AEMC

REVIEW

Australian Energy Market Commission

FINAL REPORT

BIENNIAL REVIEW INTO LIQUIDITY IN WHOLESALE GAS AND PIPELINE TRADING MARKETS

26 JUNE 2018

INQUIRIES

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ABOUT THE AEMC

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

SUMMARY

1 A liquid market is often referred to as one in which market participants have access to a range of products and can reliably make transactions in a timely way, at a cost-reflective price. In a liquid market, changes in supply and demand have a relatively small impact on price.

2 Liquidity in a market is a multi-faceted concept that is difficult to measure with a single indicator. In the gas market assessing liquidity requires a broader approach than merely assessing the availability of gas volumes, as adding to the supply of gas may not necessarily result in more gas being traded between different parties.

3 In 2016, the Australian Energy Market Commission (AEMC or Commission) completed a review of the gas markets and gas transportation arrangements on the east coast of Australia (the east coast gas review). In our final report on the east coast gas review, the AEMC recommended a number of metrics that would capture the characteristics of a liquid market and allow for the monitoring of liquidity in the Australian wholesale gas and pipeline capacity trading markets.

4 In the final report on the east coast gas review, the AEMC also recommended that the Council of Australian Governments Energy Council (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. This recommendation formed the basis for the COAG Energy Council's direction in December 2017 for the AEMC to conduct such a review. The terms of reference for the review can be found on the AEMC website.

Scope of the review

5 Broadly, the terms of reference provided by the COAG Energy Council requires the AEMC to:

- monitor changes in liquidity in the wholesale gas and pipeline capacity trading markets
- report on the effectiveness of reforms implemented
- identify whether any further reforms to these markets may be required to achieve the Council's Vision or promote the National Gas Objective (NGO).

6 However, the COAG Energy Council recognised that a number of the reforms set out in the east coast gas review will not be in place when the first biennial review is completed. Therefore, the initial review is relatively narrow in scope and focuses primarily on:

- the development of the methodology the AEMC intends to 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 gas supply hub (GSH) and Moomba GSH and the effect that the introduction of Optional Hub Services at Wallumbilla has had on liquidity in this market.

The Commission's findings

Metrics

7 The AEMC used both quantitative and qualitative metrics in the analysis of liquidity in the gas market. The metrics used address both wholesale gas and pipeline capacity trading. This first review focuses primarily on the two locations of the GSH, Wallumbilla and Moomba, with some metrics also included on the short term trading markets (STTMs), the Victorian Declared Wholesale Gas Market (DWGM) and pipeline capacity trading where available. The quantitative metrics do not examine bi-lateral or over-the-counter (OTC) markets and in particular, the long-term gas and transportation contracts that underpins much of the market. As such, this review has not examined or commented on liquidity or trends on these aspects of the market. It is recognised that without examining all aspects of the gas market, any trends or analysis is limited to just the particular facilitated market (GSH, STTM, DWGM), rather than on the market overall.

8 The Commission has developed detailed methodology for each of the quantitative metrics. For the qualitative metrics, the Commission conducted a qualitative survey with a range of market participants registered on the GSH, two pipeline operators and four industrial loads currently not registered on the GSH. The purpose was to gather information about these stakeholders' confidence in the GSH's historic and future operations.

Baselines

9 Using these metrics and methodologies the Commission calculated baseline measures of liquidity for the facilitated markets examined.

10 The quantitative metrics are designed to measure different facets of liquidity and, where possible, have been calculated for a two year period: 2016 and 2017. This is expected to preserve consistency with subsequent reports in the future that will be conducted every two years.

11 The Commission has found that almost all quantitative indicators of liquidity on the GSH have positively changed over the past two years, in particular at the Wallumbilla location.

12 While the Commission recognised the focus of the report is on the GSH, depending on the availability of data and the type of metric, some baseline numbers were also calculated for the STTMs and DWGM. These baseline figures were more diverse and did not show a positive change across all markets and metrics. It should be noted that unlike the GSH, these markets are mandatory. The only metric calculated for pipeline capacity trading indicated a positive change of increasing volumes on two of the pipelines.

13 Two criteria had to be met to calculate the metrics required in the terms of reference:

- information had to be publicly available
- the metric had to be meaningful in relation to the relevant market.

14 Some of the metrics, for example the bid-offer spread or the range of products, were not useful for mandatory, auction based, intraday and day ahead markets such as the DWGM or the STTMs. In addition, very limited information is publicly available about pipeline capacity

trading. The AEMC, together with the Australian Energy Regulator (AER) and the Australian Energy Market Operator (AEMO) will continue developing metrics and publishing information on all of the facilitated markets for use by participants and in the next biennial review.

15 With respect to the operations of the GSH, the Commission found that the majority of survey participants:

- had confidence in the GSH and expected that confidence and liquidity would grow further in the next two years
- based their expectations of changing liquidity on a range of factors, including:
  - the availability of more physical supply from additional development of gas fields, new gas pipelines and liquefied natural gas (LNG) terminals
  - the potential for a greater number, diversity and activity of market participants
- held the view that the greatest impediments to trade on the GSH were:
  - uncertainty related to transporting gas purchased on the GSH
  - the administrative costs associated with trading on the exchange
  - the inflexibility of exchange traded products and sporadic availability of necessary volumes on the GSH.

16 The Commission recognises that several key reforms are currently being implemented in the wholesale gas and pipeline markets. These reforms include the capacity trading reforms currently being developed by the Gas Market Reform Group (GMRG) and reforms to the Victorian DWGM.

17 It will take some time for these significant reforms to be implemented and for the market and market participants to fully understand and incorporate the reforms into their businesses.

18 Further, although not all issues identified by stakeholders are directly covered by the reforms currently being actioned (for example, the costs associated with trading), it is advisable to see what, if any, indirect effect the reforms may have on the market before determining if further changes are required to address these issues.

19 As this report provides mainly baseline metrics and only limited data on the movement of liquidity it is not appropriate at this time to make any further recommendations for further reforms to the wholesale gas or pipeline capacity markets.

20 The Commission considers that given the importance of physical supply that was expressed by the majority of survey participants, there could be merit in including more detailed and sophisticated metrics about the role of gas producers in the next biennial review.

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1 INTRODUCTION

1.1 Background

Recognising the ongoing structural changes happening 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:[1]

> "…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."

In order to develop a road map for gas market development which will 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 gas review). In addition, the Victorian Government, with the agreement of the COAG Energy Council asked the AEMC to conduct a review of the Victorian declared wholesale gas market (the Victorian DWGM review).

1.2 Recommended reforms to the gas markets

On 28 July 2016, the Commission released the Stage 2 Final Report for the east coast gas Review. The Final Report contained 15 recommendations to improve the efficiency of gas trading and access to pipeline transportation. This package of recommendations set out key reforms to the east coast gas market including:

1. **Changes to the wholesale gas trading markets**: concentration of gas trading at a Northern Hub located at Wallumbilla with existing physical trading limitations addressed through the implementation of optional hub services and a Southern Hub to be transitioned from the existing Victorian declared wholesale gas market (DWGM). At this time, reforms for the DWGM are being considered that do not involve a transition to a Southern Hub, although this may be considered at a later time. In addition, the short term trading markets (STTMs) are to be simplified so as to become a balancing mechanism.
2. **Improvements to pipeline capacity frameworks**: there are four aspects to these reforms including:
   - introduction of a day-ahead auction of contracted but un-nominated pipeline capacity
   - standardisation of provisions in capacity agreements to make capacity more fungible

1 COAG Energy Council, *Australian Gas Market Vision*, December 2014.

- development of capacity trading platform(s) to facilities sales
- publication of information on secondary trades.

3. **Additional information to support the market**: a detailed package of recommendations to enhance the information provided to the market, including expanding the coverage of the existing bulletin board.[2]

In the east coast gas review, the Commission also recommended that a gas reform group be created to facilitate some of the reforms. The Gas Market Reform Group (GMRG) was created by the COAG Energy Council and is currently undergoing a process to develop the required changes to the National Gas Law (NGL) and National Gas Rule (NGR) to implement the capacity trading reforms. It is expected that these reforms will be in place in 2019.

On 14 July 2017, the Commission published its final report and recommendations for the Review of the Victorian DWGM. The Commission made three recommendations:

1. provide a cleaner wholesale market price by including the costs currently recovered by common and congestion uplift into the market price, while retaining separate pricing of temporal constraints
2. establish a forward trading exchange, over the Victorian Declared Transmission System (DTS) while retaining the existing daily DWGM
3. improve pipeline capacity allocation and introduce capacity rights trading by:
   - introducing separate, tradable entry AMDQ[3] 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.[4]

The Victorian government is currently considering these recommendations, and where appropriate, developing rule change requests to be submitted to the AEMC.

1.3 Biennial liquidity review

In the east coast gas review the AEMC also recommended 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]

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2 For information on the review and recommendations see the project page on the AEMC website at: https://www.aemc.gov.au/markets-reviews-advice/east-coast-wholesale-gas-market-and-pipeline-frame

3 Authorised Maximum Daily Quantity (Authorised MDQ) and Authorised Maximum Daily Quantity Credit Certificate (AMDQ CC) are transportation rights in the Victorian DTS. These are collectively known as AMDQ.

4 For information on the review and recommendations see the project page on the AEMC website at: https://www.aemc.gov.au/markets-reviews-advice/review-of-the-victorian-declared-wholesale-gas-mar

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

1.4 Scope of the review

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

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

The terms of reference also set out the relevant markets for the review to consider. These markets covered the wholesale gas and pipeline capacity trading markets on the east coast of Australia.[7]

The COAG Energy Council recognised that a number of the reforms to the trading markets (both in relation to recommendations from the east coast gas review and the Victorian DWGM Review) will not be in place when the first biennial review is completed. Therefore, the initial review was expected to be relatively narrow in scope and to focus primarily on:

- the development of the methodology the AEMC intends to 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 Energy Council has agreed to implement
- the growth in liquidity that has occurred in the Wallumbilla gas supply hub (GSH) and Moomba GSH and the effect that the introduction of Optional Hub Services at Wallumbilla has had on liquidity in this market.

The terms of reference included a more detailed description of the scope of the review.

It is expected that over time, the markets and metrics included in the review will evolve to provide market participants, governments and market bodies information that can be used as a basis to make operational, commercial and regulatory decisions.

1.5 Review process

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

- A scoping paper outlining the approach proposed to be used by the Commission for the review, including the liquidity metrics and the methodology for determining those metrics. The Commission published the scoping paper on 13 February 2018. Three submissions were received to the scoping paper.
- A draft report containing draft results and draft recommendations on any further reforms that may be required, if appropriate. The Commission published the draft report on 26 April 2018. The draft report did not contain any recommendations for any further gas market reforms at this time. Three submissions were received to the draft report. All submissions are available at the AEMC's website.[8]

7 The terms of reference states that in subsequent reviews, the AEMC will be expected to monitor developments in the Northern Territory and Western Australia, where and when it is relevant to do so.

8 See: https://www.aemc.gov.au/markets-reviews-advice/biennial-review -into-liquidity-in-wholesale-gas-an

- A final report containing the final liquidity metrics and if appropriate, recommendations.

The AEMC is required to provide the final report to the COAG Energy Council six weeks prior to the Council's mid-year meeting. Unless determined otherwise, the final report is due to be published on the same day it is considered by the COAG Energy Council.

2 METHODOLOGY AND METRICS

A liquid market is often referred to as one in which market participants have access to a range of products and can reliably make transactions in a timely way, at a cost-reflective price. In a liquid market, changes in supply and demand have a relatively small impact on price.

Liquidity in a market is a multi-faceted concept that is difficult to measure with a single indicator. In the gas market assessing liquidity requires a broader approach than merely assessing the availability of 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:[9]

- **Market depth:** where no single buy or sell order is likely to move the market price excessively
- **Market breadth:** where a large number of bids to purchase gas and offers to sell gas are present in the market
- **Immediacy:** the ability to trade large volumes in a short period of time
- **Resilience:** the ability of the market to recover towards its natural equilibrium after being exposed to a shock.

This review measures liquidity based on these characteristics.[10]

For each of these characteristics, metrics are chosen that can accurately measure whether that characteristic of liquidity is present in the relevant gas markets. In particular, the terms of reference requires the AEMC to look at the facilitated markets, including the GSH, STTMs, DWGM and secondary capacity trading. However, this review is focused primarily on the GSH with some information, where available on the STTMs, DWGM and capacity trading.

The Commission notes that the facilitated markets only represent a sub-set of the gas markets in the east coast of Australia. As explained throughout the report, bilateral and OTC-trades that constitute a large share of each market could only be considered by the AEMC to a very limited extent.

Table 2.1 provides an overview of the metrics the AEMC included in the analysis of liquidity in the gas markets.

The table includes both quantitative and qualitative metrics. It provides information on which of the above four inter-related characteristics each metric addresses, how the metric was constructed, and the expected trend in these metrics associated with an increase in liquidity over time. Quantitative metrics are expected to be objectively measured and quantified.

9 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

10 Resilience is not 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.

Qualitative metrics relate to concepts that are difficult to quantify, such as confidence in the market or the perception of its current operation.

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

In its submission to the scoping paper, the Australian Energy Regulator (AER) recognised the importance of publishing information related to the liquidity metrics (including underlying data) on its website and was of the view that publication improves the transparency of competitive markets.[11]

Section 2.1 and 2.2 of the Scoping paper[12] contains a detailed description of the methodology of the metrics in Table 2.1.

Table 2.1: Metrics to monitor liquidity in the gas markets

METRIC	CHARACTERISTIC	DESCRIPTION	TREND AND/THRESHOLD	UNDERLYING DATA
Traded volumes	Market breadth	Volume of trades in each market over the measurement period	Should be increasing	• traded volumes
Churn rate	Immediacy	Ratio of all traded volumes to demand for the underlying physical product	Around 10 in a liquid market but likely to be much lower as the market develops. Trend should be increasing	• traded volumes • throughput of the underlying physical product
Bid-offer spreads	Immediacy	The difference between prices on the bid and offer side of the market	Should be narrowing	• bid prices • offer prices
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.	Increasing to a state where all market participants are actively trading on the facilitated markets	• number of actively trading participants • number of active participants in each registered

11 AER submission to the Scoping paper, 5 March 2018, p. 1

12 See AEMC, *Biennial review into liquidity in wholesale gas and pipeline trading markets*, Scoping Paper, 13 February 2018.

METRIC	CHARACTERISTIC	DESCRIPTION	TREND AND/THRESHOLD	UNDERLYING DATA
		producers, retailers, industrial customers, physical or financial participants)		category
Concentration of trades amongst active participants	Market depth	The proportion of trades accounted for by individual participants	Should be decreasing	• traded volumes by participant[a] • all traded volumes
Number of trades per product	Market breadth	The number of traded transactions per product	Should be increasing	• number of trades by product category
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 products available • types of exchange traded products available
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	A survey based estimation of the share of trades through the facilitated markets.
Confidence of market	All characteristics	Survey-based measure of market	Participants should have increasing	Survey (qualitative)

METRIC	CHARACTERISTIC	DESCRIPTION	TREND AND/THRESHOLD	UNDERLYING DATA
participants		participants' confidence in the trading market and any perceived impediments or barriers to using the markets vis-à-vis entering into bilateral trades	confidence and be more willing to engage in hub-based trading	
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)

Note: a: The Commission has aggregated this data to an appropriate level to avoid individual's confidential information being identified.

The Commission understands that these relatively simple metrics cannot take into account the full complexity of each market. Therefore, as liquidity in the gas markets increases over time, consideration may be given to the development of more sophisticated measures.

3 ASSESSMENT OF THE METRICS

Of the ten metrics listed in Table 2.1 of Chapter 2, the first seven are quantitative indicators.[13] That is they can be objectively measured and quantified.

The last three metrics in Table 2.1 provided valuable information on the non-quantifiable aspects of the development of liquidity to be incorporated into the analysis. These qualitative metrics capture all four characteristics of liquidity and therefore provide a wider view that supports the quantitative ones.

The Commission has not assessed the metrics against specific benchmarks at this time. Taking into account the nascent and developing nature of the Moomba and Wallumbilla locations, the Commission is of the view that analysis showing the trends in these metrics over time is more useful than looking at how those markets perform against pre-defined thresholds.

3.1 Traded volumes

3.1.1 The gas supply hubs

The GSH is a voluntary exchange for the wholesale trading of natural gas. GSH participants can trade, through an electronic platform, standardised, short-term physical products.

The Wallumbilla location of the GSH has been in operation since March 2014. In June 2016, a new trading location at Moomba was established. The two trading locations share a similar market framework in which market participants trade voluntarily.

The Commission considers that since the GSH is a voluntary hub it does not represent the overall market in those regions. This was noted by AGL in their submission to the scoping paper.[14]

Figure 3.1 shows that in its six months of operation in 2016, no trades were registered at the Moomba location, while in 2017, two trades constituted the total sold volume of 12 TJ.

13 The terms of reference set out eight quantitative metrics, however, it also stated that one of the metrics (Trades conducted through the facilitated markets versus bilateral and OTC trades) should be calculated to the extent the underlying information is publicly available. The AEMC considered that due to the limited availability of information on bilateral and OTC trades, at this time this metric can only be assessed qualitatively. Further explanation about the metric and reasoning for this consideration is provided in section 3.8.1

14 AGL submission to the Scoping paper, 13 March 2018, p. 1

Figure 3.1: Traded volumes on the GSH, Moomba location

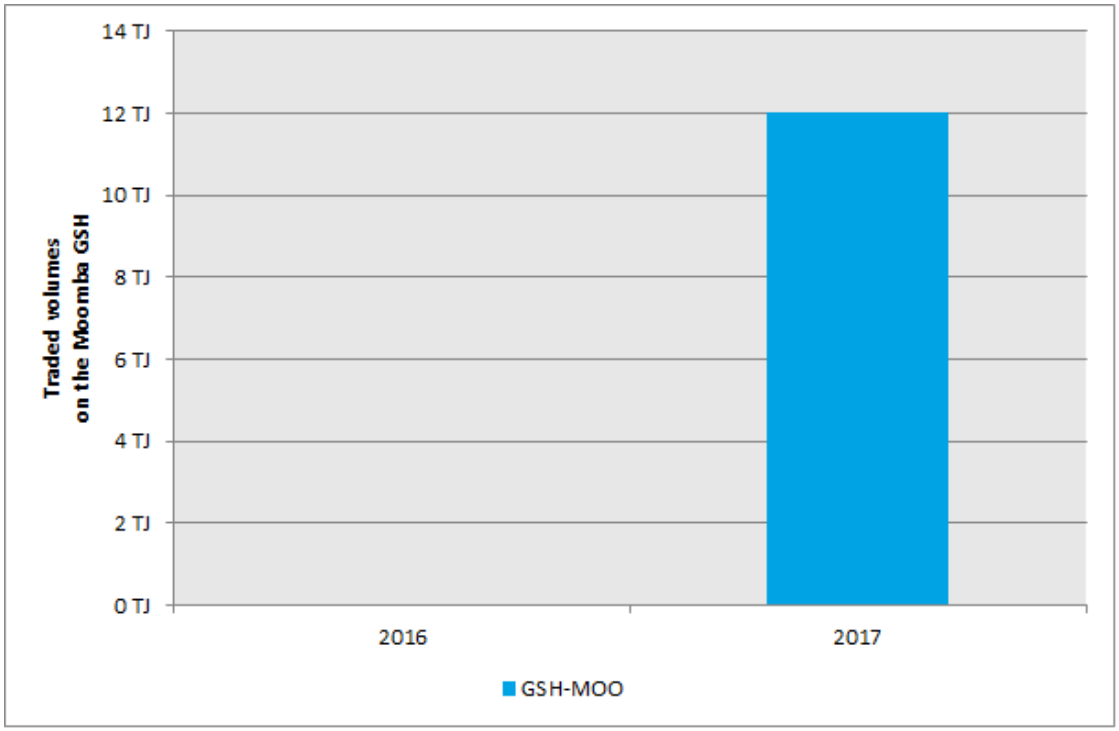
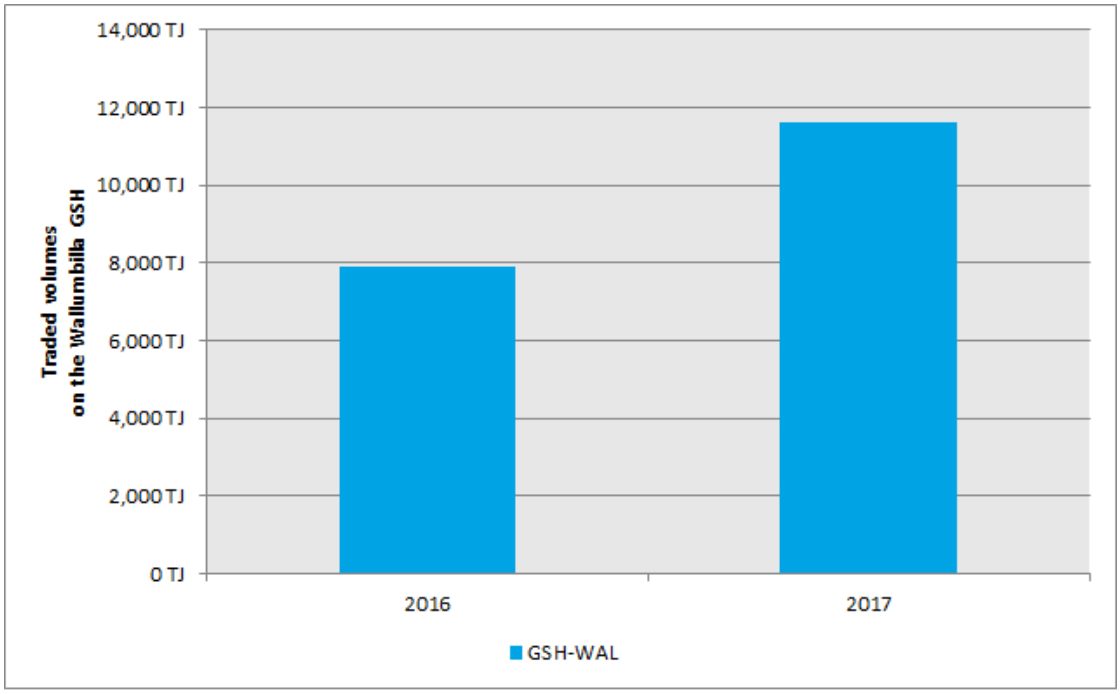


Figure 3.2 shows that traded volumes sold at Wallumbilla GSH in 2016, its second year of operation, reached 7,918 TJ. In 2017, the volume of trades increased by 47 per cent, reaching 11,605 TJ. Although there has been an increase in the volume of trades on the GSH, 267,430 TJ of gas flowed through Wallumbilla, indicating that GSH trades are a small fraction of the total gas that flowed through that location.

Figure 3.2: Traded volumes on the GSH, Wallumbilla location



These increasing volumes, especially at the Wallumbilla location, align with the expectations of stakeholders expressed through the qualitative survey. The majority of survey participants indicated that they have confidence in the Wallumbilla location of the GSH and expected that confidence will increase over time together with liquidity. This confidence was partially based on more supply coming on line in the next two years and additional participants entering this market. More supply being available is expected to lead to increased traded volumes on the GSH in the next two years.

3.1.2 The short term trading markets

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

Traded volumes for the STTMs are calculated separately for the Brisbane, Sydney and Adelaide locations. The Commission understands that 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.[15]

15 Bilateral trades may occur in various forms and between various parties, such as between two or more retailers, retailers and producers, industrial consumers and producers, retailers and industrial consumers, etc.

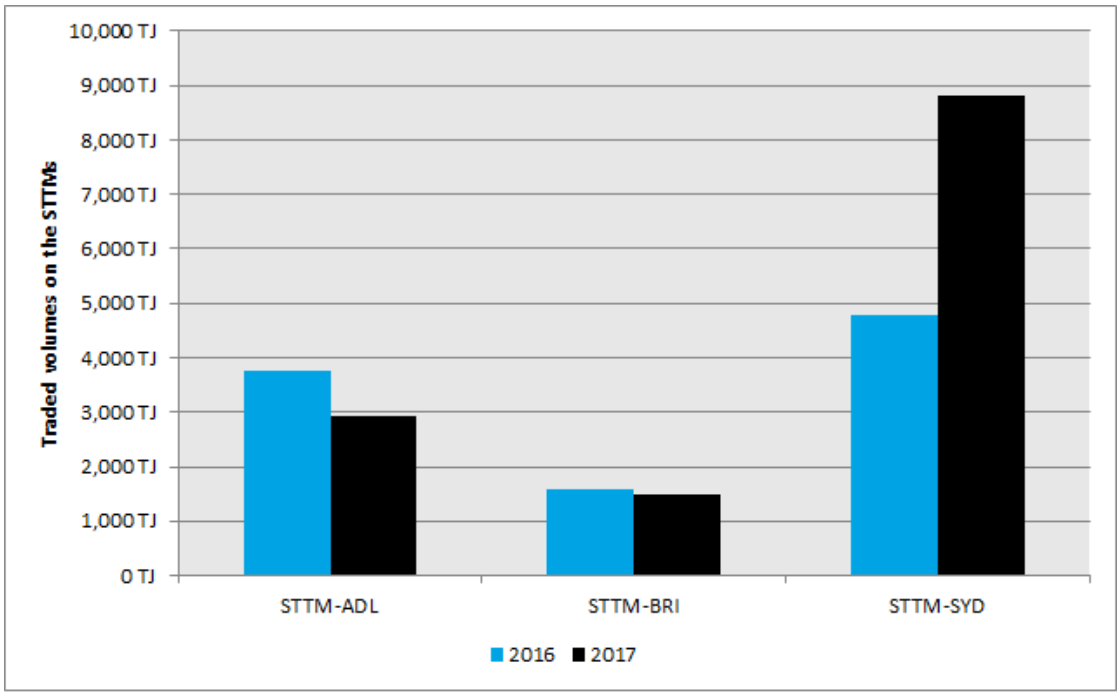
Therefore, to measure the volume of trades that are conducted on the STTMs, these self-trades are omitted from the data set.

This metric (traded volumes) also uses ex-ante (day ahead) volumes as they represent volumes that are intended to be traded, and do not include deviations from schedules. Finally, the traded volume for the STTMs is calculated as a sum of the seller net positions (after subtracting the self-trade volumes) market participants hold after the ex-ante auction is run.

The Commission found that traded volumes have decreased on the Adelaide and the Brisbane STTMs from 2016 to 2017 by 22 and 5 per cent respectively. Figure 3.3 illustrates that volumes on the Adelaide and Brisbane STTMs dropped from 3,776 TJ to 2,931 TJ and 1,569 TJ to 1,491 TJ, respectively.

In contrast, the Sydney STTM saw an 84 per cent increase in volumes from 2016 to 2017, reaching 8,796 TJ in 2017 compared to 4,776 TJ in 2016.

Figure 3.3: Traded volumes on the STTMs



Stakeholders that participated in the qualitative survey held differing views in relation to whether the STTMs and the GSH play competing or complementary roles in the market. Some stakeholders were of the view that the STTMs and the GSH all have different purposes and, therefore, the increase of liquidity on one should not lead to a decrease in liquidity on

the other. Others suggested that, from the perspective of taking on daily spot exposures, market participants may choose between trading on the GSH or the STTMs.

Similar to stakeholder expectations in relation to the GSH, stakeholders expect that an increase in the supply of gas will lead to increased traded volumes on the STTMs in the next two years. Stakeholders indicated that new sources of gas supply could potentially include new gas field developments, new pipelines and import liquefied natural gas (LNG) terminals.

In its submission to the draft report, AEMO added that trading activity might be driven by a range of factors including large retailers limiting contract offers, producers charging higher prices and offering less flexibility.[16] The Commission understands that these factors can also contribute to higher traded volumes on the STTMs as gas users are incentivised to take greater exposures to the STTMs. This is because for large users, difficulties in negotiating gas supply contracts with retailers or producers serve as an incentive for building out their own capabilities to trade on the spot market where they may realise lower prices than otherwise offered by other counterparties.

The Commission considers that the availability of new sources of gas supply could have a similar effect on the rest of the wholesale gas markets on the east coast of Australia (i.e. in non-centralised, bilateral and OTC-trading) as more supply could incentivise counterparties to underwrite longer term contracts with greater flexibility. However, these contracts may, in turn, crowd out trading from the facilitated markets.

3.1.3 The Victorian declared wholesale gas market

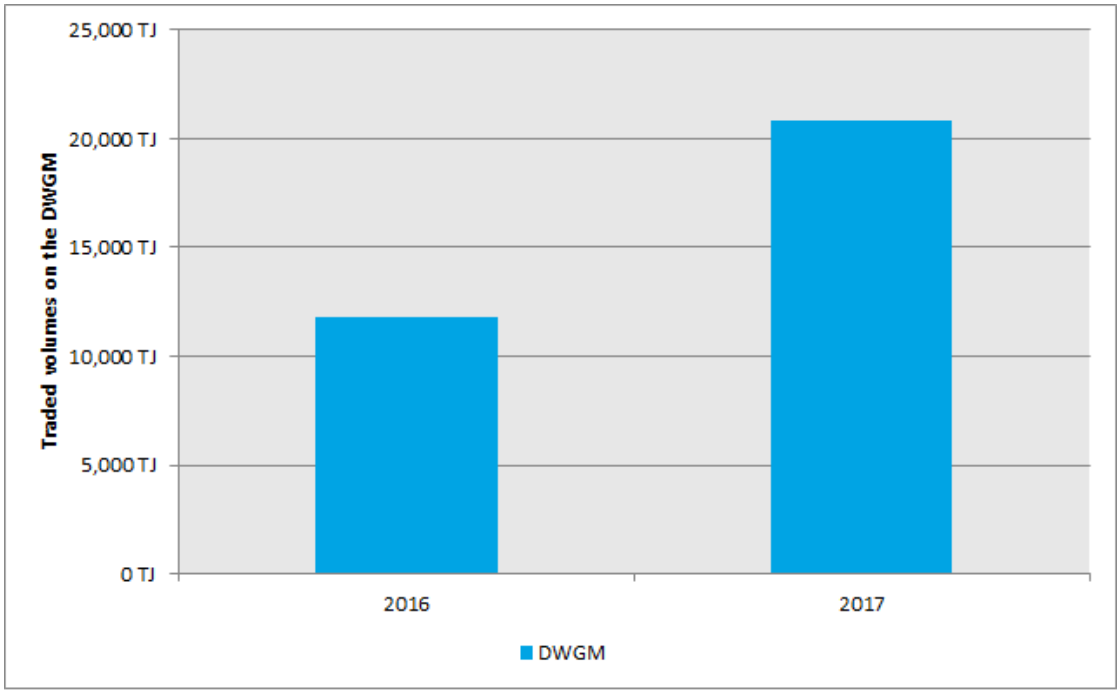
Similar to the methodology described in the previous section in relation to the STTMs, traded volumes for the DWGM are also calculated as a sum of seller positions of market participants after the first auction run at 6am, every morning. The Commission is of the view that this provides the best approximation of traded volumes that are comparable across all centralised wholesale gas markets in Australia.

In addition, the Commission agrees with AGL's view expressed through its submission, that both the STTMs and the DWGM are more than just balancing markets.[17] Therefore, we have included traded volumes calculated according to the methodology above in our analysis.

16 AEMO submission to the Draft report, 23 May 2018, pp. 2-3

17 ibid., p. 1

Figure 3.4: Traded volumes on the DWGM



As shown in Figure 3.4, traded volumes on the DWGM increased considerably, by 60 per cent from 2016 to 2017, from 11,786 TJ in 2016 to 20,805 TJ in 2017.

The Commission notes that in general there was more local supply of gas available in the Victorian market in 2017 relative to 2016. This was partially due to a prolonged outage of the Iona underground gas storage facility (UGS) in 2016 and high volumes of production at the Longford production facility in 2017.

Some stakeholders indicated that smaller retailers and new entrants to the gas market tend to purchase gas only from the spot market in Victoria. One of the reasons for this is the transaction costs of bilateral contracting are considered too high in comparison to trading on the spot market. They were also of the view that depending on the type of business, the potential savings achieved by procuring gas only from the spot market, may be higher than the risks associated with taking spot exposure.

Therefore, if new participants enter the market, it could be expected that there would be an increase in traded volumes on the DWGM in the next two years.

3.1.4 Pipeline capacity trading

Traded volumes for pipeline capacity are reported for the purposes of this review as the sum of the traded capacity in a particular year that is publicly reported by the pipeline operators. These volumes only cover a portion of the total pipeline capacity that is traded in the Australian market and there appears to be little evidence available on pipeline capacity

trading. The Commission expects that more information will be available in relation to trading of secondary capacity after the capacity trading reforms are implemented.

Pipeline capacity volumes are grouped by pipeline and expressed in TJ.

Some primary and secondary pipeline capacity is offered for sale on some pipeline operators' websites and listed on the GSH. Primary capacity is defined as capacity that is directly marketed by the pipeline operator, while secondary capacity is offered for sale by a market participant that has previously purchased capacity from another party.

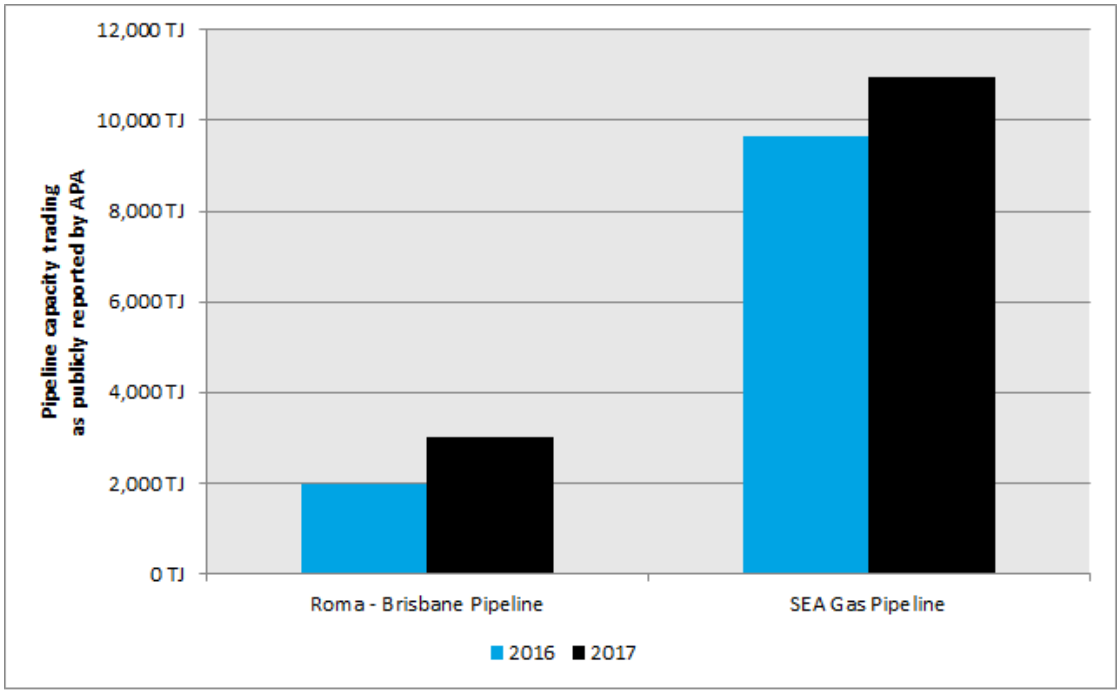
Primary and secondary capacities offered for sale in 2016 and 2017 included:

- the Eastern Gas Pipeline (EGP) and the Queensland Gas Pipeline (QGP) operated by Jemena (primary and secondary capacity)
- the Carpentaria Pipeline, the Moomba to Sydney Pipeline (MSP), the Roma to Brisbane Pipeline (RBP), the South West Queensland Pipeline (SWQP) and the South East Australia Gas Pipeline (SEA Gas Pipeline) operated by the APA group (secondary capacity only).

Trades only occurred on the RBP and the SEA Gas Pipeline in 2016 and 2017. Both of these pipelines use the pipeline trading platform operated by APA group.

Figure 3.5 illustrates that traded volumes of daily firm secondary capacity on the RBP increased by 51 per cent, from 1,993 TJ to 3,009 TJ from 2016 to 2017. There was also a 13 per cent increase in secondary trading volumes on the SEA Gas Pipeline from 9,660 TJ to 10,950 TJ.

Figure 3.5: Pipeline capacity trading as publicly reported by APA



Source: APA's capacity trading website, http://capacitytrading.apa.com.au

The majority of pipeline capacity was traded outside APA's platform, via bilateral agreements. The average traded volumes of daily firm secondary capacity that were publicly reported constituted only a fraction of the nameplate capacity of those pipelines.

Table 2 below shows how average traded daily volumes compare to the total volume the pipeline could transport. Percentages are expressed as a ratio of the average traded volumes of daily firm secondary capacity and the nameplate capacity of the pipelines in each year. The AEMC has no visibility of bilateral agreements at this time.

Table 3.1: Yearly average ratio of daily traded capacity as a percentage of nominal capacity of the pipeline

PIPELINE	NAMEPLATE CAPACITY (TJ)	AVERAGE RATIO OF DAILY CAPACITY (2016)	AVERAGE RATIO OF DAILY CAPACITY (2017)
Roma - Brisbane Pipeline	233	2.3%	3.5%
SEA Gas Pipeline	314	8.4%	9.6%

Some stakeholders indicated that although the capacity trading reforms have not yet been implemented, the proximity of its implementation deadline is already affecting pipeline capacity trading. Therefore, greater volumes of secondary trading are expected to occur in the next two years.

In its submission to the draft report, AEMO suggested a range of pipeline capacity trading metrics to be included in the next biennial review.[18]

The Commission agrees that once the pipeline capacity trading reforms are implemented, the metrics that monitor liquidity in those markets will need to be reviewed and then developed or adjusted, as necessary.

3.2 Churn rate on the gas supply hub

Churn rate is defined as the ratio of all traded volumes to the throughput of the underlying physical product, whether that is gas or pipeline capacity.[19] The churn rate is commonly used in commodity and financial markets to assess maturity and liquidity of a given market.

AGL, in its submission to the scoping paper, contended that the churn rate (defined as the ratio of trades to the physical market) at the GSH will not be comparable to the measure used in futures and forward markets.[20] The Commission understands that the definition of churn rate requires it to be calculated as a ratio of trades to physical throughput.

Churn rate is only calculated in relation to the GSH as a ratio between the total traded volumes and the total physical throughput delivered through the trading locations of the GSH. Due to the availability of data, churn rate calculations start from the fourth calendar quarter of 2016. 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.

Physical flows varied significantly across quarters from October 2016 to December 2017. Table 3.2 below shows exported volumes out of these locations in TJ by quarter.

In 2017, a total of 267,430 TJ flowed out from Wallumbilla, and 117,818 TJ left Moomba.[21]

Table 3.2: Quarterly net flows through the Wallumbilla and Moomba locations (TJ)

YEAR	QUARTER	WALLUMBILLA	MOOMBA
2016	Oct-Dec	73,179	30,009
2017	Jan-Mar	68,737	30,590
2017	Apr-Jun	58,384	26,060
2017	Jul-Sept	69,140	30,814
2017	Oct-Dec	71,169	30,355

18 AEMO submission to the Draft report, 23 May 2018, p. 2
19 A more detailed description of the churn rate is available in the Scoping paper of this report.
20 AGL submission to the Scoping paper, 13 March 2018, p. 2
21 These volumes represent the gas that flows out from the Wallumbilla and Moomba locations to all possible directions.

Traded volumes on the GSH have increased across quarters October 2016 to December 2017. Table 3.3 below shows those volumes in TJ by quarter.

In 2017, the total of 11,602 TJ was traded at Wallumbilla, and 12 TJ at Moomba.

Table 3.3: Quarterly traded volumes at the Wallumbilla and Moomba locations (TJ)

YEAR	QUARTER	WALLUMBILLA	MOOMBA
2016	Oct-Dec	1,180	0
2017	Jan-Mar	1,344	0
2017	Apr-Jun	2,582	0
2017	Jul-Sept	3,681	2
2017	Oct-Dec	3,995	10

As previously discussed, the churn rate for a location is a mathematical fraction created by dividing the traded volumes by the total physical throughput of gas during a given period. For example the quarterly churn rate for Wallumbilla for the last quarter of 2016 is calculated by dividing its 1,180 TJ traded volumes by 73,179 TJ of gas that was transported through the relevant pipelines.

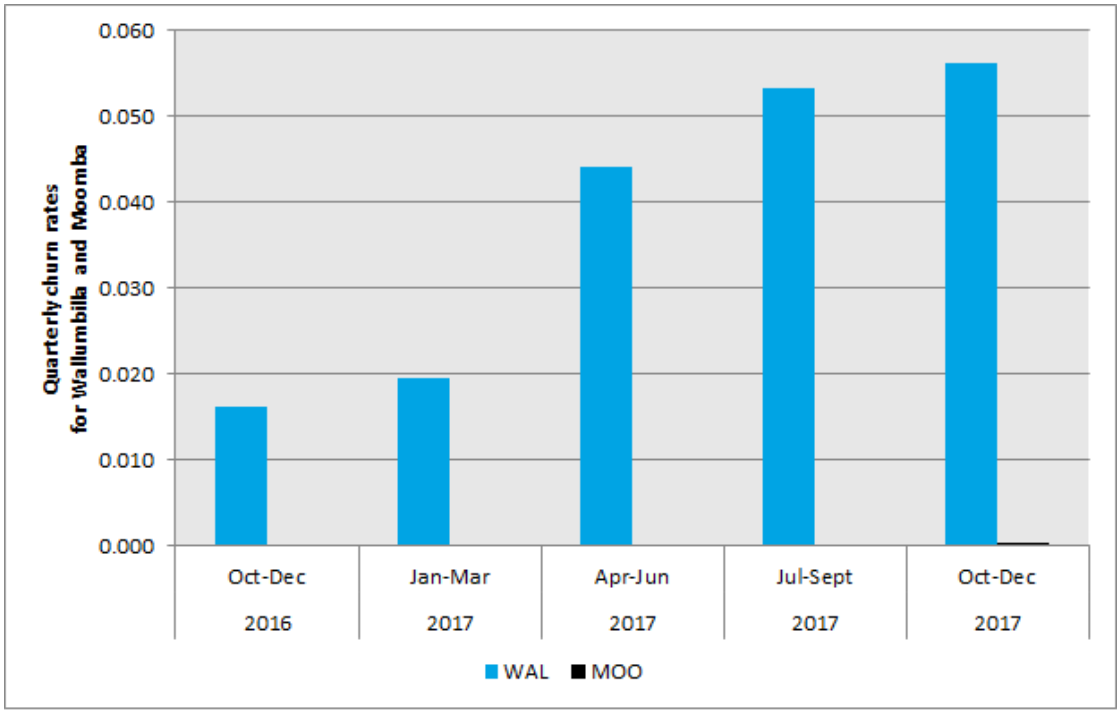
As shown in Table 3.4, churn rates remained below 0.1 across all quarters and locations. However, there appeared to be an upward trend at Wallumbilla. The churn rate for Moomba remained below 0.001 in the third and fourth quarters of 2017. Table 3.4 and Figure 3.6 below shows churn rates by quarter.

In 2017, the yearly churn rate for Wallumbilla was 0.043 and remained below 0.001 for Moomba.

Table 3.4: Quarterly churn rates for the Wallumbilla and Moomba locations

YEAR	QUARTER	WALLUMBILLA	MOOMBA
2016	Oct-Dec	0.016	N/A
2017	Jan-Mar	0.020	N/A
2017	Apr-Jun	0.044	N/A
2017	Jul-Sept	0.053	<0.000
2017	Oct-Dec	0.056	<0.000

Figure 3.6: Quarterly churn rates for Wallumbilla and Moomba locations



The Commission expects that where more gas supply becomes available and more participants enter the market, churn rates would increase. However, if bilateral and OTC-traded volumes increase more rapidly than exchange based trading, churn rates may decrease.

3.3 Bid-offer spreads on the gas supply hub

3.3.1 Submissions

The Commission recognises the importance of providing usable metrics to the industry.

During the qualitative survey process, a GSH market participant suggested that individual bid-offer spreads would provide more meaningful information, if this metric was calculated as a dollar value of the price difference between the best bid and offer in the order book.

That stakeholder noted that the industry in general is more used to understanding and using absolute dollar spreads than percentages. It added that a percentage value may be misleading if calculated at different times when the price of the underlying commodity changes significantly. For example, a one dollar spread between an offer price of $6 and a bid price of $5 would equal to a 20 per cent spread. While the same one dollar spread on a $11-$10 bid-offer pair would represent just a 10 per cent spread.

The Commission notes that the absolute value of spreads occurring at lower priced commodities contains different information to those occurring at higher priced commodities.

In other words, a one dollar spread carries a different message to market participants on a commodity that is usually priced between one to ten dollars per unit, than a one dollar spread on a commodity that is traded in the hundreds of dollars per unit.

In the Commission's view, both the absolute dollar and the relative percentage value of the bid-offer spread contain different and useful information, and as such both metrics will be included in the report.

AGL, in its submission to the scoping paper, suggested that the bid-offer spread may not be accurate as some prices can be out of date.[22] The Commission is of the view that bid-offer spreads reflect market participants' ability to trade in the market. Out of date prices, if left in the order book intentionally, form part of that ability or inability to trade.

3.3.2 Baselines

In order to be consistent with future reports, the Commission considered that the bid-offer spread should only be calculated in relation to trading locations that exist at the time of completion of this report and are likely to continue to exist during the time of completion of subsequent reports.

In March 2017 the RBP, SWQP and QGP trading locations at the Wallumbilla GSH were discontinued. Simultaneously, a new Wallumbilla product (WAL) was introduced that groups together delivery points at, and connecting to the Wallumbilla GSH. A new South East Queensland (SEQ) product was also launched with virtual delivery at the RBP. Consequently, the Commission calculated the bid-offer spreads from the second calendar quarter (1 April to 30 June) through to the fourth calendar quarter (1 October to 31 December) of 2017, for products that were available to trade in that time period.

Figure 3.7 shows that the bid-offer spread in absolute dollar terms have decreased in relation to all traded products. The spread was generally smaller for the shorter term products and larger for the longer term products. As further discussed in section 3.6, data based on the number of trades appear to suggests that products with tenors closer to the delivery period are more frequently traded than products that reach further out to the future. More vibrant trading activity indicates that there is a better ability to trade volumes in a short period of time, leading to lower bid-offer spreads and greater liquidity in shorter term products. This is consistent with survey participants' views that liquidity on the GSH is lower in the long term, and higher in the short term.

22 AGL submission to the Scoping paper, 13 March 2018, p. 2

Figure 3.7: Bid-offer spreads on the WAL product ($)

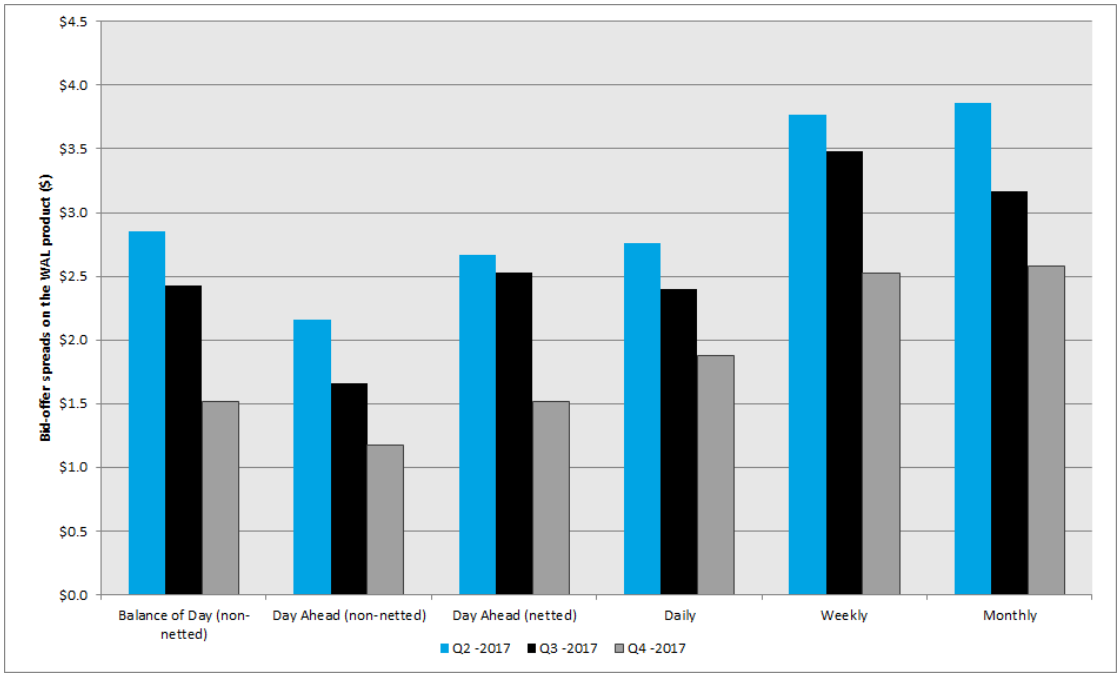


Figure 3.8 shows the bid-offer spread in relative terms, as a percentage (lowest offer minus highest bid, divided by the highest bid) for the same products and the same period. The relative increase in the third quarter of 2017 is due to a drop in the bid and offer prices in that quarter.

Figure 3.8: Bid-offer spreads on the WAL product (%)

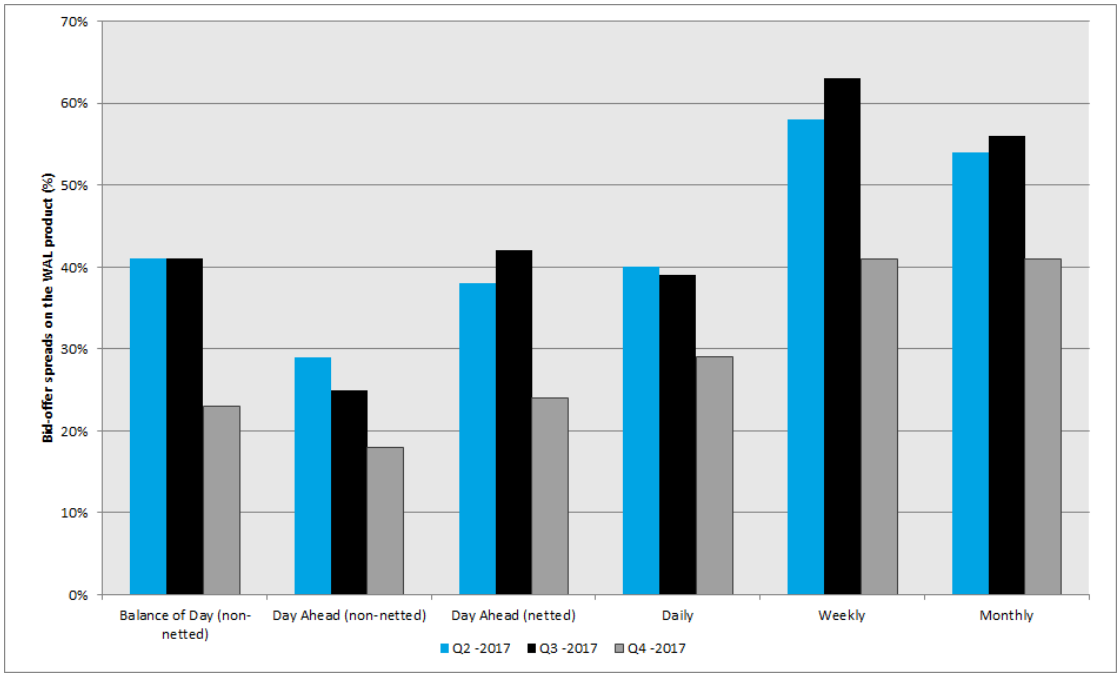


Figure 3.9 and 3.10 illustrate that with the exception of the weekly products the bid-offer spread for the SEQ products has been gradually decreasing throughout the period. Similar to the WAL products, the spread was higher on the long term and lower on the short term SEQ products.

Figure 3.9: Bid-offer spreads on the SEQ product ($)

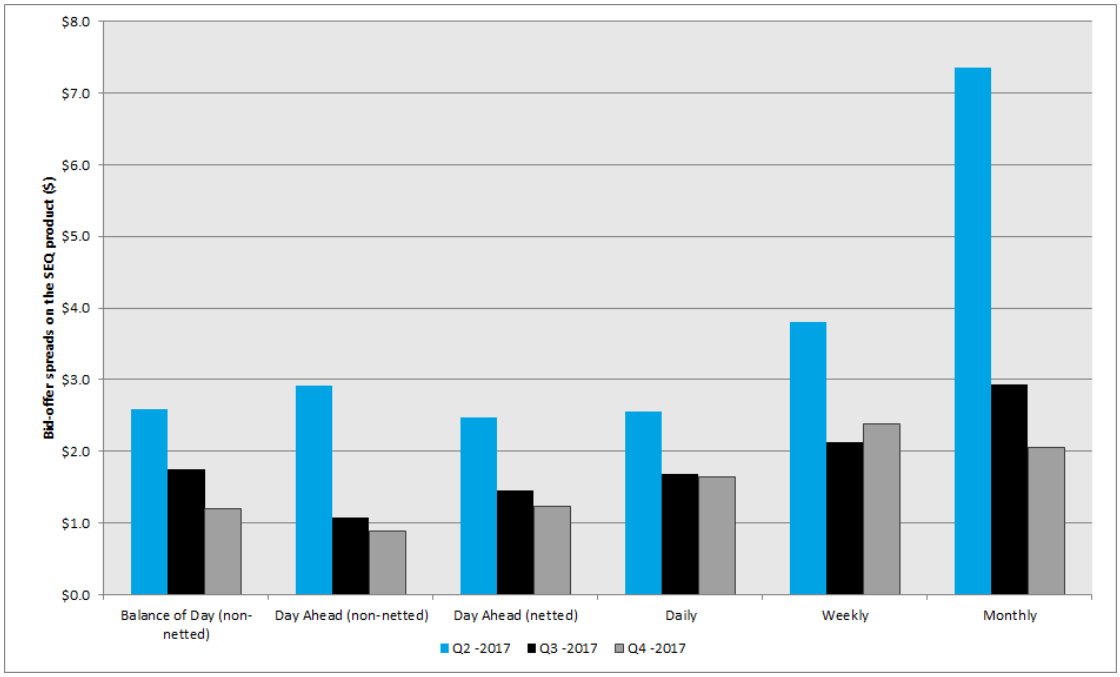
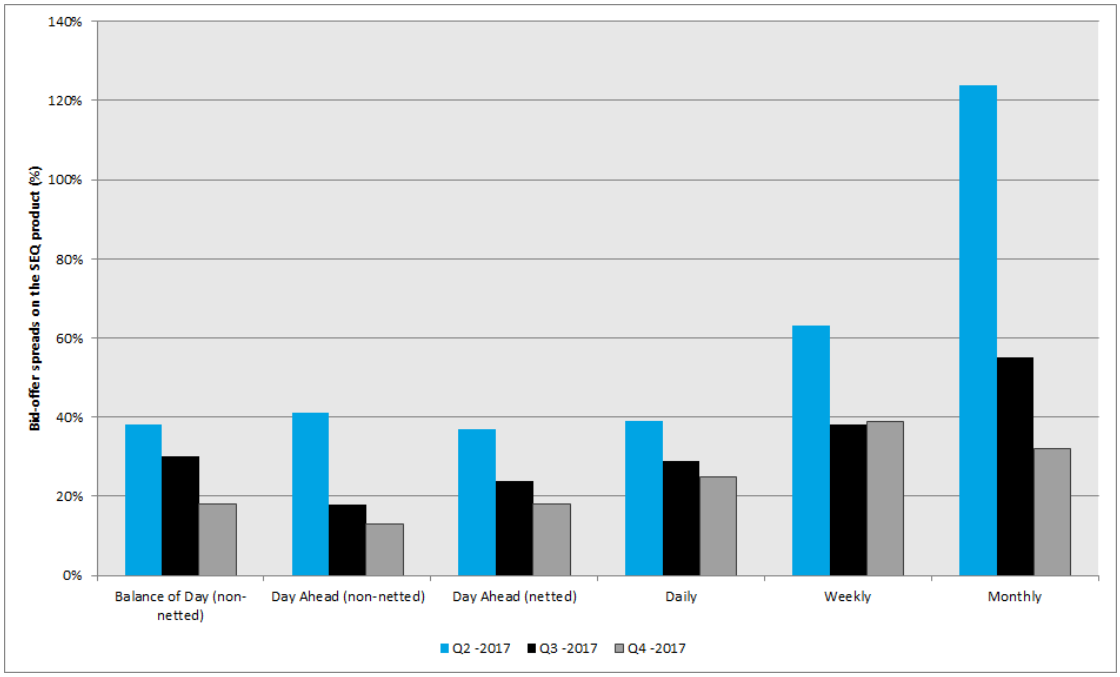


Figure 3.10: Bid-offer spreads on the SEQ product (%)



Figures 3.11, 3.12, 3.13 and 3.14 illustrate that bid-offer spreads were inconclusive and were not always available on the Moomba GSH. This is due to a lack of offers or bids submitted to the order book during the period. The two trading locations shown in those figures are the Moomba to Adelaide Pipeline (MAP) and the Moomba to Sydney Pipeline.

Figure 3.11: Bid-offer spreads on the MAP product ($)

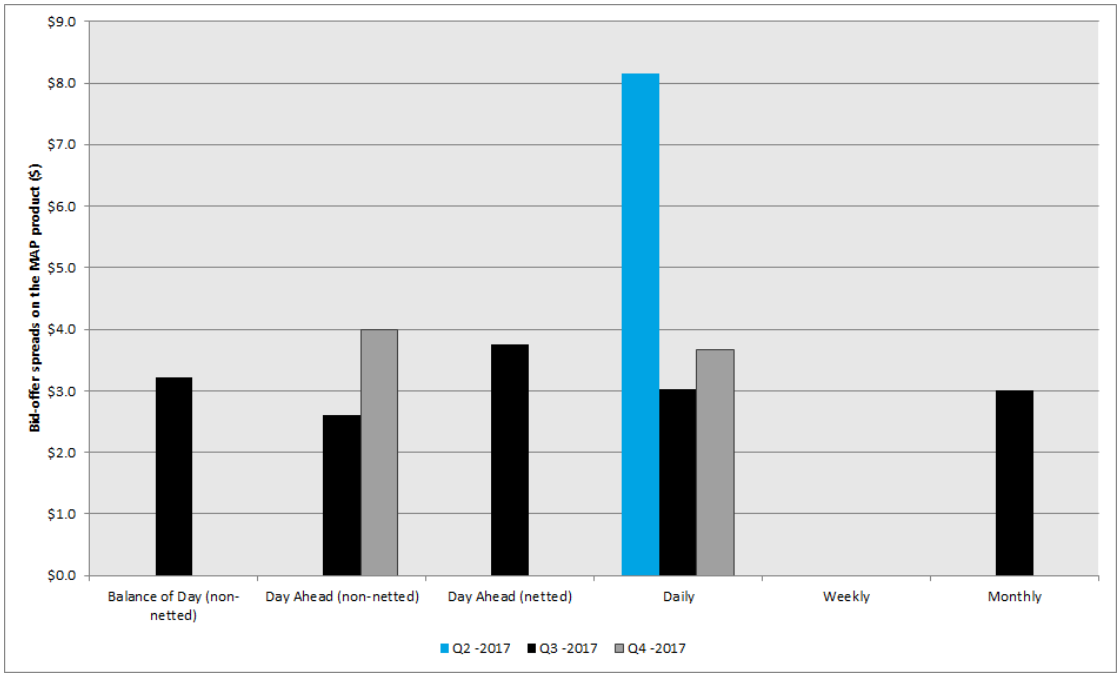


Figure 3.12: Bid-offer spreads on the MAP product (%)

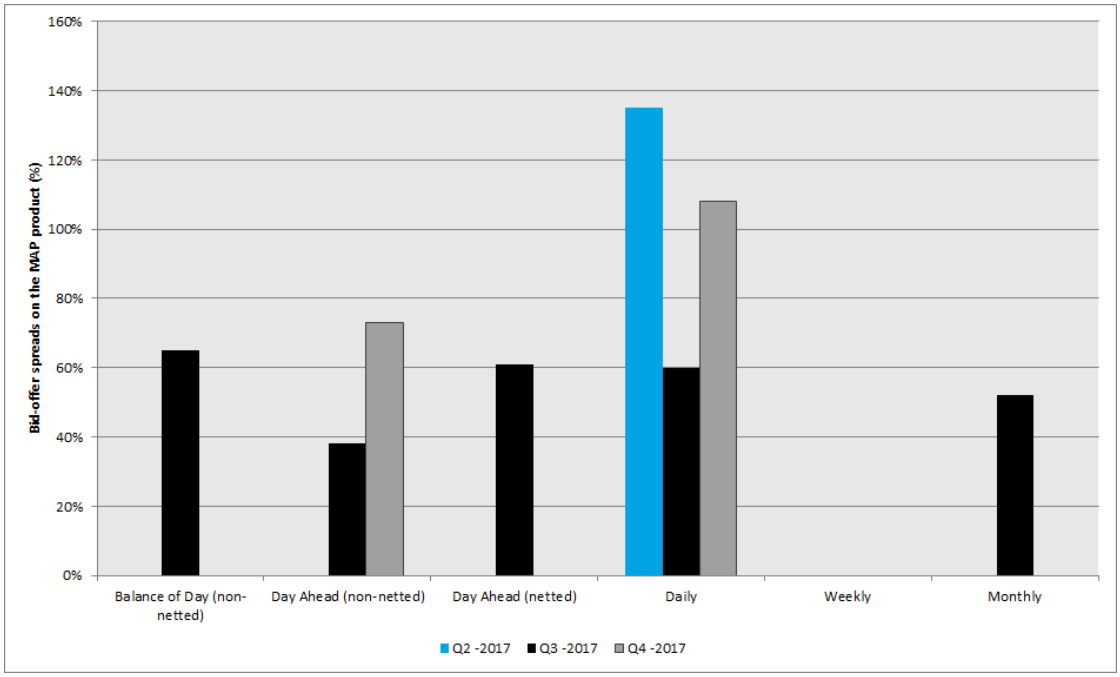


Figure 3.13: Bid-offer spreads on the MSP product ($)

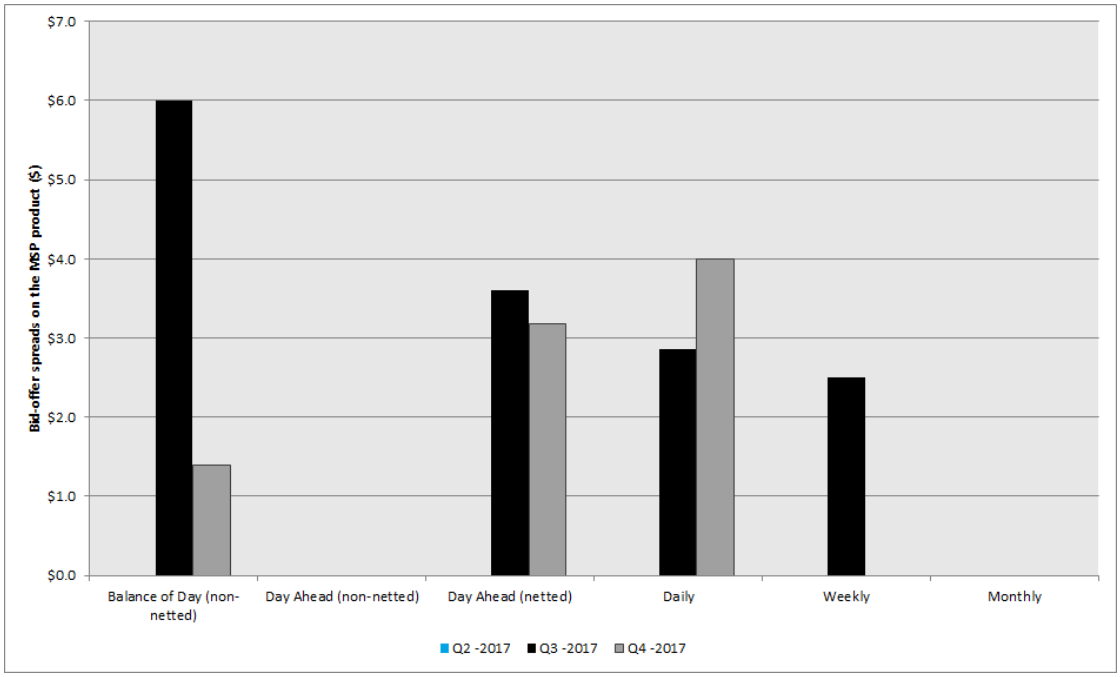


Figure 3.14: Bid-offer spreads on the MSP product (%)

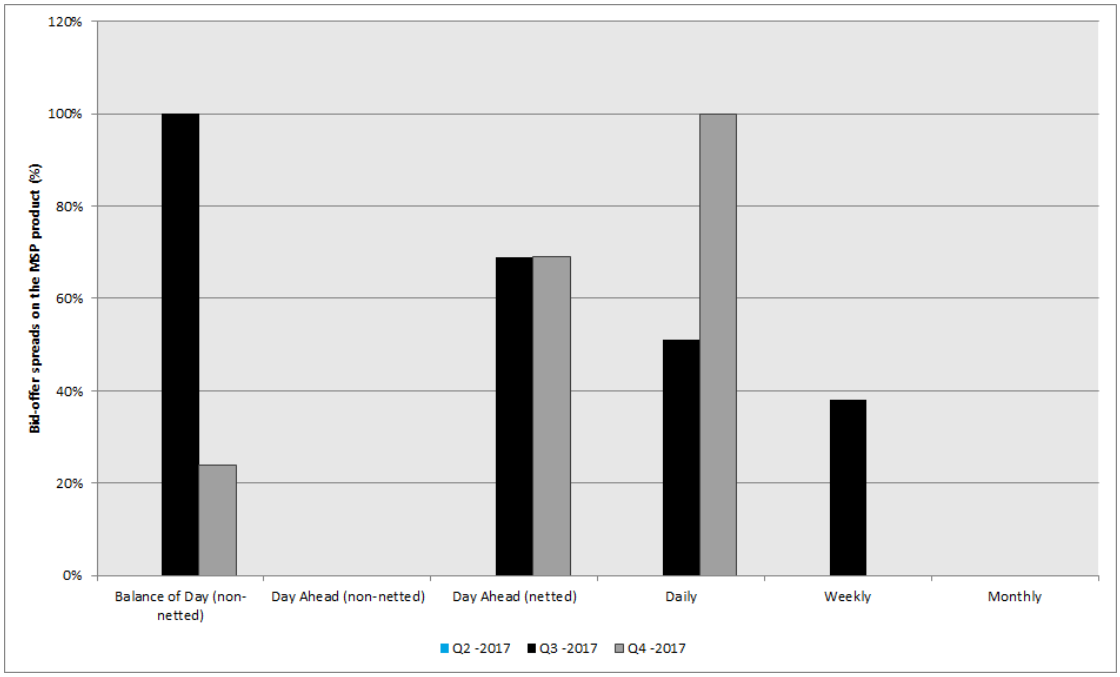


Table 3.5 provides the absolute and relative bid-offer spread number values for all products in Figure 3.7 to Figure 3.14.

Table 3.5: Bid-offer spreads on the GSH

ABSOLUTE SPREADS ($)				
TRADING LOCATION	**PRODUCT**	**Q2 -2017**	**Q3 -2017**	**Q4 -2017**
WAL	Balance of Day (non-netted)	2.85	2.43	1.52
	Day Ahead (non-netted)	2.16	1.66	1.17
	Day Ahead (netted)	2.67	2.53	1.52
	Daily	2.76	2.4	1.88
	Weekly	3.77	3.48	2.52
	Monthly	3.86	3.17	2.58
SEQ	Balance of Day (non-netted)	2.58	1.75	1.20

ABSOLUTE SPREADS ($)

TRADING LOCATION	PRODUCT	Q2 -2017	Q3 -2017	Q4 -2017
	Day Ahead (non-netted)	2.92	1.08	0.89
	Day Ahead (netted)	2.47	1.45	1.23
	Daily	2.55	1.69	1.65
	Weekly	3.80	2.12	2.38
	Monthly	7.35	2.94	2.05
MAP	Balance of Day (non-netted)	N/A	3.21	N/A
	Day Ahead (non-netted)	N/A	2.60	4.00
	Day Ahead (netted)	N/A	3.76	N/A
	Daily	8.15	3.02	3.67
	Weekly	N/A	N/A	N/A
	Monthly	N/A	3.00	N/A
MSP	Balance of Day (non-netted)	N/A	6.00	1.40
	Day Ahead (non-netted)	N/A	N/A	N/A
	Day Ahead (netted)	N/A	3.61	3.18
	Daily	N/A	2.86	4.00
	Weekly	N/A	2.50	N/A
	Monthly	N/A	N/A	N/A

RELATIVE SPREADS (%)

TRADING LOCATION	PRODUCT	Q2 -2017	Q3 -2017	Q4 -2017
WAL	Balance of Day (non-netted)	41	41	23
	Day Ahead (non-netted)	29	25	18

RELATIVE SPREADS (%)

TRADING LOCATION	PRODUCT	Q2 -2017	Q3 -2017	Q4 -2017
	Day Ahead (netted)	38	42	24
	Daily	40	39	29
	Weekly	58	63	41
	Monthly	54	56	41
SEQ	Balance of Day (non-netted)	38	30	18
	Day Ahead (non-netted)	41	18	13
	Day Ahead (netted)	37	24	18
	Daily	39	29	25
	Weekly	63	38	39
	Monthly	124	55	32
MAP	Balance of Day (non-netted)	N/A	65	N/A
	Day Ahead (non-netted)	N/A	38	73
	Day Ahead (netted)	N/A	61	N/A
	Daily	135	60	108
	Weekly	N/A	N/A	N/A
	Monthly	N/A	52	N/A
MSP	Balance of Day (non-netted)	N/A	100	24
	Day Ahead (non-netted)	N/A	N/A	N/A
	Day Ahead (netted)	N/A	69	69
	Daily	N/A	51	100
	Weekly	N/A	38	N/A
	Monthly	N/A	N/A	N/A

Stakeholders, as part of the qualitative survey, indicated that the bid-offer spread is expected to narrow in the future, as liquidity and confidence in the hub increases. This is consistent with the Commission's expectation for this metric over time.

3.4 Number of active participants

AGL in its submission to the scoping paper stressed the importance of the number of parties prepared and able to trade as a measure of liquidity.[23] The Commission shares this view and uses the methodology outlined in the scoping paper and below to provide a useful metric of liquidity.

For the metric listed in Table 2.1 it is necessary to define an "active" participant in the market. An active participant is defined, for the purposes of this review, as one that has been engaged in trading on the market at least once in any given month. Further, being engaged in a market is understood as submitting a valid bid or an offer. This definition allows for a comparison across all centralised wholesale gas markets in eastern Australia.

This metric is designed to measure participation in the markets at the early stages of market development. As part of the qualitative survey process, a GSH market participant suggested that the timeframe at which the activity of a participant is looked at could be reduced to a week, instead of a month. The AEMC notes that as liquidity in the market increases over time, consideration may be given to the development of more sophisticated measures of market depth or measuring activity over shorter (weekly or daily) timeframes.

This liquidity metric is expressed through calculating the average yearly activity of registered participants belonging to certain categories, based on the arithmetic average of monthly activity. These categories include exporters, retailers, generators, industrial customers and traders, wherever possible. For example if only one retailer was active in a market in six out of the total twelve months in a year, the activity metric for retailers would be calculated by dividing the number of active retailers in each month (6 x 1) by the number of total months in a year (12). In this instance the metric would equal to (6 x 1) / 12 = 0.5.

3.4.1 The gas supply hubs

The number of active participants on the GSH has increased for almost every participant category from 2016 to 2017.

This metric shows the average yearly involvement of participants by participant type, based on their monthly activity. Table 3.6 and Figure 3.15 below show this activity at Moomba and Wallumbilla, combined. This is because there is only one single membership available for both Moomba and Wallumbilla, via registration on the GSH.

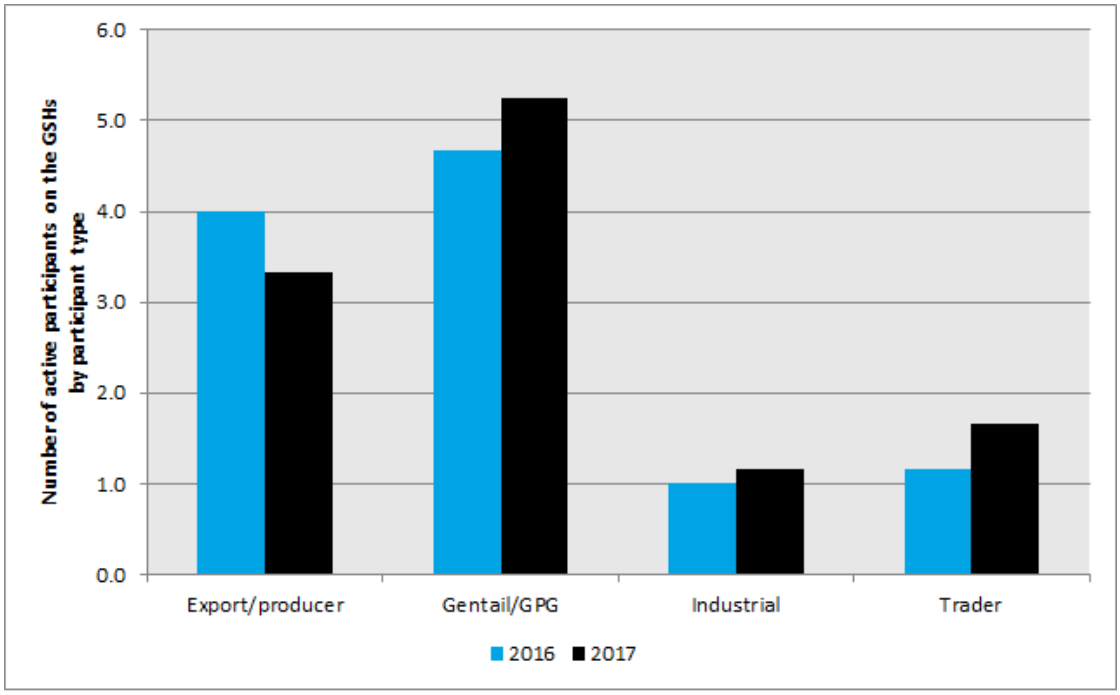
The average number of all active participants was 10.8 in 2016 and 11.4 in 2017.

23 ibid., p. 1

Table 3.6: **Yearly average trading activity on the GSH by participant type**

TYPE OF PARTICIPANT	2016	2017
Exporter/producer	4.0	3.3
Gentailer/Gas Power Generator	4.7	5.3
Industrial	1.0	1.2
Trader	1.2	1.7

Figure 3.15: **Yearly average trading activity on the GSH by participant type**



As new participants enter the GSH, greater activity is expected on the hub. Currently, gentailers and gas fired generators appear to be the most active participant category, however, stakeholders indicated that further involvement of traders[24] is likely to occur in the next two years. This expectation is based on the observation by a stakeholder that the increasing activity of brokers and financial intermediaries indicates "there is money to be made on these markets". In terms of industrial participants, it is necessary to wait and see if

24 In this context, traders are defined as companies that do not have a "natural position" in the market, i.e. they do not have a significant physical portfolio such as a retailer's load or a producer's production assets.

and when they enter the market, and what, if anything, is preventing their participation in the GSH.

3.4.2 The short term trading markets

The number of active participants on the STTMs has increased for every participant category from 2016 to 2017.

Due to the differences in market design, the participant categories in the STTMs are somewhat different from the other markets. Within the pre-defined areas around the demand centres of Adelaide, Sydney and Brisbane, participation on the STTMs is mandatory.

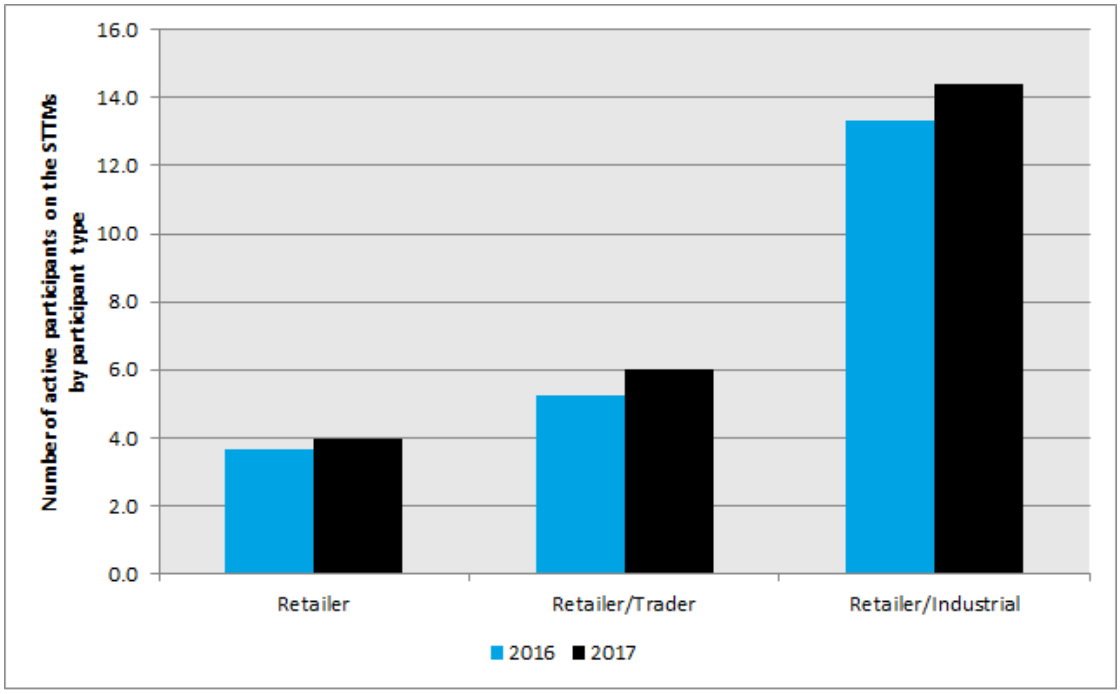
This metric shows the average yearly involvement of participants by participant type, based on their monthly activity.

Table 3.7 and Figure 3.16 summarise the outcomes in 2016 and 2017. The average number of all active participants across all STTMs was 22.2 in 2016 and 24.4 in 2017.

Table 3.7: Yearly average trading activity on the STTMs by participant type

TYPE OF PARTICIPANT	2016	2017
Retailer	3.7	4.0
Retailer/Trader	5.2	6.0
Retailer/Industrial	13.3	14.4

Figure 3.16: Yearly average trading activity on the STTMs by participant type



Trends across the three STTMs were similar, with two exceptions:

1. The activity of retailers compared to other types of participants was greater on the Adelaide STTM than at the others.
2. While the number of active participants on the STTMs has increased for every participant category from 2016 to 2017, participant activity in the Retailer/Industrial participant category on the Brisbane STTM has decreased from 2016 to 2017.

Table 3.8 and Figures 3.17, 3.18 and 3.19 provide an overview of participant activity at the Adelaide, Brisbane and Sydney STTMs.

Table 3.8: Yearly average trading activity on the ADL, BRI and SYD STTMs by participant type

STTM	PARTICIPANT CATEGORY	2016	2017
ADL	Retailer	2.4	3
	Retailer/Trader	0.1	0.3
	Retailer/Industrial	3.0	4.1
BRI	Retailer	1.1	1.2

STTM	PARTICIPANT CATEGORY	2016	2017
	Retailer/Trader	0.9	1.0
	Retailer/Industrial	5.2	4.3
SYD	Retailer	3.6	4
	Retailer/Trader	5	6
	Retailer/Industrial	8.4	11.7

Figure 3.17: Yearly average trading activity on the ADL STTM by participant type

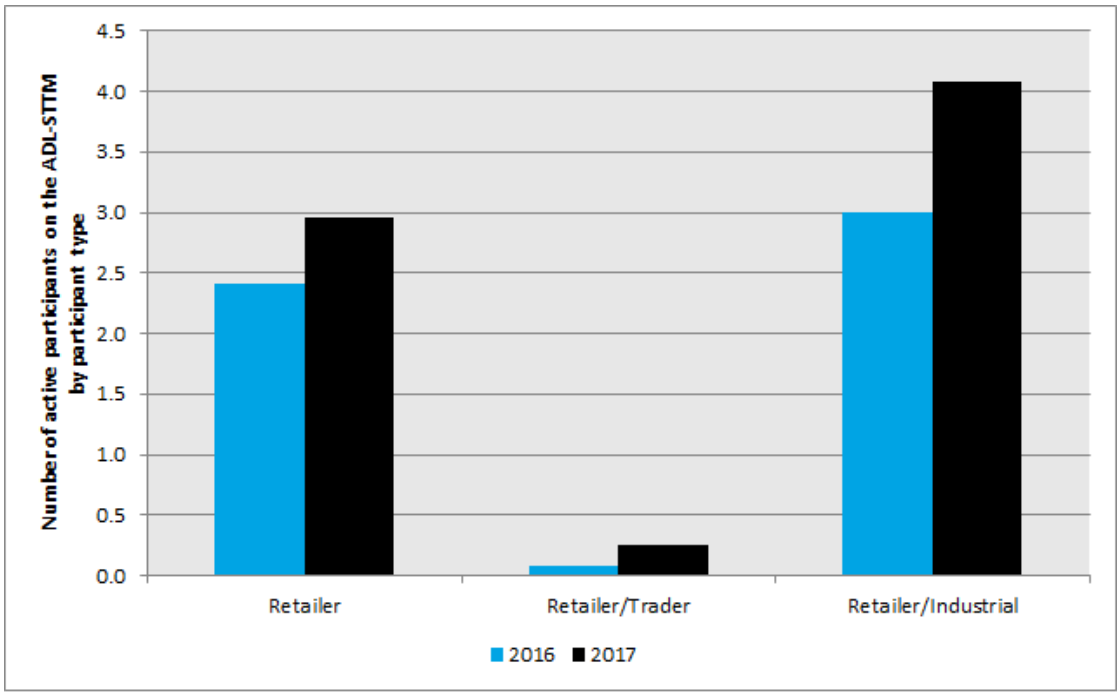


Figure 3.18: Yearly average trading activity on the BRI STTM by participant type

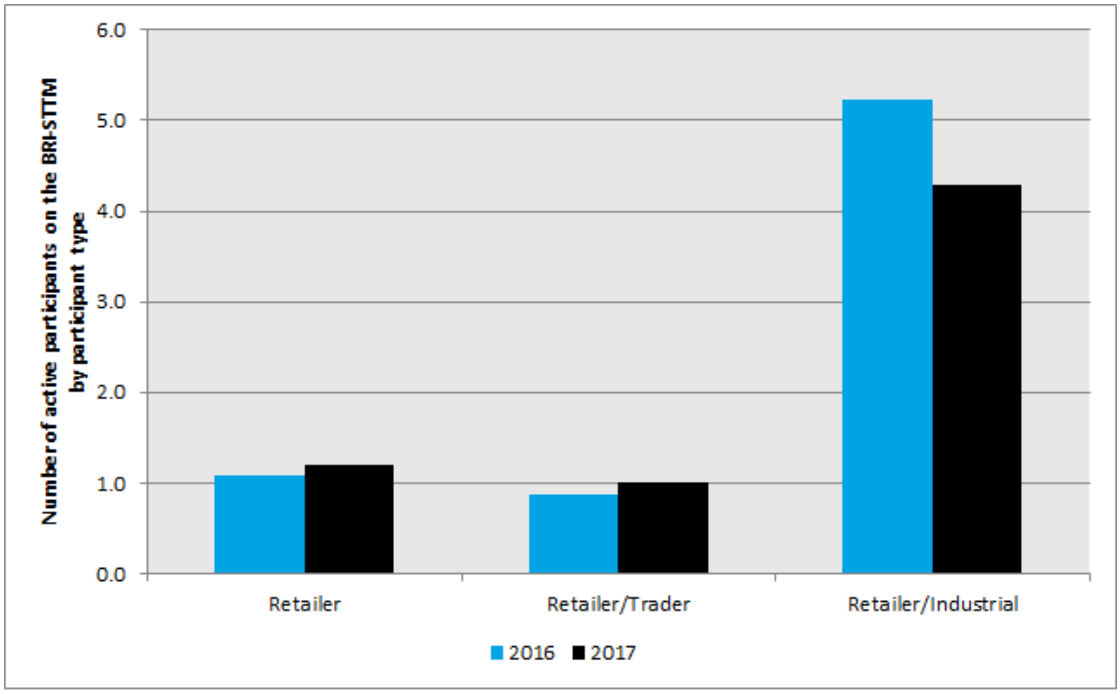
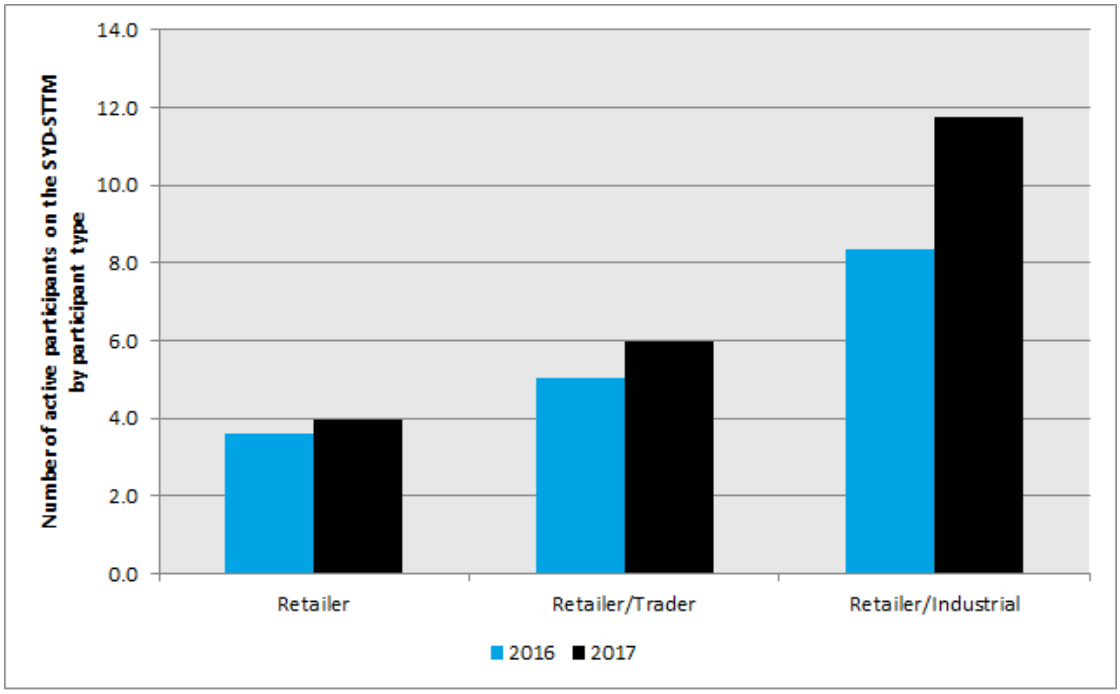


Figure 3.19: Yearly average trading activity on the SYD STTM by participant type



Trading activity on the STTMs may be expected to increase further as long term gas supply contracts expire and market participants become more confident in using a range of contracting and spot market acquisitions to manage their gas demand and pricing. This may become an alternative to purchasing gas via third parties, such as retailers.

3.4.3 The Victorian declared wholesale gas market

The number of active DWGM participants has increased in almost every participant category from 2016 to 2017.

Due to the differences in market design, the participant categories in the DWGM are somewhat different from the other markets. The DWGM is also a mandatory market, where gas on the wholesale level can only be purchased and sold through the market.

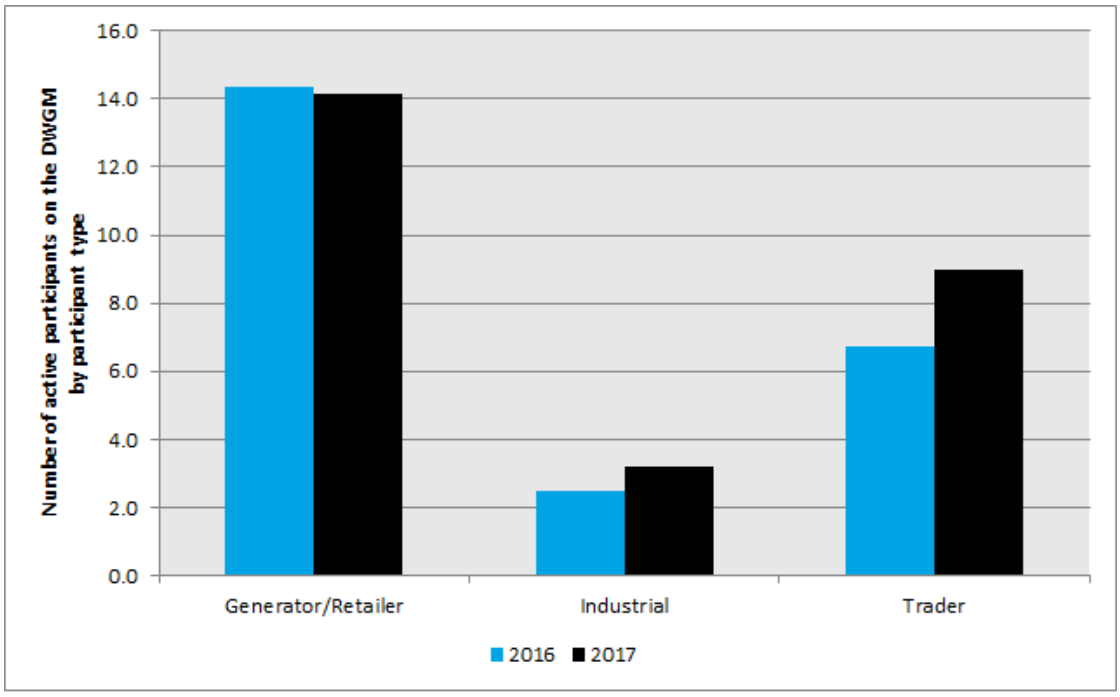
This metric shows the average yearly involvement of participants by participant type, based on their monthly activity. Table 3.9 and the Figure 3.20 below show this activity in greater detail.

The average number of all active participants was 23.6 in 2016 and 26.3 in 2017.

Table 3.9: Yearly average trading activity on the DWGM by participant type

TYPE OF PARTICIPANT	2016	2017
Generator/Retailer	14.4	14.1
Industrial	2.5	3.2
Trader	6.7	9.0

Figure 3.20: Yearly average trading activity on the DWGM by participant type



Industrial users and traders showed the greatest increase in activity on the DWGM. This aligns with some of the stakeholder feedback that indicated market participants' increased confidence in being able to independently trade on the market. Higher prices offered for longer term contracts was seen as an incentive for market participants to build out trading capabilities and be involved in spot trading.

3.5 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 Guideline document indicates that HHI levels above 2,000 are indicative of a concentrated market. A more

detailed description of the methodology of the calculation of the HHI was included in the scoping paper.

In addition, the Commission considered that market concentration on centralised markets such as the GSH, the STTMs and the DWGM may be different on the buy and the sell sides. For this reason separate HHI values were calculated for each side of the markets.

Origin, in its submission to the scoping paper contended that due to the fundamental differences between the European and the Australian markets, measuring market concentration, particularly the HHI, does not provide a valid point of reference at this time.[25]

The Commission recognises the differences between the Australian and European markets and is also aware that current levels of market concentration may apply to Australian markets in the longer term. However, the Commission considers that there is value in of showing the dynamics of the HHI and how concentration changes in the market over time.

Origin also submitted that publication of information about market concentration should be carefully considered, so that it does not compromise the anonymous nature of the trading platform.[26] The Commission shares this view and, therefore, measures concentration in this final report by the HHI.

In its submission to the draft report, AEMO cautioned against using the nominal HHI as a measure of overall market concentration as it excludes bilateral and OTC trades from the analysis and suggested that the entire underlying market should be considered instead.[27]

The Commission notes that the baseline figures it calculated for each organised 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. In addition, the AEMC's ability to assess information related to bilateral contracts is restricted by the confidential nature of those contracts.

3.5.1 The gas supply hubs

Sell side market concentration has increased somewhat from 2016 to 2017 at the Wallumbilla location. The HHI value was 1,424 in 2016 and 1,462 in 2017. This shows a small increasing trend and increasing concentration.

Buy side concentration has decreased at Wallumbilla from 1,840 to 1,331.

HHI could not be calculated for Moomba in 2016, due to the lack of trades. Given the two trades that occurred in 2017 with different buyers and sellers in both cases, the value was 7,222 for both sides. The Commission notes that this number is not very informative given the low number of trades.

Despite the relatively low number of active participants at Wallumbilla, both sell and buy side market concentration remained below 2,000.

25 Origin submission to the Scoping paper, 14 March 2018, p. 1
26 ibid., p .1
27 AEMO submission to the Draft report, 23 May 2018, p. 3

3.5.2 The short term trading markets

Figure 3.21 and Table 3.10 below show market concentration on all STTMs from a sell and buy side perspective. Concentration on the sell side has decreased on the Adelaide and the Brisbane STTMs, but the HHI value remained above 2,000 in both cases. There was a small increase in concentration on the sell side on the Sydney STTM, however, the HHI value remained below 2,000 in 2016 and 2017.

Figure 3.21: Sell side HHI on the STTMs

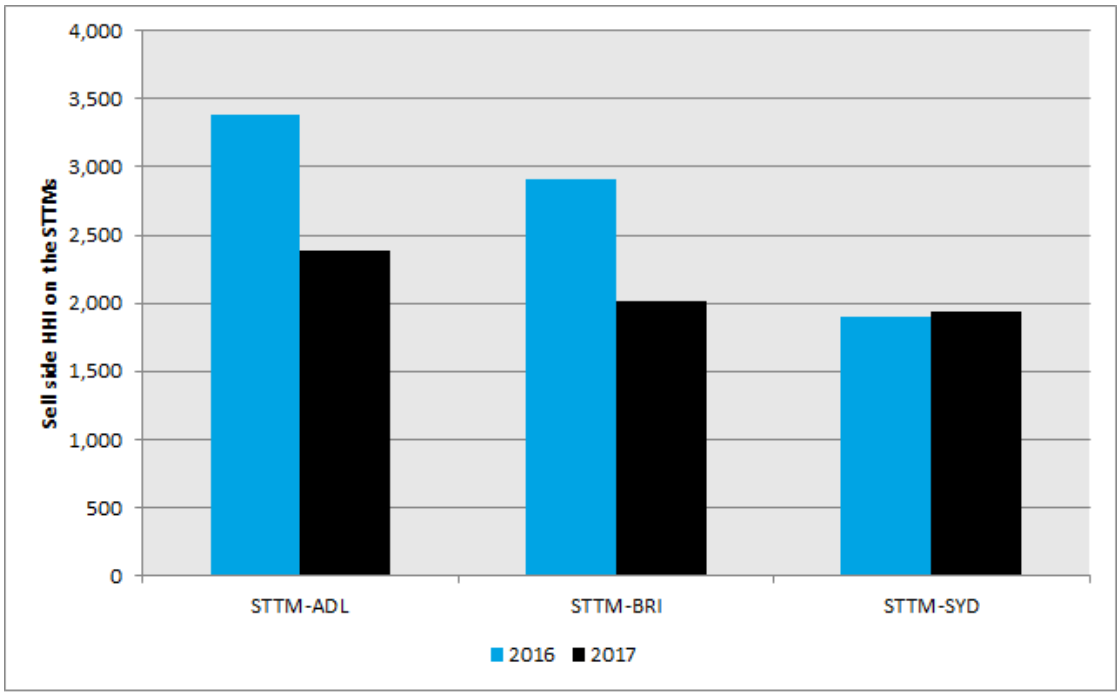


Table 3.10: Sell side HHI on the STTMs

STTM	2016	2017
ADL	3,392	2,391
BRI	2,919	2,025
SYD	1,905	1,935

Figure 3.22 and Table 3.11 show a reverse of the sell side trend was observable on the buy side, whereby concentration decreased on the Adelaide and the Brisbane STTMs below an HHI of 2,000. The buy side HHI of the Sydney STTM, increased from 2016 to 2017, but remained below 2,000.

Figure 3.22: Buy side HHI on the STTMs

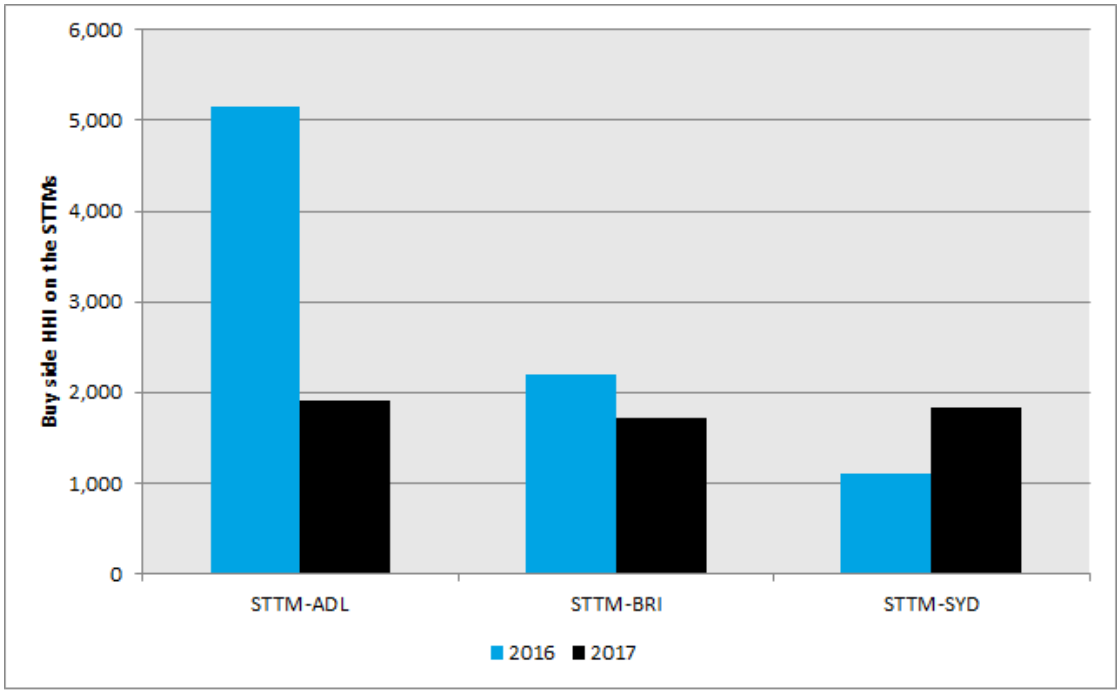


Table 3.11: Buy side HHI on the STTMs

STTM	2016	2017
ADL	5,139	1,901
BRI	2,187	1,718
SYD	1,108	1,834

Market concentration levels appeared to decrease both on the sell and a buy side in the two STTMs (Adelaide and Brisbane) that also had the lowest traded volumes. This decrease in concentration occurred while traded volumes decreased, but participant activity increased.

The Sydney STTM, the least concentrated amongst all three STTMs, did see an increase in concentration. However, its HHI values on both the sell and the buy side remained below 2,000.

3.5.3 The Victorian declared wholesale gas market

Market concentration increased on the DWGM on both the sell and the buy sides.

Figure 3.23 and Table 3.12 illustrate that there was a significant increase on the sell side from 1,529 to 3,044 from 2016 to 2017. A smaller increase on the buy side pushed the HHI from its 1,189 level in 2016 to 1,310 in 2017.

Figure 3.23: Sell and buy side HHI on the DWGM

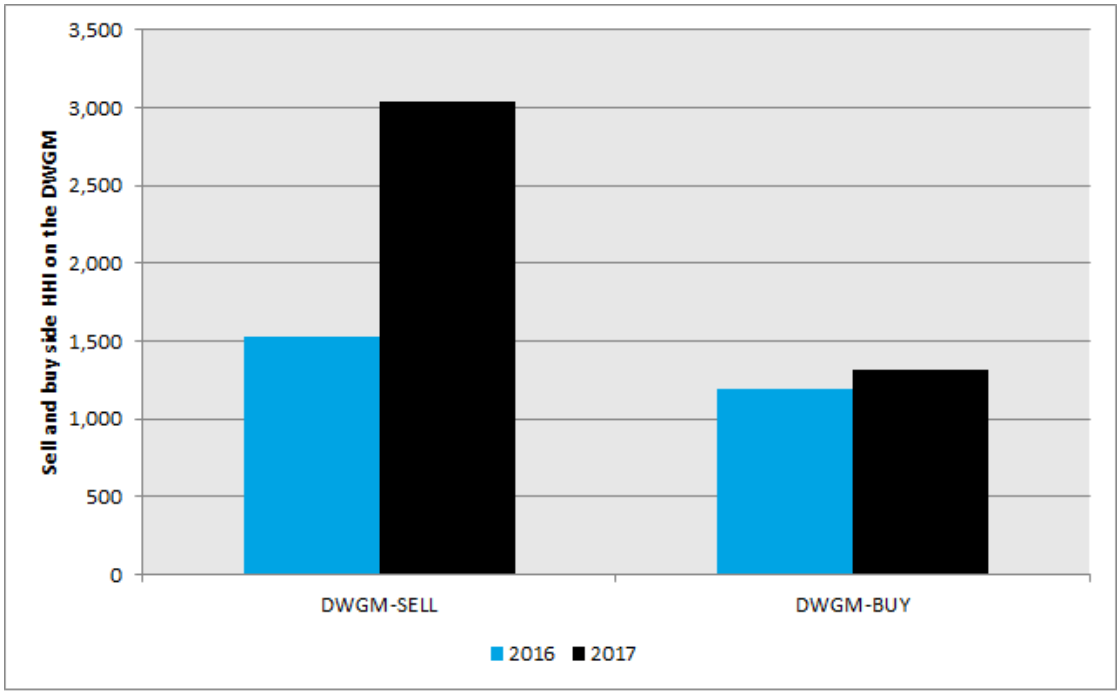


Table 3.12: Sell and buy side HHI on the DWGM

HHI SIDE	2016	2017
SELL	1,529	3,044
BUY	1,189	1,310

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.

With the exception of the Adelaide STTM in 2016, buy side market concentration, with HHI values below 2,000, appeared to be lower than sell side market concentration across all markets and periods. In other words, in almost all markets a lower number of sellers offered greater volumes for sale, while a higher number of buyers purchased smaller volumes. By 2017, buy side HHI value in all markets was below 2,000.

With the exception of the DWGM, there were either small increases or considerable decreases across all markets in the sell side market concentration from 2016 to 2017. This means that in most markets, during this time period, the average volume offered by sellers either decreased or did not increase significantly.

3.6 Number of trades per product

The Commission considers that showing the number of trades per product as a sum of the number of trades relating to products with the same tenor length as the best way of calculating this metric. For example if a daily product was traded 365 times in a year, showing the metric as this number can be easily interpreted and compared with other products that may have longer delivery periods.

This metric was only calculated for the GSH, as the STTMs and the DWGM are intraday and day ahead markets with mandatory participation and a limited set of tradeable products.

There were no trades in 2016 at the Moomba location. Further, no compression product has been traded at the Wallumbilla GSH since its introduction to the market in March 2017.

Table 3.13 below shows the number of trades that occurred in each year, at Wallumbilla by product category.

Table 3.13: Number of trades per product at Wallumbilla

TYPE OF PRODUCT	2016	2017	% CHANGE FROM 2016 TO 2017
Balance of Day	225	288	28%
Day Ahead	363	471	30%
Daily	186	767	312%
Weekly	21	97	362%
Monthly	3	14	367%

The number of trades at Wallumbilla has increased significantly from 2016 to 2017, especially in the longer term daily, weekly and monthly product categories.

There was one balance of day and one daily trade at the Moomba location in 2017.

3.7 Range of products traded

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

Feedback from the qualitative survey suggests that OTC traded products, i.e. products not traded on the GSH, may offer one or two years delivery into the future. While longer term bilateral contracts that go out as far as three to five years or longer are occasionally agreed upon, they are not typical to the gas market at this time, mainly due to prevailing gas prices.

3.8 Qualitative survey

The AEMC consulted with a total of 14 participants registered on the GSH, as well as two pipeline operators and four large industrial loads that are not currently registered on the GSH. Appendix B provides a list of stakeholders that participated in the survey.

As per the terms of reference and the AEMC's recommendation in the east coast gas review,[28] the purpose of this first biennial review was to primarily cover how trading is developing at the GSH.

During the survey, some information was provided in relation to other markets (including the OTC-markets) as well, as stakeholders very often participate in various markets.

This section below provides an anonymised summary of the feedback provided during those consultations and an overview of the three public submissions received in response to the scoping paper. The three public submissions that were made to the draft report have either been summarised and addressed through previous subsections of this chapter or in Appendix A of the Final report.

3.8.1 Trades conducted through the facilitated markets versus bilateral and OTC trades

Formal submissions to the scoping paper

AGL in its submission to the scoping paper contended that bilateral trades are typically traded under a master agreement that has already been negotiated between two parties, and they allow for a range of flexible options, that the GSH does not offer. It was therefore of the view, that exchange-based trading is not necessarily easier to execute quickly relative to bilateral trades.[29]

The Commission acknowledges that in some cases the ease of execution for bilateral trades may be equal, or even greater than for exchange based trading. However, a range of conditions would need to be met for this to eventuate. This includes, but is not limited to the counterparties having an already negotiated master agreement, and internal approval procedures and sufficient credit limits being in place.

The Commission understands that the exchange agreement is a standardised document, while negotiating master agreements can be a difficult, lengthy and costly process for some companies. During the qualitative survey process, a GSH market participant suggested that because of the transparent operation and calculable risk levels of trading on the GSH, the internal approval procedures in place made it easier to conduct trades on the exchange than trading under a master agreement. In addition, stakeholders noted that achieving a sufficient credit limit with counterparties can also be challenging for certain companies, especially for new entrants and for firms that have a credit rating below investment grade.

Origin Energy in its submission to the scoping paper noted that caution must be exercised in comparing outcomes to more mature European markets and the generally higher level of

28 See recommendation 12, in AEMC, *East Coast Wholesale Gas Markets and Pipeline Frameworks Review,* Stage 2 Final Report, 23 May 2016, p. 42

29 AGL submission to the Scoping paper, 13 March 2018, p. 1

existing bilateral contracting that preceded the introduction of hub-based trading. Origin was also of the view that a broader assessment of wholesale market conditions would appropriately acknowledge the role of bilateral contracting, which it says is necessary before any additional market reforms (outside of those set out in the east coast gas review and the Victorian DWGM Review) are contemplated.[30]

The Commission agrees with this statement and continues to hold the view that the purpose of this first review, as per the terms of reference, did not include recommendations for additional market reforms. Further, the Commission acknowledges the role of bilateral trades in the market, but is limited in determining the extent of that role, as bilateral contracts are generally commercial-in-confidence. Therefore, at this time, the Commission must rely on information that is voluntarily provided by survey participants.

The Commission considered that a qualitative assessment based on the approximate percentage values provided via the surveys is better suited to provide the information required in the terms of reference. The Commission notes that the terms of reference only required the AEMC to calculate the metric "to the extent this information is publicly available". Because one of the underlying data sets (the volume of bilateral trades) is not publicly available, publishing a quantitative metric would not have been possible.

Survey

Out of the 14 registered participants that took part in the survey, seven provided an estimate for the proportion of trading that is typical to their operation on the organised markets including the GSH, the STTMs and DWGM, versus their trading OTC or bilaterally. To be able to focus on recent trends, participants were asked to exclude their long term "legacy" gas contracts from their OTC volumes, while providing an estimate for the metric.

Answers varied greatly between trading only on the organised markets with no bilateral trading, and trading up to 95 per cent of volumes bilaterally and leaving only 5 per cent to the hubs.

The factors contributing to this wide range of percentages included:

- **Differences in the operation of the businesses**: different businesses have different needs for exchange based trading in their operation. Trader companies without considerable physical portfolios are likely to have different OTC to GSH trading ratios in their books than those looking to cover the "overs and unders" associated with short term fluctuations in the gas consumption or gas production of their assets.
- **Seasonal effects on businesses' portfolios:** retailers' loads may follow a relatively predictable seasonal pattern throughout the year that can be covered by both OTC or on the exchange.
- **Other external factors such as events in the National Electricity Market (NEM):** gas fired power generation is likely to require greater volumes of gas on short notice

30 Origin submission to the Scoping paper, 14 March 2018, p. 1

when electricity demand is highest and/or when interconnectors or other generators trip and additional supply is needed in the NEM.

One participant indicated that while it conducts a greater number of trades on the GSH compared to trading OTC, the majority of its traded volume is still traded OTC. This indicates that participants may trade frequently on the GSH but that the volumes of gas that they are trading are small.

A clear trend could not be established with regards to which participant categories were more engaged in hub trading. However, gas fired power generators, traders with no significant physical portfolio, some retailers and some industrials tended to have a higher proportion of their volumes[31] go through the GSH than others.

3.8.2 Confidence and market liquidity

The majority of stakeholders indicated that they have confidence in the market and expected that confidence will increase over time together with liquidity. However, in their view, this confidence and increased liquidity only applied to shorter term products, tradeable at Wallumbilla and not to Moomba locations or longer term, weekly and monthly products.

Price signals

The importance of signals coming from prices seen at the GSH is an indicator of confidence in the market. This is because if registered participants trust those signals, they are more likely to take those signals into account while making various business decisions.

Surveyed participants agreed that the trustworthiness of price signals for making investment decisions or hedging is not sufficient. Stakeholders were generally of the view that the longer the term of the decision, the less likely that the GSH price would be used as an index given the short-term nature of the products traded on the GSH. Some stakeholders indicated that reference to hub prices would be used in trading in some cases, but the majority of views highlighted the importance of prices on the GSH for short term portfolio optimisation purposes.

Number of participants and their involvement in the market

A number of participants surveyed by the AEMC were of the view that further increase in liquidity and confidence would be dependent on the registration of new participants, including industrial users, and their greater involvement in the market including the GSH. This could mean for example that for an industrial user, the baseload equivalent of its long term demand would be covered by a bilateral contract, but daily variations of surpluses or shortages would be sold or purchased on a facilitated market. Some expressed views that the diversity of new participants was also an important factor and the greater involvement of banks, financial intermediaries and brokers usually indicates that a market is entering a more mature phase. Generally, the view that the number and type of participants will continue to expand going forward was shared by a large number of participants, in relation to all gas markets.

31 This includes off-screen trades that are previously negotiated bilaterally to be only settled through the GSH, and on-screen trades that are traded anonymously.

Others, however, pointed out that if a market participant's portfolio mainly consists of a flat load that can be covered accurately by a baseload OTC contract, any fluctuation in its daily volumes could provide only marginal additions to traded volumes on the GSH. In such cases the only time it may make economic sense for the business to participate on the hub was in the case of a force majeure, but those exceptional cases alone do not warrant registration on the GSH.

Another stakeholder added that many industrial users are fully contracted until the 2030s. Given this, significant changes in liquidity should not be expected in the next two years from these users.

The role of additional supply

Stakeholders pointed to the importance of the availability of more supply. Such additional supply could potentially enter the market if:

- LNG producers offered greater volumes to the domestic market
- moratoria on gas exploration were lifted
- the new APLNG pipeline, the new Northern Gas Pipeline connecting the Northern Territory and Queensland, and the proposed import LNG terminals was built
- the possibility of government intervention in case of a domestic gas shortage remained credible.

Almost all survey participants recognised that LNG producers are the largest suppliers of gas into the GSH. One stakeholder noted that maintaining the competitive tension that is building up between two of the exporters would likely lead to the appearance of more trades on the hub.

Some participants suggested that there are numerous factors that influence the trading practices of LNG producers and these serve as an incentive to trade bilaterally, rather than through the GSH. One such factor is the existing physical interconnection between LNG facilities allowing them to trade quickly and easily among themselves. The second being the fact that sudden surpluses or shortages in their operations constitute volumes that are orders of magnitude greater than what the GSH could currently absorb.

Additional sources of supply may also appear if conventional and unconventional gas fields could be developed. Gas originating from these new fields could either partially be directly traded on the GSH or free up supply elsewhere and increase volumes on the GSH as part of location swaps. New pipelines were also mentioned to provide access to supply and, therefore, contribute positively to increased liquidity.

One survey participant raised the importance of the proposed LNG import terminals. In its view, Australian gas prices are only linked to global gas prices in a one-sided way, via LNG export terminals. LNG import terminals would complete this international linkage, as they would allow for a better integration of global gas prices into the pricing of both domestic sales and purchases of gas. This participant suggested that better integration into the global gas market would contribute to the possibility of building out a longer term future curve and, therefore, having more certainty about the long term price of gas. Having such certainty

would have a range of positive effects on the Australian market, including, but not limited to an increase in confidence to trade gas and also the willingness of market participants to underwrite investment in new pipeline capacity.

Some survey participants were concerned that while government intervention may increase liquidity in the short term, in the long term it may reflect that there are issues in the market. In particular, a lack of confidence that participants can get the gas they need to where they need it at a reasonable price. It was further expressed, that intervention is likely to damage investment certainty in the market and may lead to decreasing liquidity in the long term. This observation was also made in relation to policy uncertainty in a general sense.

The Commission considers that given the importance of physical supply that was expressed by the majority of survey participants, there could be merit in including more detailed and sophisticated metrics about the role of gas producers in the next biennial review.

Other matters

A number of participants suggested that the implementation of pipeline capacity reforms, especially the day ahead capacity auctions that are expected to start from March 2019, may have an effect on liquidity on the GSH. Feedback on the interrelationship of transportation and liquidity is further elaborated in section 3.8.3.

Other factors that may potentially impact liquidity on the GSH were also mentioned by some stakeholders, however, some of these are at odds with one another. These included:

- rapidly decreasing costs associated with new gas field development
- increasing oil prices
- the appearance of more standardised contracts
- the inclusion of new, longer term products and new delivery points, including, but not limited to the Culcairn notional point
- limiting the number of products available to trade to further concentrate liquidity
- the development of derivative, longer term forward financial markets that would support physical trading
- the implementation of G20 reforms that would lead to increased collateral requirements in OTC trading for companies below investment grade
- the publication of LNG netback price index
- the expiry of long term legacy contracts.

3.8.3 Impediments to trading on the GSH

Transportation

The majority of stakeholders were of the view that transportation, and operational issues linked to transportation were barriers to trade on the GSH. This view was especially expressed in relation to Moomba, where the lack of trading since June 2016 was explained as a result of the uncertainty about where the injection and delivery points would be and how gas could be transported, should a market participant successfully conduct a trade there.

More generally, the costs and availability of firm capacity was raised as an impediment, because the market framework of the GSH requires the physical haulage of gas. That is to say, all gas to be traded on the GSH has to be shipped to one of the GSH locations.

Almost all participants had the expectation that the day-ahead capacity auction being implemented from March 2019 is likely to contribute toward overcoming this barrier to trade. This is because capacity from the auctions will allow for physically moving the gas after a successful trade on the GSH. However, some participants expressed their concerns about the priority of acquired auction rights as the firmness of the capacity won by successful auction participants may be jeopardised by upward renominations made by long term capacity holders. They were of the view that if the firmness of capacity won on the day-ahead auction is not guaranteed, participants may be reluctant to make trading decisions on the GSH on the back of that capacity.

Costs

Many participants were of the view that costs on the GSH were impeding trade, especially if greater volumes were to be settled through the hub. These costs included fixed yearly membership and license fees and variable transaction fees that were associated with the volume that was cleared through the exchange. The magnitude of upfront prudential requirements and the $100,000 cap on accepting cash as collateral were also said to cause problems for smaller market players. In addition, bigger and/or investment grade companies that have master agreements and credit limits in place with other market players can trade OTC freely, without having to provide collateral. It was, however, recognised, that for relatively new companies that do not have sufficient credit limits with their counterparties, OTC trading can be as big of a challenge as the prudential requirements associated with trading on the GSH.

Flexibility and availability

A number of participants suggested that the flexibility to be able to agree on a selection of various delivery points including other pipelines, storage and supply fields was missing from the GSH, but could be achieved in a bilateral trade. In general, stakeholders were of the view that the possibility to cater for bespoke needs including, but not limited to, optionality of delivery, force majeure clauses and the customisable length of tenors (especially longer term ones), was not present on the GSH. Two stakeholders, however, stressed the importance of keeping exchange traded products as simple as possible. They were of the view that the sole purpose of the hub is to provide trading opportunities for trading simple, basic products. If that goal is achieved, OTC trading can "wrap around" those products and fill in the gaps that are created by bespoke, individual needs.

Some participants also thought that the necessary volume of bids and offers were not present at the GSH at times when they were most needed by the market (i.e. in tight supply conditions), which directed trade to the OTC market.

3.8.4 Optional hub services

All stakeholders shared the view that the introduction of optional hub services (compression products at Wallumbilla) had no effect on liquidity, or it was too early to assess such an effect. Some stakeholders noted that some products on the GSH (including the compression and spread products) "got ahead of the market", are too complex and are of limited use at this time. This limited use stemmed from the notion that it is difficult to manage compression separately from haulage. Others were of the view, that the capacity reforms may assist in utilising the trade of compression products and the need for these products might change in the future.

Most stakeholders were satisfied with the reduction of delivery points from three to two at Wallumbilla, but did not attribute any significant change in liquidity to it.

3.8.5 General comments

The majority of survey participants agreed with the proposed metrics and the high level methodology that was put forward by the AEMC in the scoping paper.

Almost all stakeholders agreed that the number and the magnitude of regulatory changes that affect the design of energy markets have been a challenge as of late. They expressed their concerns about not being able to fully participate in industry consultations. It was suggested that sufficient time should be given to observe how the reforms are implemented, as there is a learning curve for businesses that make decisions around how to operate in new regulatory environments.

A number of participants made general comments about the market framework of the GSH and suggested changes to its operation that, in their view, would lead to greater liquidity in the future.

Some stakeholders suggested that the removal of the $100,000 cash collateral limit would be beneficial to the market, as the type of bank guarantees that are required by AEMO are difficult to negotiate with banks. Those stakeholders also argued that prudential requirements could be further decreased, if pre-payment or daily settlement was allowed.

A couple of participants were of the view that liquidity would be boosted on both Moomba and Wallumbilla locations, if there was a switch from a voluntary to a mandatory market design. Others added that under some conditions, producers could be obliged to provide market making functions and offer additional volumes to the market.

A number of stakeholders suggested that longer trading hours would allow market participants to trade more on the hub. For example unplanned outages of equipment that are happening outside of trading hours could be fully or partially traded on the GSH, instead of resorting to bilateral arrangements. However the costs of longer trading hours would need to be considered alongside any potential benefits.

3.9 Conclusion

The Commission has found that almost all quantitative indicators of liquidity on the Wallumbilla GSH have positively changed over the past two years.

Table 3.14 provides an overview of those changes.

Table 3.14: Trends of liquidity metrics at the Wallumbilla GSH

METRIC	TREND FROM 2016 TO 2017
Traded volumes	significant increase
Churn rate	increase
Bid-offer spreads	N/A[a]
Number of active participants	increase
Concentration of trade (buy side)	small increase
Concentration of trade (sell side)	decrease
Number of trades per product	significant increase

Note: a: Due to the change in tradeable products at the Wallumbilla GSH in March 2017, no yearly trend could be established from 2016 to 2017 in relation to the bid-offer spread metric.

There was significant growth in both the total yearly volumes traded on the Wallumbilla location and the number of trades in shorter term products. Longer term products were traded less and their range only stretches out to a maximum of three months into the future. The churn rate for Wallumbilla saw a gradual increase together with a greater number of active participants throughout the period that approached a yearly average of 12 in 2017. There has been a graduate decrease in the bid-offer spread on the products traded at the Wallumbilla location from the second calendar quarter to the fourth calendar quarter of the 2017 calendar year. Market concentration of the Wallumbilla location slightly increased on the sell side, but dropped significantly on the buy side. The trend in HHI values indicate a positive change, despite the relatively low number of active participants in absolute terms.

Baseline numbers for the STTMs and the DWGM varied greatly and were not as conclusive as those for the Wallumbilla GSH.

The majority of stakeholders that participated in the AEMC's qualitative survey expressed their confidence in the GSH at Wallumbilla and were expecting liquidity to grow further in the next two years.

The Commission is of the view that both the qualitative and quantitative metrics that were used in the review indicate that the Wallumbilla location of the GSH is a developing market, where liquidity is expected to grow further in the future. It is recognised that some aspects of liquidity at this early stage of the market are more informative than others. For example, churn rates may take longer to develop to meaningful levels, while traded volumes or the number of trades per product already provide useful information that is easy to interpret.

Because the Moomba location of the GSH has only been in operation since June 2016, the Commission sees less value in its associated metrics. The Commission believes that at the time of concluding this first review, it is too early to assess the operation of that hub and more time should be given for any of the related liquidity metrics to develop.

The Commission considers that in subsequent reviews, a more developed market with more historical trends available, will provide an opportunity for more detailed analysis.

4 ABBREVIATIONS

ACCC	Australian Competition and Consumer Commission
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
Commission	See AEMC
COAG	Council of Australian Governments
DWGM	Victorian declared wholesale gas market
DTS	Victorian Declared Transmission System
GBB	Gas Bulletin Board
GMRG	Gas Market Reform Group
GSH	gas supply hub
HHI	Herfindahl-Hirschman Index
LNG	liquefied natural gas
MAP	Moomba to Adelaide Pipeline
MCE	Ministerial Council on Energy
MSP	Moomba to Sydney Pipeline
NEM	National Electricity Market
NGL	National Gas Law
NGR	National Gas Rules
NGO	National Gas Objective
OTC	over-the-counter
RBP	Roma Brisbane Pipeline
SEA Gas Pipeline	South East Australia Gas pipeline
SEQ	South East Queensland
SWQP	South West Queensland Pipeline
STTM	short term trading market
TJ	terajoules

A SUMMARY OF OTHER ISSUES RAISED IN SUBMISSIONS

This appendix sets out the issues raised in the second round of consultation on this review process and the AEMC's response to each issue. If an issue raised in a submission has been discussed in the main body of this document, it has not been included in this table.

Table A.1: **Summary of other issues raised in submissions**

STAKEHOLDER	ISSUE	AEMC RESPONSE
AEMO	In its submission to the draft report, AEMO suggested a range of additional metrics to measure liquidity on the STTMs and the DWGM (pp. 1-2)	The Commission notes that the terms of reference provided by the COAG Energy Council for this first review focused primarily on: • the Wallumbilla and Moomba GSH • monitoring the effects of the reforms that are already implemented. The Commission is of the view that the inclusion of more detailed STTM and DWGM metrics will be more appropriate in the next biennial review, when one or more of the DWGM or STTM related reforms may already be in place.
AEMO	In its submission to the draft report, AEMO suggested a range of pipeline capacity trading metrics to be included in the next biennial review. (p. 2)	The Commission agrees that once the pipeline capacity trading reforms are implemented, the metrics that will monitor liquidity in those markets should be developed or adjusted, as required.
AGIG	In its submission to the draft report, AGIG suggested that the positive effects of market maker obligations currently implemented in the United Kingdom would be worth considering in the Australian context and has the potential to significantly improve the operation and competitiveness of domestic industry. (pp. 1-2)	The Commission is of the view that considering the introduction of market maker obligations to the Australian gas markets would be out of the scope of this review at this time.

STAKEHOLDER	ISSUE	AEMC RESPONSE
MEA Group	In its submission to the draft report, MEA Group formed a view that the pipeline capacity trading reforms being developed by the GMRG have the potential to work against the efficient operation and use of the national gas system and may not be aligned to the National Gas Objective. It added that these reforms may increase costs for industry and deliver a mechanism that only increases risk for anyone wishing to utilise the traded capacity due to the nature of how these reforms interact with current state gas markets. (p. 1)	It is expected that the Commission will be able to evaluate the impacts of the capacity trading reforms on the east coast gas market in subsequent reviews.
MEA Group	In its submission to the draft report, MEA Group expressed its support for the AMDQ capacity trading reforms (p. 1)	The Commission notes that the implementation of the reforms of the DWGM will be considered via rule change requests that are currently being developed by the Victorian government.

B LIST OF COMPANIES THAT PARTICIPATED IN THE SURVEY

Table B.1: List of survey participants

NAME OF STAKEHOLDER	TYPE OF STAKEHOLDER
APA Group	pipeline operator
AGL Energy	gentailer
Alinta Energy	gentailer
Arrow Energy	gas producer and power generator
Australia Pacific LNG	LNG producer and exporter
EnergyAustralia	gentailer
ERM Power	gentailer
Incitec Pivot	industrial user
Jemena	pipeline operator
Macquarie Bank	trader
Orica	industrial user
Origin	gentailer
Orora	industrial user
Qenos	industrial user
Royal Dutch Shell	LNG producer and exporter
Santos	LNG producer and exporter
SA Water	industrial user
Stanwell	gentailer
Strategic Gas Market Trading	trader
Visy	industrial user