secondary capacity trading
- the standard and facility specific agreements adopted by the transportation service providers comply with the NGR and do not appear to discriminate in favour of the primary shippers on the pipelines.[36]

3.6 Range of products traded

This sub-section summarises the range of products traded across the east coast gas markets, as requested by the terms of reference.

Gas Supply Hubs

The traded curve on the GSH stretches out to a maximum of three months into the future.

STTMs and DWGM

Both markets trade on a daily basis, therefore there is only one product.

Day-ahead auction

The day-ahead auction also sells capacity on a daily basis. However, the following services/products can be available:

- forward haul services with separate products offered in both directions on bidirectional pipelines
- compression services on stand-alone compression facilities
- backhaul services on single direction pipelines (or parts of pipelines)

In addition, the DAA framework applies to all transmission pipelines with a nameplate rating of 10 TJ/day or more that are providing third party access and are used to service more than one shipper.

Capacity trading platform

Even though there has only been 1 trade to date (which took place in February 2020), the following products can be sold on the CTP:

- firm forward haul services on transmission pipelines (with services offered in both directions if the pipeline is bi-directional)
- firm compression services on stand-alone compression facilities
- firm park (storage) services on those pipelines that offer this service.

OTC markets and bilateral trading

Feedback from the survey and interviews suggested the following products are traded bilaterally: locational and time swaps, physical index linked gas, long and short-term tolling transactions, and transactions linked to other commodities.

A description of these products is provided in table 12 in the Appendix.

OTC financial derivatives market

Stakeholders reported using a range of financial derivative products including swaps, caps, and options across the DWGM and STTMs, plus weather hedges and oil linked hedges.

A description of these products is also included in table 12 in the Appendix.

ASX gas futures

The ASX offers forward hedging contracts at the Wallumbilla Gas Supply Hub and the Victorian gas product.

There are two products offered under this market: quarterly products and yearly products (strips = 4 quarters).

The Victorian gas product is offered for up to two and a half years ahead, and the Wallumbilla GSH for up to four and a half years ahead.

QUALITATIVE ASSESSMENT

CHAPTER 4

4 . QUALITATIVE ASSESSMENT

The terms of reference require a qualitative assessment of participant confidence in the facilitated markets and participants perception of future market developments.

The AEMC has assessed this metrics via a survey of market participants and follow-up interviews.

A number of changes that may improve liquidity were suggested by stakeholders in surveys and interview.

This chapter notes these, but the AEMC has not assessed the merits of these suggestions in this draft report.

Further stakeholder views are invited on these, or other areas for improvement, in submissions to the draft report.

4.1 Methodology

The results presented here were obtained using a mix of multiple choice survey questions, open answer questions, and one on one interviews.

Australian gas industry participants were identified with a total of 93 approached to participate in the survey.

Responses were received from 26 participants. One on one interviews were then conducted with 20 participants.

The interviews were open discussions guided by a broad set of discussion points relevant to the particular interviewee.

4.2 Survey scope and questions

The qualitative assessment covered issues associated with all facilitated markets on the east coast, bilateral contracting, financial futures and derivative markets for gas.

The survey asked a total of 48 questions. 30 questions were specific to gas and pipeline capacity markets on the east coast, with the remainder applying to gas markets in Western Australia and the Northern Territory.

4.3 Survey distribution and interview participants

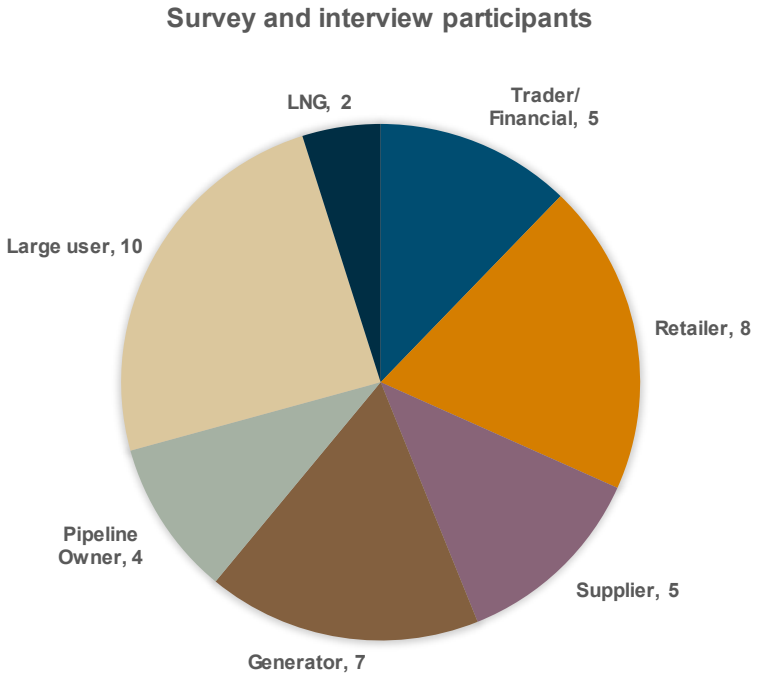
A wide range of market participants were approached in order to achieve a balanced response, including pipeline owners, end users, gas retailers, gas fired generators, traders and financial market participants, gas suppliers, and LNG exporters.

Comparison with 2018 results

The qualitative assessment conducted in this review includes all facilitated markets on the east coast as well as general market conditions in Western Australia and the Northern Territory.

By contrast, the 2018 review was limited to the Gas Supply Hubs with the qualitative assessment methods limited to interviews.

Therefore, results here can be viewed as a baseline from which future reviews can assess changes in participant confidence in Australian gas markets.



Note: One participant can be included in more than one category. Please refer to table 11 at the Appendix for a complete list of companies that participated in survey and/or interviews.

4.4 Experience participating in facilitated gas and pipeline capacity markets

The survey requested participants' views on their current experience of each facilitated market. Key findings for each market are summarised below.

Gas Supply Hubs

A significant number of stakeholders were positive about their experience trading on the Wallumbilla GSH. They cited the simplicity of on-screen trading and improving liquidity at Wallumbilla as positive aspects of their participation.

Stakeholders also provided a range of general reasons in support of the GSHs including their role increasing price transparency, market liquidity, and encouraging the development of a forward market to enable participants to better manage risk.

Survey responses however also identified a range of issues with the hubs. These included:

- low liquidity due to the voluntary nature of the hub
- low visibility of bids and offers due to registration and license fees
- no alignment of prudential requirements with other facilitated markets
- perceived issues with supply being less certain through the GSH than through the STTMs and DWGM.

Follow up interviews also uncovered a general lack of confidence in hub pricing especially in forward products due to the low number of trades and concerns about upstream market concentration.

Stakeholders were also concerned about the lack of transparency of alternative delivery points in on-screen hub trading.

Short Term Trading Markets (STTMs)

Survey results found high levels of stakeholder satisfaction with their experience trading in the STTMs in Sydney, Brisbane and Adelaide.

The STTMs were considered simple to use and had effective and appropriate mechanisms for managing costs and market operation. One trader noted the STTMs as being very end user friendly.

Follow up interviews confirmed survey findings. Interviewed stakeholders were satisfied in a range of areas including:

- the security of supply in the STTMs given its status as a compulsory market
- the role played by AEMO taking care of pipeline nominations in the STTM

Stakeholders indicated a high degree of confidence in STTM pricing, particularly in Sydney which has the highest liquidity of the three STTMs.

Victorian Declared Wholesale Gas Markets (DWGM)

Stakeholders were generally satisfied by their experience participating in the DWGM.

As a compulsory market, stakeholders identified the DWGM as the facilitated gas market with the highest level of liquidity and highest number of active participants.

However, stakeholders also noted the complexity of the DWGM and the lack of firm transport capacity as challenging issues. This issue was noted as increasing the risk of participating in the DWGM.

Follow up interviews found high levels of stakeholder satisfaction and confidence with DWGM pricing.

This level of confidence was observed to be high enough for the DWGM to support the trade of financial derivatives, including the trading of the ASX gas futures product.

Day-Ahead Auction (DAA)

Interview and survey responses reported a positive experience participating in the DAA.

While the DAA was noted as being in the early stages of development, with some participants still in a learning phase, the general view was that the DAA was a good initiative that would assist liquidity in the markets.

A number of participants reported success using the DAA to transport gas at low or zero cost, from Queensland to southern demand centres.

The DAA was considered primarily useful for sophisticated participants who were able to use it for short-term portfolio optimisation, although one end user also reported success using the auction.

While views were generally positive towards the DAA, interview and survey responses identified some issues including:

- a complex and bureaucratic registration process
- challenges given auction timing and closure of nominations in different markets
- the DAA not being a "firm" product.

Capacity Trading Platform (CTP)

Limited comment was received by stakeholders on their experience participating in the CTP, reflecting the lack of trades on the CTP to date.

One respondent reported having used the CTP once, with several others looking for opportunities to participate.

Despite extremely limited usage to date, a number of stakeholders noted their support for the mechanism in the longer term.

4.5 Satisfaction with current levels of liquidity and future expectations and intentions

This review assessed confidence in facilitated markets through stakeholder satisfaction with:

- current levels of liquidity
- expectations for liquidity growth, and
- intentions for future participation.

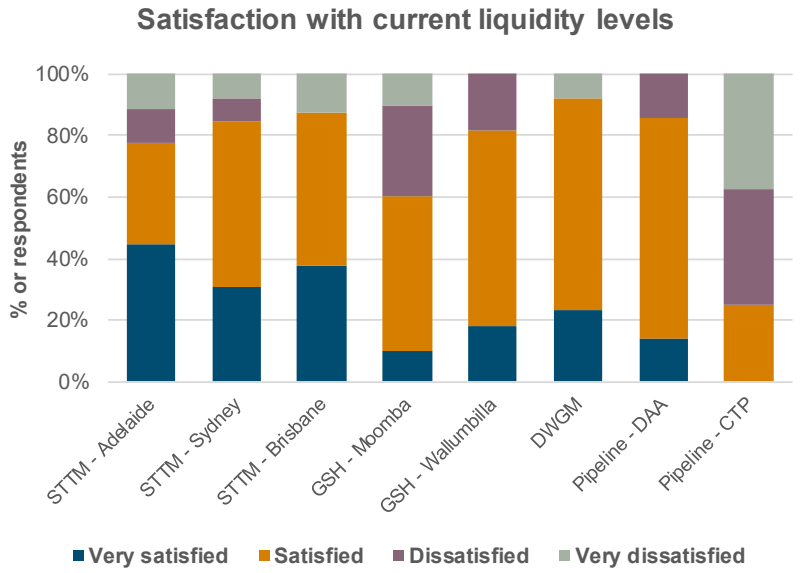
Taken together these three elements provide a view on overall stakeholder confidence in the facilitated markets. This section presents a summary of survey and interview results in each of these areas.

Satisfaction with current liquidity levels

The survey asked stakeholders to report on their satisfaction with current liquidity levels. The AEMC received 23 responses to this question.

Stakeholders reported being either satisfied or very satisfied with liquidity in the DWGM, STTM and the day-ahead auction of pipeline capacity.

Slightly lower levels of satisfaction were observed for the GSHs with much lower levels of satisfaction for the pipeline capacity trading platform.



Satisfaction with DWGM liquidity was high given it is gross pool, and has the most participants.

Liquidity in the Sydney STTM was noted to be maturing with lower levels of liquidity on the Adelaide and Brisbane STTMs.

Survey and interview responses noted that liquidity at Wallumbilla and Moomba were improving and a good level of satisfaction was reported for liquidity in the short-term products listed at Wallumbilla.

Stakeholders also noted the role of the DAA in improving liquidity at GSHs particularly Wallumbilla.

Levels of liquidity however remained below those required for stakeholder confidence that the Wallumbilla or Moomba hubs were representative of the overall market for gas in their regions.

Stakeholders particularly noted Wallumbilla forwards as illiquid and only going out three months. This lack of forward term and liquidity was considered to limit the value of Wallumbilla as a price benchmark.

One interviewee suggested it could be worth examining moving the Brisbane STTM to Wallumbilla to improve liquidity and value of the Wallumbilla hub.

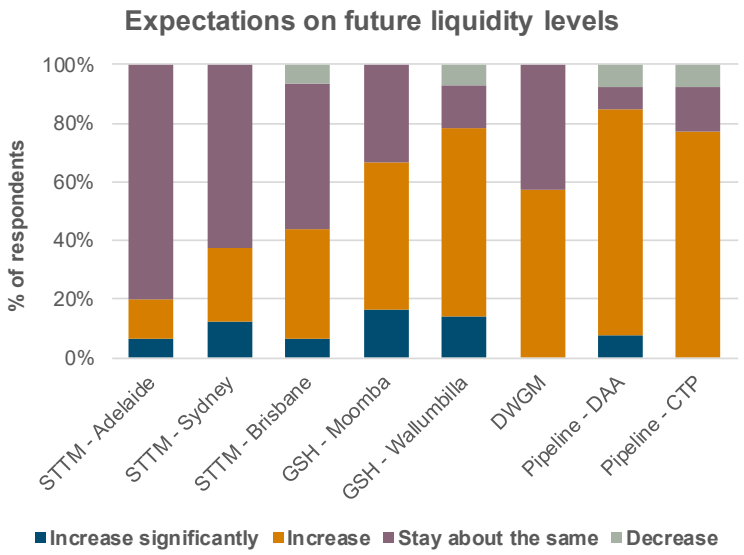
Moomba liquidity was considered to be low due to the limited number of participants at that hub, suppliers in particular.

Expectations on future liquidity levels

The survey also asked stakeholders whether they thought liquidity would increase or decrease in the next two years in each facilitated market. The AEMC received 23 responses to this question.

Survey results show that stakeholders are generally optimistic that liquidity would either increase or stay the same in each of the facilitated markets over the next two years.

In addition, a few stakeholders expected a significant increase in liquidity in most facilitated markets.



Stakeholders were less optimistic about the growth of liquidity in the compulsory markets (STTM/DWGM) than they were about the voluntary GSHs, which partly reflects the higher levels of satisfaction about the current levels of liquidity in DWGM and STTMs.

Stakeholders noted some general reasons why they expected liquidity to increase over the next two years across the different markets. These included:

- an increase in the number and diversity of market participants
- additional trading as market participants increase their in-house trading capabilities
- structural shifts in gas production as southern fields production decline.

These issues will be considered further in the coming section on drivers.

It is worth noting that while most stakeholders considered that liquidity in the DAA would continue to increase over the next two years, one respondent questioned the sustainability of this growth given the potential for a reduction in contracted pipeline capacity levels. This issue is discussed further in section 4.7.

Expected changes in participation and activity levels

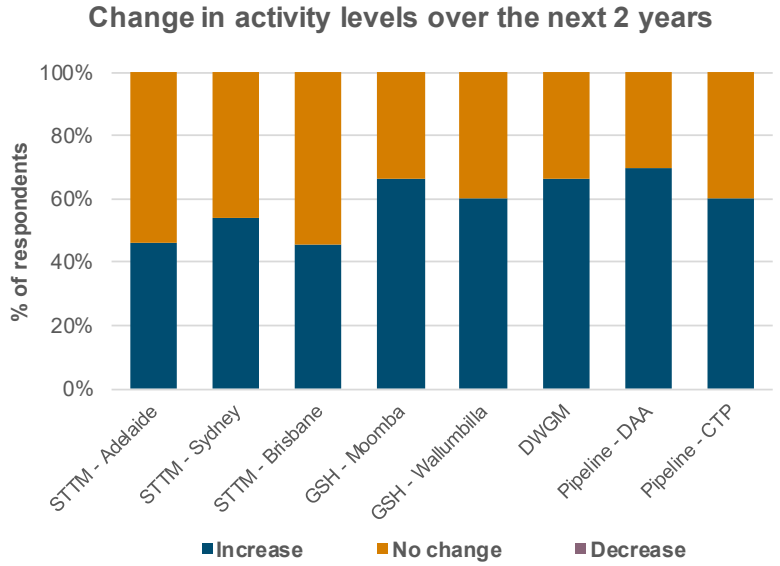
The survey asked stakeholders whether their activity levels in the facilitated markets were likely to increase, decrease, or remain at current levels over the next two years. The AEMC received 23 responses to this question.

All respondents indicated an intention to either increase or remain at current levels of activity over the next two years.

Reasons given for increasing participation included:

- anticipated increases in business activity
- end users seeking to reduce gas costs relative to what they would pay under retail contracts
- suppliers seeking to sell the output of newly developed gas fields, and
- managing take or pay contractual arrangements.

Growth in facilitated market liquidity also improves confidence for participants to increase their trading.



Increasing familiarity with the operation of the facilitated markets and in-house trading capability were also indicated by several stakeholders as reasons for increasing participation over the next two years.

4.6 Drivers and barriers to growth in facilitated market liquidity

Drivers for increased liquidity

To asses views on potential drivers of liquidity, the survey asked stakeholders to rank a list of 11 pre-identified drivers and to add any other drivers which were not listed. The AEMC received 23 responses to this question.

Stakeholders were firmly of the view that additional gas supply and more participants were required to drive liquidity in facilitated markets over the next two years.

In the interviews, some stakeholders also emphasised that an increase in physical supply on its own would not necessarily increase liquidity without a corresponding increase in the number of participants trading.

These comments reflected concern over concentration in the supply side of the market.

In the interviews, changes in the geographic production of gas were identified as a structural driver for additional liquidity over coming years.

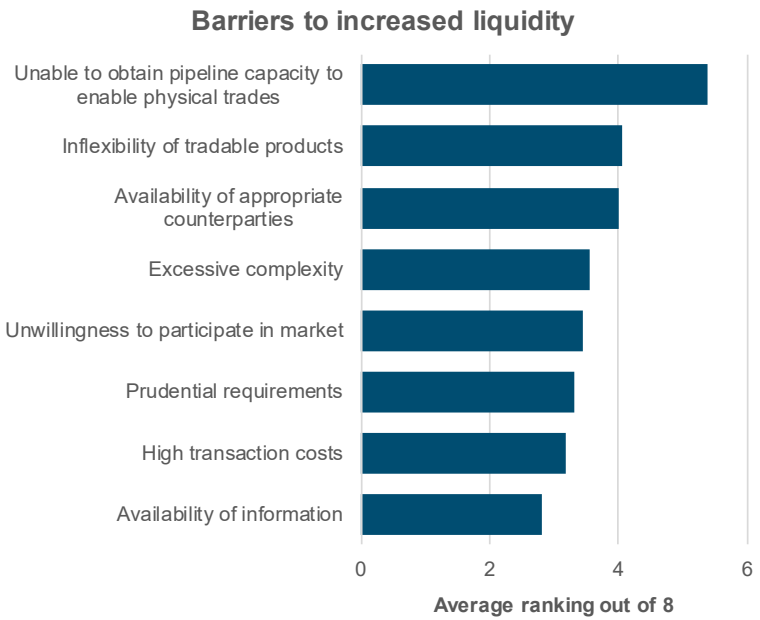
Stakeholders reported that, as southern fields decline, there will also be a decline in overall contracted levels in the DWGM and a need to procure more gas from Queensland.

Increased flows from north to south combined with more spot exposed trading in the DWGM were considered to be an additional driver of liquidity.

Stakeholders also considered further product development (such as the potential ASX financial-physical product at Wallumbilla discussed in section 4.9.1) as an additional driver of liquidity, particularly in forward trading.

Barriers to increased liquidity

The online survey asked respondents to rank their views from a list of eight pre-identified barriers.



Stakeholders ranked the inability to obtain pipeline capacity as the largest single barrier to liquidity in facilitated markets.

Through the one on one interviews, stakeholders made the following comments:

- Existing pipeline tariffs for short-term pipeline transportation or storage are too high and often make short-term trading activities commercially unviable.
- There is currently a limited number of delivery points available in the standardised products traded at the Gas Supply Hubs. Some stakeholders considered more points where participants can trade could improve liquidity by making on-screen facilitated market trading more attractive.

- Prudential requirements and registration fees were identified as a barrier, particularly by smaller participants. Of particular concern was the lack of alignment between the STTMs, DWGM, and GSHs each having different prudential requirements. Prudential requirements were also considered by some to require excessive working capital to make forward trades on the Gas Supply Hub thereby limiting liquidity in longer dated products.
- Cost and complexity of registration was also raised as a barrier. Fixed fees were noted to be a barrier to small participants trading on the Gas Supply Hubs. One respondent identified the fixed fees associated with registration on the hub had led them to de-register as their level of trading was insufficient to justify the ongoing fixed costs.

4.7 Effectiveness of pipeline capacity trading reforms

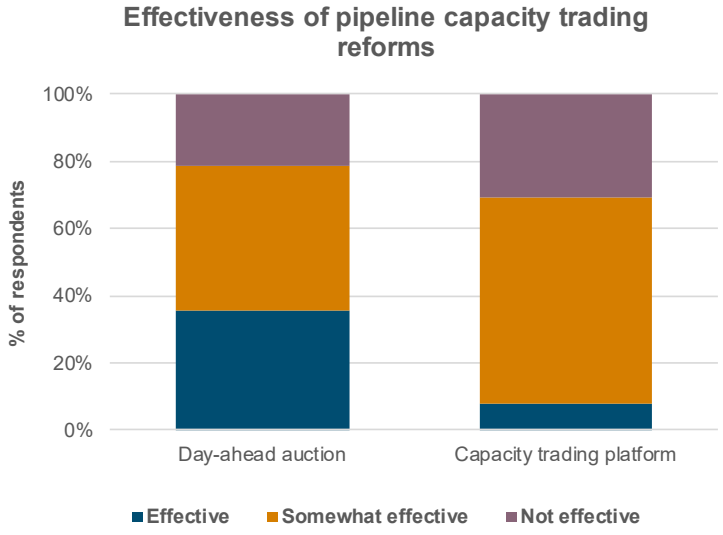
The terms of reference requires the AEMC to assess the effectiveness of recent reforms to the gas market.

As noted earlier, these have been in place since March 2019. Therefore, the survey asked whether stakeholders considered the pipeline capacity trading reforms (the DAA and the CTP) would, over the next two years, be effective at producing a liquid pipeline capacity trading market. The AEMC received 21 responses to this question.

The majority of stakeholders considered the capacity trading reforms would be either somewhat effective or very effective at creating a liquid market for pipeline capacity trading over the next two years.

Survey comments noted that the DAA has the potential to improve utilisation of pipeline capacity, limit the power of incumbent shippers holding onto large positions in the market, and provide access and the ability to ship gas to new and smaller participants.

Interviewees further considered the DAA to provide value by enhancing liquidity in other facilitated markets by allowing market participants to take advantage of short-term optimisation opportunities to move gas north/south.



Liquidity on the DAA was, however, noted as being very pipeline specific rather than a general phenomenon across the east coast.

One stakeholder noted that demand for capacity through the DAA was limited to those pipelines which were required to move gas from Wallumbilla to the southern markets.

A number of interviewees and survey respondents were concerned about the incentives created by the DAA and resulting consequences for pipeline capacity investment.

These stakeholders were concerned that the DAA creates incentives for stakeholders to reduce their pipeline contracting levels. One stakeholder was particularly concerned that pipeline investment may drop as the market shifts away from incumbent gas transportation agreements to greater use of the DAA.

While a number of stakeholders reported reconsidering their levels of pipeline capacity contracting in the future, given the opportunity to procure capacity through the DAA potentially at zero cost, others considered that de-contracting would be a flawed approach. These stakeholders noted that a reduction in contracted pipeline capacity would also reduce opportunities in the DAA as the auction only includes capacity that is contracted but un-nominated.

While the CTP was not considered a success to date, most stakeholders remained positive with some considering it too early to evaluate, with additional time required for the market to mature.

Drivers for and barriers to the development of liquidity in the pipeline capacity trading markets

Stakeholders were asked for their views on the drivers and barriers to the development of liquidity in the pipeline capacity trading markets.

Liquidity growth in the DAA and the CTP was noted to be closely connected to liquidity in the GSH with uptake of capacity trading opportunities being driven by demand for short-term trading opportunities in the hubs.

Day-ahead auction

Stakeholders considered a key driver for liquidity in the DAA would be more stakeholders engaging with the DAA as a means of reducing pipeline transport costs as existing gas transportation agreements expire.

However, this driver was also reported as a barrier to liquidity, as lower levels of contracted pipeline capacity would also reduce opportunity in the DAA as the auction is of contracted but un-nominated pipeline capacity.

Several participants also identified limits to the usefulness of the DAA for parties that required longer term firm access rights as DAA agreements were short-term and could be curtailed or re-nominated by the primary capacity owner.

Capacity trading platform

A number of barriers to growth in CTP liquidity were put forward by stakeholders. These include:

- the fixed fees associated with use of the platform
- existing shippers holding onto their contracted positions to keep their optionality
- the cheaper alternative of using the DAA and/or locational swaps, which has the advantage of avoiding paying for transport tariffs and AEMO admin fees
- seasonality of gas use, which limits the availability of counterparties willing to trade in the CTP. For example, shippers may have spare capacity to trade in the summer, but may find it hard to find a party willing to buy it as it is usually a season where there is excess capacity anyway.

OTC markets and bilateral trades

4.8 Bilateral physical contracting market

4.8.1 Overview

Bilateral gas contracts are conducted under Master Service Agreements (MSA) and involve terms and conditions that are negotiated between individual counterparties. This type of trade still constitutes the majority of trades.

There is little publicly available information on contract prices or terms. The ACCC has reported some information recently and noted the shift towards shorter term contracts in recent years. The ACCC reported in 2018 that recent contract offers for gas favoured durations of either one or two years.[37]

The AER has noted that there is a disparity between the type of information available to large participants that are frequently active in the market, and what is available to smaller players, with the imbalance favouring large incumbents in price negotiations.[38]

4.8.2 Qualitative assessment

The growth in facilitated markets has occurred alongside the continued use of long and short-term bilateral contracting.

The survey and interviews sought participant views on these bilateral markets and their interaction with liquidity in facilitated markets.

Stakeholders had the general view that facilitated markets and bilateral contracting worked together to meet participant needs.

Advantages for trading on facilitated markets relative to bilateral trading

The survey asked stakeholders about the advantages of trading in facilitated markets relative to bilateral contracting.

The survey requested stakeholder views on which, of a set of eight, factors made trading on facilitated markets attractive relative to bilateral contracting. The AEMC received 19 responses to this question.

Disadvantages of trading on facilitated markets relative to bilateral trading

Stakeholders were also asked about the disadvantages for trading on facilitated markets. The following were reported:

- the cost of trading on facilitated markets relative to bilateral contracting with a counterparty when a master service agreement is already in place
- the complexity and registration requirements associated with participating in facilitated markets
- the lack of product customisation – one stakeholder also considered product development in facilitated markets to be slow and not allow for bespoke product tenures/quantities
- the time intensive nature of participation in facilitated markets – participation was noted as being time consuming if required to constantly monitor offers/bids.

Liquidity on over the counter (bilateral) trades

While no public information is available to directly assess the levels of liquidity on over the counter trades, the survey and interviewed participants provided some anecdotal insights.

Bilateral contracting can occur between individual counterparties or be facilitated by third party brokers. One insight into bilateral contract liquidity was from stakeholders reporting an increase in the number of brokers entering the market to facilitate bilateral trades.

Whilst stakeholder comment was limited, interviewed participants indicated optimism about the future growth of liquidity in bilateral trading. One interviewee anticipated large gas volumes on the east coast will be traded in these markets over coming years.

A number of types of over the counter products were considered to be growing in liquidity, in particular, swap contracts to assist portfolio optimisation.

Locational swaps between two parties holding gas in different regions were noted as a popular means of avoiding pipeline charges.

Interviews also highlighted growth in longer dated bilateral products. Liquidity in bilateral trading markets was noted as having evolved from daily products to weekly and monthly products and longer term strips.

Interviews also indicated a number of barriers to increasing liquidity in bilateral contracting markets, including:

- internal mandates that limit the amount of bilateral trading a party can do under a master service agreement, and
- a lack of notional trade points across different pipelines. More notional pipeline trade points would enhance trading flexibility and lead to more bilateral market liquidity.

Financial markets

4.9 Liquidity and financial gas market

The terms of reference require the AEMC to evaluate the liquidity in financial gas markets.

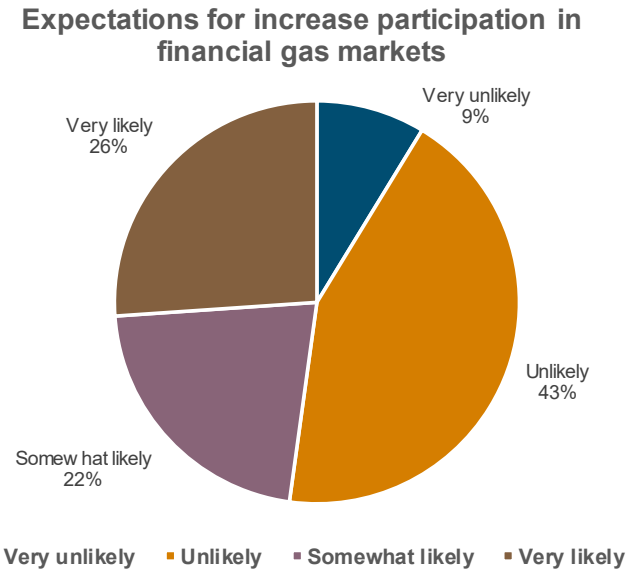
To achieve this, the survey and interviews sought information on participant use of financial products for gas, including the gas futures products listed at the Australian Stock Exchange (ASX) and the use of bilateral trades for derivatives.

Participation expectations

The majority of stakeholders considered it unlikely that they would increase their activities in financial gas products trading over the next two years.

Stakeholders noted that financial gas products were at an early stage of development and were generally positive that participation would grow as liquidity increases over time.

One stakeholder noted that the use of financial gas products would be a natural progression from the use of electricity derivatives and that some were still in a watching phase and assessing the opportunities in gas.



Some stakeholders considered that as more participants increase their reliance and exposure to facilitated markets, and their associated price volatility, their appetite for financial derivatives may also increase.

4.9.1 ASX gas futures

Overview

In addition to electricity futures contracts, the ASX offers forward hedging contracts for domestic gas at the Wallumbilla Gas Supply Hub and the Victorian DWGM.

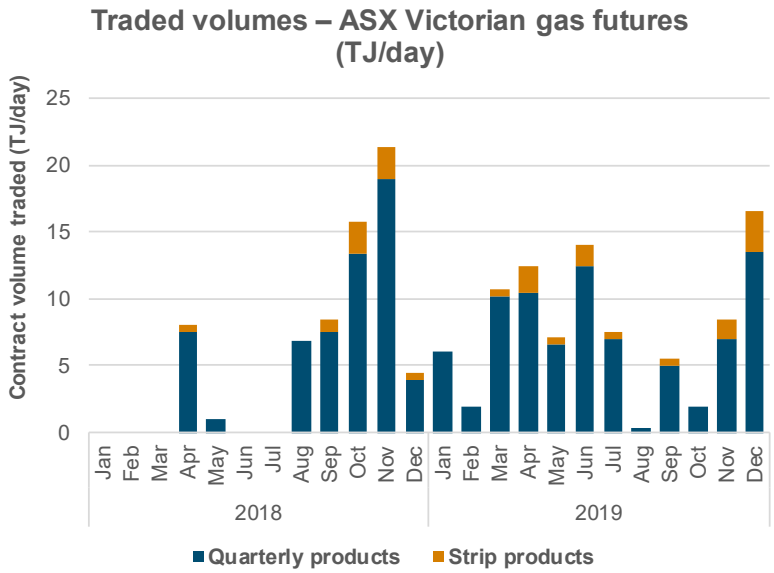
These are standardised and centrally cleared financial contracts structured as cash-settled contracts for difference (CFDs) against a relevant wholesale gas reference price.

- ASX Victorian Wholesale Gas Futures: this market was established in 2013. However, participants did not begin trading the ASX Victorian Wholesale Gas Futures until April 2018.
- Wallumbilla Gas Supply Hub Benchmark Price: this product was launched in April 2015, a year after the establishment of the GSH. The Wallumbilla end of day benchmark price is used as the reference price for ASX's new gas futures contracts.

4.9.1 ASX gas futures

Victorian gas product

Metric 1: Traded volumes



There are two products traded under this market: quarterly and yearly (strip) products. The DWGM product is offered for up to two and a half years ahead.

Historically, market participants have not used the ASX trading platform to hedge their future gas positions.

However, over 2018 there was a progressive increase in volumes traded for 2019 positions in the DWGM.

Most of the traded volumes are in quarterly products with average monthly trade in 2019 representing around 6.9 TJ/day of contracting gas.

The increased trade of ASX products is a positive indication of liquidity however volumes are small relative to the size of the market.

In 2019 total contracts traded were equal to around four per cent of the total gas traded in the DWGM.

4.9.1 ASX gas futures

Qualitative assessment

Stakeholders expressed mixed views about participating in the ASX gas market futures. While some considered liquidity in the ASX futures to be too low for their business needs, several noted liquidity to be growing and likely to continue growing over time.

Stakeholders indicated that ASX futures trading is attractive to those without MSAs in place for bilateral derivative trading.

ASX futures were also considered to be transparent and easy to trade. The lack of diversity in the product offering on the ASX was however identified as an issue for some stakeholders.

Trading in the ASX DWGM gas futures was noted to have increased in the last few years, enabled by increased levels of liquidity in the underlying DWGM and driven by an increase in the number of sellers willing to offer the product.

It was also reported that improvements to the Gas Bulletin Board had enhanced information transparency, providing market participants with more confidence to trade DWGM futures products.

In contrast, there has been no liquidity in the ASX product linked to the Wallumbilla GSH price. This lack of liquidity was attributed to a lack of confidence in pricing at Wallumbilla due to limited underlying market liquidity combined with concerns about high levels of upstream market concentration.

Stakeholders are aware that the ASX is investigating changes to existing products and introducing new products in response to market demand. These include a Sydney STTM futures product and a Wallumbilla GSH financial-physical delivery product, and moving the DWGM product from a quarterly to a monthly product.

Stakeholders were generally positive about these changes and considered the proposed financial-physical futures likely to improve forward curve transparency enhancing the value of Wallumbilla as a benchmark price.

4.9.2 Financial derivatives market

Overview

Financial derivatives for gas are bilaterally traded risk management tools. A range of intermediaries, including brokers, facilitate trading in these products which are executed under a master service agreement in a similar manner to physical bilateral contracts for gas.

Qualitative assessment

The survey asked stakeholders whether they participate in financial derivative markets (other than the ASX gas futures) and for feedback on their experience. Seven stakeholders confirmed their participation.

Stakeholders reported using a range of financial derivative products including swaps, caps, and options across the DWGM and STTMs, plus weather hedges and oil linked hedges.

Interviewees reported that liquidity in derivative markets has increased driven by the introduction of the AFMA's Cash Settled Gas Trading Addendum (AFMA addendum) in February 2018. The AFMA addendum provides a set of standard terms enabling market participants to trade more effectively.

Participant's views towards the use of derivatives were mixed. One advantage mentioned by stakeholders included flexibility to develop new products quickly to satisfy specific needs.

The flexibility and speed at which new products can be developed was referred to by one participant as providing a 'market incubator' for developing standardised financial products such as those traded on ASX futures markets.

On the other hand, several end users considered physical and gas storage positions to be preferable to financial derivatives. The lack of transparency was also noted as an issue.

Another barrier to the development of liquidity is the requirement for an Australian Financial Services License to trade gas derivates. It was noted that many market participants do not hold such license.

Western Australia

4.10 WESTERN AUSTRALIA

4.10.1 Overview

Western Australia has substantial gas resources, with supply from the North West Shelf piped to demand centres located in the South West of the state through the Dampier to Bunbury pipeline (DBP) and Kalgoorlie through the Goldfields pipeline (GFP).

Source: WA Gas Bulletin Board

According to AEMO's 2019 WA Gas Statement of Opportunities, the WA domestic gas market is characterised by:

- bilateral, confidential, long-term take-or-pay gas sales contracts
- residential, commercial, and small industrial consumers comprising a small proportion of total demand
- a small number of transmission pipelines, interconnectors, and limited surplus pipeline capacity
- small volumes of short-term and spot gas sales
- limited transparency into the state of the market, such as the availability of new supply or potential buyers.[39]

WA has the highest domestic natural gas consumption of all Australian states, despite its relatively small population. WA consumed 644 PJ of gas in 2017-18, approximately 41 per cent of Australia's total domestic gas consumption.[40]

Large customers are supplied directly through the transmission network (such as the Dampier Bunbury Pipeline and the Goldfields Gas Pipeline).

Some smaller remote customers are supplied by domestic LNG facilities, which convert natural gas to LNG that is then transported by road.

Based on WA Gas Bulletin Board data, in 2018-19, large customers accounted for 86 per cent of gas used in WA, the majority of which was consumed in the minerals processing (32 per cent of large customer use), mining (27 per cent), and electricity generation (27 per cent) sectors.[41]

There is currently no AEMO facilitated market in Western Australia with trading occurring either bilaterally or through two private market platforms Energy Access[42] and Gas Trading Australia.[43]

4.10.2 Qualitative assessment

To assess circumstances in the Western Australian market, the survey asked questions on:

- satisfaction with levels of liquidity and the ease of trading in WA gas and pipeline capacity markets
- barriers to the development of gas and pipeline capacity market liquidity, and
- expectations of future liquidity.

Ten stakeholders with a role in the WA market provided responses to the survey questions with key views summarised in the following slides.

Satisfaction with liquidity levels and the ease of trading in WA gas and pipeline capacity markets

Stakeholders were positive about liquidity in wholesale gas and pipeline capacity markets in WA.

Effective trading opportunity was considered available bilaterally or using the two private spot market platforms.

Stakeholders commented that a significant number of gas suppliers are seeking to sell gas and pipeline capacity is available to ship the gas to demand centres.

One interviewee illustrated the current supply and demand situation by observing that prices currently available on WA's spot market trading platforms are below those available on contract markets.

One stakeholder commented on how the WA gas market is closely interlinked with the electricity market, that is, the market design in the electricity market has a direct implication in the gas market.

The reserve capacity mechanism in place in WA, means that generators that participate in that mechanism need to have both supply (gas) and firm transportation (pipeline capacity) contracts in place for at least the capacity year they are applying to receive capacity credits.[44]

Because these generators are not always running to their full contracted capacity, it implies that much of the gas and the transportation capacity that is contracted is actually available for trading in the short-term.

Therefore, there is a portion of users in the WA gas market that makes use of such short-term gas and capacity to fulfil their needs.

For reference, 66% of the electricity generation fleet capacity is made up by gas powered generation in WA, whereas around 41% of the electricity is generated by gas powered generators.[45]

Satisfaction with current liquidity levels in WA

The survey asked how satisfied stakeholders were with the current level of short and long term liquidity in WA's bilateral contract markets.

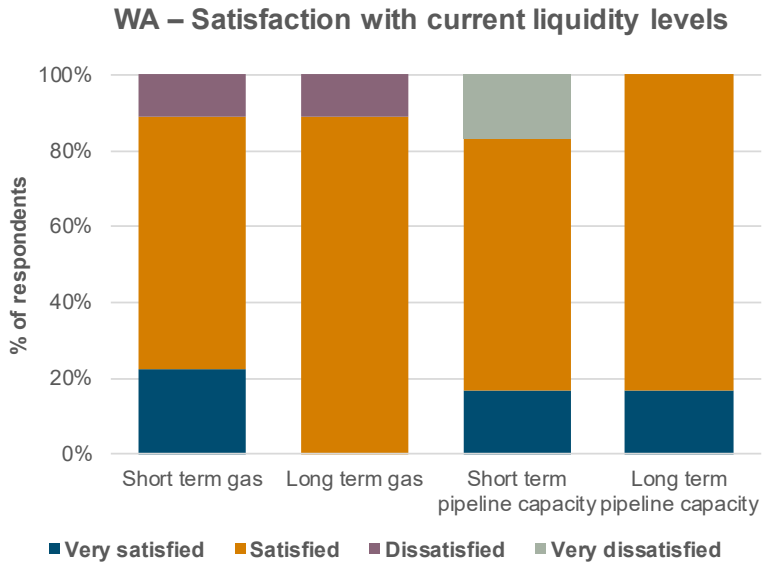
The AEMC received 10 responses to this question, showing that stakeholders were generally either satisfied or very satisfied with liquidity levels.

One stakeholder reported being dissatisfied with liquidity levels in the short and long-term gas and short-term pipeline capacity markets.

Stakeholders noted the structure of the WA market, with a limited number of large users representing a significant proportion of overall demand, as being suited to a bilateral contracting market.

Some issues raised by stakeholders included the low levels of market transparency and challenges negotiating short-term pipeline capacity, particularly for new market entrants.

It is a general understanding that major market participants have master service agreements in place allowing easy bilateral contracting. Stakeholders also considered there to be ready access to the DBP making it relatively easy to procure pipeline capacity from the Australian Gas Infrastructure Group (AGIG) or on the secondary market.



Most survey respondents did not report using third party services to assist their bilateral contracting. One reported using the Gas Trading spot market and warehousing facilities for sharing line-pack with other market participants.

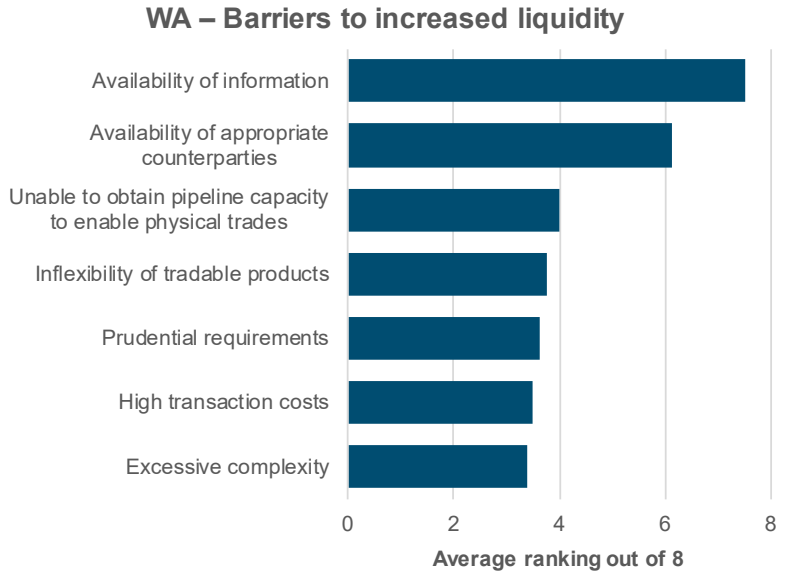
Barriers to liquidity growth in WA

The survey requested stakeholders to rank a set of seven potential barriers to the growth of liquidity in WA's gas markets and to identify any additional barriers that were not listed.

Eight stakeholders responded identifying the availability of information to be the most significant barrier to increased liquidity in the WA market.

Stakeholders expanded on the availability of information in the WA context by commenting on the need for:

- improved transparency on the development of new gas fields to assist businesses to effectively plan operations and investment in new plant
- improved transparency on pricing and volumes traded bilaterally WA
- improved transparency around what short-term pipeline capacity is available on the DBP particularly in coming years when free capacity is used up.



The procurement of short-term pipeline capacity was also considered by stakeholders as barrier for new market participant who do not have MSAs in place. One stakeholder noted that trading short-term pipeline capacity was easy once in the market but not easy for new participants to access.

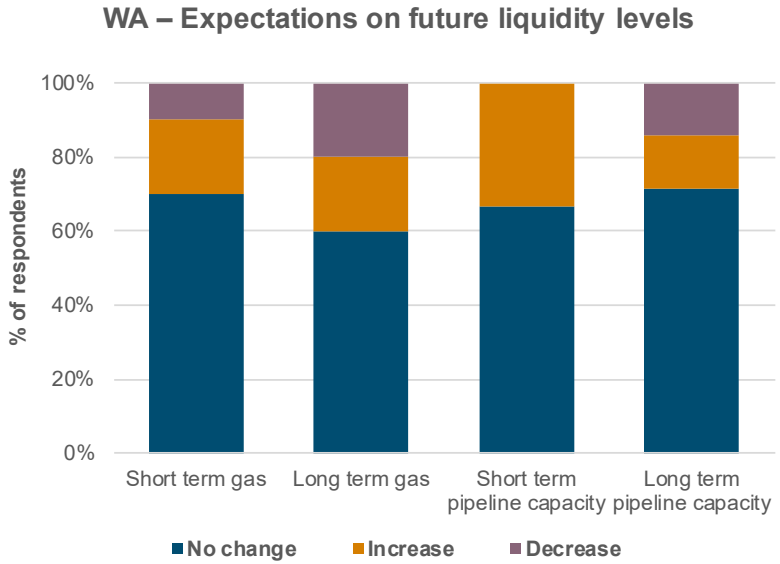
While one stakeholder considered the absence of a compulsory market in WA to be a barrier to enhanced liquidity, other stakeholders considered there to be a lack of demand for such a market, given the relative ease at which they were able to contract for gas and pipeline capacity.

Expectations on future levels of liquidity

The survey asked stakeholders about their expectations for future levels of liquidity in the WA contract market. 10 stakeholders answered with a general view that there would be little change in liquidity in coming years unless major new gas users or retailers emerged.

Stakeholders were most optimistic about the development of liquidity in the short-term pipeline capacity market. Stakeholders commented that the DBP has spare capacity with one noting an increase in secondary market capacity trades on the DBP.

Liquidity is also expected to increase in short-term gas supply market which is currently cheaper than long-term gas supply.



Need for a facilitated market in Western Australia

The survey asked for stakeholder views on whether the absence of an AEMO facilitated market for gas and pipeline capacity trading in WA imposes barriers to effective short and long term trading.

Nine stakeholders responded to this question, with seven identifying the absence of a facilitated market in

WA as either representing no barrier or only a minor barrier to effective short and long-term trading.

Comments received through the interviews reinforced the view that participants did not report significant material barriers to procuring gas in WA and there was little interest in the implementation of a facilitated market in WA.

Stakeholders further commented that the size of the market, the limited number of customers, the increased number of suppliers, as well as the historical relationship between market participants made a facilitated market unnecessary.

Two stakeholders advocated for the implementation of a formal market structure in WA.

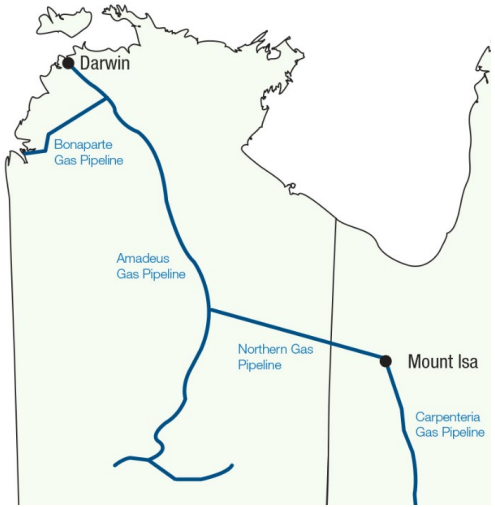
- One considered implementing a common exchange agreement would enhance transparency and work well given the participants in WA.
- The other considered a hub-type arrangement to be desirable as a way of transparently linking supply and demand.

Northern Territory

4.11 NORTHERN TERRITORY

4.11.1 Overview

The Northern Territory (NT) has significant on-shore and off-shore natural gas resources which supports domestic consumption and LNG exports.



Source: AER, *2018 State of the Energy Market*, p. 181.

The NT gas market has for many years been isolated from other Australian gas markets with no interconnecting pipelines to either the west or east coast.[46]

The gas market has historically been dominated by the supply of gas fired generation, without the large residential and industrial markets for gas seen in the east coast.

The relatively small size of the market has meant both supply and transport have been contracted through a limited number of long-term agreements, generally entered into by NT government owned entities.

The NT market uses approximately 25 PJ per year, or about 68 TJ/day on average, approximately 3 per cent of the Australian domestic gas consumption.[47]

The Amadeus Gas Pipeline (120TJ/day) links the Amadeus Basin in the south of the Northern Territory and transports natural gas to Darwin and Alice Springs.

Historically, the NT market has not seen the level of price volatility or scarcity of long term contracts seen in recent years in the wider east coast market.

However, the lack of visibility in the NT contract market and the smaller number of participants does make comparisons difficult.

The majority of the domestic load is in the Darwin-Katherine region. Contracts entered into by Power and Water Corporation PWC and Territory Generation are designed to manage the peaking gas requirement around power generation in this region.

While Territory Generation is the largest customer for gas in the NT, there is also independent electricity producers, e.g. Energy Developments Ltd located in the Darwin Katherine area.

In addition, Glencore's MacArthur River mine, located at the end of the MacArthur River lateral off the Amadeus Gas Pipeline, has in recent years augmented its gas fired generation load onsite.[48]

4.11.2 Recent developments

The Northern Gas Pipeline (90TJ/day) was commissioned in January 2019 and connects the Northern Territory to the east coast through Mt Isa in Queensland.

This new supply source, primarily meeting Mount Isa demand, has freed up capacity on the SWQP to deliver gas to the southern states.

The Northern Gas Pipeline is bringing material volumes of gas to east coast market since starting up at the beginning of 2019. In 2019, 25.7 PJ flowed along the NGP to Queensland. This represented 4.2 per cent of east coast domestic gas consumption of 612.7 PJ in 2019.[49]

Application of capacity trading reforms in the NT

In 2018 the AEMC conducted a review of the application of capacity trading reforms in the NT, on behalf of the COAG EC, which recommended that pipeline capacity trading reforms developed by the AEMC for the east coast gas market, should also apply in the NT.

The review concluded that the reforms would make it cheaper and easier to move gas around the NT market and also the connected east coast market.[50]

The AEMC considered the ownership issues in the Territory were not something that it could take into account when assessing whether the proposed reforms would contribute to the achievement of the National Gas Objective.

Instead, the AEMC considered these issues are best addressed by the NT government in balancing the various economic benefits that may arise from the reforms and the possible impacts on Territory taxpayers.[51]

In June 2018, at the request of the NT government, the COAG EC agreed that the capacity trading reforms will apply in the NT with the exception of the day-ahead auction for which application will be delayed.[52]

Under the derogation, no capacity on a transportation facility wholly or partly in the NT can be made available for purchase through the DAA.

The derogation will expire after five years of the commencement of the capacity trading reform package or at any time before that at the discretion of the NT government.[53]

4.11.3 Qualitative assessment

To assess circumstances in the NT the survey asked questions on the satisfaction with liquidity levels and the ease of trading in NT gas and pipeline capacity markets; barriers to the development of liquidity, both in gas an in pipeline capacity trading, and expectations of future liquidity.

Key stakeholder observations on liquidity

Key interview and survey observations on liquidity conditions in the Northern Territory included:

- Gas supply is available from producers in the NT for transport to the east coast.
- Liquidity is generally low, especially short and medium term. One stakeholder considered current level of liquidity to be so low that it can only increase.
- Market information on gas and transport prices and availability is very opaque and limited.
- Effective market facilitation was considered by a number of stakeholders to be important for liquidity to increase in the NT.
- Several stakeholders commented that liquidity was unlikely to increase without an appropriate trading platform, for both commodity and transportation.

Access to transport capacity was identified as a key issue by several stakeholders. The Amadeus Gas Pipeline (AGP) was noted to be fully contracted with limited capacity available on the secondary market.

This situation was considered a major barrier to competition in the NT gas market and to limit the value of the integration of the NT to the east coast market's liquidity as access to capacity on the AGP is required to flow gas east on the NGP.

In addition, transparency on the amount of contracted but un-used physical capacity on the AGP was noted to be very limited, further inhibiting secondary pipeline capacity trading. Given the challenge of procuring short-term pipeline capacity in NT, some stakeholders considered the DAA should apply to the AGP. One stakeholder was particularly concerned that there is a lack of incentive for the primary shipper on the AGP to trade un-used capacity in the secondary market.

Integration of the Northern Territory with the east coast

Following the commissioning of the Northern Gas Pipeline, NT gas supply is now able to flow to the east coast.

One on one interviews asked stakeholders for their views on whether the integration with the east coast would enhance liquidity on east coast gas markets.

Most stakeholders did not think the NGP would have a significant impact on east coast market liquidity.

Even though stakeholders thought that there would be some improvement in liquidity as supply to Mt Isa through the NGP increases the net amount of gas available to other users in Queensland.

This benefit was considered small and limited to Queensland due to pipeline capacity constraints shipping this gas from Queensland to southern demand centres.

Reasons given by stakeholders for why NT integration with the east coast through the NGP would have limited benefits for east coast liquidity included:

- the size of the pipeline (capacity of 90 TJ/day) - a larger pipeline connected to Moomba was considered more valuable
- the cost of the pipeline and the additional costs associated with removing nitrogen requires high east coast gas prices to justify flowing gas to the east coast
- a lack of market participant confidence in the reliability of the pipeline primarily due to instability of nitrogen removal plant
- shipping costs associated with moving gas to east coast demand centres would be too high given the distances involved.

References and footnotes

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5. See recommendation 12, in AEMC, *East Coast Wholesale Gas Markets and Pipeline Frameworks Review*, stage 2 final report, 23 May 2016, p. 15.
6. The terms of reference are available at the AEMC's website on: http://www.aemc.gov.au/Markets-Reviews-Advice/Biennial-review-into-liquidity-in-wholesalegas-an
7. The Gas Market Reform Group (GMRG) was established by the COAG Energy Council in the latter half of 2016 to lead the design, development and implementation of a range of reforms set out in the Gas Market Reform Package. Find more at http://gmrg.coagenergycouncil.gov.au/about-us
8. This follows the AEMC's recommendation in our East Coast Review that the AER publish the indicators on a regular basis to promote market transparency. The metrics are available at the AER's website on: https://www.aer.gov.au/industry-information/industry-statistics?f%5B0%5D=field_accc_aer_sector%3A5
9. The reports are available at the ACCC's website on: https://www.accc.gov.au/regulated-infrastructure/energy/gas-inquiry-2017-2025
10. IEA, *Development of competitive gas trading in continental Europe – How to achieve workable competition in European gas markets?*, IEA information paper, May 2008, p. 46.
11. Resilience will not be measured separately. Metrics used to assess the first three characteristics (market depth and breadth and immediacy) can also be used to evaluate resilience. However, it is difficult to evaluate on an ex ante basis when the market has not been subject to a shock.

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12. The Commission understands that this set of underlying data may include confidential information. Therefore, the appropriate level of aggregation will be considered, so that individual participants are not identifiable from this metric.
13. Powershop, *submission to scoping paper*, p. 1.
14. Shell, *submission to scoping paper*, p. 1.
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22. ACCC, *Gas Inquiry Interim Report*, July 2019, p. 25.
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30. AEMO, *2019 Gas Statement of Opportunities*, March 2019, http://forecasting.aemo.com.au/Gas/AnnualConsumption/Total
31. ACCC, *Gas Inquiry Interim Report*, January 2020, p. 102.
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37. ACCC, *Gas Inquiry Interim Report*, July 2018, pp. 24, 49.
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39. AEMO, *2019 Western Australia Gas Statement of Opportunities*, December 2019, p. 15.
40. AEMO, *2019 Western Australia Gas Statement of Opportunities*, December 2019, p. 16.
41. AEMO, *2019 Western Australia Gas Statement of Opportunities*, December 2019, p. 18.
42. See https://www.energyaccessservices.com.au/
43. See http://www.gastrading.com.au/

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44. See AEMO's website: https://aemo.com.au/energy-systems/electricity/wholesale-electricity-market-wem/wa-reserve-capacity-mechanism
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48. AEMC, *Review of the application of capacity trading reforms in the Northern Territory*, final report, March 2018, p. 9.
49. EnergyQuest, *Energy Quarterly March 2020 report*, p. 78.
50. AEMC, *Review of the application of capacity trading reforms in the Northern Territory*, final report, March 2018, p. 21.
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52. COAG Energy Council, *Gas market reform bulletin*, 3 July 2018.
53. Ibid.

Abbreviations

ACCC	Australian Competition and Consumer Commission
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AFMA	Australian Financial Markets Association
AGIG	Australian Gas Infrastructure Group
ASX	Australia Stock Exchange
Commission	See AEMC
COAG EC	Council of Australian Governments Energy Council
CTP	Capacity Trading Platform
DAA	Day-Ahead Auction
DWGM	Victorian Declared Wholesale Gas Markets
DTS	Victorian Declared Transmission System
GBB	Gas Bulletin Board
GMRG	Gas Market Reform Group
GSH	Gas Supply Hub
HHI	Herfindahl-Hirschman Index
LNG	liquified natural gas
NGL	National Gas Law
NGR	National Gas Rules
NGO	national gas objective
OTC	over the counter
STTM	Short Term Trading Market
NT	Northern Territory
WA	Western Australia

Pipelines

AGP	Amadeus Gas pipeline
DBP	Dampier to Bunbury pipeline
DDP	Darling Downs pipeline
GFP	Goldfields pipeline
MAP	Moomba to Adelaide pipeline
MSP	Moomba to Sydney pipeline
NGP	Northern Gas pipeline
QGP	Queensland Gas pipeline
RBP	Roma to Brisbane pipeline
SWQP	South West Queensland pipeline
TGP	Tasmanian Gas pipeline
WGP	Wallumbilla Gas pipeline

APPENDIX

GAS MARKETS BACKGROUND AND RECENT REFORMS

Wholesale gas markets

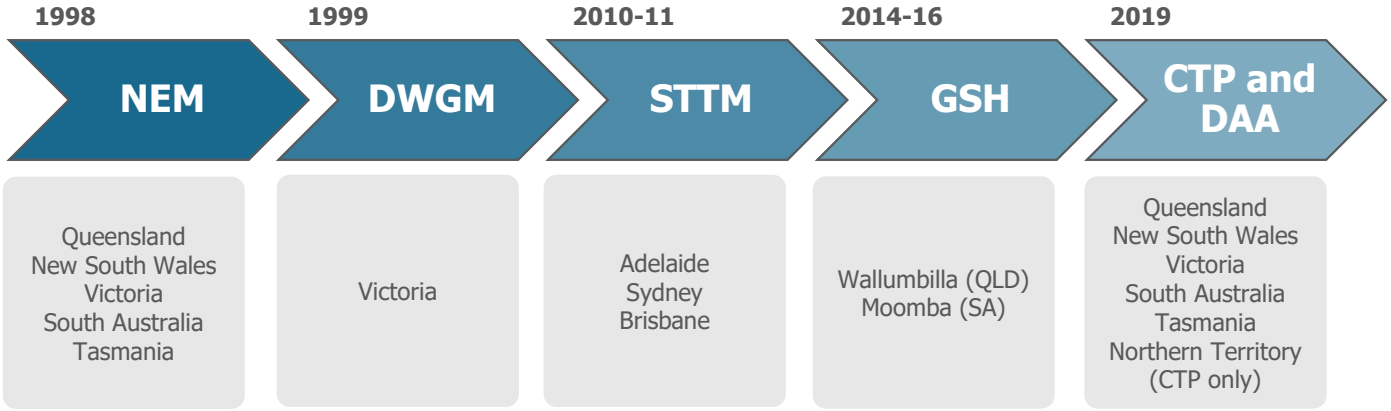
The eastern gas region has a number of wholesale markets for gas, which allow retailers or large customers to purchase gas without entering into long term contracts.

They are mainly used for managing short-term imbalances that arise on a day when a large buyer's actual demand differs from its contracted supply.

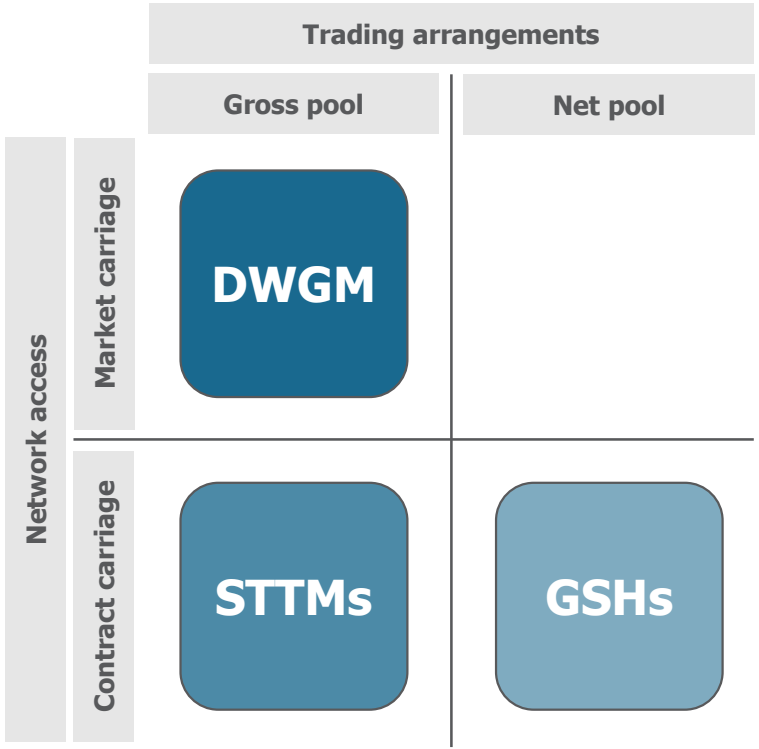
Pipeline capacity trading markets

There are currently two facilitated secondary capacity trading markets operating in the East Coast:

- the Capacity Trading Platform (CTP), which is a voluntary exchange-based trading and listing service
- the Day-Ahead Auction (DAA) of contracted but un-nominated capacity, which is a very short-term variation of a use-it-or-lose-it mechanism.



Wholesale gas markets trading arrangements



TRADING ARRANGEMENTS

Gross pool

- All commodity that is dispatched/scheduled is traded through the market.

Net pool

- Voluntary participation
- Market participants may trade bilaterally "off market"
- Market participants may choose not to trade at all, meeting their own energy requirements.

NETWORK ACCESS

Market carriage

- Capacity is allocated dynamically through the energy markets

Contract carriage

- Capacity allocated on the basis of bilateral contracts between the pipeline owner and the network user
- Capacity can be reallocated between network users on a secondary capacity market.

Table 8: Recent AEMC gas market reviews

REFORM	CATEGORY	DESCRIPTION
East Coast Wholesale Gas Market and Pipeline Frameworks Review (2015-2016)	• Wholesale gas markets • Capacity markets • Information provision	The Commission recommended a package of 15 key reforms focused on redesigning wholesale gas markets, improving access to pipeline capacity and increasing transparency, which included: 1. Continued development of the Wallumbilla GSH to provide a Northern Hub 2. Reforming the existing DWGM arrangements to develop a Southern Hub 3. Evolution of the Short Term Trading Market hubs and Moomba GSH 4. Improvements to the pipeline capacity frameworks 5. Information to support the market.
Victorian Declared Wholesale Gas Market review (2016-2017)	• Wholesale gas markets • Capacity markets	Recommended a staged approach to reforms, with 3 incremental short-term changes to the existing DWGM regime: 1. A clean and simple wholesale price 2. Establish a voluntary forward trading exchange over the DTS 3. Improved pipeline capacity allocation and introduce capacity rights trading by: • introducing separate, tradable entry AMDQ rights and exit AMDQ rights • introducing an exchange to improve secondary trading of AMDQ rights (permanent transfer) and benefits (temporary transfer) • making AMDQ available for a range of different tenures. 1. AEMC to assess the southern hub gas market conditions in 2020 as part of the existing biennial liquidity review, and provide recommendations on whether to proceed with implementing the target model.

Source: AEMC website.

Table 8: Recent AEMC gas market reviews

REFORM	CATEGORY	DESCRIPTION
Review into the scope of economic regulation applied to covered pipelines (2017-2018)	• Pipeline economic regulation • Information provision	32 recommendations, focused on making it easier to negotiate gas transportation contracts, which covered the following topics: 1. Framework for pipeline regulation 2. Expansions and extensions 3. Reference services 4. Access arrangements 5. Determining efficient costs 6. Negotiation and information 7. Arbitration
Review of the application of capacity trading reforms in the Northern Territory (2018)	• Capacity markets	This review, on behalf of the COAG Energy Council, recommended that pipeline capacity trading reforms developed by the AEMC for the east coast gas market, should apply in the Northern Territory. The reforms would make it cheaper and easier to move gas around the NT market and also the connected east coast market. The proposed reforms are: 1. a day-ahead auction of contracted but un-nominated pipeline capacity 2. a capacity trading platform to facilitate sales by capacity holders ahead of the auction and provide for exchange based trading 3. standardised provisions in capacity agreements to make capacity more fungible and allow shippers greater receipt and delivery point flexibility 4. a reporting framework for secondary trades of pipeline capacity and hub services.

Source: AEMC website.

Table 9: Other recent reform processes

REFORM	MARKET BODY	DESCRIPTION
Information disclosure and arbitration framework – NGR Part 23 (2016-2017)	GMRG	The new information disclosure and arbitration framework aims to facilitate access on reasonable terms to services provided by non-scheme pipelines, by: • providing for the publication and exchange of information to facilitate timely and effective commercial negotiations • providing an effective and binding process to resolve disputes about proposed terms of access in a cost-effective and efficient manner • setting out principles for determining disputes consistent with the outcomes reasonably to be expected in a workably competitive market.
Pipeline capacity trading – NGR Parts 24 and 25 (2017-2018)	GMRG	Developed and implemented the reforms related to pipeline capacity trading recommended by the AEMC on the East Coast gas review: • A capacity trading platform that provides for exchange-based trading of commonly traded transportation products and a listing service for other more bespoke products. • A day-ahead auction of contracted but un-nominated capacity, which will be conducted each day on non-exempt transportation facilities shortly after nomination cut-off time and subject to a reserve price of zero. • A range of measures to facilitate capacity trading and the day-ahead auction, including the development of standard operational transportation service agreements. • A reporting framework for secondary capacity trades and a number of other transparency measures that are designed to facilitate capacity trading and the auction. • A standard market timetable that provides for a common gas day start time and a common nomination cut-off time for transportation facilities subject to the capacity trading reforms and the day-ahead auction.

Source: Gas Market Reform Group website.

Table 9: Other recent reform processes

REFORM	MARKET BODY	DESCRIPTION
Measures to improve transparency in the gas markets (2018-2019)	ACCC/GMRG	Recommended 18 measures to improve the transparency of the gas market, many of which would be mandated through the inclusion of new reporting obligations in the National Gas Law (NGL) and National Gas Rules (NGR), covering the following areas: 1. Upstream activities (reserves and resources; contracted reserves; drilling activities; production cost estimates) 2. Infrastructure availability and developments (infrastructure developments; uncontracted capacity outlook; users with contracted capacity) 3. Gas and infrastructure prices (long-term gas supply agreements; short-term gas supply agreements; retail gas prices; transportation prices; stand-alone compression and storage facility prices) 4. LNG exports and imports
Regulation impact statement (RIS) Measures to improve transparency in the gas market (2019-2020)	COAG EC	• This Consultation RIS covers the package of gas transparency measures identified in recommendations 1-10 and 14-17 of the ACCC-GMRG joint report and the AEMC's Stage 2 Bulletin Board improvements. • A decision was made by COAG EC in March 2020 and amendments to the NGL, regulations and NGR is being prepared for consideration by the COAG EC in mid-2020. Reporting obligations are expected to be in place by the end of Q1 2021.
Regulation impact statement (RIS) Options to improve gas pipeline regulation (2019-2020)	COAG EC	• The purpose of this RIS process is to identify and evaluate options to deliver a more efficient, effective and well-integrated regulatory framework for gas pipelines.

Source: Gas Market Reform Group website and COAG Energy Council website.

Table 10: Recent AEMC gas market rule changes

RULE CHANGE	YEAR	CATEGORY	DESCRIPTION
Gas day harmonisation	2017	• Wholesale markets • Capacity markets	Harmonise the gas day start times of all STTMs with the Victorian DWGM gas day start time of 6.00 am AEST.
Improvements to natural gas bulletin board	2017	• Information provision	Enhance the breadth and accuracy of information provided to the market through the Bulletin Board.
DWGM unintended scheduling results – decision timing	2017	• Wholesale markets	Amended the time for AEMO to respond to requests for investigations of an unintended scheduling result in the Victorian DWGM.
STTM changes to periodic review of market parameters	2017	• Wholesale markets	Aligns the periodic review of market parameters for the STTMs with the NEM reliability standard and settings review.
Regulation of covered pipelines	2019	• Economic regulation	Implemented a range of improvements to the regulation of covered transmission and distribution gas pipelines across Australia based on AEMC's review in 2018.
STTM interface protocol	2019	• Wholesale markets	Streamlines the process of consultation required to make changes to the Short Term Trading Market Interface Protocol.
DWGM improvement to AMDQ regime	2020	• Capacity markets	Introduces separate, tradeable entry and exit capacity rights.
DWGM simpler wholesale price	2020	• Wholesale markets	Simplifies risk management for market participants and improves wholesale gas prices in the Victorian DWGM.

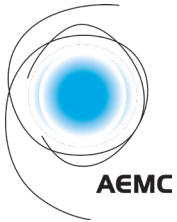
Source: AEMC website.

Table 11: List of companies that participated in survey and/or interviews

NAME OF STAKEHOLDER	TYPE OF STAKEHOLDER	NAME OF STAKEHOLDER	TYPE OF STAKEHOLDER	NAME OF STAKEHOLDER	TYPE OF STAKEHOLDER
1. Adelaide Brighton	large user	12. EnergyAustralia	gentailer	23. Perth Energy	retailer
2. AGIG	pipeline operator	13. Gas Trading Australia	trader	24. Qenos	large user
3. AGL Energy	gentailer	14. Glo Bird	retailer	25. Santos	gas producer / LNG exporter
4. Alcoa	large user	15. Hydro Tasmania	generator	26. SEA Gas	pipeline operator
5. Alinta Energy	gentailer	16. ICAP	broker	27. Shell / ERM Power	gas producer / LNG exporter / retailer
6. APA Group	pipeline operator	17. Incitec Pivot	large user	28. Simplot	large user
7. ASX	financial market operator	18. Jemena	pipeline operator	29. Synergy	gentailer
8. Beach Energy	gas producer	19. Macquarie Bank	trader / gas producer	30. Tianqi Lithium	large user
9. Central Petroleum	gas producer	20. Nyrstar	large user	31. Visy	large user
10. CITIC Pacific	large user	21. Orica	large user	32. Weston Energy	retailer
11. CQ Partners	trader	22. Origin Energy	gentailer		

Table 12: Description of physical and financial products

PRODUCT	DESCRIPTION
Swap	A swap involves two counterparties exchanging variable cash flows (from a floating gas price in a particular market) for a set price over an agreed-upon period. Swaps can be physical or financial. Most swaps are purely financial and settled in cash, physical swaps require ownership of physical gas underlying the agreement.
Locational swap	A locational swap involves counterparties swapping the cash flows associated with relative prices (in the case of a financial swap) or the ownership of gas (in the case of a physical swap) in two different markets. Locational swaps can be used to avoid pipeline charges associated with moving physical gas between markets.
Time swap	A time swap is a contract between counterparties which exchange cash flows from the settlement of gas in one period against those in another period.
Index linked	Index linked gas contracts are those where the price of the gas is indexed by movements in the price of another commodity (commonly oil).
Tolling transaction	A tolling transaction is an agreement to put a certain amount of gas through a processing facility over the duration of the transaction.
Options	A contract permitting the option buyer the right, without obligation, to buy or sell an underlying asset in the form of a commodity.
Caps	A contract through which the buyer earns payments when the market price exceeds an agreed price. Caps are typically purchased by retailers to place a ceiling on their market costs.
Weather hedges	A weather hedge is a financial instrument used by companies or individuals to hedge against adverse market outcomes related to weather conditions. There is an increasing range of weather related risk management products.



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